



14 February 2018

Dear Sir / Madam,

**Tender Reference No. (340) in P/AE/PUR/AGC**  
**Invitation to Tender for the Renovation Works of Safety Experience Training**  
**Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council**

You are invited to submit a tender for the Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council as specified in the tender documents.

1. Your tender proposal, **in copies specified in the tender**, should be submitted in two separate sealed envelopes.
2. The tenderer shall deposit two separate sealed envelopes with labels as specified below into the tender box located at **CIC Headquarters - 38/F, COS Centre, 56 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong** **not later than 12:00 noon on 14 March 2018.** Late tenders will NOT be considered.
  - a) Label with "Technical Proposal for Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council"
  - b) Label with "Fee Proposal for Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council"

Please note that the envelope labelled with "Technical Proposal" shall **NOT** include any pricing details. Failure to do so will render the tender null and void. Tenders submitted after the above time or tenders deposited at places other than that stated above will **NOT** be considered.

3. The tenderer shall provide the completed 'Application Form for Inclusion in the CIC Vendor List' as provided in the tender invitation, containing basic information of the interested tenderer (For Non-CIC Registered Vendor only).

4. In the event of Typhoon Signal No. 8 or above, or Black Rainstorm Warning is hoisted on the tender closing date, the closing time will be postponed to 12:00 noon of the next working day.
5. Construction Industry Council is not bound to accept any proposal it may receive. In addition, it will reject bids which are considered to have been priced unreasonably low.
6. It should be noted that the Council will not be responsible for the reimbursement of any cost incurred by you for the preparation of the submission.
7. The invited tenderer who has decided to decline the bid shall return the Reply Slip for Declining Bid provided in Appendix F of the Conditions of Tender.
8. There will be a briefing session and site visit session **at 10:00 am on 23 February 2018**, Kwai Chung Campus (KCC), 7-11 Kwai Hop Street, Kwai Chung, New Territories, Hong Kong. Interested tenderers shall complete and return the reply slip in **Appendix G** by fax 2100 9439 or e-mail: [kelvinlee@cic.hk](mailto:kelvinlee@cic.hk) no later than 12:00 noon on 21 March 2018 confirming the attendance of the said tender briefing and site visit session and state clearly the number of attendees for CIC's arrangement.
9. The tender documents can be downloaded from CIC's website: <http://www.cic.hk>.
10. For queries regarding this tender invitation or/and tender process, please contact Mr. Kelvin LEE, Senior Officer – Management Support, on telephone 2100 9425 or via e-mail: [kelvinlee@cic.hk](mailto:kelvinlee@cic.hk).

Yours sincerely,



Justin WONG  
Manager – Projects & Contracts Administration

Encl.



## **Checklist for Submission of Tender**

Please go through the following checklist to ensure that all necessary information and documents for the tender have been provided in your tender submission. Please note that the checklist is for guidance and reference purposes only and shall not be deemed to form part of the Tender Document. The address labels at the bottom of this checklist may be used on the envelopes for submitting the tender.

Tenderers should note that their tenders may be invalidated if the information in the tender submission is incorrect or the required documents are not provided together with the tender document.

Particulars	Reference
<b>Technical Proposal</b>	
1. Organisation of Proposed Project Team	Conditions of Tender, Appendix A Clause 1.1
2. Qualifications of Proposed Project Team	Conditions of Tender, Appendix A Clause 1.2
3. Tenderer's Track Record & Project Reference	Conditions of Tender, Appendix A Clause 2.1, 2.2 and 2.3
4. Approach and work programme to (i) fulfill the technical requirements and (ii) deliver all deliverables outlined in the Assignment Brief and its Annexes <b>[Mandatory Requirement]</b>	Conditions of Tender, Appendix A Clause 3.1
5. A duly completed Standard Letter for complying with Anti-Collusion Clause	Conditions of Tender, Appendix B
6. A duly signed CIC's General Conditions of Contract and Guidelines for Works or Services (2b)-CAR	CIC's General Conditions of Contract and Guidelines for Works or Services (2b)-CAR
7. All documents mentioned in the Technical Assessment Marking Scheme	Conditions of Tender, Appendix E
8. A duly completed Schedule of Equipment and Delivery for MVAC, Electrical and Fire Services Installation <b>[Mandatory Requirement]</b>	Assignment Brief, Annexes 9, 10 and 11
9. -Statements of Convictions under Cap. 115, Cap. 59 and Cap. 57; -Outline Health & Safety Plan; and -Certificate of General Building Contractor Registration	Special Conditions of Tender
<b>Fee Proposal</b>	
10. Form of Tender	Conditions of Tender, Appendix C
11. Fee Proposal	Conditions of Tender, Appendix D

**Note:** Items marked as 'Mandatory Requirements' are particulars that **MUST** be submitted under the Technical Proposal. Non-compliance with the Mandatory Requirements may lead to the tender submission being not considered for tender evaluation.

## Construction Industry Council

### Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council

Please adhere the following labels on separate sealed envelope of your submitted tender.

**"Confidential"**

**Technical Proposal**

Construction Industry Council (CIC)  
The Tender Box  
38/F, COS Centre,  
56 Tsun Yip Street,  
Kwun Tong, Kowloon, Hong Kong

Ref. No.: [(340) in P/AE/PUR/AGC]  
Renovation Works of Safety Experience Training Centre (SETC) at  
Kwai Chung Campus (KCC) of the Construction Industry Council

Name of Tenderer: \_\_\_\_\_

Closing Time and Date: 12:00 noon on 14 March 2018



**"Confidential"**

**Fee Proposal**

Construction Industry Council (CIC)  
The Tender Box  
38/F, COS Centre,  
56 Tsun Yip Street,  
Kwun Tong, Kowloon, Hong Kong

Ref. No.: [(340) in P/AE/PUR/AGC]  
Renovation Works of Safety Experience Training Centre (SETC) at  
Kwai Chung Campus (KCC) of the Construction Industry Council

Name of Tenderer: \_\_\_\_\_

Closing Time and Date: 12:00 noon on 14 March 2018

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

This form should be completed in FULL BLOCK LETTERS  
and returned to :

請詳細填寫本申請書並交回：

Procurement Department  
Construction Industry Council  
38/F, COS Centre, 56 Tsun Yip Street  
Kwun Tong, Kowloon, Hong Kong

香港九龍觀塘駿業街56號  
中海日升中心38樓  
建造業議會  
採購部

Tel. No.: 2100 9000  
Fax. No.: 2100 9439  
E-mail: vendor@cic.hk

電話號碼: 2100 9000  
圖文傳真號碼: 2100 9439  
電子郵件: vendor@cic.hk

Enquiries concerning the personal data collected by means of this form, including the making of access and corrections, should be addressed to the above Department.

如查詢此表格內的資料，包括查閱途徑及修訂資料，請與上述部門聯絡。

### PART I - DETAILS OF THE COMPANY 第一部 - 公司資料

(i) Company Name : \_\_\_\_\_  
(English) 【Company name should correspond with that registered under the Business Registration Ordinance (Cap 310)】

公司名稱 : \_\_\_\_\_  
(中文) 【公司名稱須與商業登記條例(第310章)內所登記的名稱相同】

(ii) Company Address : \_\_\_\_\_  
(English)

公司地址 : \_\_\_\_\_  
(中文)

(iii) E-mail 電子郵件 : \_\_\_\_\_ (iv) Website 網址 : \_\_\_\_\_

(v) Tel. No. 電話號碼 : \_\_\_\_\_ (vi) Fax. No. 圖文傳真號碼 : \_\_\_\_\_

In order to reduce paper consumption, all future CIC notifications will be dispatched by means of email, unless specifically requested in writing to the CIC otherwise.

為減少紙張用量，除非另作書面要求，所有議會通訊將以電郵傳遞。

### PART II - ORGANISATIONS AND STAFF 第二部 - 公司組織及職員資料

- (i) Company Type 公司類別：
- ☐ A body corporate registered under the Companies Ordinance (Cap 32) 根據《公司條例》(第32章)註冊的法人團體
- ☐ A partnership (unincorporated) 合夥(非屬法團)
- ☐ A sole proprietorship (unincorporated) 獨資(非屬法團)
- ☐ Others (Please specify) 其他(請註明) \_\_\_\_\_

(ii) Members of organisation 公司成員：

	English Name 英文姓名	Chinese Name 中文姓名
* Directors / Proprietors / Partners 董事 / 東主 / 合夥人	_____	_____
	_____	_____
	_____	_____

\* Delete where inappropriate 將不適用者刪去

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商 / 供應商登記申請書

(iii) Person(s) to contact on matters relating to tenders / contracts :

獲授權回答有關投標 / 合約等問題的負責人資料：

	Name(s) 姓名	Official Capacity 職位	Tel. No. 電話號碼	Mobile No. 流動電話號碼
(1)				
(2)				
(3)				

(iv) Please confirm whether your organisation is a registered subcontractor under the CIC's Subcontractor Registration Scheme (SRS).

請貴公司確認是否在分包商註冊制度 (SRS) 下的註冊分包商。

☐ Yes, SRS Number :  
是, 分包商註冊制度編號 :

☐ No  
不是

### PART III - BUSINESS TYPE 第三部 - 業務性質

(i) Services and Goods which your company can provide/supply 貴公司所供應的服務及貨品

Please select your business type and corresponding coverage area (s) 請選擇 貴公司所屬的業務性質及相應的覆蓋範圍

Please tick ☒ as appropriate 請在適當空格加上 ☒

Business Type 業務性質

☐ Type 1 - Supplier

類別一 - 供應商

Trade of Services 服務行業

☐ 1 Construction Materials  
(建築材料)

- ☐ 1.1 Accelerator (催乾劑)
- ☐ 1.2 Acrylic Paint (亞加力漆)
- ☐ 1.3 Air-conditioning & Ventilation Accessory (空調及通風配件)
- ☐ 1.4 Adhesive / Sealant (膠漿 / 封邊膠)
- ☐ 1.5 Aggregates (石仔)
- ☐ 1.6 Air-conditioning & Ventilation (空調及通風)
- ☐ 1.7 Aluminium Bar / Hollow (鋁條 / 通)
- ☐ 1.8 Aluminium Foamwork Accessory (鋁模板配件)
- ☐ 1.9 Aluminium Foamwork (鋁模板)
- ☐ 1.10 Aluminium Pipe (鋁管)
- ☐ 1.11 Aluminium Sheet (鋁板)
- ☐ 1.12 Anti-ant Paint (抗蟻油漆)
- ☐ 1.13 Asphalt (瀝青)
- ☐ 1.14 Bamboo & Accessory (竹料及配件)
- ☐ 1.15 Bar-bending & Fixing (鋼筋屈扎)
- ☐ 1.16 Bronze / Copper / Brass Pipe (青銅 / 銅 / 黃銅管)
- ☐ 1.17 Bearing (啤令)
- ☐ 1.18 Belt (坑帶)
- ☐ 1.19 Bitumen Compounds (瀝青混合物)
- ☐ 1.20 Boring Drill Accessory (岩土鑽探配件)
- ☐ 1.21 Bronze / Copper Bar (青銅 / 銅條)
- ☐ 1.22 Bronze / Copper Sheet (青銅 / 銅板)
- ☐ 1.23 Bronze / Copper Wire (青銅 / 銅線)
- ☐ 1.24 Brushing Lacquer (手掃漆)
- ☐ 1.25 Bucket (桶 / 泥斗)
- ☐ 1.26 Cable Accessory & Trunking (電線配件及線槽)
- ☐ 1.27 Cable (電線)
- ☐ 1.28 Canvas Goods (帆布及布帳製品)
- ☐ 1.29 Ceiling (天花)

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商 / 供應商登記申請書

- ☐ 1.30 Cement (水泥)
- ☐ 1.31 Cement Paint (雪花英泥)
- ☐ 1.32 Centre Punch (中心沖 / 賓子)
- ☐ 1.33 Clear Lacquer (透明漆)
- ☐ 1.34 Clay Sand (黃花沙)
- ☐ 1.35 Clear Varnish (透明清漆)
- ☐ 1.36 Concrete Blocks (混凝土磚)
- ☐ 1.37 Concrete (混凝土)
- ☐ 1.38 Concrete Pipe (混凝土管道)
- ☐ 1.39 Curtain Wall / External Cladding (幕牆/幕板)
- ☐ 1.40 Drill Bit & Cutter Bit (鑽咀及刀咀)
- ☐ 1.41 Door & Accessory (大門及配件)
- ☐ 1.42 Dry Wall (石膏板)
- ☐ 1.43 Electrode (電焊支)
- ☐ 1.44 Electrical Supplies (電器材料)
- ☐ 1.45 Emulsion Paint / Latex (乳膠漆)
- ☐ 1.46 Epoxy Coating (環氧塗料)
- ☐ 1.47 Epoxy (環氧樹脂漆)
- ☐ 1.48 Fencing / Mesh / Chain (圍欄 / 鐵絲網 / 鎖鏈)
- ☐ 1.49 Fibre Glass Products (玻璃纖維產品)
- ☐ 1.50 Filter (過濾器)
- ☐ 1.51 Fire Retardant Paint (防火漆)
- ☐ 1.52 Floor Board Coating (地台油)
- ☐ 1.53 Gaseous Fuels / Welding (氣體燃料 / 焊接)
- ☐ 1.54 Glazed Ceramic Wall Tiles (牆壁瓷磚)
- ☐ 1.55 Gloss Latex Paint (悅亮漆)
- ☐ 1.56 Gloves (手套)
- ☐ 1.57 Gold (金)
- ☐ 1.58 Granite (麻石)
- ☐ 1.59 Grinding / Polish (研磨 / 拋光)
- ☐ 1.60 Hammertone Paint (鎚紋漆)
- ☐ 1.61 Heat Insulating Materials (隔熱物料)
- ☐ 1.62 Hot-dip Galvanizer (熱浸鍍鋅)
- ☐ 1.63 Hose and Fittings (膠喉及配件)
- ☐ 1.64 Homogeneous Floor Tiles (過底地磚)
- ☐ 1.65 Hydrated Lime (熟石灰)
- ☐ 1.66 Insulation Materials (絕緣體)
- ☐ 1.67 Iron Work (訂製鐵器)
- ☐ 1.68 Jointing (接口)
- ☐ 1.69 Laminated Plywood (夾板)
- ☐ 1.70 Luminous Paint (螢光漆)
- ☐ 1.71 Marble & Accessory (雲石及配件)
- ☐ 1.72 Metal / Plastic Container (金屬 / 塑膠容器)
- ☐ 1.73 Metal Etching (金屬蝕刻)
- ☐ 1.74 Mosaic Tiles (紙皮石)
- ☐ 1.75 Multi-Colour Paint (多彩漆)
- ☐ 1.76 Nail / Staple & Accessory (釘及配件)
- ☐ 1.77 Non-slip Treatment (防滑處理)

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商 / 供應商登記申請書

- ☐ 1.78 Nylon (尼龍)
- ☐ 1.79 Pipe Fittings (管道配件)
- ☐ 1.80 Pipe (喉管)
- ☐ 1.81 Pigment / Staining (色粉)
- ☐ 1.82 Plastering (抹灰)
- ☐ 1.83 Plastic Sheet / Board (膠片 / 膠板)
- ☐ 1.84 Plastic / Wood Flooring (膠 / 木地板)
- ☐ 1.85 Polyurethane Paint (聚脂漆)
- ☐ 1.86 Polishing / Sharpening (拋光 / 磨石)
- ☐ 1.87 Primer / Sealer (封底漆)
- ☐ 1.88 Rain Gear (雨具)
- ☐ 1.89 Red Bricks (紅磚)
- ☐ 1.90 River Sand (淡水沙)
- ☐ 1.91 Road Marking Paint (馬路劃線漆)
- ☐ 1.92 Sanitary (潔具)
- ☐ 1.93 Sanding Paper / Cloth (砂紙 / 布)
- ☐ 1.94 Saw Blade / Wheel & Accessory (鋸片 / 碟及配件)
- ☐ 1.95 Screw & Accessory (螺絲及配件)
- ☐ 1.96 Scantling & Planking (什木枋板)
- ☐ 1.97 Silk Screen (絲網)
- ☐ 1.98 Stone Like Coating Paint (石頭漆)
- ☐ 1.99 Solvent (溶劑)
- ☐ 1.100 Spraying Paint (噴漆)
- ☐ 1.101 Steel / Iron Bar (鋼 / 鐵條)
- ☐ 1.102 Steel / Iron Gate (鋼 / 鐵門)
- ☐ 1.103 Steel / Iron Pipe (鋼 / 鐵管)
- ☐ 1.104 Steel / Iron Sheet (鋼 / 鐵片)
- ☐ 1.105 Steel / Iron Wire (鋼 / 鐵線)
- ☐ 1.106 Stone (開山大石)
- ☐ 1.107 Stopping (填補料)
- ☐ 1.108 Steel Reinforcement (鋼筋)
- ☐ 1.109 Stainless Steel Bar (不銹鋼條)
- ☐ 1.110 Stainless Steel Pipe (不銹鋼管)
- ☐ 1.111 Stainless Steel Sheet (不銹鋼片)
- ☐ 1.112 Stainless Steel Wire (不銹鋼線)
- ☐ 1.113 Steel Wire Rope / Nylon Webbing Sling (鋼絲繩 / 尼龍帆布帶)
- ☐ 1.114 Surveying Supplies (測量材料)
- ☐ 1.115 Switch (掣)
- ☐ 1.116 Synthetic Paint (合成油漆)
- ☐ 1.117 Textured Latex (砂膠漆)
- ☐ 1.118 Undercoat Pattern (底漆)
- ☐ 1.119 Valve (閥門)
- ☐ 1.120 Washable Distemper (可洗膠灰水)
- ☐ 1.121 Wall Paper (牆紙)
- ☐ 1.122 Water Proofing Material (防水物料)
- ☐ 1.123 Water-boiled Proved Laminated Plywood (防水夾板)
- ☐ 1.124 Weldmesh (馬路網)
- ☐ 1.125 Window & Accessory (窗戶及配件)



## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

- |                            |       |                                                                       |
|----------------------------|-------|-----------------------------------------------------------------------|
| <input type="checkbox"/>   | 1.126 | Wire Rope (鋼纜)                                                        |
| <input type="checkbox"/>   | 1.127 | Wood Stripe (木線)                                                      |
| <input type="checkbox"/> 2 | 2.1   | Brush & Accessory (刷及配件)                                              |
|                            | 2.2   | Chisel (鑿)                                                            |
|                            | 2.3   | Crowbar (鐵筆)                                                          |
|                            | 2.4   | Drawing Instrument (繪圖工具)                                             |
|                            | 2.5   | Electric Drill / Hammer Drill & Accessory (電鑽及配件)                     |
|                            | 2.6   | Edge Rule (壓尺)                                                        |
|                            | 2.7   | File (銼)                                                              |
|                            | 2.8   | Hammer (鎚仔)                                                           |
|                            | 2.9   | Masonry Tools (泥水工具)                                                  |
|                            | 2.10  | Meter / Tester (測試儀錶)                                                 |
|                            | 2.11  | Portable Electrical Tools & Accessory (手提式電動工具及配件)                    |
|                            | 2.12  | Pipe Bender & Expander (喉管屈曲器及掙大器)                                    |
|                            | 2.13  | Pick (泥耙)                                                             |
|                            | 2.14  | Pipe Cutter (喉管剪鉗)                                                    |
|                            | 2.15  | Pipe Dies and Head (牙模及扳頭)                                            |
|                            | 2.16  | Plane (刨)                                                             |
|                            | 2.17  | Plier / Pincer / Nipper (鉗子)                                          |
|                            | 2.18  | Saw (鋸)                                                               |
|                            | 2.19  | Screwdriver (螺絲批)                                                     |
|                            | 2.20  | Spanner / Wrench (扳手)                                                 |
|                            | 2.21  | Scraper / Shovel / Pottery Tool (刮 / 鏟 / 泥刮)                          |
|                            | 2.22  | Steel Snip/ Cutter (剪鉗)                                               |
|                            | 2.23  | Surveying Level (測量平水儀)                                               |
|                            | 2.24  | Surveying Scale (測量磅)                                                 |
|                            | 2.25  | Trowel (抹子 / 批匙)                                                      |
|                            | 2.26  | Vise (虎鉗 / 夾)                                                         |
|                            | 2.27  | Welding Tools (焊接工具)                                                  |
| <input type="checkbox"/> 3 | 3.1   | Anti-Surge Protection (防電保護)                                          |
|                            | 3.2   | Confined Space Equipment (密閉空間設備)                                     |
|                            | 3.3   | Eye Protection (眼部保護)                                                 |
|                            | 3.4   | Fall Protection (高空防墮保護)                                              |
|                            | 3.5   | First Aid Supplies (急救用品)                                             |
|                            | 3.6   | Fire Extinguisher & Equipment (滅火筒及設備)                                |
|                            | 3.7   | Foot Protection (腳部保護)                                                |
|                            | 3.8   | Gas & Radiation Detector (氣體及輻射探測器)                                   |
|                            | 3.9   | Hand Protection (手部保護)                                                |
|                            | 3.10  | Hearing Protection (聽覺保護)                                             |
|                            | 3.11  | Head Protection (頭部保護)                                                |
|                            | 3.12  | Noise Assessment Tools (噪音評估工具)                                       |
|                            | 3.13  | Respiratory Protection (呼吸保護)                                         |
|                            | 3.14  | Road Safety Equipment & Reflective Vest (交通安全用品及反光衣)                  |
|                            | 3.15  | Safety Net & Tool Box (安全網及工具箱)                                       |
|                            | 3.16  | Safety Sign / Label (安全標貼/告示牌)                                        |
|                            | 3.17  | Self-Contained Breathing Apparatus & Air Compressor<br>(自供式呼吸器及空氣壓縮機) |
|                            | 3.18  | Welding Protection (燒焊保護)                                             |

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商 / 供應商登記申請書

- |                            |                                                        |                               |                                                                                 |
|----------------------------|--------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------|
| <input type="checkbox"/> 4 | Petroleum & Fuel Products<br>(石油及燃油產品)                 | <input type="checkbox"/> 4.1  | Anti-Rust Spray (防銹噴霧)                                                          |
|                            |                                                        | <input type="checkbox"/> 4.2  | Brake Fluid (剎掣油)                                                               |
|                            |                                                        | <input type="checkbox"/> 4.3  | Cutting Oil (切割油)                                                               |
|                            |                                                        | <input type="checkbox"/> 4.4  | Hydraulic Oil (液壓油)                                                             |
|                            |                                                        | <input type="checkbox"/> 4.5  | Industrial Diesel Oil (工業柴油)                                                    |
|                            |                                                        | <input type="checkbox"/> 4.6  | Lubricant Oil / Grease Oil (潤滑油 / 潤滑脂油)                                         |
|                            |                                                        | <input type="checkbox"/> 4.7  | Transmission Oil (傳動油)                                                          |
|                            |                                                        | <input type="checkbox"/> 4.8  | Ultra Low Sulphur Diesel Oil - Ex-petroleum Filling Stations<br>(超低含硫柴油 - 油站加油) |
|                            |                                                        | <input type="checkbox"/> 4.9  | Unleaded Petrol - Ex-petroleum Filling Stations (無鉛汽油 - 油站加油)                   |
| <input type="checkbox"/> 5 | Construction Equipment & Machinery<br>(建築設備及機械)        | <input type="checkbox"/> 5.1  | Aluminium / Galvanized Iron Working Platform (高空工作台)                            |
|                            |                                                        | <input type="checkbox"/> 5.2  | Air Compressor & Blower (風機)                                                    |
|                            |                                                        | <input type="checkbox"/> 5.3  | Bolt & Pipe Threading Machine / Groove Machine (電動管紋機 / 壓坑機)                    |
|                            |                                                        | <input type="checkbox"/> 5.4  | Builder's Lift (建築工地升降機 - 工人籠)                                                  |
|                            |                                                        | <input type="checkbox"/> 5.5  | Cable Dectector (地下電纜探測器)                                                       |
|                            |                                                        | <input type="checkbox"/> 5.6  | Concrete Mixers (混凝土攪拌機)                                                        |
|                            |                                                        | <input type="checkbox"/> 5.7  | Concrete Vibrator (混凝土震機)                                                       |
|                            |                                                        | <input type="checkbox"/> 5.8  | Crawler Crane (履帶式吊機)                                                           |
|                            |                                                        | <input type="checkbox"/> 5.9  | Dozers (推土機)                                                                    |
|                            |                                                        | <input type="checkbox"/> 5.10 | Dust Collectors (集塵器)                                                           |
|                            |                                                        | <input type="checkbox"/> 5.11 | Forklifts and Tow Tractors (叉車及拖引車)                                             |
|                            |                                                        | <input type="checkbox"/> 5.12 | Gantry Crane (龍門式吊機)                                                            |
|                            |                                                        | <input type="checkbox"/> 5.13 | Generator Set (發電機組)                                                            |
|                            |                                                        | <input type="checkbox"/> 5.14 | Gondola Systems (吊船)                                                            |
|                            |                                                        | <input type="checkbox"/> 5.15 | Hydraulic Punching / Shearing / Swing Beam Machine (液壓沖 / 剪 / 擺式剪板機)            |
|                            |                                                        | <input type="checkbox"/> 5.16 | Hydraulic Excavators (液壓挖土機)                                                    |
|                            |                                                        | <input type="checkbox"/> 5.17 | Loaders (裝載機)                                                                   |
|                            |                                                        | <input type="checkbox"/> 5.18 | Mobile / Trucks / Lorry Crane (汽車吊機)                                            |
|                            |                                                        | <input type="checkbox"/> 5.19 | Metal Work Machine & Equipment (金屬工作機)                                          |
|                            |                                                        | <input type="checkbox"/> 5.20 | Pipe Welding Machine (喉管熱熔對接焊機)                                                 |
|                            |                                                        | <input type="checkbox"/> 5.21 | Plate Compactor (壓路板)                                                           |
|                            |                                                        | <input type="checkbox"/> 5.22 | Pump (泵)                                                                        |
|                            |                                                        | <input type="checkbox"/> 5.23 | Roller Shutter (捲閘)                                                             |
|                            |                                                        | <input type="checkbox"/> 5.24 | Spray Booth (噴漆柜)                                                               |
|                            |                                                        | <input type="checkbox"/> 5.25 | Surveying Measuring Instrument (測量儀器)                                           |
|                            |                                                        | <input type="checkbox"/> 5.26 | Thicknessing Planer (壓鉋機)                                                       |
|                            |                                                        | <input type="checkbox"/> 5.27 | Tower Crane (塔式吊機)                                                              |
|                            |                                                        | <input type="checkbox"/> 5.28 | Wood Turning Lathe (木車床)                                                        |
| <input type="checkbox"/> 6 | Repair & Maintenance Equipment / Tools<br>(維修及保養設備或工具) | <input type="checkbox"/> 6.1  | Repair & Maintenance – Air-conditioning & Ventilation (空調及通風維修保養)               |
|                            |                                                        | <input type="checkbox"/> 6.2  | Repair & Maintenance – Builders' Lift – Hoists (建築工地升降機維修保養)                    |
|                            |                                                        | <input type="checkbox"/> 6.3  | Repair & Maintenance – Carpark System (停車場系統維修保養)                               |
|                            |                                                        | <input type="checkbox"/> 6.4  | Repair & Maintenance – Cleaning Equipment (清潔設備維修保養)                            |
|                            |                                                        | <input type="checkbox"/> 6.5  | Repair & Maintenance – Construction Machine & Equipment<br>(建築機械及設備維修保養)        |
|                            |                                                        | <input type="checkbox"/> 6.6  | Repair & Maintenance – Crawler Crane (履帶式吊機維修保養)                                |
|                            |                                                        | <input type="checkbox"/> 6.7  | Repair & Maintenance – Diesel Generating Set (柴油發電機組維修保養)                       |
|                            |                                                        | <input type="checkbox"/> 6.8  | Repair & Maintenance – Drinking Facilities & Equipment<br>(飲用水設施及設備維修保養)        |

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

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|----------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>   | 6.9                      | Repair & Maintenance – Electrical (電工工程維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>   | 6.10                     | Repair & Maintenance – Fire Service Facilities & Equipment (消防設施及設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>   | 6.11                     | Repair & Maintenance – Gantry Crane (龍門式吊機維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>   | 6.12                     | Repair & Maintenance – Glass (玻璃維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>   | 6.13                     | Repair & Maintenance – Gondola System (吊船系統維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>   | 6.14                     | Repair & Maintenance – Hydraulic Mobile Crane (液壓輪胎式吊機維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <input type="checkbox"/>   | 6.15                     | Repair & Maintenance – Kitchen Equipment & Facilities (廚房設備及設施維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>   | 6.16                     | Repair & Maintenance – Lift & Escalator (升降機及扶手電梯維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>   | 6.17                     | Repair & Maintenance – Lightning System (避雷系統維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>   | 6.18                     | Repair & Maintenance – Lorry Crane (起重機貨車維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input type="checkbox"/>   | 6.19                     | Repair & Maintenance – Measurement Equipment (量度設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>   | 6.20                     | Repair & Maintenance – Metal Work Machine & Equipment (金屬工作機械及設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>   | 6.21                     | Repair & Maintenance – Non-Destructive Testing Equipment (非破壞性測試設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>   | 6.22                     | Repair & Maintenance – Office Equipment (辦公室設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>   | 6.23                     | Repair & Maintenance – Photocopier Machine (影印機維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>   | 6.24                     | Repair & Maintenance – Plumbing & Drainage (水務工程維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>   | 6.25                     | Repair & Maintenance – Power Supply Facilities (電力裝置設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <input type="checkbox"/>   | 6.26                     | Repair & Maintenance – Power Tools (電動工具維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/>   | 6.27                     | Repair & Maintenance – Private Car (私家車維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>   | 6.28                     | Repair & Maintenance – Safety Equipment (安全設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>   | 6.29                     | Repair & Maintenance – Security Facilitate (警衛設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>   | 6.30                     | Repair & Maintenance – Sports Equipment (體育設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>   | 6.31                     | Repair & Maintenance – Survey Equipment (測量設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>   | 6.32                     | Repair & Maintenance – Tower Crane (塔式起重機維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input type="checkbox"/>   | 6.33                     | Repair & Maintenance – Water Pump (水泵維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>   | 6.34                     | Repair & Maintenance – Walkie Talkie (對講機維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input type="checkbox"/>   | 6.35                     | Repair & Maintenance – Welding Tools & Equipment (焊接工具設備維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/>   | 6.36                     | Repair & Maintenance – Windows (窗戶維修保養)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> 7 | Testing & Survey (測試及檢驗) | <input type="checkbox"/> 7.1 Testing & Survey - Air Quality (室內空氣質素測試)<br><input type="checkbox"/> 7.2 Testing & Survey - Acoustic Test / Noise Assessment (噪音評估測試)<br><input type="checkbox"/> 7.3 Testing & Survey - Car & Lorry (車輛續牌驗查)<br><input type="checkbox"/> 7.4 Testing & Survey - Compressor & Blower (空氣壓縮機測試)<br><input type="checkbox"/> 7.5 Testing & Survey - Drinking Water (飲用水測試)<br><input type="checkbox"/> 7.6 Testing & Survey - Fire Service Installation & Equipment (消防裝置及設備檢測)<br><input type="checkbox"/> 7.7 Testing & Survey - Gas Cylinder & Tester (氣樽及試錶測試)<br><input type="checkbox"/> 7.8 Testing & Survey - Gondola System (吊船系統測試及檢查)<br><input type="checkbox"/> 7.9 Testing & Survey - Illumination Quality (照明質量測試)<br><input type="checkbox"/> 7.10 Testing & Survey - Inspection, Testing & Certification for Fixed Electrical Installations (固定電力裝置定期測試及檢查)<br><input type="checkbox"/> 7.11 Testing & Survey - Jack & Lifting (千斤頂安全測試)<br><input type="checkbox"/> 7.12 Testing & Survey - Lift & Escalator (升降機安全負荷測試)<br><input type="checkbox"/> 7.13 Testing & Survey - Loader & Crane (裝載及起重機械安全負荷測試)<br><input type="checkbox"/> 7.14 Testing & Survey - Measurement Tool (儀器精確度測試及調較)<br><input type="checkbox"/> 7.15 Testing & Survey - Non-Destructive (非破壞性檢測)<br><input type="checkbox"/> 7.16 Testing & Survey - Power Supply Facilities (電力裝置設備測試及檢查) |

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

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|-----------------------------|------|--------------------------------------------------------------------------|
| <input type="checkbox"/>    | 7.17 | Testing & Survey - Safety Equipment (安全設備測試及檢查)                          |
| <input type="checkbox"/>    | 7.18 | Testing & Survey - Testing Materials / Laboratory Services (物料 / 化驗服務測試) |
| <input type="checkbox"/>    | 7.19 | Testing & Survey - Tower Crane (塔式起重機測試及調查)                              |
| <input type="checkbox"/> 8  | 8.1  | Asbestos Removal (清理石棉)                                                  |
|                             | 8.2  | Dumping - Construction Materials (建築物廢料處理)                               |
|                             | 8.3  | Grease Trap Cleaning & Maintenance (隔油池清洗及保養)                            |
|                             | 8.4  | Environment Planning (環保規劃)                                              |
|                             | 8.5  | Environment Recycling (環保再造)                                             |
|                             | 8.6  | Sewage Treatment (污水處理)                                                  |
|                             | 8.7  | Tree Risk Assessment (樹木風險評估)                                            |
|                             | 8.8  | Waste & Scrap Disposal (廢置材料回收)                                          |
| <input type="checkbox"/> 9  | 9.1  | Carpet / Floor Mat (地毯)                                                  |
|                             | 9.2  | CCTV System (閉路電視監控系統)                                                   |
|                             | 9.3  | Chair (椅子)                                                               |
|                             | 9.4  | Cleaning Supplies (清潔用品)                                                 |
|                             | 9.5  | Cleaning Tools (清潔工具)                                                    |
|                             | 9.6  | Clock & Watch (鐘錶)                                                       |
|                             | 9.7  | Communication System (通信系統)                                              |
|                             | 9.8  | Curtain & Blinds (窗簾及百葉簾)                                                |
|                             | 9.9  | Doorphone System (門禁系統)                                                  |
|                             | 9.10 | Electric Household Appliance (家用電器)                                      |
|                             | 9.11 | Filing Cabinet / Locker (文件櫃/儲物櫃)                                        |
|                             | 9.12 | Glass & Accessory (玻璃及配件)                                                |
|                             | 9.13 | Ink Cartridges, Toner Cartridges & Ribbons (打印機油墨盒, 碳粉盒及色帶)              |
|                             | 9.14 | Information Display System and Service (資訊顯示系統和服務)                       |
|                             | 9.15 | Kitchen Equipment (廚房設備)                                                 |
|                             | 9.16 | Lighting / Bulb (照明/燈泡)                                                  |
|                             | 9.17 | Medicine & Health Supplies (藥物及健康)                                       |
|                             | 9.18 | Office / Storage Container (辦公室/貯物貨櫃)                                    |
|                             | 9.19 | Partition Panel and Accessory (屏風及附件)                                    |
|                             | 9.20 | Paper (紙張)                                                               |
|                             | 9.21 | Paper Shredder / Laminator (碎紙機 / 過膠機)                                   |
|                             | 9.22 | Pantry Supplies (茶水間用品)                                                  |
|                             | 9.23 | Paper Towels & Tissues (紙巾及廁紙)                                           |
|                             | 9.24 | Sign (門牌)                                                                |
|                             | 9.25 | Stage & Accessory (舞台用品)                                                 |
|                             | 9.26 | Stationery (文具)                                                          |
|                             | 9.27 | Steel Desk (鋼枱)                                                          |
|                             | 9.28 | Wall Board Assembly (組合壁板)                                               |
|                             | 9.29 | Water Dispenser & Service (飲水機及服務)                                       |
|                             | 9.30 | Wooden Desk (木枱)                                                         |
| <input type="checkbox"/> 10 | 10.1 | Printing of Annual Report (印刷年報)                                         |
|                             | 10.2 | Printing of Aluminium Roll-Up Screen (印製易拉架)                             |
|                             | 10.3 | Printing of Booklet & Handouts (印刷小冊子及講義)                                |
|                             | 10.4 | Printing of Certificate (印刷證書)                                           |
|                             | 10.5 | Printing of Company Letterhead Materials (印刷公司印刷品)                       |
|                             | 10.6 | Printing of Flag / Banner (印製旗/旗幟)                                       |

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

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|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> 11 Information Technology and Computers<br>(資訊科技及電腦) | <input type="checkbox"/> 10.7 Printing of Name Card (印刷卡片)<br><input type="checkbox"/> 10.8 Photocopying Services (複印服務)<br><input type="checkbox"/> 10.9 Printing of Promotional Items (印刷宣傳用品)<br><input type="checkbox"/> 10.10 Printing / Production of Backdrop (印刷 / 製作背景)<br><input type="checkbox"/> 10.11 Printing of P.V.C. Card (印製證明卡)<br><input type="checkbox"/> 11.1 Computer Hardware Accessory (電腦硬件配件)<br><input type="checkbox"/> 11.2 Computer Hardware (電腦硬件)<br><input type="checkbox"/> 11.3 Computer Hardware Leasing (電腦硬件租用)<br><input type="checkbox"/> 11.4 Computer Hardware Peripheral (電腦硬件周邊)<br><input type="checkbox"/> 11.5 Computer Network (電腦網絡)<br><input type="checkbox"/> 11.6 Contract Out Works - Computer Service (外判工程 - 電腦服務)<br><input type="checkbox"/> 11.7 Computer Software (電腦軟件)<br><input type="checkbox"/> 11.8 Computer Software & Services Subscription (電腦軟件及服務租用)<br><input type="checkbox"/> 11.9 Information Technology & Telecommunications (資訊科技及電信)<br><input type="checkbox"/> 11.10 Repair & Maintenance – Audio / Visual (音頻 / 視頻維修保養)<br><input type="checkbox"/> 11.11 Repair & Maintenance – Computer Equipment (電腦設備維修保養)<br><input type="checkbox"/> 11.12 Repair & Maintenance – Card Printer (證明卡打印機維修保養)<br><input type="checkbox"/> 11.13 Repair & Maintenance – Computer Room Facilities (電腦房設備維修保養)<br><input type="checkbox"/> 11.14 Repair & Maintenance – Software and Application Support<br>(軟件及應用系統支援維修保養)<br><input type="checkbox"/> 11.15 Repair & Maintenance – Server and Network Services<br>(伺服器及網絡服務維修保養)<br><input type="checkbox"/> 11.16 Repair & Maintenance – Telecom System & Equipment (電訊系統及設備維修保養)<br><input type="checkbox"/> 11.17 Contract Out Works - Software Development (外判工程 - 軟件開發)<br><input type="checkbox"/> 11.18 Rental of Telecom System & Equipment (租用電訊系統及設備)<br><input type="checkbox"/> 11.19 Telecom Services (電訊服務) |
| <input type="checkbox"/> 12 Rental Services<br>(租用服務)                         | <input type="checkbox"/> 12.1 Rental of Crane (租用吊機)<br><input type="checkbox"/> 12.2 Rental of Cylinder Service & Air Filling (租用氣樽及充氣)<br><input type="checkbox"/> 12.3 Rental of Digital Photocopier (租用影印機)<br><input type="checkbox"/> 12.4 Rental of Generator Set (租用發電機組)<br><input type="checkbox"/> 12.5 Rental of Gown (租用禮服)<br><input type="checkbox"/> 12.6 Rental of Horses and Carriage Service (租用馬車服務)<br><input type="checkbox"/> 12.7 Rental of Machinery Equipment (租用機械設備)<br><input type="checkbox"/> 12.8 Rental of Portable Mobile Toilets with Hygiene Service<br>(租用流動式廁所及清理服務)<br><input type="checkbox"/> 12.9 Transportation Service - Goods (貨運服務)<br><input type="checkbox"/> 12.10 Transportation Service - Passenger (客運服務)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> 13 General Supplies<br>(一般供應)                        | <input type="checkbox"/> 13.1 General Fixture (一般固定裝置)<br><input type="checkbox"/> 13.2 Light Truck / Coaster (輕型貨車及小巴)<br><input type="checkbox"/> 13.3 Private Car (私家車)<br><input type="checkbox"/> 13.4 Promotional Items (宣傳物品)<br><input type="checkbox"/> 13.5 Reference Book/ Reference Report & Publication (參考書/ 參考報告及刊物)<br><input type="checkbox"/> 13.6 Seasonal Decoration (節慶裝飾)<br><input type="checkbox"/> 13.7 Souvenir (紀念品)<br><input type="checkbox"/> 13.8 Sports Equipment (適體健器材)<br><input type="checkbox"/> 13.9 Stage Accessory (舞台用品)<br><input type="checkbox"/> 13.10 Building Management Supplies (物業管理供應)<br><input type="checkbox"/> 13.11 Trophy / Medals (獎杯 / 獎牌)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

- |                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> 14 General Services<br>(一般服務)      | <input type="checkbox"/> 13.12 Uniform (制服)<br><input type="checkbox"/> 13.13 Walkie Talkie (對講機)<br><input type="checkbox"/> 14.1 Advertisement - Advertising Design & Production (廣告設計及製作)<br><input type="checkbox"/> 14.2 Advertisement - Advertisement Production & Placement Services<br>(廣告製作及報刊廣告代理服務)<br><input type="checkbox"/> 14.3 Referee Services (裁判服務)<br><input type="checkbox"/> 14.4 Catering Services (餐飲服務)<br><input type="checkbox"/> 14.5 Clipping Services (剪報服務)<br><input type="checkbox"/> 14.6 Catering / Kitchen Equipment and Services (餐飲/廚房設備及服務)<br><input type="checkbox"/> 14.7 Cleaning Services (清潔服務)<br><input type="checkbox"/> 14.8 Copywriting & Editorial Services (撰稿及編輯服務)<br><input type="checkbox"/> 14.9 Drycleaning & Laundry Services (乾洗及洗衣服務)<br><input type="checkbox"/> 14.10 Driver Services (司機服務)<br><input type="checkbox"/> 14.11 Disposal Services (棄置服務)<br><input type="checkbox"/> 14.12 Design Services - Graphics Design (平面設計)<br><input type="checkbox"/> 14.13 Design Services - Illustration / Character Design (插畫 / 角色設計)<br><input type="checkbox"/> 14.14 Design Services - Interior / Exterior Design (室內 / 室外設計)<br><input type="checkbox"/> 14.15 Design Services - Product and Logo Design (產品及商標設計)<br><input type="checkbox"/> 14.16 Design Services - Website / Apps Design & Development<br>(設計網頁 / 應用程式及製作)<br><input type="checkbox"/> 14.17 Event Management - Exhibition Booth Design, Production & Installation<br>(展覽攤位設計、製作及佈置)<br><input type="checkbox"/> 14.18 Event Management - Event Production & Management Services<br>(活動籌辦及管理服務)<br><input type="checkbox"/> 14.19 Event Management - Photography Services (照相服務)<br><input type="checkbox"/> 14.20 Event Management - Video Broadcast Services (視頻廣播服務)<br><input type="checkbox"/> 14.21 Event Management - Video Shooting and Editing Services (影片製作及剪接)<br><input type="checkbox"/> 14.22 Football Referee Services (足球裁判服務)<br><input type="checkbox"/> 14.23 Landscape & Gardening (園境及園藝)<br><input type="checkbox"/> 14.24 Lettershop Services (入信服務)<br><input type="checkbox"/> 14.25 Logistics & Transport Services (物流及運輸服務)<br><input type="checkbox"/> 14.26 Mailing / Courier & Delivery Services (郵寄 / 速遞及運送服務)<br><input type="checkbox"/> 14.27 Pest Control (蟲害防治)<br><input type="checkbox"/> 14.28 Property / Facility Management (物業 / 設施管理)<br><input type="checkbox"/> 14.29 Public Relations (公共關係)<br><input type="checkbox"/> 14.30 Scanning Services (掃描服務)<br><input type="checkbox"/> 14.31 Security Guarding Services (保安護衛服務)<br><input type="checkbox"/> 14.32 Signage Production (指示牌製作)<br><input type="checkbox"/> 14.33 Translation Services - Annual Report Translation (年報翻譯)<br><input type="checkbox"/> 14.34 Translation Services - General Translation (一般翻譯)<br><input type="checkbox"/> 14.35 Translation Services - Simultaneous Translation & Interpretation (即時翻譯及傳譯) |
| <input type="checkbox"/> 15 Professional Services<br>(專業服務) | <input type="checkbox"/> 15.1 Agency Services (代理服務)<br><input type="checkbox"/> 15.2 Consultancy Services (顧問服務)<br><input type="checkbox"/> 15.3 Auditing Services (審計服務)<br><input type="checkbox"/> 15.4 Building Information Modeling (BIM) (建築訊息模型)<br><input type="checkbox"/> 15.5 Certificate Services (認證服務)<br><input type="checkbox"/> 15.6 Counseling Services (輔導服務)<br><input type="checkbox"/> 15.7 Human Resources Services (人力資源服務)<br><input type="checkbox"/> 15.8 Insurance - General Insurance (一般保險)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

- ☐ 15.9 Insurance - Medical Insurance (醫療保險)
- ☐ 15.10 Legal Services (法律服務)
- ☐ 15.11 Market Research (市場調查)
- ☐ 15.12 Medical Services (醫療服務)
- ☐ 15.13 Quality Management Services (質量管理服務)
- ☐ 15.14 Risk Management and Data Privacy Assessment (風險管理及數據私隱評估)
- ☐ 15.15 Trade Testing (技能測試)
- ☐ 15.16 Training - Course (培訓課程)
- ☐ 15.17 Training - Management (培訓管理)
- ☐ 15.18 Training - Safety (培訓安全)

#### Type 2 - Construction Contractor

- ☐ 類別二 - 建築工程承辦商
- ☐ 1 Contractors – Air-conditioning & Ventilation (空調及通風)
  - ☐ 2 Contractors – Building Information Modeling (建築訊息模型)
  - ☐ 3 Contractors – Carpark System (停車場系統)
  - ☐ 4 Contractors – Curtain / Blind / Carpet Tile/ Floor Finishes (窗簾/簾/方塊地毯/ 地板)
  - ☐ 5 Contractors – Design & Construction (設計及施工工程)
  - ☐ 6 Contractors – Demolishment Work (拆除工程)
  - ☐ 7 Contractors – Electrical (電工工程)
  - ☐ 8 Contractors – External Wall (外牆工程)
  - ☐ 9 Contractors – Facility Security (設備保安)
  - ☐ 10 Contractors – Civil, Foundation & Geotechnical (土木, 地基及土力工程)
  - ☐ 11 Contractors – Fire Service Facilities & Equipment (消防設施及設備工程)
  - ☐ 12 Contractors – Gas & Oil (煤油及石油氣工程)
  - ☐ 13 Contractors – Glass (玻璃工程)
  - ☐ 14 Contractors – Grass Cutting (剪草)
  - ☐ 15 Contractors – Kitchen Equipment & Facilities (廚房設備及設施工程)
  - ☐ 16 Contractors – Lift & Escalator (電梯及扶手電梯)
  - ☐ 17 Contractors – Platform (平台)
  - ☐ 18 Contractors – Plumbing & Drainage (水務工程)
  - ☐ 19 Contractors – Playground Equipment (遊樂場設備)
  - ☐ 20 Contractors – Scaffolding Work (建築棚架工程)
  - ☐ 21 Contractors – Steel Door Work (鋼門工程)
  - ☐ 22 Contractors – Structure Repair (結構修復工程)
  - ☐ 23 Contractors – Steel Structural Work (鋼鐵結構工程)
  - ☐ 24 Contractors – Waterproof (防水工程)
  - ☐ 25 Contractors – Windows (窗戶工程)
  - ☐ 26 Contractors – Wooden Door Work (木門工程)
  - ☐ 27 Contractors – Workshop Equipment & Facilities (測試場設備及設施工程)

#### Type 3 - Others

- ☐ 類別三 - 其他

(please specify if the above is found inappropriate) 請細列明如上述沒有適用者

3.1

\_\_\_\_\_

\_\_\_\_\_

3.2

\_\_\_\_\_

\_\_\_\_\_

(Note : If found insufficient space, please use separate sheet)  
(註：如空位不足，請另紙列出)

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

(iii) Please provide names of your major clients / customers for our internal reference purposes.  
請提供貴公司的主要客戶名稱，作內部參考之用。

(1) \_\_\_\_\_ (2) \_\_\_\_\_  
(3) \_\_\_\_\_ (4) \_\_\_\_\_

#### PART IV - DOCUMENTS TO BE SUBMITTED 第四部 - 須提交證明文件清單

##### Type 1 - Supplier (類別一 - 供應商)

- (i) Please attach a copy of the valid Business Registration Certificate for our reference and record.  
請寄交有效的商業登記證文件副本以供參考和存照。
- (ii) Please attach one set of relevant product / service catalogue(s) for our consideration.  
請夾附最少一份有關產品 / 服務目錄以供參閱。

##### Type 2 - Construction Contractor (類別二 - 建築工程承辦商)

- (i) Please attach a copy of the valid Business Registration Certificate for our reference and record.  
請寄交有效的商業登記證文件副本以供參考和存照。
- (ii) Please attach one set of relevant product / service catalogue(s) for our consideration.  
請夾附最少一份有關產品 / 服務目錄以供參閱。
- (iii) Please attach company profile  
請夾附公司簡介
- (iv) Please attach past 2 years financial report  
請夾附最近兩年之財務報表
- (v) Please attach the past 3 years relevant job reference with the contract amount for each selected category(s)  
請夾附最近三年每個選定類別之相關工作參考及合同金額
- (vi) Please attach relevant construction works licence(s)  
請夾附有關工程牌照
- (vii) Please attach Quality Assurance policy  
請夾附質量保證政策
- (viii) Please attach Health and Safety policy  
請夾附健康及安全政策
- (ix) Please attached Quality Management System certification(s) (if any)  
請夾附品質管理系統認證 (如有)
- (x) Reference/ Appreciation Letter(s) (if any)  
請夾附參考/感謝信 (如有)

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

#### PART V - CERTIFICATION 第五部 - 證明

##### (i) Personal Information Collection Statement 收集個人資料聲明

- (1) CIC will use the provided information for the purpose of processing this registration form and dealing with our procurement-related matters.  
提供的資料會用作本議會處理有關申請登記成為本議會之承辦商/供應商及與採購相關的事宜。
- (2) Under the provisions of the Personal Data (Privacy) Ordinance, you have the right to request access to or correction of personal data. Written requests should be addressed to CIC.  
根據個人資料(私隱)條例, 你有權要求查閱和更改個人資料, 有關申請須以書面向本議會提出。
- (3) CIC will not be able to process and consider incomplete forms.  
如果資料有任何遺漏, 本議會將不能處理本表格事宜。

##### (ii) Declaration 聲明

- (1) I declare that all information given in this registration form is, to the best of my knowledge, accurate and complete. If any false information is given, the application is deemed to be invalid and I shall forfeit my right to submit quotations and tender.  
本人聲明本表格內所提供的一切資料, 依本人所知均屬真確, 並知道倘若虛報資料, 申請即屬無效, 且喪失其後落標資格。
- (2) I agree that if registered, I will conform to the regulations, terms and conditions set by the CIC.  
本人同意如本人註冊成為建造業議會之承辦商/供應商, 當遵守建造業議會之工作守則。
- (3) I declare that our company as stated in this form shall uphold the highest ethical principles in relation to our procedures as well as having a corrupt free environment in rendering of goods and services to the CIC operations including compliance with all applicable laws and regulations, maintaining confidentiality where appropriate, adopt an open and fair competition, anti-bribery and corruption.  
本人聲明本申請書上的公司會在運作過程中堅守道德原則, 並在廉潔的環境下向建造業議會提供貨品及服務, 包括遵守所有適用法例及規則、保密原則、防賄法例、反貪法例, 以及維護公開公平的競爭。

I apply on behalf of the aforementioned company for inclusion in the CIC Vendor List.

本人謹代表上述公司, 申請登記成為建造業議會承辦商/供應商。

Signature:

簽署: \_\_\_\_\_

Name in block letters:

姓名(正楷): \_\_\_\_\_

Designation:

職銜: \_\_\_\_\_

Date:

日期: \_\_\_\_\_

(Space for company chop)  
(公司印鑑)

## Application Form for Inclusion in the CIC Vendor List

### 建造業議會承辦商/供應商登記申請書

#### DOCUMENT CHECKLIST 文件核對表

Please enclosed the following items (請夾附以下文件) :

##### Type 1 - Supplier (類別一 - 供應商)

- ☐ Completed application form for inclusion in the CIC Vendor List (Form PRO-01)  
已填妥建造業議會承辦商/供應商登記申請書
- ☐ Copy of valid Business Registration Certificate  
有效的商業登記證文件副本
- ☐ Relevant product / service catalogue(s)  
有關產品 / 服務目錄

##### Type 2 - Construction Contractor (類別二 - 建築工程承辦商)

- ☐ Completed application form for inclusion in the CIC Vendor List (Form PRO-01)  
已填妥建造業議會承辦商/供應商登記申請書
- ☐ Copy of valid Business Registration Certificate  
有效的商業登記證文件副本
- ☐ Relevant product / service catalogue(s)  
有關產品 / 服務目錄
- ☐ Company profile  
公司簡介
- ☐ Past 2 years financial report  
最近兩年之財務報表
- ☐ Past 3 years relevant job reference with the contract amount under each selected item category(s)  
最近三年每個選定類別之相關工作參考及合同金額
- ☐ Relevant construction works licence(s)  
有關工程牌照
- ☐ Quality Assurance policy  
健康及安全政策
- ☐ Health and Safety policy  
質量保證政策
- ☐ Quality Management System certification(s) (if any)  
品質管理系統認證 (如有)
- ☐ Reference/ appreciate letter(s) (if any)  
參考/感謝信 (如有)

Note : Please put a "✓" in the box under each column to indicate that the document has been enclosed.

注意事項：請在欄內方格加上「✓」號以示已附上該文件。

**Tender Documents**  
**for**  
**Renovation Works**  
**of**  
**Safety Experience Training Centre (SETC)**  
**at**  
**Kwai Chung Campus (KCC)**  
**of**  
**the Construction Industry Council**

**Employer**  
**Construction Industry Council (CIC)**  
**38/F, COS Centre,**  
**56 Tsun Yip Street,**  
**Kwun Tong, Kowloon,**  
**Hong Kong**

**Architect / Building Services Engineer**  
**Quantity Surveyor / Structural Engineer**  
**David S.K. Au & Associates Ltd. (DAAL)**  
**15/F, 633 King's Road,**  
**North Point,**  
**Hong Kong**

**February 2018**

**DA17003/MC**

**Renovation Works**  
**of**  
**Safety Experience Training Centre (SETC)**  
**at Kwai Chung Campus (KCC)**  
**of the Construction Industry Council**

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**Renovation Works**  
**of**  
**Safety Experience Training Centre (SETC)**  
**at Kwai Chung Campus (KCC)**  
**of the Construction Industry Council**  
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**Conditions of Tender**  
**for**  
**Renovation Works**  
**of Safety Experience Training Centre (SETC)**  
**at Kwai Chung Campus (KCC)**  
**of the Construction Industry Council**

**February 2018**

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## 1 Notes to Tenderers

- 1.1 All tenderers shall read the instructions contained in this Conditions of Tender carefully prior to preparing their tender submissions. Any tender submission, which does not follow these instructions is deemed to be incomplete and may be disqualified.
- 1.2 The tender documents consist of:
  - a) Conditions of Tender;
  - b) Appendices to Conditions of Tender;
  - c) Assignment Brief and its Annexes;
  - d) Memorandum of Agreement;
  - e) General Conditions of Employment;
  - f) CIC's General Conditions of Contract and Guidelines for Works or Services (2b) – CAR;
  - g) Contractor's Safety Requirements

## 2 Invitation

- 2.1 Tenderers are invited by the Construction Industry Council (hereinafter referred to as the “CIC”) to submit proposal and bid for Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council. Further details are given in the **Assignment Brief and its Annexes**.
- 2.2 The tender shall be submitted in accordance with the **Conditions of Tender**.
- 2.3 If the tender is accepted and the contract is awarded, the tender documents specified in Clause 1.2 above, the tender proposal submitted by the tenderer and other relevant contract correspondence as agreed by the tenderer and CIC will form part of the contract.

### 3 Tenderers' Response to CIC Enquiries

- 3.1 In the event that the CIC determines that clarification of any tender is necessary, it will advise the tenderer to supplement its tender. Unless otherwise specified in the request for clarification, the tenderer shall thereafter have 14 working days to submit such requested information. Any clarification made shall be at the tenderer's own cost and expense.

### 4 Completion of Tender

- 4.1 The tenderer is required to submit all information specified in **Appendix A** of the Conditions of Tender with his tender. In addition, the tenderer shall submit with his tender a duly signed and witnessed letter in the form set out in **Appendix B** of the Conditions of Tender. Should the tenderer fails to submit this letter with his tender, his tender will not be considered.
- 4.2 If CIC's participation is required, the tenderer should clearly state the details and the expected resources, skills, level of participation, responsibilities, and duration.
- 4.3 The tenderer shall state in his proposals the implementation plan of delivering the deliverables as described in the **Assignment Brief and its Annexes**.
- 4.4 The tenderer must submit his offer in Hong Kong Dollars. **OFFERS SUBMITTED IN OTHER CURRENCIES SHALL NOT BE CONSIDERED.**
- a) The tenderer is required to submit the completed **Form of Tender as per Appendix C** of the Conditions of Tender.
- b) In addition, the tenderer is required to submit **the Fee Proposal** using the prescribed form provided in **Appendix D** of the Conditions of Tender. There shall be no adjustment for any price fluctuations; and
- c) The tenderer should ensure that the fee quoted is accurate before submitting the tender. Under no circumstances will the CIC accept any change of quoted lump sum fee on the ground that a mistake has been made in the tender price.

#### **4. Completion of Tender (Cont'd)**

- 4.5 A two-envelope approach is adopted for tender submission, i.e. the tenderers should submit all information specified in **Appendix A** of the Condition of Tender and the letter annexed in **Appendix B** and mentioned in Clause 4.28 of the Conditions of Tender (collectively known as “technical proposal”) in one envelope and the completed Form of Tender using the prescribed form provided in **Appendix C** of the Conditions of Tender and the Fee Proposal using the prescribed form provided in **Appendix D** of the Conditions of Tender (collectively known as “fee proposal”) in a separate envelope. Failure to do so will render the tender void.
- 4.6 The tenderer shall submit **FIVE (5)** hard copies and corresponding files in electronic form (e.g. in MS Word 2003 / MS Excel 2003 / PDF format) stored in an electronic medium (eg: CD-ROM) of the technical proposal in a sealed envelope marked “Technical Proposal” and **TWO (2)** hard copies of the fee proposal in a separate sealed envelope marked “Fee Proposal” clearly indicating the tenderer’s name and tender title. In the event of discrepancies between original and electronic versions of the Tender Submission, the former shall prevail.
- 4.7 Tender should be submitted to the **Tender Box of CIC at 38/F, COS Centre, 56 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong by 12:00 noon on 14 March 2018.** Late submission will NOT be considered. Failure to do so shall render the tender void.
- 4.8 In the event that a Typhoon Signal No. 8 or above or Black Rainstorm Warning is hoisted on the tender closing date, the tender closing time will be postponed to 12:00 noon on the following working day.
- 4.9 The CIC will not reimburse any cost incurred by tenderers for the preparation and submission of the tender.
- 4.10 The CIC may reject a tender which is unreasonably low in terms of price and may therefore affect the tenderer’s capability in carrying out and complete the services and delivering the deliverables in accordance with the Assignment Brief and its Annexes.
- 4.11 Any amendments to the rates offered must be signed by the person who signs the tender. Failure to do so will render the tender null and void.
- 4.12 Unless otherwise stated, tenders shall be valid for 120 days from the specified closing date. If no letter of acceptance or order is placed within the validity period of the offer, the tenderer may assume that the offer has not been accepted.



#### **4. Completion of Tender (Cont'd)**

- 4.13 This is an invitation to offer. The CIC is not bound to accept the lowest tender or the highest combined scores under the technical and fee proposal or any tender. The CIC reserves the right to accept or omit any individual item or whole section of a tender without price alteration to the items or sections accepted. The tenderer hereby acknowledges that there will not be any loss of profit claim as a result of the reduction in the scope of works.
- 4.14 The CIC reserves the right to negotiate with any or all tenderer(s) on the terms of the tender.
- 4.15 Tenderer should ascertain the prices quoted are accurate before submitting his tender. Under no circumstances will the Employer accept any request for price adjustment due to any mistake made in the tender prices.
- 4.16 The CIC shall have the right, in its absolute discretion, to disclose to any person and for any purpose, any information submitted to the CIC as part of the tender or otherwise in connection with the awarded contract, without further notification to the successful tenderer. In submitting the tender, the tenderer irrevocably consents to such disclosure.
- 4.17 In the event that a tenderer discovering a genuine error in his tender after it has been deposited, he may in writing draw attention to the error and submit amendment which may be accepted, provided that the amendment has been deposited on or before the closing time fixed for the receipt of tenders.
- 4.18 The tendered sum will be regarded as a lump sum tender and will not be amended for errors found in the examination of tenders.
- 4.19 Should examination of a tender reveal errors of such magnitude as in the opinion of the CIC would involve the tenderer in serious loss then the nature and amount of such errors will be communicated to the tenderer and he will be asked to confirm in writing that he is prepared to abide by his tender.
- 4.20 The tenderer shall be required to check the numbers of the pages of the tender documents against the page numbers given in the contents. If the tenderer finds any missing, in duplicate or indistinct, he must inform the CIC at once and have the same rectified.
- 4.21 Should the tenderer for any reason whatsoever be in doubt as to the precise meaning of any item or description, he must inform the CIC in order that correct meaning may be decided before the date for submission of tender.

#### **4. Completion of Tender (Cont'd)**

- 4.22 Tenderer shall inspect the Site and make themselves thoroughly acquainted with the existing condition of the premises, location, the existing structure / accessibility, restrictions for loading and unloading materials, and all the materials, and all other aspects which may affect the delivery of the deliverables. Tenderer shall make due and proper allowance when estimating their rates and prices for the information obtained or which ought to have been obtained during the site inspection.
- 4.23 No liability will be admitted, nor claim allowed in respect of errors in the tenderer's tender due to mistakes in the tender documents which should have been rectified in the manner described above.
- 4.24 Tenderer shall be deemed to be in possession of a valid business registration certificate and, if necessary, be registered with the relevant authority authorizing him to carry out the works described in the tender documents.
- 4.25 Tenderer shall comply with the CIC's General Conditions of Contract and Guidelines for Works or Services. The tender price shall deem to be included all cost incurred.
- 4.26 Any qualification of tender or of the tender documents may cause the tender to be disqualified.
- 4.27 No unauthorized alteration or erasure to the text of the tender documents will be permitted. Any tender containing such alteration or erasure may not be considered.
- 4.28 The tenderer shall strictly comply with the following anti-collusion clause:
- (1) (a) Subject to sub-clause (2) of this Clause, the tenderer shall not communicate to any person other than the CIC the amount of the tender price or any part thereof until the tenderer is notified by the CIC of the outcome of the tender exercise.
- (b) Further to paragraph (a) of this sub-clause, the tenderer shall not fix the amount of the tender price or any part thereof by arrangement with any other person, make any arrangement with any person about whether or not he or that other person will or will not submit a tender or otherwise collude with any person in any manner whatsoever in the tendering process.
- (c) Any breach of or non-compliance with this sub-clause by the tenderer shall, without affecting the tenderer's liability for such breach or non-compliance, invalidate his tender.

#### **4. Completion of Tender (Cont'd)**

4.28 The tenderer shall strictly comply with the following anti-collusion clause (Cont'd):

(2) Sub-clause (1)(a) of this Clause shall have no application to the tenderer's communications in strict confidence with:

(a) his own insurers or brokers to obtain an insurance quotation for computation of tender price;

(b) his consultants or sub-contractors to solicit their assistance in preparation of tender submission; and

(c) his bankers in relation to financial resources for the Contract

(3) The tenderer shall submit with his tender a duly signed and witnessed letter in the form set out in Appendix B of the Conditions of Tender. The signatory to the letter shall be a person authorized to sign CIC contracts on the tenderers's behalf.

(4) The tenderer shall indemnify and keep indemnified the CIC against all losses, damages, costs or expenses arising out of or in relation to any breach of or non-compliance with sub-clause (1) of this Clause by the tenderer, including but not limited to additional costs due to price escalation, costs and expenses of re-tendering and other costs incurred.

4.29 The tenderer shall not and shall ensure that his agents and employees shall not give or offer any advantages as defined under the Prevention of Bribery Ordinance to any agent or employee of CIC. Any breach of the clause by the tenderer shall, without affecting the tenderer's liability for such breach, invalidate his tender.

4.30 The invited tenderer who has decided to decline the bid shall return the Reply Slip for Declining Bid provided in Appendix F of the Conditions of Tender.

**4.31 The Items marked as 'Mandatory Requirements' are particulars that MUST be submitted under the Technical Proposal. In the event that a tenderer does not meet the mandatory requirements in the tender submission, his tender may not be considered for tender evaluation.**

## **5 Tender Briefing and Site Visit Session**

- 5.1 Tenderer is invited to attend a tender briefing session and site visit at the time and place as stated in the tender invitation. Interested tenderers should e-mail to the Subject Officer at least 2 working days before the stated time confirming the attendance of the said briefing session and site visit and state clearly the number of attendees for CIC's arrangement.
- 5.2 The CIC may record the queries raised by the tenderers attending the tender briefing and may issue a Replies to Tender Queries to all tenderers for information.

## **6 Tender Interview**

- 6.1 During the tender evaluation stage, the tenderer is requested to attend a tender interview which will be held on **21 March 2018** to present his tender proposals. Upon receipt of a request from the CIC, the tenderer shall provide a tender presentation to demonstrate whether the proposal can fulfill the requirements specified in the Assignment Brief and its Annexes.
- 6.2 The presentation shall be set up with the tenderer's own resources and expense. The CIC shall not bear any costs associated with the presentation.
- 6.3 The presentation should at least include the project team profile, the approach to fulfill the objectives described in the Assignment Brief and its Annexes and an outline programme for completing the assignment. The presentation shall be conducted, where possible, by the leader of the proposed project team for performing the project management.
- 6.4 Each interview presentation should be no longer than 30 minutes, including a 15-minute questions and answers session.

## **7 Tender Evaluation**

- 7.1 Tenderers shall note that their tender proposals, presentations and responses to CIC's queries in connection with the tender will be assessed in accordance with **the tender evaluation procedures and criteria** specified in **Appendix E** of the Conditions of Tender.

## **8 Tenderer's Commitment**

- 8.1 All information and responses from the tenderer must be submitted in writing. The relevant provisions of this invitation to tender and such documents so submitted shall be the representation of the tenderer and may be incorporated into and made part of the Contract between the CIC and the successful tenderer.
- 8.2 The CIC reserves the right to disqualify any tender that directly or indirectly attempts to preclude or limit the effect of the requirements as mentioned on the Assignment Brief and its Annexes.
- 8.3 Tender shall remain valid and open for acceptance for **120 days** after the tender closing date.

## **9 Amendments**

- 9.1 The CIC reserves the right to amend or withdraw the Assignment Brief and its Annexes before acceptance of a tender.
- 9.2 The CIC may issue Tender Addendum and / or Replies to Tender Queries no later than 7 days before tender closing if CIC found it necessary.

## **10 Award of Contract**

- 10.1 The successful tenderer will receive a letter of acceptance as an official notification of acceptance. Unless and until a formal contract agreement is prepared and executed, this letter of acceptance together with the tender submission shall constitute a binding contract between the successful tenderer and the CIC. Tenderers who do not receive any notification within the validity period of their offer shall assume that their tenders have not been accepted.
- 10.2 The CIC reserves the right of not awarding the contract after receipt of submissions by the tenderer.
- 10.3 In order to ensure the fairness of the tender process, all answers to tender queries / tender clarifications and tender addendums will be uploaded to CIC's website. All tenderers have to take note of this arrangement. Any claim for extension of time or additional payment due to ignorance of this clause shall not be entertained by the CIC.

## **11 Rights to Exercise**

- 11.1 The CIC may, at any time during the contract period by notice of writing, direct the Contractor to alter, amend, omit, add to, or otherwise vary any of the work items stated in the Contract and/or works required as specified by the CIC, and the Contractor shall carry out such variations. The contract sum will be adjusted all in accordance with the relevant provisions specified else in the tender documents and/or works required as specified by the CIC.

## **12 Submitted Documents**

- 12.1 All submitted documents will not be returned.

## **13 Enquiries**

- 13.1 In case the tenderer has any tender enquiries or/ and tender clarification queries, he should submit in writing to the procurement department with details as below:-

Mr. Kelvin LEE  
Senior Officer - Management Support  
Construction Industry Council  
38/F, COS Centre,  
56 Tsun Yip Street, Kwun Tong,  
Kowloon, Hong Kong

Tel : (852) 2100-9425  
Fax: (852) 2100-9439  
Email: kelvinlee@cic.hk

## APPENDIX A – Details for Submission of Tender

The tenderer is required to provide all details as described therein.

**To be included  
in  
Technical Proposal**

### 1. Tenderer's Staff Resources

#### 1.1 Organization of Proposed Project Team

1.1.1 The tenderer shall submit:

- (a) **Company's Profile, Background and Expertise;**
- (b) An **Organization Chart** indicating the proposed project team structure and strength of the proposed project team. The project team shall include members who have experience in supplying the Deliverables as outlined in the Assignment Brief and its Annexes.

#### 1.2 Qualifications of Proposed Project Team Members

1.2.1 The project team members shall possess the required **Qualifications, Professional Knowledge and Relevant Experience** to supply the Deliverables as outlined in the Assignment Brief and its Annexes.

1.2.2 The project team proposed in the tender submission shall form part of the Agreement. The tenderer shall provide the details included but not limited to the following information of proposed project team members in the tender submission:

- a) Name
- b) Post / Title in this Project
- c) Core Team Member (Yes/No)
- d) Language (Chinese/English/Both)
- e) Project knowledge and Years of Relevant Experience
- f) Qualifications
- g) Duties and Responsibilities in the Assignment

## 2. Tenderer's Track Record & Project Reference

- 2.1 The tenderer is required to provide a full list of project references undertaken in the **past 5 years** (as of the tender closing date) for projects similar to this Assignment, giving the details by adhering to the submission format as specified in Section 2.2 below.
- 2.2 The tenderer shall submit a list of **relevant project references** in the following format with support of copies of job references or recommendation letters from previous clients.

Brief Project Description	Scope of Services	Client	Contract Value (in HK\$)	Duration	Year

- 2.3 In case the tenderer is unable to disclose of track record and project reference due to the signing of confidentiality agreement with its previous clients, please specify in the tender submission accordingly. In this circumstance, the tenderer will be asked to describe this information to the Assessment Panel during the tender interview.

## 3. Project Approach and Requirements

- 3.1 The tenderer is required to submit the following to demonstrate his capabilities in fulfilling the project approach and technical requirements and to present all the deliverables outlined in the Assignment Brief and its Annexes:-
- (i) **Tender Programme** shall be in the form of a linked bar chart identifying the critical path and included but not limited to the following activities:
- (a) Design Development - design development periods for the main areas of work, Employer design presentation and Employer approvals.
  - (b) Procurement Activities - purchase order, manufacturing period, testing and delivery.
  - (c) Construction Activities - key elements of the construction including Builder's Works, MVAC, Electrical and Fire Services Installations, installation of Simulation Equipment, testing and commissioning and handover procedure.
  - (d) Maintenance Activities - maintenance activities, which will be carried out under the Contract during the Defects Liability Period (DLP).



### 3. Project Approach and Requirements (Cont'd)

- (ii) A completed **Method Statement** must be submitted to demonstrate a full understanding of the Assignment, the method statement should included but not limited to the following:-
- (a) Access to the Site for materials delivery;
  - (b) Detailed method statements in undertaking the Works mentioned in Annex 3 - Section 3 of Particular Preliminaries for Builder's Works, Annex 6 - Section 3 of Particular Specifications for MVAC Installation and Annexes 7 and 8 - Section 2 of Particular Specifications for Electrical Installation & Fire Services Installation (collectively known as 'the Works');
  - (c) Approach to undertaking the Assignment;
  - (d) Maintaining access and existing fire escape routes clear during the Works;
  - (e) Noise, vibration and dust control during the Works to minimise disruption;
  - (f) Installation of temporary services and service diversions to ensure that areas outside of the works area remain in use during the project and procedures for third party liaison;
  - (g) Approach to the Completion of the Project;
  - (h) Site Waste Management Plan.
- (iii) **Health and Safety.** The Tenderer shall include the following:-
- (a) **Detailed CV's** of personnel to be responsible for implementing the Health and Safety Policy and whether they are site-resident or on a visiting basis;
  - (b) A diagram showing **Reporting Responsibilities and Methods** by which any conflicts of interest between Health and Safety and other project objectives and restrictions will be resolved;
  - (c) **Accident Statistics** covering a period of two years to date, inclusive of subcontracted labour with the method of calculation and definitions clearly shown.
- (iv) **Environmental Plan** - The Tenderer shall include the following:
- (a) Submit the **Environmental Management Report** for measures of pollution, recycling, use of harmful material, noise level and noise control etc.
- (v) **Works Quality Assurance Plan**
- 3.2 The tender shall refer to the other requirements laid down in the Assignment Brief and its Annexes of the tender document.

#### 4. Documents and Information to be submitted by the Tenderer

- 4.1 The tenderer is required to provide the following documents and information as described in the tender documents:

Particulars	Reference
<b>Technical Proposal</b>	
1. Organisation of Proposed Project Team	Conditions of Tender, Appendix A Clause 1.1
2. Qualifications of Proposed Project Team	Conditions of Tender, Appendix A Clause 1.2
3. Tenderer's Track Record & Project Reference	Conditions of Tender, Appendix A Clause 2.1, 2.2 and 2.3
4. Approach and work programme to (i) fulfill the technical requirements and (ii) deliver all deliverables outlined in the Assignment Brief and its Annexes <b>[Mandatory Requirement]</b>	Conditions of Tender, Appendix A Clause 3.1
5. A duly completed Standard Letter for complying with Anti-Collusion Clause	Conditions of Tender, Appendix B
6. A duly signed CIC's General Conditions of Contract and Guidelines for Works or Services (2b)-CAR	CIC's General Conditions of Contract and Guidelines for Works or Services (2b)-CAR
7. All documents mentioned in the Technical Assessment Marking Scheme	Conditions of Tender, Appendix E
8. A duly completed Schedule of Equipment and Delivery for MVAC, Electrical and Fire Services Installation <b>[Mandatory Requirement]</b>	Assignment Brief, Annexes 9, 10 and 11
9. -Statements of Convictions under Cap. 115, Cap. 59 and Cap. 57; -Outline Health & Safety Plan; and -Certificate of General Building Contractor Registration	Special Conditions of Tender
<b>Fee Proposal</b>	
10. Form of Tender	Conditions of Tender, Appendix C
11. Fee Proposal	Conditions of Tender, Appendix D

**Note:** Items marked as 'Mandatory Requirements' are particulars that **MUST** be submitted under the Technical Proposal. Non-compliance with the Mandatory Requirements may lead to the tender submission being not considered for tender evaluation.

## **APPENDIX B – Standard Letter for complying with Anti-Collusion Clause**

To: Construction Industry Council (CIC)

Date:

**To be included  
in  
Technical Proposal**

Dear Sir/Madam,

Tender Ref: \_\_\_\_\_ (340) in P/AE/PUR/AGC

Tender Title: Renovation Works of Safety Experience Training Centre  
(SETC) at Kwai Chung Campus (KCC) of the CIC

\*[I/We], [( \_\_\_\_\_ )] of  
name of the tenderer

( \_\_\_\_\_ )<sup>1</sup>,  
address of the tenderer

refer to \*[my/our] tender for the above Contract.

\*[I/We] confirm that, before \*[I/We] sign this letter, \*[I/We] have read and fully understand this letter and the anti-collusion clause in Conditions of Tender Clause 4.28.

\*[I/We] represent and warrant that in relation to the tender for the above Contract:

- (i) \*[I/We], other than the Expected Communications referred to in the last paragraph of this letter, have not communicated and will not communicate to any person other than the CIC the amount of the tender price or any part thereof until \*[I/We] have been notified by the CIC of the outcome of the tender exercise;
- (ii) \*[I/We] have not fixed and will not fix the amount of the tender price or any part thereof by arrangement with any person;
- (iii) \*[I/We] have not made and will not make any arrangement with any person as to whether \*[I/We] or that other person will or will not submit a tender; and
- (iv) \*[I/We] have not otherwise colluded and will not otherwise collude with any person in any manner whatsoever in the tendering process.

\*[I/We] shall indemnify and keep indemnified the CIC against all losses, damages, costs or expenses arising out of or in relation to any breach of any of the representations and/or warranties above, including but not limited to damages for delay, costs and expenses of re-tendering and other costs incurred.

In this letter, the expression “Expected Communications” means \*[my/our] communications in strict confidence with:

- (i) \*[my/our] own insurers or brokers to obtain an insurance quotation for computation of tender price;
- (ii) \*[my/our] consultants or sub-contractors to solicit their assistance in preparation of tender submission; and
- (iii) \*[my/our] bankers in relation to financial resources for the Contract.

Signed for and on behalf of [ \_\_\_\_\_ ]  
name of the tenderer

by [ \_\_\_\_\_ ]<sup>2</sup>:  
name and position of the signatory

\_\_\_\_\_  
Name of Witness: \_\_\_\_\_

Signature of Witness: \_\_\_\_\_

Occupation: \_\_\_\_\_

Note:

\* Delete as appropriate

1. Where the tenderer comprises two or more persons or companies acting in partnership, joint venture or otherwise, this part in square brackets should be expanded to include the respective names and addresses of such persons or as the case may be companies.

2. Where the tenderer comprises two or more persons or companies acting in partnership, joint venture or otherwise, all such persons or as the case may be companies must sign. The signatory for each of such persons or companies shall be a person authorised to sign CIC contracts on behalf of that person or as the case may be company.

**APPENDIX C – Form of Tender**

**To be included  
in  
Fee Proposal**

FORM OF TENDER  
FOR  
RENOVATION WORKS  
OF SAFETY EXPERIENCE TRAINING CENTRE (SETC)  
AT KWAI CHUNG CAMPUS  
OF THE CONSTRUCTION INDUSTRY COUNCIL

**To: Construction Industry Council  
38/F, COS Centre,  
56 Tsun Yip Street,  
Kwun Tong, Kowloon,  
Hong Kong**

Dear Sirs,

1. Having examined the Conditions of Tender, Appendices to Conditions of Tender, Assignment Brief and its Annexes, Memorandum of Agreement, General Conditions of Employment, CIC's General Conditions of Contract and Guidelines for Works or Services (2b-CAR) and Contractor's Safety Requirements thereto for the execution of the above named Services, we offer to execute and complete the whole of the said Services in conformity with the said Conditions of Tender, Appendices to Conditions of Tender, Assignment Brief and its Annexes, Memorandum of Agreement, General Conditions of Employment, CIC's General Conditions of Contract and Guidelines for Works or Services (2b-CAR) and Contractor's Safety Requirements and the tender proposals submitted herewith within 180 Calendar Days including Sundays and Public Holidays from the date of contract awarded and for the sum of Hong Kong Dollars..... (HK\$.....) (not being subject to fluctuations in labour and material costs) or such sums as may be ascertained in accordance with the Conditions of Employment.
2. We agree to abide by this tender and not to withdraw it for a period of 120 days from the date fixed for receiving it and including that date and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

3. Unless and until a formal agreement is prepared and executed, this tender together with your written acceptance thereof subject to the provisions of Clause 2 hereof shall constitute a binding Contract between us.
4. We understand that you are not bound to accept the lowest or any tender you may receive.

Signature \_\_\_\_\_

In the capacity of \_\_\_\_\_

Duly authorized to sign tenders for and on behalf of \* \_\_\_\_\_

\_\_\_\_\_  
Registered Address of the Firm

\_\_\_\_\_  
Date \_\_\_\_\_

Witness \_\_\_\_\_

Address \_\_\_\_\_

Occupation \_\_\_\_\_

Date \_\_\_\_\_

Business Registration Certification No. \_\_\_\_\_

Name of Partner(s)

Residential Address of Partner(s)

- \* In the cases of a (a) Limited Company or (b) Partnership or unincorporated body, (a) the name of the Company or (b) the name(s) of the partner(s) must be inserted in the space provided above.

## **APPENDIX D – Fee Proposal**

**To be included  
in  
Fee Proposal**

FEE PROPOSAL  
FOR THE  
RENOVATION WORKS  
OF SAFETY EXPERIENCE TRAINING CENTRE (SETC)  
AT KWAI CHUNG CAMPUS (KCC)  
OF THE CONSTRUCTION INDUSTRY COUNCIL

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The Contractor shall be paid a Lump Sum fee of HK\$\_\_\_\_\_ for the provision of all services and all expenses incurred in connection with the carrying out and satisfactory completion of the Assignment as detailed in the Assignment Brief and its Annexes.

The tender is a lump sum price based on the drawings and specification.

The tenderer shall enclose with his tender the completed Schedule of Rates as below:

- (1) The Schedule of Rates shall be in sufficient details to indicate the breakdown of the works. Failure to submit the Schedule of Rates may cause his tender not to be considered by the Employer.
- (2) Any items which are not included in the Schedule of Rates but shown on the drawings or described in the specifications under the tender document shall be deemed to have been included in the tender figures.
- (3) Upon award of the Contract, the Schedule of Rates shall be deemed to be the Contractor's Schedules and will be regarded as firm and will not be subject to remeasurement (except PROVISIONAL quantity item if any) or adjustment whatsoever otherwise than in accordance with the expressed provisions of the terms of the Contract.
- (4) The total of the Schedule must agree with the amounts carried to the Summary of Tender. Any items which are not included in the Schedule but shown on the drawings or described in the specifications under the tender documents shall be deemed to have been included in the tender figures. The rates in the Schedule shall be used for the valuation of variations ordered by the Employer, but the quantities referred to in the Schedule shall not form part of the Contract Documents.
- (5) The tenderer should note that the quantities as inserted in the Schedule of Rates for all measured work should be consistent with those shown on the tender drawings and the drawings to be prepared and provided by the tenderer. Where large discrepancy or apparent inconsistency in the quantity of any item is identified, the item total will remain intact and the tenderer will be requested to adjust the unit rate and the quantity to tally with the item total.

- (6) The Tenderer is required to enter quantities, rate and the total against all items in the Schedule of Rates. The submitted quantities are at the sole risks of the tenderer. The Tenderer shall be deemed to have allowed for all other miscellaneous works which are not mentioned in the Specification nor or on the Drawings but which are indispensably necessary for the satisfactory completion of the Works.
- (7) Dimensions provided in the Schedule of Rates shall for reference only.
- (8) The Contractor's rates for the items contained in the Schedule of Rates shall be deemed to include cost of all incidentals of labour, material, plant (working or idle), supervision, general attendance, profit and all other things and matters necessary for the carrying out of the Works and all provisions of the Conditions of Contract and Specification and for the timely and satisfactory completion of the entire Works contained in the Contract.
- (9) If so required by the Architect / the CIC / the Quantity Surveyor, the Main Contractor shall submit further breakdown of the Schedule of Rates showing the build-up of any 'lump sums' included in the Schedule of Rates.



### **Schedule of Rates**

Table 1 - Detailed breakdown of tender price

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b><u>A</u></b>	<b><u>Preliminaries</u></b>				
A1.	Annexes 2 & 3	Allow for complying with the Standard Conditions, Drawings and Specification	1 Item		
A2.	Annexes 2 & 3	Provide all necessary temporary works including scaffoldings, strutting, propping, working platforms, hoarding, safety enclosures, etc. for the completion of the work.	1 Item		
A3.	Annexes 2 & 3	Provide all necessary temporary protection to existing works	1 Item		
A4.	Annexes 2 & 3	Allow for complying with the requirements of Buildings Department, Drainage Services Department, Environmental Protection Department, District Lands Office, other relevant Government Departments and Public Utilities Companies	1 Item		
A5.	Annexes 2 & 3	Insurance of Contractor All Risks and EC shall arrange by contractor / its insurance contractor (For EC, such policy shall be endorsed to cover the CIC as an insured party and shall include endorsements W338, W348 and W204; For CAR, a minimum coverage for third party liability is HK\$30,000,000.00 and shall be endorsed joint name with the CIC.	1 Item		
A6.	Annexes 2 & 3	Allow for all levies	1 Item		
A7.	Annexes 2 & 3	Provision of AS and TCP as required under current Buildings Ordinance	1 Item		
A8.	Annexes 2 & 3	Provide temporary electricity supply for the carrying out of the works	1 Item		
A9.	Annexes 2 & 3	Provide temporary water supply for the carrying out of the works	1 Item		
A10.	Annexes 2 & 3	Provide Contractor's site office	1 Item		

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>A</b>	<b><u>Preliminaries (Cont'd)</u></b>				
A11.	Annexes 2 & 3	Provide full time site management team	1 Item		
A12.	Annexes 2 & 3	Submit and obtain approval from architect / engineer all required shop drawings and sample of materials for the works before construction works proceed	1 Item		
A13.	Annexes 2 & 3	Provide all necessary mock-up works	1 Item		
A14.	Annexes 2 & 3	Provide all necessary warranty / guarantee as specified in drawings / Specification	1 Item		
A15.	Annex 4, Item 1.2.8	Provide 2% spare materials of all finishes for future maintenance purpose	1 Item		
A16.	Annexes 2 & 3	Discard and remove all debris arising from the works from the work site area	1 Item		
A17.	Annexes 2 & 3	Allow for making good, reinstatement and cleaning of all affected area to match existing	1 Item		
A18.	Annexes 2 & 3	Conduct detailed survey of existing services, liaise with the Management Office and the Employer for the temporary arrangement of all existing affected service pipes / cables / trunkings; all accessory diversion and / or protection and subsequent reinstatement to the services pipes / ductwork and its support / fixing shall be allowed to the satisfaction of the Management Office and the Employer	1 Item		
A19.	Annexes 2 & 3	Conduct condition survey to the Site, including G/F & 2/F;	1 Item		
A20.	Annexes 2 & 3	Preparation of initial surveys, record plans, shop drawings, working drawings, as-built drawings, etc. as required	1 Item		

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b><u>A</u></b>	<b><u>Preliminaries (Cont'd)</u></b>				
A21.	Annexes 2 & 3	Allow for other works not listed above but required by Design, Specification, Drawings and Statutory Requirements	1 Item		
A22.	Annexes 2 & 3	Allow for carrying out water ponding test of all completed waterproofing works as described upon completion including submission of reports, as specified in drawings / Specification	1 Item		
A23.	Annexes 2 & 3	Allow for carrying out infra-red thermographic scanning, as specified in drawings / Specification	1 Item		
Sub-Total (Section A) :					

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>B</b>	<b><u>Demolition</u></b>					
B1	<u>Demolish / remove / hack off and cart away the following existing works including all temporary works, associated fittings, fixings and making good affected area to match with existing and removal of all debris, etc., as shown on drawing Nos. AT-01-02, AT-01-21, AA-01</u>					
	(Dwg. Nrs AT-01-02, AT-01-21, AA-01)	a. Demolish existing non-structural wall	m2			
		b. Demolish existing steps	m2			
		c. Remove existing hoisting beams	m			
		d. Remove and reinstated existing equipment	No.			
		e. Remove existing door	No.			
		f. Remove existing R.C. sink	No.			
		g. Remove existing drainage items	Item			
		h. Remove existing window	No.			
		i. Hack off existing finish to existing cable trenches	m			
		j. Hack off existing internal floor finish to sound concrete to suit new finishes	m2			
		k. Hack off existing internal wall finish to sound concrete to suit new finishes	m2			
		l. Hack off existing internal ceiling finish to sound concrete to suit new finishes	m2			
		m. Relocated existing hose reel	Item			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>B</b>	<b><u>Demolition (Cont'd)</u></b>					
B2	<u>Repair all defective rendering and cracks</u>					
	Annex 4 – Section 11	a. Hammer tap the entire concrete/substrate surface to identify defective rendering/concrete/substrate including cracks	m2			
		b. Saw cut and hack off defective concrete / rendering / finishes till sound substrate as per Drawings and Specification <b>(PROVISIONAL)</b>	m2	50		
		c. Supply and apply all necessary primer, bond coat, repair mortar etc. for repairing all defective areas <b>(PROVISIONAL)</b>	m2	50		
		d. Repair cracks by v-cut and repair mortar <b>(PROVISIONAL)</b>	m	50		
		e. Repair cracks by injection method <b>(PROVISIONAL)</b>	m	50		
				Sub-Total (Section B) :		

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK</u></b>					
C1	<u>Reinforced Concrete; Grade C35/20</u> (as drawings No. AT-01-02)					
	Dwg. No. AT-01-02	a. Steps	m3			
	Dwg. No. AT-01-02	b. Wall	m3			
C2	Dwg. No. AT-01-02	<u>Sundry Concrete</u> (as drawings No. AT-01-02)  Mass concrete fill; Grade 20P	m3			
C3	Dwg. No. AA-02	<u>Reinforcement</u>  Steel bar (all size)	kg			
	<u>Formwork</u>					
C4	Dwg. No. AA-02	Sides of wall	m2			
C5	Dwg. No. AT-08-15	Sloping soffit of staircase	m2			
	<u>Edges and breaks; not exceeding 300mm wide</u>					
C6	Dwg. No. AT-08-15	Riser to steps	m			
C7	Dwg. No. AT-08-15	Sides of steps	m			
	<u>Partition</u>					
C8	Annex 4 Sec.20 (Dwg. Nos. AT-04-01, AT-07-10, AT-08-21 – AT-08-24)	500x500x80mm thick gypsum block wall; “Multigips” brand, Germany origin, Kwan Tai Engineering Co., Ltd.; all as described in the Specification (WL-03)	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Partition (Cont'd)</u>					
C9	Annex 4 Sec.2 (Dwg. Nos. AT-08-04 & AT-08-05)	"Y-Tong" R.C. block wall; or other approved equivalent block wall; including all steel frames, R.C. lintel, R6 dowel bars, bolts, backing rod, sealant, fire seal, expanded steel lath, G.M.S. angel, 102x51x10.42 kg/m channel, steel plate and all necessary fixing accessories (WL-04)	m2			
C10	Annex 4 Sec.23 (Dwg. Nos. AT-04-01 & AT-07-32)	Design to approval, supply and install for 9mm thick cement board dry wall system, , subject to the approval by the Architect / CIC; "Hofmann Board" brand, "Hofmann Construction Material Limited", complete with all necessary sub-frame; all as described in the Specification (WL-05)	m2			
	<u>External Wall Finishes</u>					
C11	Annex 4 Sec.6	Bond coat / spatterdash coat; all as described in the Specification	m2			
C12	Annex 4 Sec.9 (Dwg. No. AT-04-02)	25mm thick (minimum) waterproofing cement sand screed with polymer bonding air and additive, nitobond SBR, China origin, Fosroc Hong Kong Limited; all as described in the Specification (SC-01)	m2			
C13	Annex 4 Sec.9 (Dwg. No. AT-04-02)	Waterproofing system; Brushbond FLX III waterproofing system, China Origin, Fosroc Hong Kong Limited; all as described in the Specification (WP-01)	m2			
C14	Annex 4 Sec.5 (Dwg. No. AT-04-02)	External acrylic texture paint system; compo silicon with texture paint, Japan origin, SKK Paint (H.K.) Co., Ltd.; all in accordance with manufacturer's recommendations; all as described in the Specification (PT-02)	m2			
	<u>Internal Floor Finishes</u>					
C15	Annex 4 Sec.6	Bond coat / spatterdash coat; all as described in the Specification	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Internal Floor Finishes (Cont'd)</u>					
C16	Annex 4 Sec.6	25mm thick (minimum) cement sand screed; all as described in the Specification	m2			
C17	Annex 4 Sec.9 (Dwg. No. AT-04-02)	50mm thick (minimum) waterproofing cement sand screed with polymer bonding air and additive, nitobond SBR, China origin, Fosroc Hong Kong Limited; all as described in the Specification (SC-01)	m2			
C18	Annex 4 Sec.9 (Dwg. No. AT-04-02)	Waterproofing system with vapor barrier; proofex geomembrane waterproofing system; China origin, Fosroc Hong Kong Limited, all as described in the Specification (WP-02)	m2			
C19	Annex 4 Sec.6 (Dwg. No. AT-04-02)	Self-leveling screed, E Mix Flowment 550, Signal Plus Building Supplies Ltd.; all as described in the Specification (SC-02)	m2			
C20	Annex 4 Sec.6 (Dwg. No. AT-04-01)	3000x1000x6mm thick stone tile; brand "Slender", Katanar model; Italy origin, GMA stone (HK) Co., Ltd. (FL-01)	m2			
C21	Annex 4 Sec.6 (Dwg. Nos. AT-04-01, AT-07-13 & AT-07-14)	2mm thick homogeneous vinyl floor in pattern; "Tarkett" brand, "Eclipse premium" series, Sweden Origin, Signal Plus Building Supplies Ltd. (FL-02-01, FL-02-02A, FL-02-02B, FL-02-02C, FL-02-06, FL-02-03A, FL-02-03B, FL-02-04, FL-02-05)	m2			
C22	Annex 4 Sec.6 (Dwg. No. AT-04-01)	500x500mm wide carpet tile flooring, "Voxflor" brand, China origin, Signal Plus Building Supplies Ltd. (FL-03)	m2			
C23	Annex 4 Sec.6 (Dwg. No. AT-04-02)	3000x1000x3mm thick porcelain tile; "Laminam" brand, Italy origin, Buona Idea building Material (Int'l) Ltd. (FN-01 & FN-02)	m2			
C24	Annex 4 Sec.6 (Dwg. No. AT-04-02)	3000x1000x3mm thick porcelain tile; "Levantina" brand, Spain origin, GMA Stone (HK) Co. Ltd. (FN-03)	m2			



Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
C25	Annex 4 Sec.3 (Dwg. No. AT-04-02)	1.5mm thick grade 304 hairline stainless steel skirting (SK-01)	m			
	<b><u>Internal Wall Finishes</u></b>					
C26	Annex 4 Sec.6	Bond coat / spatterdash coat; all as described in the Specification	m2			
C27	Annex 4 Sec.5	Surface Preparation; apply two layers of approved tile filler as "SK TILE FILLER" (of brand SKK) or approved equivalent; all in strict accordance with manufacturer's instructions; all as described in the Specification	m2			
C28	Annex 4 Sec.6	25mm thick (minimum) cement sand screed; all as described in the Specification	m2			
C29	Annex 4 Sec.5 (Dwg. No. AT-04-02)	Internal resin paint system; compo urethane W, Japan origin, SKK Paint (H.K.) Co. Ltd.; all in accordance with manufacturer's recommendations; all as described in the Specification (PT-01)	m2			
C30	Annex 3 Item 3 (Dwg. No. AT-07-04 )	Design and build for entrance TV wall with leaflet to the Architect's approval, complete with all necessary frame and fixing accessories				
C31	Annex 3 Item 3 (Dwg. Nos. AT-04-01, AT-07-04 – AT-07-08)	Design to approval, supply and install for 19mm thick thin concrete panel system, subject to the approval by the Architect / CIC; "Richter Akustik & Design" brand; Belgium origin, Super Star Co. Ltd, including all necessary support frame (WL-01)	m2			
C32	Dwg No. AT-07-41 – AT-07-43	Design and build for feature column at briefing area 1, subject to the approval by the Architect / CIC; comprise of 3mm thick (minimum) aluminium panel (FN-07), 3mm thick porcelain tile (FN-03), accessed panel, 12mm diameter S.S. rod, 25x25x5mm thick s.s. angel and all necessary fixing accessories	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Internal Ceiling Finishes</u>					
C33	Annex 4 Sec.6	Bond coat / spatterdash coat; all as described in the Specification	m2			
C34	Annex 4 Sec.5	Surface Preparation; apply two layers of approved tile filler as "SK TILE FILLER" (of brand SKK) or approved equivalent; all in strict accordance with manufacturer's instructions; all as described in the Specification	m2			
C35	Annex 4 Sec.6	25mm thick (minimum) cement sand screed; all as described in the Specification	m2			
C36	Annex 4 Sec.5 (Dwg. No. AT-04-02)	Internal resin paint system; composite urethane W, Japan origin, SKK Paint (H.K.) Co. Ltd.; all in accordance with manufacturer's recommendations; all as described in the Specification (PT-01)	m2			
C37	Annex 4 Sec.19 (Dwg. Nos. AT-04-01, AT-07-24 – AT-07-28)	12mm thick (minimum) gypsum ceiling, including all necessary supporting frame / gird; subject to Architect's approval; all as described in the Specification (CL-01)	m2			
C38	Annex 4 Sec.19 (Dwg. Nos. AT-04-01, AT-07-24 – AT-07-28, AT-07-34, AT-07-35, AT-08-08)	Design to approval, supply and install for 300x100x25mm high aluminium baffle ceiling, subject to the approval by the Architect / CIC; power coated in 3 layers to CIC black; "Branfon" brand, China Origin, Vertex Building Materials Ltd., all as described in the Specification (CL-02-01 to CL-02-03)	m2			
C39	Annex 4 Sec.19 (Dwg. Nos. AT-04-01, AT-07-24 – AT-07-28, AT-08-09)	600x600x15mm thick acoustic rockwool ceiling tiles, "Rockfon" exposed grid / recess edge brand, China origin, Vertex Building Materials Ltd., all as described in the Specification (CL-03)	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Steel and Metal Works</u>					
C40	Annex 4 – Section 16 (Dwg. Nos. AT-05-01, AT-05-21)	<u>50mm thick self-closing metal honey comb core door; comprise of grade 316 hairline finished stainless steel frame and 1.5mm thick min. grade 316 hairline stainless steel finished face panel on both faces complete with door closer, lever handle all necessary silicone sealant, fixing lug/anchor bolt, hinge, ironmongeries and all necessary fixing accessories; all in strict accordance with manufacturer's instructions and all as described in the Specification</u>  M1: Single-leaf door with ironmongeries; 850 x 2100mm high (Zone A)	No.			
C41	(Dwg. Nos. AT-08-10)	Stainless steel manhole matching cover complete with all necessary s.s. angle frame, ironmongeries, finishing works and fixing accessories  Overall size approx. 900 x 900mm high	No.			
C42	Annex 4 Sec.3 (Dwg. No. AT-04-01)	Design to approval, supply and install for Corrugated metal sheet, subject to the approval by the Architect / CIC; power coated to CIC green, "Widevelop" brand, "Widevelop (Hong Kong) Ltd.", all in accordance with manufacturer's recommendations; all as described in the Specification (WL-02)	m2			
C43	Annex 4 Sec.18 (Dwg. Nos. AT-04-02 & AT-07-09)	Design to approval, supply and install for 3mm thick (minimum) aluminium panel with PVDF coating; subject to the approval by the Architect / CIC; complete with all necessary supporting frame; including all necessary silicone sealant, fixing lug/anchor bolt, ironmongeries and all necessary fixing accessories; all in strict accordance with manufacturer's instructions (FN-07)	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Steel and Metal Works (Cont'd)</u></b>					
C44	Annex 4 Sec.3 (Dwg. No. AT-07-04)	Design to approval, supply and install for 1.5mm thick (minimum) decorative stainless steel leaflet rack (FN-11), subject to the approval by the Architect / CIC; "Cobelco" brand, hairline finishes, complete with all necessary fixing and accessories	m2			
C45	Annex 4 Sec.3 (Dwg. Nos. AT-07-07 & AT-07-08)	Design to approval, supply and install for 1.5mm thick (minimum) dismountable hairline stainless steel panel (FN-11) to cover the TV and associate devices, subject to the approval by the Architect / CIC; "Cobelco" brand, hairline finishes, complete with all necessary fixing and accessories	m2			
C46	Annex 4 Sec.3 (Dwg. Nos. AT-04-02 & AT-07-09)	Design to approval, supply and install for oriented strand board (FN-11), subject to the approval by the Architect / CIC; complete with all necessary fixing and accessories AT-04-02 and AT-07-09  Overall size : 1722x1045mm high	m2			
C47	Annex 4 Sec.17 (Dwg. No. AT-08-07)	Design to approval, supply and install for powder coated aluminium louvre for A/C rack, subject to the approval by the Architect / CIC; comprise of 40x12mm thick aluminium hollow section blades bolted to 50x50x5mm thick aluminium angle, 50x50x5mm thick S.S. angle; 50x40x150mm aluminium angle, 32mm diameter PVC condensation pipe, complete with screws, bolts & nuts, necessary fillet weld, etc; all necessary fixing accessories and all in accordance with manufacturer's instruction; all as described in Specification Overall size: approximate 22000x575x1000mm high	No.			
C48	Annex 4 Sec.3 (Dwg. Nos. AT-04-02, AT-07-09 & AT-07-10)	Design to approval, supply and install for 1mm thick aluminium ally circle cut out mesh (FN-4), subject to the approval by the Architect / CIC; "Alrox" brand, Widevelop (Hong Kong) ltd., complete with all necessary fixing and accessories	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Steel and Metal Works (Cont'd)</u>					
C49	Annex 3 Item 3 (Dwg. Nos. AT-04-02, AT-07-05)	Design to approval, supply and install for decorative film on glass, subject to the approval by the Architect / CIC; "Envision LX 480Cv3 Non-PVC graphic film", 3M fascia glass finishes; 3M Hong Kong Ltd., complete with all necessary pattern, including all necessary fixing accessories (FN-09-01)	m2			
C50	Annex 3 Item 3 (Dwg. Nos. AT-04-02 & AT-09-03)	<u>Typical zone signage: 3M decorative film on wall / tile; "Scotchcal IJ8150 clear view graphic film"; including necessary wording, warning stripe (FN-09-02)</u>				
		to wall; English font style : 'Danger Zone Warning' - "ZONE A, PERSONAL PROTECTIVE EQUIPMENT"; Chinese font style : ' Simhei' - "區域 A：個人防護裝備"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE B, WORKING AT HEIGHT"; Chinese font style : ' Simhei' - "區域 B：離地工作安全訓練"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE C, LIFTING & RIGGING PLANT"; Chinese font style : ' Simhei' - "區域 C：起重吊運設備"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE D, FIRE SAFETY"; Chinese font style : ' Simhei' - "區域 D：消防安全"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE E, CHEMICAL AND ELECTRICAL SAFETY"; Chinese font style : ' Simhei' - "區域 E：安全使用化學物品及電力"	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Steel and Metal Works (Cont'd)</u></b>					
C50	Annex 3 Item 3 (Dwg. Nos. AT-04-02 & AT-09-03)	to wall; English font style : 'Danger Zone Warning' - "ZONE F, GOOD HOUSE KEEPING"; Chinese font style : ' Simhei' - "區域 F : 良好工地整理"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE G, MACHINERY & TRAPPING HAZARD"; Chinese font style : ' Simhei' - "區域 G : 機械操作及切 割夾捲危害"	No.			
		to wall; English font style : 'Danger Zone Warning' - "ZONE H, VR CAVE "; Chinese font style : ' Simhei' - "區域 H : 虛擬實境訓練"	No.			
C51	Annex 3 Item 3 (Dwg. Nos. AT-04-02, AT-07-16 – AT-07-18)	Vinyl sticker, 3M decorative film on top of WL-01 wall tile, "3M" brand (FN-09-02)	m2			
C52	Annex 4 – Section 17 (Dwg. Nos. AT-05-11, AT-05-31, AT-05-32, AT-08-11)	<u>Weatherproof type louver, comprise of 50mm thick natural anodized aluminium section frame with PVF3 coated finish; complete with M.S. fixing lug, waterproofing cement grout, M8 expansion bolt and ironmongery etc; all necessary fixing accessories and all in accordance with manufacturer's instruction; all as described in Specification</u>				
		a. L1: Louver with aluminium blade; 1450mm wide x 650mm high (External)	No.			
		b. L2: Louver with aluminium blade; 3350mm wide x 650mm high (External)	No.			
		c. L3: Louver with aluminium blade; 1350mm wide x 650mm high (External)	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Glazing</u>					
C53	Annex 4 – Section 4 (Dwg. Nos. AT-05-02, AT-05-25)	<u>-/120/120 F.R.R. tempered glass doors comprise of grade 304 hairline finished stainless steel frame; complete with door hinge, door closer, back to back fixing type door pull handle, 75 x 3mm thick G.M.S. plate, 20 x 20 x 1.5mm thick G.M.S. glazing bead, 100 x 50 x 5mm thick G.M.S. hollow, all necessary fixing accessories: all in strict accordance with manufacturer's instructions and all as described in the Specification</u>  G1 : Double-leaf door with ironmongeries, 1600 x 2100mm high (Entrance to reception)	No.			
C54	Annex 4 Sec.7 (Dwg. No. AT-07-05)	<u>Design to approval, supply, install and calculations for glass wall, subject to the approval by the Architect / CIC; complete with 12mm thick (minimum) tempered clear glass wall; comprised of GMS supporting frame, GMS channel, S.S. channel and all necessary sealant joint, all fittings, fixing lugs, brackets, screws, bolts, ironmongery and including all necessary fixing accessories (FN-08)</u>	m2			
C55	Annex 4 Sec.7 (Dwg. Nos. AT-05-02 & AT-07-05)	<u>Extra over for 12mm thick super white clear tempered glass sliding door, complete with auto sliding door system, GMS supporting frame, GMS channel in power coated colour, S.S. channel and all necessary ironmongeries and fixing accessories</u>  G2 : Sliding door with ironmongeries, 1000 x 2700mm high (Office)	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Furniture and Equipment</u></b>					
C56	Annex 3 Item 3 (Dwg. No. AT-05-51)	Office chair; "POSH Activity Chair", Asia origin, POSH – Herman Miller (Dongguan) Furniture Co., Ltd. (F-01)  Overall size : 720x700x1290mm high	No.			
C57	Annex 3 Item 3 (Dwg. No. AT-05-51)	Desk; "Imagine desk", Asia origin, POSH – Herman Miller (Dongguan) Furniture Co., Ltd. (F-02)  Overall size : 2075x600x725mm high	No.			
C58	Annex 3 Item 3 (Dwg. No. AT-05-51)	Office cabinet; "POSH – CK8 Return Cabinet", Asia origin, POSH – Herman Miller (Dongguan) Furniture Co., Ltd. (F-03)  Overall size : 1200x450mm wide	No.			
C59	Annex 3 Item 3 (Dwg. No. AT-05-52)	Desk with drawer, "Imagine Desh with CK8 drawer", Asia origin, POSH – Herman Miller (Dongguan) Furniture Co., Ltd. (F-04) Overall size : Desk 1200x600x725mm high MP : 300x500x635mm high	No.			
C60	Annex 3 Item 3 (Dwg. No. AT-05-52)	RFID smart card locker, Asia origin, Ansen Security Networks Ltd., complete with smart card operated lockers, 32 compartments, using existing TPTG operating (F-05)  Overall size : 2880x450x1880mm high	No.			
C61	Annex 3 Item 3 (Dwg. No. AT-05-52)	Storage cabinet, PK4 model, Asia origin, POSH – Herman Miller (Dongguan) Furniture Co., Ltd. (F-06)	No.			
C62	Annex 3 Item 3 (Dwg. No. AT-05-53)	LG Ultra HD TV 40UF7700, LG brand, Korea origin, 4K resolution, with network (wi-fi) and USB 3.0/2.0, LG.COM.HK supplier, complete with adjustable wall mount device (E-01)  Oversize : 40 inch 906x524x56.7mm thick	No.			



Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Furniture and Equipment (Cont'd)</u>					
C63	Annex 3 Item 3 (Dwg. No. AT-05-53)	LG SJ9500, LG brand, Korea origin, 4K resolution, with network (wi-fi) and USB 3.0/2.0, LG.COM.HK supplier, complete with adjustable wall mount device (E-02)  Oversize : 55 inch 1228x765x57mm thick	No.			
C64	Annex 3 Item 3 (Dwg. No. AT-05-53)	LG 75UH5C, LG brand, Korea origin, 4K resolution, with network (wi-fi) and USB 3.0/2.0, LG.COM.HK supplier, complete with adjustable wall mount device (E-03)  Oversize : 75 inch 1682x960.3x39.7mm thick	No.			
C65	Annex 3 Item 3 (Dwg. No. AT-05-53)	iPad Pro, Apple brand, California origin, 2224x1668 resolution at 264 pixels per inch (PPI), network (Wi-Fi), Apple.com/hk supplier (E-04)  Overall size : 10.5 inch 250.6x174.1x6.1mm thick	No.			
C66	Annex 3 Item 3 (Dwg. Nos. AT-07-01 – AT-07-03)	Design and build for reception counter, subject to the approval by the Architect / CIC; complete with 3mm thick checker plate porcelain tile (FN-01), 3mm thick wooden textured porcelain tile (FN-02), 3mm thick hairline stainless steel (FN-10), void for cable access, 6mm thick dark stone tiled recessed skirting (FN-01), wooden textured plastic laminate (PL-02), drawer with concealed handle; complete with and all necessary ironmongeries and fixing accessories  Overall size : (1630x400+ 2725x700+ 1650x400) x 1050mm high	No.			
C67	Annex 4 Sec.21 (Dwg. No. AT-07-19)	Shelving unit, comprise of 450x450x12mm thick and 130x130x12mm thick plywood shelving unit, complete with 1.5mm thick (minimum) plastic laminate (PL-02) on all and both sides of 12mm plywood, 3M decorative film	m2			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Furniture and Equipment (Cont'd)</u></b>					
C68	Annex 3 Item 3 (Dwg. Nos. AT-02-02, AT-04-02 & AT-07-20)	Design and build for 150x200x19mm thick hanging feature "I-beam" trimmed in line with the adjoining dry wall (tilted), subject to the approval by the Architect / CIC; comprise of 19mm thick plywood and Formica Plastic Laminate in 'Metal Look' finish (PL-04); complete with all necessary fixing accessories	m			
C69	Annex 3 Item 3 (Dwg. No. AT-07-21)	Design and build for partition feature, subject to the approval by the Architect / CIC; comprise of 25x25mm RHS, 30x30mm aluminium capping; complete with all necessary fixing accessories  Overall size 2380x3580mm high	m2			
C70	Annex 4 Sec.7 (Dwg. No. AT-07-22)	Design and build for notice panel for all zones, subject to the approval by the Architect / CIC; comprise of 6+6mm super clear white tempered glass panel, hairline grade 304 s.s. bolt connection, necessary text description in 3M graphic, (content of description to be provided by CIC); complete with all necessary fixing accessories	No.			
C71	Annex 4 Sec.3 (Dwg. No. AT-07-23)	Design and build for display rack, subject to the approval by the Architect / CIC; comprise of 30x30x3mm thick GMS angle frame, 3mm thick GMS shelves, 5x5mm square wire mesh in colour coated, 3mm thick GMS panels, 1155x1178mm high 3mm thick GMS cabinet door with lock; including forming opening for TV (E-01) to be mounted on wall; complete with all necessary fixing accessories	m2			
C72	Annex 4 Sec.3 (Dwg. No. AT-07-23)	Extra over for 1155x1178mm high cabinet door with lock in colour powder coated 3 layers, comprise of 3mm thick GMS panels, 3mm thick GMS shelves, hinges; complete with all necessary ironmongeries and fixing accessories	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Furniture and Equipment (Cont'd)</u></b>					
C73	Annex 4 Sec.21 (Dwg. No. AT-07-24 & AT-07-25)	Design and build for shelf for storage area, subject to the approval by the Architect / CIC; comprise of 12mm plywood, 1.2mm thick Formica plastic laminate (PL-02), complete with all necessary fixing accessories  Overall size : 2080x1800x350mm thick	No.			
C74	Annex 4 Sec.3 (Dwg. Nos. AT-07-29 & AT-07-30)	Design and build for aluminium truss feature system powder coated black, subject to the approval by the Architect / CIC; comprise of 500x500x20mm thick metal plate, 18mm thick metal plate, 12mm diameter stainless steel rod, metal shoes base, complete with Hilti anchor bolt, 4mm thick fillet weld, M10 Hilti anchor bolt and all necessary fixing accessories	No.			
C75	Annex 4 Sec.21 (Dwg. Nos. AT-04-02 & AT-07-36)	Design and build for display tool board with 20 diameter s.s. hanger, subject to the approval by the Architect / CIC and all necessary fixing accessories	No.			
C76	Annex 4 Sec.21 (Dwg. Nos. AT-04-02 & AT-07-36)	Design and build for cabinet comprise of 12mm thick plywood, Formical plastic laminate (PL-01), lock and all necessary fixing accessories  Overall size : 1730 x 700 x 500mm deep	No.			
C77	Annex 4 Sec.3 (Dwg. No. AT-08-06)	3mm thick s.s. access door for fire hose reel, comprise of 20mm thick plywood with 1.5mm thick s.s. finish on external face, s.s. frame, magnetic door hatch, 12x12x1.5mm thick s.s. door stop with s.s. screw fix, 50x25x1.5mm thick s.s. frame, 1.5mm thick clear acrylic signage plate with silk screen printing message, 1.5mm thick hairline s.s. signage panel with text in acid edged; complete with piano hinge, conceal pull handle and all necessary ironmongeries and fixing accessories  Overall size : 800 x 800mm high	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Furniture and Equipment (Cont'd)</u>					
C78	Dwg. Nos. AT-05-03, AT-05-23	50mm thick hardwood solid core self-closing door; comprised of hardwood frame, plastic laminate (PL01) on both sides; complete with lever hander with door closer, lever handle, 200 x 200mm stainless steel close door signage (type II), ironmongeries, painting and all necessary wood preservative, painting and coating; all in strict according with manufacturer's instruction and all as described in the <u>Specification</u>  D1 : Single-leaf door with ironmongeries; 850 x 2100mm high (VR room)	No.			
C79	-	50mm thick concealed doors; comprised of hardwood frame, thin concrete panel system (WL-01) on hardwood door, internal resin paint (PT-01) on inner side; complete with lever hander with lever handle, ironmongeries, painting and all necessary wood preservative, painting and coating; all in strict according with manufacturer's instruction and all as described in the <u>Specification</u>				
	Dwg. Nos. AT-05-03, AT-05-23	a. D3L: Single-leaf door with ironmongeries; 650 x 2100mm high (VR room, CCTV server room, Storage room)	No.			
	Dwg. Nos. AT-05-03, AT-05-23	b. D3R: Single-leaf door with ironmongeries; 650 x 2100mm high (CCTV server room)	No.			
	Dwg. Nos. AT-05-04, AT-05-23	c. D4R: Single-leaf door with ironmongeries; 500 x 2100mm high (Storage room)	No.			
	Dwg. Nos. AT-05-04, AT-05-23	d. D4L: Single-leaf door with ironmongeries; 500 x 2100mm high (Storage room)	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Furniture and Equipment (Cont'd)</u></b>					
C80	Dwg. No. AT-05-05	<u>50mm thick -/60/60 F.R.R. hardwood solid core panel; comprised of Internal Resin Paint (PT-01) on inner side, Thin Concrete Panel System (WL-01) on outer side; complete with fixing lug/anchor bolt, ironmongeries and all necessary fixing accessories; all in strict according with manufacturer's instruction and all as described in the Specification</u>  PD1: 450 x 900mm high (Zone F)	No.			
C81	Dwg. No. AT-05-05	<u>50mm thick -/60/60 F.R.R. hardwood solid core panel; comprised of Internal Resin Paint (PT-01) on inner side, Porcelain E Tile (FN-03) on outer side, 3mm thick hairline stainless steel trim covering the finish; complete with fixing lug/anchor bolt, ironmongeries and all necessary fixing accessories; all in strict according with manufacturer's instruction and all as described in the Specification</u>  PD2: 900 x 750mm high (Briefing area)	No.			
C82	Annex 4, Section 26 Dwg. No. AT-07-04	<u>Supply, installation and test &amp; commissioning digital signage system "BrightSign XT1143"; supplier of "Pacific Datacom (HK) Ltd.; complete with all necessary fixing accessories; all in strict according with manufacturer's instruction and all as described in the Specification</u>	No.			
	<b><u>Signage</u></b>					
C83	Dwg. No. AT-09-01	<u>Exit signage; complete with polycarbonate exit sign plate; stainless steel hairline box; including all necessary fixing accessories etc.; all as described in Specification</u>  "EXIT/出口" overall size 750 x 265mm high; 4 Nos. 125mm high green lettering or green graphic; 2 Nos. 125mm high green lettering or green graphic Chinese characters (S-01)	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Signage (Cont'd)</u></b>					
C84	Dwg. No. AT-09-02	<p><u>Door sign; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u></p> <p>“STORE ROOM / 儲物房” overall size 720 x 320mm high; 9 Nos. 50mm high acid etched print with paint finish English characters; 3 Nos. 70mm high acid etched print with paint finish Chinese characters (S-02)</p>	No.			
C85	Dwg. No. AT-09-02	<p><u>No smoking sign; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u></p> <p>“NO SMOKING / 不准吸煙” overall size 500 x 900mm high; 9 Nos. Acid etched print with paint finish English characters; 4 Nos. acid etched print with paint finish Chinese characters (S-03)</p>	No.			
C86	Dwg. No. AT-09-04	<p><u>Reception signage; including all necessary fixing accessories etc.; all as described in Specification and as drawing No. AT-09-04</u></p> <p>“CONSTRUCTION INDUSTRY COUNCIL / 建造業議會” overall size 2500 x 1100 mm high; 27 Nos. 120mm high complete with 3mm hairline stainless steel English characters, 5 Nos. 250mm high complete with 3mm hairline stainless steel Chinese characters; 1 No. “CIC LOGO”; complete with 3mm thick aluminium in baked enamel finish</p>	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<b><u>Signage (Cont'd)</u></b>					
C87	Dwg. No. AT-09-04	<p><u>Entrance signage; including all necessary fixing accessories etc.; all as described in Specification and as drawing No. AT-09-04</u></p> <p>“SAFETY EXPERIENCE TRAINING CENTRE / 安全體驗訓練中心” overall size 1450 x 520 mm high; 30 Nos. 60mm high complete with 3mm hairline stainless steel English characters, 8 Nos. 110mm high complete with 3mm hairline stainless steel Chinese characters; 1No. “CIC LOGO”; complete with 3mm thick aluminium in baked enamel finish</p>	No.			
C88	Dwg. No. AT-09-02	<p><u>First aid sign; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u></p> <p>“For First Aid, call 2100-9054 / 如需急救, 致電 2100-9054” overall size 220 x 330mm high; 31 Nos. letters; 6 Nos. Chinese characters (S-05)</p>	No.			
C89	Dwg. No. AT-09-02	<p><u>Door sign plate; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u></p> <p>“SEVER ROOM / 伺服器機房” overall size 200 x 100mm high; 10 Nos. Acid etched print with paint finish English characters; 5 Nos. acid etched print with paint finish Chinese characters (S-06)</p>	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Signage (Cont'd)</u>					
C90	Dwg. No. AT-09-02	<u>Pull sign label; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u>  “Pull/拉” overall size 100 x 100mm; 4 Nos. English characters; 1 No. Chinese characters	No.			
C91	Dwg. No. AT-09-02	<u>Push sign label; complete with 1.5mm thick grade 304 stainless steel plate in hairline finishes; grade 304 stainless steel lettering with English lettering and Chinese characters cut to shape; including all necessary fixing accessories etc.; all as described in Specification</u>  “Push/推” overall size 100 x 100mm; 4 Nos. English characters; 1 No. Chinese characters	No.			
C92	Dwg. No. AT-09-04	<u>Reception signage; complete with s.s. supporting and hairline s.s. rod; including all necessary fixing accessories etc.; all as described in Specification and as drawing No. AT-09-04</u>  “CONSTRUCTION INDUSTRY COUNCIL / 建造業議會” overall size 2500 x 1100 mm high; 27 Nos. 120mm high complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING” English characters, 5 Nos. 250mm high complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING” Chinese characters; 1 No. “CIC LOGO”; complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING”	No.			



Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>C</b>	<b><u>BUILDER'S WORK (CONT'D)</u></b>					
	<u>Signage (Cont'd)</u>					
C93	Dwg. No. AT-09-04	<p><u>Entrance signage; complete with s.s. supporting and hairline s.s. rod; including all necessary fixing accessories etc.; all as described in Specification and as drawing No. AT-09-04</u></p> <p>“SAFETY EXPERIENCE TRAINING CENTRE / 安全體驗訓練中心” overall size 1450 x 520 mm high; 30 Nos. 60mm high complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING” English characters, 8 Nos. 110mm high complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING” Chinese characters; 1No. “CIC LOGO”; complete with 1.5mm thick grade 304 hairline stainless steel printed by “ETCHING”</p>	No.			
C94	-	<p><u>OTHERS</u></p> <p>Allow for other works not listed above but required by the Design, Specification, Drawings and Statutory Requirements. (The Contractor shall place a value and submit a detailed breakdown of the items with Quantities and Rates, or write 'Nil').</p>				
			Sub-Total (Section C) :			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>D</b>	<b><u>MVAC Installation</u></b>					
<b>D1</b>	<b><u>Preliminaries</u></b>					
D1.1	Annex 6	Allow for production of shop drawings and builder's work drawings.	Item			
D1.2	Annex 6	Allow for as-built drawings and O&M manual.	Item			
D1.3	Annex 6	Allow for liaison with Government's Authorities and Supply Company (BD/EPD/FSD/EMSD/CLP/WSD).	Item			
D1.4	Annex 6	Allow for providing testing and commissioning.	Item			
D1.5	Annex 6	Allow for providing testing and commissioning.	Item			
D1.6	Annex 6	Allow for providing training course to Employer.	Item			
D1.7	Annex 6	Allow for labelling, painting and identification.	Item			
<b>D2</b>	<b><u>VRV Air Conditioning System</u></b>					
	Indoor fresh air processing unit complete with wired remote controller, hanger, support, painting and all necessary accessories.					
D2.1	AC-101	PAU-1	No			
	Wall mounted outdoor unit complete with steel frame, mounting support, vibration isolator, electrical and control wiring work, emergency stop button and minor works submission (if necessary) and all necessary accessories					
D2.2	AC-101	VRV-OU	No.			
<b>D3</b>	<b><u>Split Type Air Conditioning System</u></b>					
	1 to 1 cassette type split air conditioner complete with wired remote controller, BMS interface, adapter, hanger, support, painting and all necessary accessories.					
D3.1	AC-101	AC-IU-1/AC-OU-1;	No			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
	1 to 1 cassette type split air conditioner complete with wired remote controller, BMS interface adapter, back-up auto control unit, hanger, support, painting and all necessary accessories.					
D3.2	AC-101	AC-IU-2/AC-OU-2; AC-IU-3/AC-OU-3;	No			
	1 to 1 cassette type split air conditioner complete with wired remote controller, BMS interface adapter, hanger, support, painting and all necessary accessories.					
D3.3	AC-101	AC-IU-4/AC-OU-4; AC-IU-5/AC-OU-5; AC-IU-6/AC-OU-6; AC-IU-7/AC-OU-7; AC-IU-8/AC-OU-8	No			
	1 to 1 duct type split air conditioner complete with wired remote controller, BMS interface adapter, hanger, support, painting and all necessary accessories.					
D3.4	AC-101	AC-IU-9/AC-OU-9; AC-IU-10/AC-OU-10; AC-IU-11/AC-OU-11	No			
D3.5	AC-101	AC-IU-12/AC-OU-12	No			
<b>D4</b>	<b><u>Ventilation Fan System</u></b>					
	Inline centrifugal fan c/w fan cabinet, motor, vibration isolators, support, control, wiring, emergency stop button, mounting, support and all necessary accessories					
D4.1	AC-101	EAF-1; EAF-2; EAF-3	No.			
D4.2	AC-101	EAF-4	No.			
<b>D5</b>	<b><u>Refrigerant and Condensate Drain Pipe System</u></b>					
	Refrigerant pipe c/w thermal insulation, fittings, supports and all necessary accessories					
D5.1	AC-101	Ø6.4	m			
D5.2	AC-101	Ø9.5	m			
D5.3	AC-101	Ø15.9	m			
	Aluminium cladding for refrigerant pipe exposed to view or at outdoor complete with all necessary accessories (the following size to be nominal size of pipework)					

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
D5.4	AC-101	Ø25	m			
D5.5	AC-101	Ø32	m			
D5.6	AC-101	Ø40	m			
	Aluminium cladding for refrigerant pipe exposed to view or at outdoor complete with all necessary Accessories (the following size to be nominal size of pipework)					
D5.7	AC-101	Ø6.4	m			
D5.8	AC-101	Ø9.5	m			
D5.9	AC-101	Ø15.9	m			
	Aluminium cladding for condensate drain pipe exposed to view or at outdoor complete with all necessary accessories (the following size to be nominal size of pipework)					
D5.10	AC-101	Ø25	m			
D5.11	AC-101	Ø32	m			
D5.12	AC-101	Ø40	m			
<b>D6</b>	<b><u>Air Distribution System</u></b>					
	Bare rectangular ducts, duct plenums of galvanized sheet steel, sealant, gasket, hangers and supports, connectors and all necessary accessories		No.			
D6.1	AC-101	0.6 mm thick	m <sup>2</sup>			
D6.2	AC-101	0.8 mm thick	m <sup>2</sup>			
D6.3	AC-101	1.0 mm thick	m <sup>2</sup>			
D6.4	AC-101	1.2 mm thick	m <sup>2</sup>			
D6.5	AC-101	Thermal insulation c/w vapour barrier, adhesive and all necessary accessories	m <sup>2</sup>			
D6.6	AC-101	Aluminium cladding for insulated air ductwork exposed to view c/w all necessary accessories	m <sup>2</sup>			
	Linear grille and all necessary accessories					
D6.7	AC-101	250 (W)	m			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
D6.8	AC-101	300 (H)	m			
	Double defection fresh air diffuser C/W VCD					
D6.9	AC-101	500 x 300	No.			
	Return air grille c/w aluminium filter and all necessary accessories					
D6.10	AC-101	1000 x 600	No.			
D6.11	AC-101	1000 x 300	No.			
	Single deflection, adjustable exhaust air grille and all Necessary accessories					
D6.12	AC-101	600 x 600	No.			
	Fire damper c/w fusible link, and all necessary accessories					
D6.13	-	Other (Tenderer to state)				
	Opposed blade volume control damper and all necessary accessories					
D6.14		Fire rated enclosure and all necessary accessories	m <sup>2</sup>			
D6.15		Wire mesh for external louvre and all necessary accessories	m <sup>2</sup>			
D6.16		Other (Tenderer to state)				

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>D7</b>	<b><u>Electrical Power Distribution System</u></b>					
	Motor control panel including casing, internal busbar, relays, contactors, indicating lamps, selector switches, buttons, buzzer, control, wirings, mounting support and all necessary accessories					
D7.1	AC-002	MCP-G-1	No.			
D7.2	AC-002	MCP-G-2	No.			
D7.3	AC-002	MCP-M-1	No.			
	Miniature circuit breaker (MCB) and all necessary accessories					
D7.4	AC-002	10A TP	No.			
D7.5	AC-002	10A SP	No.			
D7.6	AC-002	30A TP	No.			
	Direct-on-line motor starter and all necessary accessories					
D7.7	AC-002	4.0 kW, 3-Phase	No.			
D7.8	AC-002	0.75 kW, 1-Phase	No.			
	PVC copper cable c/w CPC, all cable accessories including cable lug, gland, shroud and the like					
D7.9	AC-002	2.5 mm <sup>2</sup> 1/C	m			
D7.10	AC-002	4 mm <sup>2</sup> 1/C	m			
D7.11	AC-002	10 mm <sup>2</sup> 1/C	m			
D7.12	AC-002	16 mm <sup>2</sup> 1/C	m			
	XLPE/SWA/PVC type copper cable c/w CPC, all cable accessories including cable lug, gland, shroud and the like					
D7.13	AC-101	G.I. cable tray c/w supporting bracket, fixing and all necessary accessories	m			
D7.14	AC-101	G.I. trunking c/w supporting bracket, fixings and all necessary accessories	m			
D7.15	AC-101	75 mm x 75 mm	m			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
D7.16	AC-101	50 mm x 50 mm	m			
	G.I. conduit c/w conduit boxes, flexible conduits, fittings, fixing and all necessary accessories					
D7.17	AC-101	Ø32	m			
D7.18	AC-101	Ø25	m			
D7.19	AC-101	Ø20	m			
D7.20	AC-201	Fuse spur unit for split air conditioner indoor unit	No.			
<b>D8</b>	<b><u>Control Equipment and Control Wiring</u></b>					
	Control wiring c/w all cable accessories including cable lug, gland, shroud and the like					
D8.1	AC-002	1.5 mm <sup>2</sup> 1/C PVC copper cable	m			
	G.I. trunking c/w supporting bracket, fixings and all necessary accessories					
D8.2	AC-101	75 mm x 75 mm	m			
D8.3	AC-101	50 mm x 50 mm	m			
	G.I. conduit c/w conduit boxes, flexible conduits, fittings, fixing and all necessary accessories					
D8.4	AC-101	Ø32	m			
D8.5	AC-101	Ø25	m			
D8.6	AC-101	Ø20	m			
D8.7	AC-101	VAC control for the ventilation fans c/w manual override switch, interfacing work, control and the associated wiring accessories	Item			
D8.8	AC-002	BMS control interface panel for split type and VRV type indoor and outdoor unit c/w wiring, conduits, fittings and all necessary accessories.	Item			
<b>D9</b>	<b><u>Others (To Be Stated By Tenderer)</u></b>					
D9.1	-					
Sub-Total (Section D) :						

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b><u>E</u></b>	<b><u>Electrical Installation</u></b>					
<b><u>E1</u></b>	<b><u>Preliminaries</u></b>					
E1.1	Annex 7	Allow for production of shop drawings and builder's work drawings	Item			
E1.2	Annex 7	Allow for as-built drawings and O&M manual	Item			
E1.3	Annex 7	Allow for liaison with Government's Authorities and Supply Company (BD/EPD/FSD/EMSD/CLP/WSD/etc.)	Item			
E1.4	Annex 7	Allow for issuance of WR1/WR1(A)	Item			
E1.5	Annex 7	Allow for providing testing and commissioning	Item			
E1.6	Annex 7	Allow for training course to Employer	Item			
E1.7	Annex 7	Allow for labeling, painting and identification	Item			
E1.8	Annex 7	Allow for spare parts	Item			
<b><u>E2</u></b>	<b><u>Main and Sub-mains</u></b>					
	<b><u>XLPE/SWA/PVC cable c/w lugs and fixing accessories</u></b>					
E2.1	EL-001	16mm <sup>2</sup> 4/C	m			
E2.2	EL-001	10mm <sup>2</sup> 4/C	m			
E2.3	EL-001	6mm <sup>2</sup> 4/C	m			
E2.4	EL-001	4mm <sup>2</sup> 4/C	m			
E2.5	EL-001	2.5mm <sup>2</sup> 4/C	m			
E2.6	EL-001	4mm <sup>2</sup> 2/C	m			
	<b><u>Terminating gland c/w PVC shroud for the following armoured cable</u></b>					
E2.7	EL-001	16mm <sup>2</sup> 4/C	No.			
E2.8	EL-001	10mm <sup>2</sup> 4/C	No.			
E2.9	EL-001	6mm <sup>2</sup> 4/C	No.			



Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
E2.10	EL-001	4mm <sup>2</sup> 4/C	No.			
E2.11	EL-001	2.5mm <sup>2</sup> 4/C	No.			
E2.12	EL-001	4mm <sup>2</sup> 2/C	No.			
	<u>Single core PVC insulated copper cable</u>					
E2.13	EL-001	25mm <sup>2</sup>	m			
E2.14	EL-001	16mm <sup>2</sup>	m			
E2.15	EL-001	10mm <sup>2</sup>	m			
	<u>MCB distribution board c/w TP AI switch</u>					
E2.16	EL-001	100A 16-way	No.			
E2.17	EL-001	100A 14-way	No.			
	<u>MCB Unit</u>					
E2.18	EL-001	10A – 32A SP	No.			
E2.19	EL-001	10A – 32A TP	No.			
E2.20	EL-001	20A – 32A DP RCBO	No.			
	<u>Metal cable tray c/w hangers and fixing accessories</u>					
E2.21	EL-201	300mm	m			
E2.22	EL-201	200mm	m			
E2.23	EL-201	100mm	m			
	<u>Metal trunking c/w hanger and fixing accessories</u>					
E2.24	EL-201	100 x 100 mm	m			
E2.25	EL-201	75 x 75 mm	m			
<u>E3</u>	<u>Lighting and Small Power</u>					
E3.1	EL-101	L01	No.			
E3.2	EL-101	L01 (B)	No.			
E3.3	EL-101	L02	No.			
E3.4	EL-101	L03	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<u>E3</u>	<u>Lighting and Small Power (Cont'd)</u>					
E3.5	EL-101	L04	No.			
E3.6	EL-101	L05	No.			
E3.7	EL-101	L06	No.			
E3.8	EL-101	L07	No.			
	Isolating Switch					
E3.9	EL-201	16A DP	No.			
E3.10	EL-201	20A DP	No.			
E3.11	EL-201	16A TPN	No.			
E3.12	EL-201	20A TPN	No.			
E3.13	EL-201	16A DP (Weatherproof)	No.			
E3.14	EL-201	20A DP (Weatherproof)	No.			
E3.15	EL-201	16A TPN (Weatherproof)	No.			
	Lighting Switch and Electrical Accessories					
E3.16	EL-101	10A 1-way (1 gang)	No.			
E3.17	EL-101	10A 1-way (2 gang)	No.			
E3.18	EL-201	13A switched single socket outlet	No.			
E3.19	EL-201	13A switched twin socket outlet	No.			
E3.20	EL-201	13A fused spur unit c/w pilot light and D.P. switch	No.			
E3.21	EL-201	20A D.P. switch c/w pilot lamp	No.			
E3.22	EL-201	20A connection unit	No.			
E3.23	EL-201	32A switched 3-pin socket outlet complying with IEC 60309	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
	<p>Normal final circuits: from distribution board to the following power points by 1/C PVC copper cable from 1.5mm<sup>2</sup> to 6mm<sup>2</sup> as specified.</p> <p>(The unit rate listed below includes the supply and installation of cables, concealed / surfaced PVC / G.I conduits, flexible steel conduit, circuit protective conductor, fittings of conduit such as junction box, bends, saddle, bush coupler, and other materials not mentioned)</p>					
E3.24	EL-101	Lighting Point	No.			
E3.25	EL-101	Lighting Switch Point; One Way; One Gang	No.			
E3.26	EL-101	Lighting Switch Point; One Way; Two Gang	No.			
E3.27	EL-201	13A Single Socket Outlet Point (Ring)	No.			
E3.28	EL-201	13A Twin Socket Outlet Point (Ring)	No.			
E3.29	EL-201	13A Single Socket Outlet Point (Radial)	No.			
E3.30	EL-201	13A Twin Socket Outlet Point (Radial)	No.			
E3.31	EL-201	13A Fused Spur Unit Point	No.			
E3.32	EL-201	20A D.P. Switch Point	No.			
E3.33	EL-201	20A Connection Unit Point	No.			
E3.34	EL-201	16A SPN / DP Isolating Switch Point	No.			
E3.35	EL-201	20A SPN / DP Isolating Switch Point	No.			
E3.36	EL-201	16A TPN Isolating Switch Point	No.			
E3.37	EL-201	20A TPN Isolating Switch Point	No.			
E3.38	EL-201	32A 3-pin socket outlet point (Radial)	No.			
E3.39	EL-201	Conduit point for Access Control System including the supply and installation of uPVC or G.I. conduit (connected from main ELV trunking), BS4662 adaptable box, draw wire and necessary accessories	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<u>E4</u>	<u>Earthing and Bonding</u>					
	Single core PVC insulated with cable lugs					
E4.1	EL-001	10mm <sup>2</sup>	m			
E4.2	EL-001	6mm <sup>2</sup>	m			
E4.3	EL-001	4mm <sup>2</sup>	m			
E4.4	EL-001	2.5mm <sup>2</sup>	m			
E4.5	EL-001	1.5mm <sup>2</sup>	m			
E4.6	-	Other (Tenderer to state)				
<u>E5</u>	<u>Dimming System</u>					
E5.1	EL-101	Dimming module	No.			
E5.2	EL-101	Scenes selection keypad	No.			
E5.3	EL-101	Occupancy sensor	No.			
E5.4	EL-101	Cat. 6 UTP data cable	m			
E5.5	EL-101	Programming charge	No.			
E5.6	EL-101	Metallic enclosure	No.			
E5.7	EL-101	By-pass switch	No.			
E5.8	EL-101	Associated conduit point including the supply and installation of uPVC or G.I. conduit (connected from main trunking), BS4662 adaptable box, wiring and necessary accessories	No.			
E5.9	-	Other (Tenderer to state)				

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<u>E6</u>	<u>CCTV System</u>					
E6.1	EL-301	Full HD IP camera c/w dome enclosure and fixing bracket	No.			
E6.2	EL-301	Full HD IP camera c/w dome enclosure, pendant rod and fixing bracket	No.			
E6.3	EL-301	Microphone	No.			
E6.4	EL-301	Network video recorder	No.			
E6.5	EL-301	LCD colour monitor	No.			
E6.6	EL-301	24-port PoE network switch	No.			
E6.7	EL-301	PC workstation	No.			
E6.8	EL-301	Software for remote surveillance	No.			
E6.9	EL-301	Associated conduit point including the supply and installation of uPVC or G.I. conduit (connected from main trunking), BS4662 adaptable box, wiring and necessary accessories	No.			
E6.10	-	Other (Tenderer to state)				
<u>E7</u>	<u>Public Address System</u>					
E7.1	EL-301	Mixer – Pre-amplifier	No.			
E7.2	EL-301	Power amplifier	No.			
E7.3	EL-301	Compact and mini disc player	No.			
E7.4	EL-301	Digital player / recorder	No.			
E7.5	EL-301	Microphone	No.			
E7.6	EL-301	Speaker	No.			
E7.7	EL-301	Speaker c/w pendent rod	No.			
E7.8	EL-301	24U server rack c/w Power Distribution Units and necessary accessories	No.			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
E7.9	EL-301	Associated conduit point including the supply and installation of uPVC or G.I. conduit (connected from main trunking), BS4662 adaptable box, wiring and necessary accessories	No.			
E7.10	-	Other (Tenderer to state)				
<u>E8</u>	<u>Telecom Cabling Installation</u>					
E8.1	EL-301	Single RJ-45 outlet	No.			
E8.2	EL-301	Twin RJ-45 outlet	No.			
E8.3	EL-301	Cat. 6 UTP data cable	m			
E8.4	EL-301	48-port patch panel	No.			
E8.5	EL-301	2m length Cat. 6 patch cable	No.			
E8.6	EL-301	42U server rack c/w Power Distribution Units and necessary accessories	No.			
E8.7	EL-301	Associated data point including the supply and installation of uPVC or G.I. conduit (connected from main trunking), BS4662 adaptable box, draw wire and necessary accessories	No.			
E8.8	-	Other (Tenderer to state)				
Sub-Total (Section E) :						

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
<b>F</b>	<b><u>Fire Services Installation</u></b>					
<b>F1</b>	<b><u>Supply and Installation of Automatic Sprinkler System</u></b>					
	Galvanized mild steel pipes (medium grade) and fittings, etc., to BS 1387					
C2.1.1	FS-101	32mm	Run			
C2.1.2	FS-101	40mm	Run			
C2.1.3	FS-101	50mm	Run			
C2.1.4	FS-101	65mm	Run			
C2.1.5	FS-101	80mm	Run			
C2.1.6	FS-101	100mm	Run			
C2.1.7	FS-101	150mm	Run			
C2.1.8	-	Others (Please specify)				
	<b><u>Sprinkler head complete with 32mm diameter G.I. pipe and all necessary accessories</u></b>					
C2.1.9	FS-101	Chrommium plated quartzoid bulb spray type sprinkler head of 68°C temperature rating	No.			
C2.1.10	FS-101	Chrommium plated quartzoid bulb spray type sprinkler head of 68°C temperature rating (Recessed type)	No.			
<b>F2</b>	<b><u>Supply and Installation of H.R. Set</u></b>					
	Galvanized mild steel pipes (medium grade) and fitting, etc., to BS 1387					
F2.1	FS-101	32mm	Run			
F2.2	FS-101	Fixed type hose reel complete with 30m long rubber hose, shut off valve, discharge nozzle, operation instruction plate, metallic striker, etc., including all associated accessories	Set			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
F2.3		Other items the tenderer to add (please specified)				
<u>F3</u>	<u>Fire Alarm System</u>					
F3.1	FS-101	Fire Alarm Bell (150mm) c/w conduit & wiring and all associated accessories	No.			
F3.2	FS-101	Manual Call Point c/w conduit & wiring and all associated accessories	No.			
F3.3	FS-101	Visual Fire Alarm c/w conduit & wiring and all associated accessories	No.			
F3.4	FS-101	Module/Control Modules c/w conduit & wiring and all associated accessories	No.			
F3.5	FS-101	Allow for modification/reprogramme of the existing main fire services control panels at F.S. Control Room on G/F for incorporating the addition of fire/fault/disabled signal from all newly added F.S. installation.	Lot			
F3.6	FS-101	Addition of battery and charger system to the new fire services control panel for all new F.S. equipment including visual fire alarm, alarm bells, etc., and all associated accessories.	Lot			
<u>F4</u>	<u>Supply and Installation of Associated Electrical Works</u>  Note: All cables shall be of “enhanced” fire resisting cables with PH 120 classification according to BS 8343-2 or equivalent.					
F4.1	FS-101	20mm dia. G.I. conduit	m			
F4.2	FS-101	25mm dia. G.I. conduit	m			
F4.3	FS-101	32mm dia. G.I. conduit	m			
F4.4	FS-101	1.5 sq. mm dia. 1/C PVC copper cable	m			
F4.5	FS-101	2.5 sq. mm dia. 1/C PVC copper cable	m			
F4.6	FS-101	4 sq. mm dia. 1/C PVC copper cable	m			



Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
F4.7	FS-101	6 sq. mm dia. 1/C PVC copper cable	m			
F4.8	FS-101	50mm x 50mm G.I. trunking	m			
F4.9	FS-101	100mm x 100mm G.I. trunking	m			
F4.10	-	Other (please specify)				
<b>F5</b>	<b>Miscellaneous</b>					
F5.1	Annex 8	Drain and Refill of Systems	Lot			
F5.2	Annex 8	Painting & Labelling	Lot			
F5.3	Annex 8	Testing & Commissioning	Lot			
F5.4	Annex 8	O&M Manual	Lot			
F5.5	Annex 8	Spare Parts	Lot			
F5.6	Annex 8	The tenderer must evaluate each of the following items and shall allow in his calculation for all the carrying out of the work specified for the fire services installations.	Lot			
F5.7	Annex 8	Application for suspension of all existing F.S. installation to FSD including the resuming of the respective system	Lot			
F5.8	Annex 8	Allow for the supply and installation of entire earthing and bonding system associated with the fire services installation	Item			
F5.9	Annex 8	The Contractor shall allow in the contract for supply and install brackets, etc., for fixing all sprinkler/hose reel pipes, conduits, visual fire alarm, etc., for the complete FS/SPR/AFA systems	Item			
F5.10	Annex 8	Allow for making the position of holes, mortices, chases and the like in the structure during the construction	Item			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Quantity	Unit Rate (HK\$)	Amount (HK\$)
F5.11	Annex 8	Allow for providing all necessary submissions, making applications to relevant authorities for tests and inspections and obtaining all necessary certificates and approvals, including the completion of all forms and payment of all fees and charges including WR1/1A, FS/314A, FS/251 to F.S.D. & all WSD submissions including WWO542, WWO46 with F.S.I. drawings	Item			
F5.12	Annex 8	Allow for providing twelve (12) months maintenance services for the entire installation including 24-hour emergency services following the date of Practical Completion of the main contract works and up to the end of the Defects Liability Record	Item			
F5.13	-	Other items not included in the above  Other (Give Detail) if a 'NIL' or nothing is entered for this item, it shall mean costs for other miscellaneous accessories thought not specifically mentioned but needed to make all the systems complete and to achieve the requisite performance have already been included in the other mentioned above.				
Sub-Total (Section F) :						

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Unit Rate (HK\$)	Amount (HK\$)
<b><u>G</u></b>	<b><u>PROVISIONAL SUMS</u></b>				
	-	<p><u>Notes:</u></p> <p>(1) The total amount of all the following provisional sums will be deducted from the Contract and in lieu there shall be added to the Contract Sum:</p> <p>a) The sums actually paid by Contractor to the statutory undertakers, or utility companies on the Architect's / CIC's written instructions.</p> <p>No adjustment will be made to any sum allowed by the Contractor for attendance on work covered by a provisional sum.</p> <p>(2) Where provisional sums are included in the Schedule of Rates for works to be carried out by the Contractor which have not been specified in detail at the time of tendering, these sums shall be deducted from the Contract and the works carried out shall be measured and valued in accordance with the Conditions of Contract and the value added to the Contract Price.</p>			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Unit Rate (HK\$)	Amount (HK\$)
<b>G</b>	<b><u>PROVISIONAL SUMS (CONT'D)</u></b>				
	-	<b><u>ATTENDANCE TO BE PROVIDED TO ALL SPECIALIST CONTRACTORS, GOVERNMENT DEPARTMENTS AND UTILITY UNDERTAKERS</u></b>			
	-	<p>1) <u>Attendance in co-ordinating and sequencing work programmes and making arrangement as regard to:-</u></p> <ul style="list-style-type: none"> <li>- The time and manner of the execution of their work and delivery of their materials and the time and manner of the submission of drawings or schedules of their builder's works requirements.</li> <li>- The obtaining of full particulars of their builder's work requirements for chases, recesses, mortices, openings, holes, sleeves, cuttings on formwork and the like.</li> <li>- The obtaining of full particulars of their further builder's work requirements for equipment bases, foundations and the like.</li> <li>- The checking of submitted builder's work requirements for conflict between all services. Submit full particulars of builder's work requirements to the Architect / CIC for Approval, together with a report detailing any ambiguity, discrepancy or conflict between all services.</li> <li>- The Contractor is to note that the location, size and routing of pipings and conduits shown on Drawings are for indication only and shall be followed as far as practicable. Notwithstanding that, obtain full particulars of any additional builder's work requirements and report any discrepancy or conflict to the Architect / CIC as above.</li> <li>- The supplying of details of the method of construction including all dimensions and other information necessary to ensure that their work is correctly executed or correct goods or materials supplied.</li> </ul>			

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Unit Rate (HK\$)	Amount (HK\$)
<b><u>G</u></b>	<b><u>PROVISIONAL SUMS (CONT'D)</u></b>				
	-	<p>2) <u>General Attendance</u></p> <p>The Contractor is to provide the attendance as described in Clause 19 of Annex 3 - Section A - Particular Preliminaries for Builder's Works" free of charge to the Specialist Contractors, Government Department and Utility Undertakers</p>			
	-	<p><b><u>WORKS TO BE CARRIED OUT BY SEPARATE SPECIALIST CONTRACTORS</u></b></p> <p>The Contractor is to provide the attendance as described in Clause 19 of Annex 3 - Section A - Particular Preliminaries for Builder's Works" free of charge to the following works carried out by separate Specialist Contractors</p>			
	-	<p>Installation of all simulator equipment of the SETC</p> <p>- The Main Contractor shall provide their own carnage and hoisting facilities for the erection and installation of the simulator equipment of the SETC, supplied by the supplier of safety training equipment from CIC. The Main Contractor shall provide removal of such carnage and hoisting facilities after all equipment are installed.</p> <p>Testing and Commissioning: The Main Contractor shall coordinate with the supplier to perform Testing and Commissioning of all the abovementioned Equipment upon completely installed</p> <p>The Main Contractor shall liaise with the supplier and it is the duty of the Main Contractor to apply for any licensing application to relevant</p>	1 Item		

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Unit Rate (HK\$)	Amount (HK\$)
<b>G</b>	<b><u>PROVISIONAL SUMS (CONT'D)</u></b>				
		<p>licensing authority / fulfilling the statutory requirement of all equipment as specified in the contract, obtain the license / approval.</p> <p>If there is comment from the licensing submission, the contractor shall in liaison with the supplier to modify the profile of equipment to comply with the relevant licensing equipment and until the relevant license is obtained.</p> <p>The Main Contractor shall coordinate with the supplier to prepare Training Manual, Operation &amp; Maintenance Manual for all simulation equipment of the SETC installed with protection of users from any potential hazard in using the Equipment;</p>			
	Annex 3 Item 19	a. Installation of all simulation equipment of the SETC	1 Item		
		b. Supply and Installation of supporting system and equipment for Zone H (VR Cave )	1 Item		
		c. Supply and Installation of smart card access to all door in SETC and provide CCTV system in SETC.	1 Item		
		d. Supply and Installation of any telecommunication services in SETC such as Telephone Line, Lan cable lines, Network Switches, Wi-Fi Access Points, Optical Fibre connections, etc.)	1 Item		

Item	Relevant Item(s) in Assignment Brief and its Annex	Description of Deliverables	Unit	Unit Rate (HK\$)	Amount (HK\$)
<b>G</b>	<b><u>PROVISIONAL SUMS (CONT'D)</u></b>				
		e. Supply and Installation of equipment for providing any AR/VR game/ media illustration.	1 Item		
		<b><u>PROVISIONAL SUM</u></b>  (Provisional sums to be expended in part or in whole as directed by the Architect / CIC or wholly deducted from the Contract Sum if not required)  Allow a provisional sum of HK\$1,000,000.00 for contingencies	1 Item		\$1,000,000
Sub-Total (Section G) :					
<b>Total for (Section A to G) :</b>					

The percentages of payment do not imply or indicate the relative or absolute amount of resources and expenses to be spent by the Contractor to produce the concerned deliverables and to complete the tasks and services. The payment schedule is as follows:-

<b>Deliverable No.</b>	<b>Deliverable Description</b>	<b>Payment Stage</b>	<b>Payment Schedule (%)</b>
1.	Appointment of Main Contractor	1	5%
2.	Upon submission of EC, CAR, organization chart, master working programme, material submissions for all long lead items, site supervision plan for consent application to BD	2	5%
3.	Upon completion of demolition works, relocation of existing equipment to 2/F	3	10%
4.	Upon completion of works according to latest building plans from Buildings Department (drawing no. AA-01 and AA-02 but not limited) and submission of Form BA14 to report completion of building works	4	10%
5.	Upon completion 50% of fit out works including all builder's works and E&M works	5	25%
6.	Upon completion 100% of fit out works including all builder's works and E&M works	6	25%
7.	Upon completion of testing and commissioning for all equipment in SETC	7	10%
8.	Upon completion of all trial run process and issuance of the certificate of Practical Completion to Main Contractor	8	5%
9.	Upon expiry of 12 months Defects Liability Period	9	5%
<b>Total</b>			<b>100%</b>



Defects Liability Period	12 month(s) upon Practical Completion of the Works
Date for Commencement	Within 7 calendar days from the CIC's / Architects' written notice to commence
Date for Possession of Site	Take over the Site and commence the Works within 3 calendar days of the CIC's / Architects' written instruction
Date for Completion	<b><u>180 calendar days</u></b> from the Date for Commencement
Liquidated and Ascertained Damages	At the rate of <b>HK\$10,000.00</b> per calendar day
Period of Final Shop drawings and Maintenance Manual	1 month after Date for Practical Completion

Name of Company : \_\_\_\_\_

Signature of Person Authorized  
to Sign for the Proposal\* : \_\_\_\_\_  
(with company chop)

Address \_\_\_\_\_

Tel No.: \_\_\_\_\_ Fax No. \_\_\_\_\_

Email: \_\_\_\_\_ Date: \_\_\_\_\_

\* If the tender is submitted by a Joint Venture, all participants in the Joint Venture must sign the Fee Proposal.

## **APPENDIX E – Tender Evaluation Procedures and Criteria**

### **1. INTRODUCTION**

- 1.1 A two-envelope approach is adopted for tender submission, i.e. Tenderer should submit the technical proposal including all information specified in **Appendix A of the Conditions of Tender** and the letter annexed in **Appendix B** and mentioned in Clause 4.28 of the Conditions of Tender in one envelope and the fee proposal comprising the completed Form of Tender using the prescribed form provided in **Appendix C of the Conditions of Tender** and the Fee Proposal using the prescribed form provided in **Appendix D of the Conditions of Tender** in a separate envelope. Fee proposal would only be opened after the technical assessment is completed subject to Clause 1.4 below.
- 1.2 A marking scheme as described below will be used for evaluating the tenders. Tender proposals shall be evaluated based on two separate aspects, namely the technical assessment and the fee assessment.
- 1.3 The pre-determined weights for technical and fee assessments are 60% and 40% respectively.
- 1.4 If the technical assessment mark in Table 1 below is less than 60% of the maximum marks, the tender proposal will be rejected and will NOT be further assessed and its fee proposal envelope will NOT be opened.
- 1.5 The rejected tender proposal will NOT be included in the weighted technical assessment score formula in Clause 2.2 and the weighted fee assessment score formula in Clause 3.2 below. The CIC reserves its right to cancel this tender exercise and re-tender thereof without further notice to the tenderer.
- 1.6 An assessment panel will be established for tender evaluation. The proposal received will be evaluated in accordance with the requirements in this Appendix.

## 2. TECHNICAL EVALUATION

- 2.1 Detailed evaluation of the technical proposal including all information specified in Appendix A of the Conditions of Tender shall be made in accordance with the assessment criteria described in Table 1.

Table 1 – Technical assessment marking scheme

Assessment Criteria	Assessed Marks (%)	Maximum Marks (%)
Assessment will be based on the following criteria:-		
1. Tenderer's profile, background and expertise <b>(10%)</b>		<b>10%</b>
2. Job reference of the Tenderer in carrying out similar project nature and scale. <b>(15%)</b>		<b>15%</b>
3. Proposed composition and organization of project team with qualifications, experience and capability of team members in carrying out similar construction services. <b>(30%)</b>		<b>30%</b>
The following sub-criteria shall be considered:		
(a) Organisation of Proposed Project Team (10%)		
(b) Qualification, Experience and Capability of Proposed Project Team (10%)		
(c) Statements of Conviction (5%)		
(d) Valid RGBC Certificate (5%)		
4. Approach and work programme to fulfill the objectives and carry out and complete all the tasks described in the Assignment Brief and its Annexes <b>(45%)</b>		<b>45%</b>
The following sub-criteria shall be considered:		
(a) Works Programme (15%)		
(b) Proposed Project Methodology (15%)		
(c) Safety & Health and Environmental measures for the Project (10%)		
(d) Works Quality Assurance (5%)		
<b>Total:</b>		<b>100%</b>

- 2.2 The weighted technical assessment score of a tender shall be determined in accordance with the following formula:

$$60 \times \frac{\text{Technical assessment mark of the subject tender}}{\text{Highest technical assessment mark of all tenders}}$$

### **3. FEE EVALUATION**

- 3.1 Tender fee for evaluation shall be the lump sum quoted in Appendix D – Fee Proposal of the Conditions of Tender.

- 3.2 The weighted fee assessment score of the tender proposal shall be worked out in accordance with the following formula:

$$40 \times \frac{\text{Lowest total lump sum fee of all tenders}}{\text{Total lump sum fee of the subject tenders}}$$

### **4. CALCULATION OF COMBINED SCORES**

- 4.1 The combined assessment score of a tender proposal shall be the sum of the weighted technical assessment score (Cl.2.2) and the weighted fee assessment score (Cl.3.2).

## **APPENDIX F – Reply Slip for Declining Bid**

With reference to your tender invitation (Tender Reference: (340) in P/AE/PUR/AGC, Closing Date: 14 March 2018), I/we regret that I am/we are unable to bid due to the following reason(s):

*(Please tick against the box(es) where applicable)*

- ☐ Inadequate time to prepare tender proposal. Suggested timeframe for proposal preparation: \_\_\_\_\_ days
- ☐ Invitation document contains insufficient details.  
Suggested supplementary details: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- ☐ Work scope too broad. Would you consider bidding if the work scope is reduced?  
☐ Yes  
☐ No  
Or which part(s) of the work scope shall be reduced to facilitate your consideration in bidding (please specify)? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- ☐ Work scope too narrow. Would you consider bidding if the work scope is broadened?  
☐ Yes  
☐ No  
Or what supplementary details shall be added to facilitate your consideration in bidding (please specify)? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- ☐ Not interested in this type of service.
- ☐ Working at full capacity at the moment.
- ☐ Work scope beyond firm's / organisation's expectation.
- ☐ Cannot meet project time schedule. Suggested timeframe for the project: \_\_\_\_\_ months

☐ Requirements / Specifications too restrictive.

☐ Others (please specify): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature : \_\_\_\_\_

Full Name of Contact Person : \_\_\_\_\_

Position : \_\_\_\_\_

Name of Company : \_\_\_\_\_

Telephone No. : \_\_\_\_\_

Fax No. : \_\_\_\_\_

E-mail : \_\_\_\_\_

Date : \_\_\_\_\_

Note:

- 1) Please return the completed reply slip to fax no: 2100 9439 no later than 12:00 p.m. on 14 March 2018.
- 2) Please contact Mr. Kelvin LEE at Tele: 2100-9425 or email: kelvinlee@cic.hk for any enquiry.

## APPENDIX G – Reply Slip for Tender Briefing and Site Visit Session

I/We would like to attend the tender briefing and site visit session for the Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of the Construction Industry Council at 10:00 a.m. on 23 February 2018 at Kwai Chung Campus (KCC), 7-11 Kwai Hop Street, Kwai Chung, New territories, Hong Kong.

<u>Full Name of Attendee(s)</u>			<u>Post/Title</u>	
<b>Company Name:</b>				
<b>Contact Person:</b>			<u>Post/Title</u>	
<b>Address:</b>				
<b>Telephone No : :</b>			<b>Fax No:</b>	
<b>Mobile Phone No:</b>			<b>E-mail :</b>	

### Note:

1. Each Tenderer shall register three attendees at most.
2. Please return the completed reply slip to fax no: 2100 9439 no later than 12:00 p.m. on 21 February 2018.
3. Please contact Mr. Kelvin LEE at Tele: 2100-9425 or email: kelvinlee@cic.hk for any enquiry.

## **APPENDIX H - GENERAL NOTES FOR PRICING**

### **1. Generally**

The Tenderer is to study the Specification and Tender Drawings carefully and to visit the Site so as to ascertain for himself the exact scope, nature and quality of the Works to be carried out, general site conditions and the requirements or restrictions to be complied therewith.

All materials, debris and other items arising from demolitions shall become the property of the Contractor unless specifically stated otherwise, and due allowance for the credit value (if any) of such materials etc. should be made at the relevant sections of the Schedule.

All works disturbed are to be made good and restored to the original state and finish.

The prices inserted by the Contractors are “Lump Sum” prices and will not be adjusted for any errors in the Contractor’s measurement and pricing.

The successful Tenderer shall liaise with the Employer and Architect on the phasing and timing of the Works and provide all necessary protection and screens to avoid dust and nuisance caused during the carrying out of the Works.

No claim will be entertained on the grounds of ignorance of the conditions under which the Works is to be carried out.

### **2. Prime Cost Rates and Provisional Sums**

Where prime cost rates are included in the description of items in the Schedule of Rates these prime cost rates are either for the material cost of that item delivered to site only and the Contractor should allow in addition for all waste, fixing, all ancillary materials required for fixing and all other similar items of a like nature or are rates for the supply and installation or application of finishes.

The Contractor rate will be adjusted by the nett difference between the prime cost rate and the actual price and will be applied to the nett quantity of the items measured as fixed, installed or applied in position.

Where provisional sums are included in the Schedule of Rates for works to be carried out by the Main Contractor which have not been specified in detail at the time of tendering, these sums shall be deducted from the Contract and the works carried out shall be measured and valued in accordance with the Conditions of Contract and the value added to the Contract Price.



## **APPENDIX H - GENERAL NOTES FOR PRICING (CONT'D)**

### **3. Preambles for Builder's Works**

The rate for all concrete work shall be held to include for the relevant formwork, reinforcement, blinding and sundry works if such items are not separately specified. It shall further include preparing existing surface / providing drill-in bars etc. in existing structures for the new works.

The rate for all brickworks shall be held to include for all cuttings, bonding at angles and intersections, raking out joints to form key, bedding and pointing frames, plates and similar items, cutting splays, chamfers and similar items, forming openings, cutting and pinning ends and making good, other similar sundry items and cement mortar.

The rate for metalwork shall be held to include for cutting/bending to lengths and shape, assembling and framing together, welding and all connection works.

The rate for demolition shall be held to include for all temporary works, protective measures, removal of demolished materials off site, reinstatement of site to match existing, etc.

The rate for painting shall be held to include all preparation work to the new or existing surfaces and painting sample panels as required.

Whenever the word “Allow” occurs in the Schedule of Rates, the cost of the items shall be at the risk of the Contractor and no adjustment will be made at the settlement of accounts. In the absence of any price against such items, the cost shall be deemed to be included in the rates of the other items.

The price of “Allow for other works not listed above” are deemed to include for all those works which are not listed in the Schedule of Rates but are required by the Contract according to the Drawings and Specification. The onus shall be on the Contractor to check for such works and price them in this item. If no price is inserted here, the costs are deemed to have been spread over the other items proportionately.

## **APPENDIX H - GENERAL NOTES FOR PRICING (CONT'D)**

### **4. Preambles for Building Services**

The works includes the supply installation, testing and commissioning of the entire Building Services Installations.

All materials and workmanship shall comply where applicable with Hong Kong Government Specifications and Standard Statutory obligations and regulations, together with any amendment made thereto, unless specified on the Drawing.

The works carried out shall be consistent with good practice in Hong Kong and to the satisfaction of the Architect and Engineer.

The contractor shall arrange for all submissions and allow for all costs relating to statutory inspections, and certificates, as appropriate and as necessary.

The unit rate submitted shall include running services around beam, columns and other obstruction at site to reach the service outlets or connection points.

All costs shall include the supply of materials, labour and painting for installation.

**Special Conditions of Tender**  
**for**  
**Renovation Works**  
**of Safety Experience Training Centre (SETC)**  
**at Kwai Chung Campus (KCC)**  
**of the Construction Industry Council**

**February 2018**

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**To be included  
in  
Technical Proposal**

## **Special Conditions of Tender**

### **1. Statement of Convictions under the Immigration Ordinance (Cap. 115)**

- 1.1 A tender will not be considered if, during the 12-month period prior to the closing date set for receipt of tenders, the tenderer has more than two convictions in respect of separate incidents under Sections 17I or 38A of the Immigration Ordinance (Cap. 115) for employing illegal immigrants or for having illegal immigrants on any site under the tenderer's control.
- 1.2 The tenderer shall submit with the tender a statement of either all convictions under Section 17I or 38A of the Immigration Ordinance (Cap. 115) for employing illegal immigrants or for having illegal immigrants on any site under the tenderer's control, and the dates of all such convictions, during the 12-month period prior to the closing date set for receipt of tenders, or a statement of "no conviction". The statement shall be certified by a person authorized to sign the contract on the tenderer's behalf.

### **2. Statement of Convictions under the Factories and Industrial Undertaking Ordinance (Cap. 59)**

- 2.1 The tenderer shall submit with the tender a statement of either all convictions under the Factories and Industrial Undertakings Ordinance, (Cap. 59) for site safety convictions for all sites under the tenderer's control, and the dates of all such convictions, during the 12-month period prior to the closing date set for receipt of tenders, or a statement of "no conviction". The statement shall be certified by a person authorized to sign the contract on the tenderer's behalf.

### **3. Statement of Convictions under the Employment Ordinance (Cap. 57)**

- 3.1 A tender will not be considered if, during the 12-month period prior to the closing date set for receipt of tenders, the tenderer has had three or more convictions in respect of separate incidents under the Employment Ordinance (Cap. 57) which individually carry maximum fines corresponding to Level 5 or higher within the meaning of Schedule 8 to the Criminal Procedure Ordinance (Cap. 221).

- 3.2 The tenderer shall submit with the tender a statement of either all convictions under the Employment Ordinance (Cap. 57), and the dates of all such conviction, during the 12-month period prior to the closing date set for receipt of tenders, or a statement of “no conviction”. The statement shall be certified by a person authorized to sign the contract on the tenderer’s behalf.

#### **4. Outline Health & Safety Plan**

- 4.1 All tenderers should submit, as part of the tender, an Outline Health & Safety Plan (Outline Plan) which shall contain sufficient information to demonstrate the tenderer’s proposals for achieving effective and efficient health & safety procedures. Failure to submit the Outline Plan may invalidate the tender.
- 4.2 The Outline Plan should start with a formal statement of policy in relation to health & safety and should include:
- (i) An assessment of risks associated with the works activities when carrying out the Works,
  - (ii) An outline of the health & safety procedures and protective controls to be developed,
  - (iii) Manner by which they would be implemented and monitored to ensure health & safety on the Site.
- 4.3 The Outline Plan should provide a suitable basis for the development of the Health & Safety Plan. The tenderer may be required to amplify, explain or develop the Outline Plan for the consideration of acceptance of tender.
- 4.4 Typical foreseeable hazards associated with construction works may include but not limited to the following:
- (i) The use of construction plant and equipment, including lifting appliances. e.g. tower cranes, excavators.
  - (ii) All temporary works including design, erection, loading, unloading and dismantling.
  - (iii) The dangers of rigging and of handling wire ropes.
  - (iv) The handling, use, storage and transportation of materials and substances.
  - (v) Hot working including grinding, chipping, cutting, welding, burning, etc.
  - (vi) Exposure to hazardous substances.

- (vii) Exposure to dust, fumes, vapors, etc.
- (viii) The risk of natural causes e.g. Typhoons.
- (ix) The risks of using electricity on site.
- (x) Risks posed to public members.

## **5. Selected Domestic Sub-Contractor**

- 5.1 The tenderer shall submit with his tender a list of sub-contractors to whom the tenderer proposes to sublet section(s) of works stating its willingness to enter into a domestic sub-contract with the tenderer to carry out the works mentioned in this tender.

## **6. General Building Contractor Registration**

The tenderer / his sub-contractors must give the registered number and the date of expiry of registration of their Registered General Building Contractor (RGBC) here:

**Registered General Building Contractor (RGBC) No.:** \_\_\_\_\_

**Date of expiry for the above registration:** \_\_\_\_\_

**Assignment Brief & its Annexes**

**for**

**Renovation Works**

**of**

**Safety Experience Training Centre (SETC)**

**at**

**Kwai Chung Campus (KCC)**

**for**

**the Construction Industry Council**

**February 2018**

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**Assignment Brief & its Annexes for  
Renovation Works of  
Safety Experience Training Centre (SETC) at  
Kwai Chung Campus (KCC) of  
the Construction Industry Council**

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**Assignment Brief & its Annexes for  
Renovation Works of  
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## **1. Background**

- 1.1 Construction Industry Council (CIC), which has been providing construction training for various construction-related trades in Hong Kong, would like to provide a new mode of safety training in a designated area at Kwai Chung Campus (KCC), Kwai Chung. The project site is called Safety Experience Training Centre (SETC).
- 1.2 The CIC had appointed David S.K. Au & Associates Ltd. as the Architect / Consultant of the SETC project (the Architect).
- 1.3 A renovation works would be carried out in the year 2018. The CIC has decided to engage a Main Contractor to carry out construction works, fitting out works, installation of the suitable equipment as specified in the contract and to set up the SETC.

## **2. Objectives**

- 2.1 The Main Contractor is required to carry out renovation works at G/F of KCC and set up the SETC as specified in the tender drawings and documents.
- 2.2 The Main Contractor is required to remove the existing training equipment at the project site (SETC area) at G/F and relocate the said equipment to the designated area at 2/F of KCC, and to set up a temporary training area as specified in the tender drawings and documents.
- 2.3 Details refer to Annexes 1 to 12 of the Assignment Brief.

### **3. Scope of Main Contract**

- 3.1 Refer to Annex 3 - Section 3.0 of Particular Preliminaries for Builder's works, Annex 6 - Section 3.0 of Particular Specification for MVAC Installation and Annexes 7 & 8 - Section 2.0 of Particular Specification for Electrical Installation & Fire Services Installation (Collectively known as 'the Works').

### **4. Presentations**

- 4.1 To attend meetings with Architect, Engineer and the CIC for any matter regarding renovation of SETC as necessary.

### **5. Deliverables**

- 5.1 All deliverables shall comply with the Contract requirements to the satisfaction of the CIC. Should there be different interpretations between the CIC and the Main Contractor against any requirements in the Contract, the CIC shall have the final jurisdiction on the explanation and approach of the implementation for the requirements. The Main Contractor shall follow the explanation of the requirements and the instructions given by the CIC to implement the solution to the satisfaction of the CIC.
- 5.2 To prepare and submit all necessary shop drawings, calculations, reports, certificates, technical information, supporting documents and other documents as required for the Architect / the CIC for review and approval, within 14 days of the contract is being awarded.
- 5.3 Not limited to the following, the Main Contractor shall submit not limited to the following documents upon awarded of Contract:
- a. Master programme,
  - b. biweekly short term forecast programme,
  - c. Site Safety report
  - d. Method Statement and Risk Assessment

## **5. Deliverables (Cont'd)**

5.3 Not limited the following, the Main Contractor shall submit not limited to the following documents upon awarded of Contract (Cont'd) :

- e. All submission Schedule not limited to Shop drawing submission schedule (including all design and built item), Material submission schedule, Mock up submission schedule
- f. Organization Chart with contact, Site management Plan, Debris Control Plan,
- g. Site Office set up.
- h. Supervision Plan for BD submission.

5.4 All documents produced by the Main Contractor shall be subject to the acceptance by the Architect / the CIC. The CIC will endeavour to respond to and comment on the documents submitted by the Main Contractor after the contract is awarded as practical as possible. The Main Contractor shall rectify and supplement the programme within 3 days upon receiving comments from the CIC / Architect and/or stakeholders.

5.5 The shop drawings produced by the Main Contractor shall be subject to the acceptance by the Architect / the CIC. The CIC will endeavour to respond to and comment on the shop drawing submitted by the Main Contractor within 2 weeks of submission as practical as possible. The Main Contractor shall rectify and supplement the submissions within 2 weeks upon receiving comments from the CIC and/or stakeholders.

5.6 The Main Contractor / his sub-contractors shall be under the Registration of General Building Contractor (RGBC) under Buildings Ordinance.

5.7 The Main Contractor shall submit all prescribed documents, test reports, carry out test for Authorized Person (AP) to carry out submission to Buildings Department and other relevant government department for approval and until obtaining the acknowledgment of submitted building works. The Main Contractor shall comply all statutory requirements to carry out the building works.

The Main Contractor shall notify BD for commencement for work and report

## **5. Deliverables (Cont'd)**

- 5.8 completion of works to BD. The Main Contractor shall submit Supervision Plan (SP) and arrange the required Technical Competent Persons (TCP) for the works.
- 5.9 To prepare as-built drawings in respect of Builder's work and M&E works upon completion of the renovation of SETC. The Contractor shall provide Chinese version of all as-built drawings as if required by the CIC / Architect.
- 5.10 To coordinate with Direct Supplier(s) by Employer (CIC) and to prepare Training / Operation & Maintenance Manual for all the experimental Equipment and tools installed in SETC with protection of users from any potential hazard in using the Equipment and tools;
- 5.11 To certify the completion for renovation of SETC upon Testing and Commissioning.
- 5.12 All documents shall be submitted electronically in MS Word format, MS Excel format (for data) and in pdf file format or any other formats as applicable which are readily printable.
- 5.13 All shop drawings must be submitted in English or Chinese (if required) to the satisfaction of the Architect / the CIC.
- 5.14 To submit warranty of all materials with the number of years as specified in the contract.

## 6. Brief Programme

- 6.1 The Main Contractor undertakes to submit deliverables as stipulated in the Assignment Brief and its Annexes to the Architect / the CIC in accordance with the tentative programme specified in Paragraph 6.3 below or as directed / agreed by the CIC / Architect from time to time.
- 6.2 Supplementary information or reports other than the deliverables stated below shall be prepared and delivered at such time upon request by the CIC.
- 6.3 The following activities shall be taken into consideration in the preparation of the programme:

Task	Description of Deliverables	Deadline
(1)	To submit required documents of all as specified in paragraph 5.3 and report	within 7 days upon contract award
(2)	To Submit Site Supervision Plan and all required documents for AP 's onward submission to BD	within 7 days upon contract award
(3)	To submit ALL Shop drawings of all as specified in paragraph 5.3 and report	Within 28 days upon contract award
(4)	To submit Form BA10 to AP's onward submission to BD	Within 7 days of the Building Consent is received by Buildings Departments
(5)	To submit Form BA14 to AP's onward submission to BD	Upon the building works as per mentioned in the approved building and structural (A&A) Plan is completed. Tentatively 60 days of the contract is awarded.

<b>Task</b>	<b>Description of Deliverables</b>	<b>Deadline</b>
(6)	To submit Training / Operation & Maintenance Manual as specified in paragraph 5.10	Within 28 days upon completion of installation of equipment.
(7)	To submit as-built drawings as specified in paragraph 5.9	Within 28 days upon completion of Testing and Commissioning
(8)	To issue Certificate of completion as specified in paragraph 5.11	Within 28 days upon completion of Testing and Commissioning
(9)	To issue all warranties of the equipment and other certificates as specified in paragraph 5.14	Within 28 days upon completion of Testing and Commissioning

## **7. Management of the Main Contractor**

- 7.1 The Main Contractor shall be directed and supervised by the Architect and the CIC as delegated.
- 7.2 References to the CIC in this Assignment Brief and its Annexes shall include the committees and/or task forces and/or task groups set up under the CIC. The CIC Secretariat will facilitate the CIC in supervising the Consultant / Main Contractor.
- 7.3 The Main Contractor shall obtain the approval of the CIC and Architect as delegated. (where appropriate) before commencement of each stage of the Assignment.
- 7.4 The Main Contractor shall attend all meetings held by the CIC / Architect formed for this Supply and Supervision project and the internal meetings of the CIC as required and necessary.



## 8. General Specifications

### 8.1 General

- 8.1.1 The scope of work should include Renovation of the CIC's Safety Experience Training Centre (SETC) at Kwai Chung Campus, 7-11 Kwai Hop Street, Kwai Chung New Territories, Hong Kong K.T.C.L. 381 ("The Site").

Detail Scopes refer to Particular Preliminary for Builder's works

The contract period of the Main Contract for SETC renovation works would be **180 calendar days** unless otherwise specified. The tentative Commencement Date of abovementioned Contract shall be April 2018.

- 8.1.2 The Main Contractor shall provide all required insurance for the carrying out works, to protect against all risks of physical loss or damage to freight from any external cause during shipping, whether by land, sea or air.
- 8.1.3 Protective plastic sheets **MUST** be provided at the Main Contractor's own cost to fully cover the equipment in order to avoid water damage when the Works are carried out at the Site.
- 8.1.4 The information provided in the tender documents only indicates the design intent and minimum performance requirements. The quantities, capacities and sizing contained should not be assumed to be the exact extent of the works. The Main Contractor should be responsible for the full design and developing a complete system fit for the intended purpose and in accordance with the design intent.
- 8.1.5 Relevant standards, codes, guidelines, regulations and other documents issued by international / local statutory authorities shall be followed.

## **8. General Specifications (Cont'd)**

8.1.6 The Works shall include, but not limited to, the following:-

- a) Submission of the proposed materials, detail sketches etc. to the CIC / Architect for comment and approval before commencement of the Works.
- b) Resume of any other trade works / fire sealant / insulation etc. before / after the Works.
- c) Liaise with any contractor(s) employed by the Employer to achieve timely completion of Works if required.
- d) The Main Contractor shall liaise closely with the Employer and its representative(s) for detail planning / execution of the Works.
- e) Provide all necessary warning notices, signage, labels, protection and temporary lighting facilities to pedestrian when needed in order to cope with all relevant statutory requirements.
- f) Submit method statement / testing procedures to the Employer for approval and carry out all necessary testings for the Works according to the latest version of procedures approved by the Employer or its representative(s).
- g) Provide FOUR (4) sets of As-built and As-Fitted record drawings, details for the alternated and addition system as installed, and Testing and Commissioning and Operation and Maintenance Manual, in both hard copy and electronic files stored CD-ROM / DVD-ROM.
- h) Provide unit rate for subsequent operation & maintenance work (if applicable) and unit rate for major components that may incur for additional / alternation works with validity for at least one years' time after DLP.

## **8. General Specifications (Cont'd)**

8.1.7 All materials and workmanship shall comply with all relevant sections of the latest edition of the following and all current amendments thereto issued, unless otherwise instructed by the Employer:

- a) CAP 123 Buildings Ordinance  
CAP 56A Boilers and Pressure Vessels Regulations  
ASD general specification 2012 or latest  
BSEN and BS

8.1.8 All inspection, checking, adjusting, servicing, modifying, testing, maintenance and repairing services for those installations not exempted from such Regulations shall be carried out by competent persons provided by the Main Contractor in a safe, prompt and workmanlike manner to the satisfaction of the Employer.

### **8.2 Main Contractor's Management Organization**

8.2.1 The Main Contractor shall provide an adequately qualified and experienced supervision team(s) for the purpose of this Contract. The team members shall be required to attend regular meetings with the Employer and its representative(s) to review the progress, work performance, complaints etc. The team shall comprise of, at least, the following team members:

#### **(a) Project Manager**

He shall have the minimum 8 years working experience in field of site construction and fitting out works.

He shall be qualified as the Technically Competent Person (T4/T5) of Register Contractor's Stream under Site Supervision Plan in BD.

#### **(b) Building Works Coordinator**

He shall have the minimum 8 years working experience in field of site construction and fitting out works.

He shall be qualified as the Technically Competent Person (T3) of Register Contractor's Stream under Site Supervision Plan in BD.

## **8. General Specifications (Cont'd)**

### (c) Building Services Coordinator

He shall have the minimum 8 years of building services installation in related to the similar project.

### (d) Site Agent

He shall have the minimum 10 years working experience in field of site construction and fitting out works.

He shall be qualified as the Technically Competent Person (T1) of Register Contractor's Stream under Site Supervision Plan in BD.

### (e) Registered Safety Officer

He shall be the Registered Safety Officer under Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations, and he shall have such qualification in minimum of 8 years.

- 8.2.2 The Main Contractor shall provide an adequate number of Competent Supervisor(s), serving for monitor the installation and safety measures carried out by the Main Contractor.

## **8.3 Equipment and Appliances Offered**

- 8.3.1 The equipment and appliances offered shall be rated at 380 volts, 3 phase 4-wire/220 volts single phase two wire  $\pm 6\%$  at 50Hz.

## **8. General Specifications (Cont'd)**

### **8.4 Inspection, Measurement and Test Equipment**

8.4.1 The Main Contractor shall use calibrated equipment for the Supply of Calibrated Inspection, Measurement and Test Equipment. All equipment and ancillaries shall be checked, calibrated and maintained in good working order and available for use at all times.

### **8.5 Spare Parts**

8.5.1 The Main Contractor shall include in his tender all required spare parts and the tenderer shall also offer warranty that all the spare parts can be available on the market for THREE (3) consecutive years after the expiry of the Defect Liability Period (DLP).

### **8.6 Advice of Orders Placed**

8.6.1 The tenderer is required to forward copies of all orders placed for major items and equipment which are necessary to be imported from overseas to Employer for reference within two weeks after approval of the corresponding equipment by the Employer. Copies of all orders placed shall be forwarded to the Employer for information & record.

### **8.7 Addition and Deletion of Installation**

8.7.1 The Employer shall have the right during the Contract period to instruct additional installation works into this Contract and the Main Contractor shall execute such additional works in accordance with the Conditions of this Contract.

8.7.2 The Employer shall have the right during the Contract period to instruct for omission of installation works from the Contract.

## **8. General Specifications (Cont'd)**

### **8.8 Information to be Submitted to the Employer**

8.8.1 In addition to the requirements of staff organization, Main Contractor's facilities, working programme, company's brochures, etc. that stipulated in this specifications, the Main Contractor shall also submit the followings :

- a) Method Statement;
- b) Warranty;
- c) Support, Maintenance and Spares;
- d) Proposed System Design Description, Schematics and Drawings;
- e) Project Methodology and Deliverables;
- f) Technical Expertise;
- g) Information on Relevant Projects
- h) Schedule of Current Projects

### **8.9 Remedy on Main Contractor's failure to Perform**

8.9.1 If the Main Contractor fails to carry out any work required under the Contract or refuses to comply with any instruction or order given by the Employer in accordance with the Contract within a reasonable time, the Employer may give the Main Contractor 7 days' notice in writing to carry out such work or comply with such instruction.

8.9.2 If the Main Contractor fails to comply with such notice, the Employer shall be entitled to carry out such work by itself or by his own workmen or by other contractors. Without prejudice to any other remedy, all additional expenditure properly incurred by the Employer in having such work or instruction carried out shall be recoverable by the Employer from the Main Contractor by deduction from money due to the Main Contractor under this Contract or under any other contract between the Employer and the Main Contractor.

## **8. General Specifications (Cont'd)**

### **8.10 Industrial Training and Pneumoconiosis Levies**

- 8.10.1 The Main Contractor's attention is drawn to his obligations under the Industrial Training (Construction Industry) Ordinance (Cap. 317) and the Pneumoconiosis (Compensation) Ordinance (Cap. 360) and the Contract Sum shall include the amounts payable in respect of these levies with regard to all works included in this Contract.

## **9. Technical Specifications**

Refer to all Annexes 3 to 11 - Particular Preliminaries / Specifications of the Contract

## **GENERAL SPECIFICATION**

### **SECTION 1 – GENERAL PRELIMINARIES**

#### **1. GENERALLY**

The General Preliminaries shall not be priced but any cost effect resulting from them shall be included in the item in the Schedule of Rates section.

The preliminary items included hereunder apply to the whole of the works in so far as they are not overridden by the Annex 3 - “Particular Preliminaries for Builder’s Works”. The provisions of the Annex 3 - “Particular Preliminaries for Builder’s Works” shall prevail over those of the General Preliminaries.

#### **2. DEFINITIONS**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

#### **3. DESCRIPTION OF THE WORKS**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

#### **4. SITE AND INSPECTION**

##### **4.01 Location**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

##### **4.02 Access and restrictions**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

##### **4.03 Site visit**

Tenderers are advised to visit the site of the Works and make themselves thoroughly acquainted with the location, general site conditions, type of ground to be excavated, accessibility, storage space, restrictions for loading and off-loading materials etc. and any other conditions which may affect their tender.

No claim for extra payment or extension of the Contract period will be allowed on the grounds of ignorance of the conditions under which the work is to be carried out.

The Main Contractor shall accept the site as found on the Date for Possession and at his own expense clear the site of any debris, etc., which may have been left on the site.

##### **4.04 Sub-soil conditions, Investigation Reports and Utility Services Information**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.



**4. SITE AND INSPECTION (CONT'D)**

4.05 Accept Site as found

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

4.06 Working area

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

4.07 Weather and Underground Water Conditions

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

**5. POSSESSION AND COMPLETION**

5.01 Possession of site

Immediately upon taking possession of the site the Main Contractor is to check and satisfy himself as to the correctness of the setting out, levels, etc., of the works already carried out on site before he commences his work. He shall immediately inform the Architect of any discrepancies or faults found in such works otherwise no claim will be considered for costs incurred and/or extensions of time in respect of such discrepancies or faults. In the event of the Main Contractor failing to observe this requirement, any work under this Contract which is incorrectly constructed as a result of such discrepancies or faults shall, if so required by the Architect, be pulled down and re-erected at the Main Contractor's expense.

Refer also to Annex 3 - “Particular Preliminaries for Builder’s Works”.

5.02 Completion

If it becomes apparent that there is any likelihood of the completion date not being met, the Architect may issue instructions to the Main Contractor directing any revision to the sequence of works, etc. to enable the works to be completed on time. The Main Contractor shall comply with such instructions at no extra cost.

The Main Contractor’s attention is drawn to the fact that he shall be responsible for any delay, loss, damages or claims whatsoever arising due to the failure of his part to proceed regularly and diligently with the statutory submission and re-submissions where necessary.

The Main Contractor should allow in his tender for all extra costs for overtime, provision of extra labour and all other provisions considered necessary for the timely completion of the Works.

Refer also to Annex 3 - “Particular Preliminaries for Builder’s Works”.

**6. CONDITIONS OF CONTRACT**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

**7. TENDER, DRAWINGS AND SPECIFICATION**

**7.01 Tender**

The tender shall be in “**Lump Sum**” price based on the Drawings and Specification. It shall be for the carrying out of the whole of the Works in conformity with the Drawings, Conditions of Contract and Specification.

**7.02 No adjustment for rises or falls in cost of labour and materials**

There will be no adjustment to the Contract Sum for rises or falls in the cost of labour and materials, freight charges, premium for insurances, or exchange rates of currencies.

**7.03 Schedule of Rates**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”.

**7.04 Ordering materials etc. from Drawings and/or Specification**

The Main Contractor should note that he should not order materials or commence work based only on quantities or sizes stated on the Drawings and/or in the Specification(s) without reference to site measurements, and there shall be no liability for any expense incurred by the Main Contractor in connection with wrong items or abortive work which would have been apparent had the site measurements been checked.

The Main Contractor shall be responsible for the correct ordering of materials and goods.

**7.05 Drawings forming part of the tender documents**

The drawings listed in the Schedule of Drawings form part of the tender documents.

**7.06 Drawings etc. at Site**

A complete set of Contract Drawings and Specification(s) together with copies of all Variation Orders and additional drawings issued after the Date of Commencement shall be available on the Site at all times for reference by the Architect.

The drawings shall be stored in a neat and orderly manner.

**7.07 Shop drawings**

Shop drawings, as may be required, shall be furnished by the Main Contractor well before the work proceeds and in any case within two weeks of the Architects' written request. The Architect may reject, approve or amend such shop drawings. No claim will be accepted for disapprovals or amendments required by the Architect.

The approval by the Architect of any such drawings shall not relieve the Main Contractor of his duties and responsibilities under this Contract.

## **7. TENDER, DRAWINGS AND SPECIFICATION (CONT'D)**

### **7.08 Working drawings and as-built record drawing**

The Main Contractor shall be responsible for checking through the working drawings to ensure that they contain sufficient information and details for the execution and completion of the works. Should the Main Contractor discover in the course of construction that additional information or detailed drawings are necessary, except those shop drawing to be furnished by himself, he is to inform the Architect in writing at least three (3) weeks before such information or detailed drawings are required as no claims for delay or whatsoever will be permitted due to the non-availability of such information or detailed drawings in time for the execution of the Works on account of the Main Contractor's failure so to inform the Architect in writing.

The Main Contractor shall submit to the Architect's office four (4) sets of as-built record drawings in both Auto CAD and PDF format on CD-ROM / DVD-ROM showing all works completed prior to application for Certificate of Completion for the works.

### **7.09 Combined Services Drawings**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works".

### **7.10 Dimensions**

Figured dimensions are to be taken in preference to scaled in all cases. Before commencing any work or ordering any materials the Main Contractor must verify all measurements. If any discrepancies are found they must be brought to the notice of the Architect immediately.

### **7.11 Specification**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works".

### **7.12 Provisional Quantities**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works".

### **7.13 Discrepancies**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works".

## **8. MATERIALS AND WORKMANSHIP**

### **8.01 Compliance with Regulations**

Materials, workmanship and the works as a whole shall conform to or be of a higher standard than the minima required by the latest edition of the Buildings Ordinance, Chapter 123 of the Laws of the Hong Kong Special Administrative Region.

### **8.02 Samples**

The quality of materials and articles supplied for any purpose are to be approved by the Architect prior to their use in the Works. Wherever practicable samples are to be submitted for approval before bulk supplies are delivered to the site. Approved samples are to be kept on site to serve as standards for the materials or goods represented by the samples. Samples, and any packing for same, are to be provided free of charge by the Main Contractor.

Should any material or article be rejected it shall be removed from the site at the Main Contractor's expense.

The Main Contractor shall provide samples of workmanship for all trades and obtain the Architect's approval prior to commencement of each trade. The approval shall not relieve the Main Contractor of his duties and responsibilities under the contract.

The Main Contractor shall submit all samples, etc. in sufficient time to allow the Architect to make the necessary decisions/approvals. The Main Contractor shall also make due allowances in his submissions programme for manufacturing periods, delivery schedules, etc.

All subsequent workmanship shall be to the standard of the approved samples.

### **8.03 Testing and Inspection of materials**

The Main Contractor shall carry out tests on all materials required by the Architect to be tested at the Main Contractor's own expense and shall pay all charges in connection with tests ordered by the Architect to be carried out by others.

The Main Contractor shall provide, mark and deliver samples of materials, goods or workmanship for testing, when directed by the Architect, to an approved laboratory to ascertain compliance with the standards herein specified. The costs of these are to borne by the Main Contractor.

The Main Contractor shall, whenever so instructed by the Architect, cut out sections of works executed or samples of materials incorporated therein and shall deliver them where directed for the purpose of testing. All works disturbed shall be made good forthwith by the Main Contractor. All costs incurred in cutting out, making good and delivering as aforesaid, shall be borne by the Main Contractor unless the result of the test shows that the materials, goods or workmanship are in accordance with this Contract.

**8. MATERIALS AND WORKMANSHIP (CONT'D)**

**8.03 Testing and Inspection of materials (Cont'd)**

The Architect and the employer shall have the right to inspect the Works in progress and all materials and equipment which are to be used in the installation. The Main Contractor shall provide transportation for the Architect, Engineer and Quantity Surveyor, etc. for accessing the site for inspection works, etc.

The Architect shall also have the right to inspect all completed works within the Defects Liability Period to determine compliance to the Drawings, Specification and general purpose of the project and the right to reject and require the replacement at the Main Contractor's expense.

**8.04 Safe custody of materials**

The Main Contractor shall be responsible for the safe custody of all materials delivered on to the site. He will be required to reinstate at his own expense any such materials that may be lost or stolen.

He will also be required to reinstate at his own expense any material or article damaged by careless handling or storage or as a result of inferior workmanship by his workmen either in the original fixing or in the subsequent taking down and refixing thereof.

**8.05 Loading and unloading of materials**

The Main Contractor shall take every care in the loading and off-loading of materials for the work, ensure that the street, roads and footpaths are not obstructed or the traffic impeded and conform with the police regulations therewith.

**8.06 Method of Execution / Construction**

The sequence of execution / construction and method of concerning shall be submitted to the Architect/Engineer/CIC for approval.

The submission to and approval by the Architect/Engineer/CIC of such method of construction shall not relieve the Main Contractor of any of his duties or responsibilities under this Contract.

## **9. INSTRUCTIONS, VARIATIONS AND METHODS OF MEASURING AND VALUING**

### **9.01 Site instructions**

The Main Contractor shall maintain an efficient organisation so that all instructions issued by the Architect are communicated immediately to the site and he shall take instructions only from the Architect or persons authorised by the Architect in writing to give them.

The Main Contractor shall enter all site instructions given to him or his foreman by the Architect or such other persons as are authorised as noted above in a Special Diary recording a description of such work ordered and shall obtain against each entry the initials of the Architect or such other authorised person on the day that such instructions are given.

The Main Contractor shall allow such diary to be inspected at all reasonable times when required by the Architect, the Quantity Surveyor and CIC.

### **9.02 Stop Works Instructions**

Apart from the Architect, Engineer and CIC are also empowered to stop all work or any part of the Works and advise the Architect immediately, if such work is not in accordance with the Architect's Specification, Drawings and Instructions.

### **9.03 Main Contractor's claims for extras for verbal instructions**

The Main Contractor shall submit to the Architect (copied to the Employer) any claims (giving full and detailed particulars of the amount claimed) for extra and additional work contained in Architect's verbal instructions which have been confirmed in accordance with clause 2(3) of the General Conditions of Contract within two weeks after the event and no claim for such extra and additional work will be considered if submitted later than required herein.

### **9.04 Measurement of Variations**

The units of billing measured omissions and additions for variations or additions of remeasurements where the unit is either metre cube or metre super the quantities shall be billed to the nearest 0.10 of a whole unit and where the unit is either metre run or kilogram the quantities shall be billed to the nearest whole.

### **9.05 Invoices, receipts, etc.**

The Main Contractor shall produce all original invoices, vouchers or receipted accounts for any materials or sub-contract labour charges when called upon to do so by the Architect, Engineer, CIC or by the Quantity Surveyor. Upon making photocopies of the invoices, receipts, etc., the originals shall be returned to the Main Contractor.

**9. INSTRUCTIONS, VARIATIONS AND METHODS OF MEASURING AND VALUING (CONT'D)**

**9.06 Main Contractor's expenses in connection with variations and settlement of accounts**

The Main Contractor shall be responsible for making or procuring at his own expense such additional copies of Architect's instructions and any specification, schedules, drawings and details issued therewith as are necessary for distribution within his own organization.

The Employer will not be liable for any expense incurred by the Main Contractor in connection with the measurement of variations or the adjustment and settlement of accounts.

**9.07 Supportive documentation for a fair valuation**

Where it becomes necessary for a fair valuation to be made, as required under sub-clause 11(4)(b) of the General Conditions of Contract, the Main Contractor shall provide all supportive documentation as may reasonably be required by the Quantity Surveyor to make such fair valuation, and this shall be provided by the Main Contractor within three weeks of the Quantity Surveyor's formal request.

**9.08 Application for Payment for Variations**

The Main Contractor shall send to the Architect once in every month an account giving particulars (as full and details as possible) of all claims for all extra or additional work contained in Architect's Instructions issued during the preceding month and no claim for payment for any such extra or additional work will be considered which has not been included in such particulars.

**10. PROGRAMME AND REPORTS**

**10.01 Programme and weekly reports**

Within 7 calendar days after the award of the Contract, the Main Contractor will be required to submit to the Architect a detailed bar chart programme showing all aspects of the construction of the project, dates for receipt of information, the submittal and approval of samples of materials and shop drawings, the procurement of critical materials and equipment, fabrication of special materials and equipment and their installation and testing.

The Main Contractor's programme shall clearly define the critical path and depict the sequences and interdependence of all of the activities in sufficient detail to satisfy the Architect that the work is thoroughly planned and meets all requirements of the Contract

In addition, the Main Contractor will be required to submit to the Architect / CIC a short term programme, showing the forecast construction works on site fabrication works off site and documents preparation in one week or two weeks per advised by the Architect.

The Architect / CIC reserves the right to examine, enquire and check the practical feasibility of the Programme and, if necessary, make suggestions and require alterations to it.

## **10. PROGRAMME AND REPORTS (CONT'D)**

### **10.01 Programme and weekly reports (Cont'd)**

Approval by the Architect of the Main Contractor's critical path schedule and revisions where applicable will not be deemed to relieve the Main Contractor of any of his duties and responsibilities under the terms of the Contract.

The Main Contractor's programme once approved by the Architect / CIC shall become the accepted basis of the Main Contractor's work. At this stage, the Main Contractor will be required to provide schedule data, in a form approved by the Architect, which indicates how he proposes to take advantage of various float conditions that exist in his network. The final delegation of total float in the project schedule will be the subject of mutual agreement.

The programme will be updated regularly to reflect the existing status of the work.

At weekly intervals (or at such shorter periods as may be agreed), the complete programme shall be revised to take into account the latest available information and the Architect to be notified of any changes.

Six copies of all programmes and supporting documents shall be submitted to the Architect. A further copy, updated weekly, shall be displayed in the Main Contractor's site office and retained for reference until completion of the Works.

If and when it is found that the works are not keeping abreast with the Critical Programme, the Main Contractor must with the utmost diligence endeavour to catch up the programme.

Should any of the Main Contractor's activities become supercritical, the Main Contractor will be required to submit a report to the Architect within seven days detailing the proposed remedial action to be taken to alleviate the unacceptable float conditions.

In order that the programme may be maintained or amended where necessary it is incumbent upon the Main Contractor to notify the Architect whenever there is the likelihood of a delay occurring in his own work or material supplies or in those of any of his Sub-Contractors.

The submission to and approval by the Architect / CIC of such programme (and revisions if applicable) shall not relieve the Main Contractor of any of his duties or responsibilities under the Contract.

The Main Contractor is required to submit to the Architect at weekly intervals reports on the general progress of the Works and detailing any information required, extension of Contract Period claimed, etc.



## **10. PROGRAMME AND REPORTS (CONT'D)**

### **10.02 Weekly Reports**

The Main Contractor shall submit to the Architect / CIC each day throughout the Contract Period a Weekly site report.

The Weekly site reports shall comprise:

- 1) Weather conditions – morning and afternoon.
- 2) Number and description of tradesmen and labourers employed for the Works.
- 3) Number, type and capacity of all plant, excluding hand tools and plant, currently employed on the Works.
- 4) Materials intended for use in the Works and delivered to site.
- 5) Outline of works in progress and % of works completion.
- 6) The reasons for any hold-up or any instructions awaited.
- 7) A table showing accumulative list of Instructions given by the Architect and site memo in record.
- 8) Safety Issues and Safety Report
- 9) Building Services Report
- 10) Record of government inspection
- 11) Progress Photos

Reports shall be submitted to the Architect or his representative and CIC.

The format of the weekly report shall be submitted to the Architect / CIC for approval before commencement of work on Site.

In all cases where another representative of the employer is employed upon the Works the weekly reports shall be submitted for checking and signing by the Architect or other representative of the Employer.

### **10.03 Progress Photographs**

The Main Contractor shall provide the Architect with two sets of progress photographs encompassing the whole of the works / site every week.

**10. PROGRAMME AND REPORTS (CONT'D)**

**10.03 Progress Photographs (Cont'd)**

The Main Contractor shall provide colour record progress photographs taken from the same vantage points at weekly intervals or as directed by the Architect/Engineer/CIC. Such photographs shall be sufficient in number and location to record the progress of the Works and one proof copy of each shall be supplied to the Architect to allow him to select the photographs which in his opinion provide the best record. A label shall be provided for each photograph in the album clearly indicating the project title, the date the photograph taken and the part of the Works it shows.

Notwithstanding the above, additional progress photographs shall be provided by the Main Contractor of any part of the works when considered necessary and directed by the Architect/Engineer/CIC.

## **10. PROGRAMME AND REPORTS (CONT'D)**

### **10.04 Site Meetings and Weekly Progress Meeting**

Site meetings will normally be held on site weekly / specified by the Architect / Engineer/ CIC. The Main Contractor shall attend site meetings when required by the Architect.

In addition, the Main Contractor shall also held a weekly progress meeting unless otherwise specified when required by the Architect / Engineer / CIC.

## **11. SUB-CONTRACTS**

### **11.01 Prime Cost and Provisional Sums**

The Main Contractor is referred to the “Prime Cost and Provisional Sums” – Section for details of materials to be supplied by Nominated Suppliers and works to be carried out by Nominated Sub-Contractors and Specialist Firms employed direct by the Employer.

Details are given in this Preliminaries of the attendance, facilities and Main Contractor’s works required by these firms and provision is made for the Main Contractor to allow for attendance or for profit and attendance as appropriate.

### **11.02 Main Contractor’s Tenders for Supply or Sub-Contracts**

If the Main Contractor tenders for a Supply or Sub-Contract to the Main Contract he should note that in the event of his Tender being successful the item for profit on that Supply or Sub-Contract contained in the “Prime cost and Provisional Sums” Section for the Main Contract will be omitted but the item for attendance will remain unchanged.

### **11.03 Main Contractor’s Relationship and Duties to Nominated Suppliers and Nominated Sub-Contractors Generally**

The Main Contractor’s relationship and duties to Nominated Suppliers and Nominated Sub-Contractors is detailed in the “Prime Cost and Provisional Sums” Section and spaces have been provided therein for the allowance for attendance on Nominated Suppliers and Nominated Sub-Contractors.

## **12. ARTISTS OR TRADESMEN NOT SUB-CONTRACTORS**

The Main Contractor shall permit the execution of Works by Artists or Tradesmen who may be engaged by the Employer.

The Main Contractor shall afford all reasonable opportunities to Artists, Tradesmen or Specialist Contractors employed direct by the Employer for the carrying out of their work. Such facilities shall include the reasonable use by others of any scaffolding or staging erected by the Main Contractor for his own use but the Main Contractor shall not be required to maintain any such scaffolding or staging longer than is necessary for his own use or to erect any special scaffolding or staging for the use of others.

### **13. OVERALL CO-ORDINATION RESPONSIBILITIES OF THE MAIN CONTRACTOR**

The Main Contractor shall be responsible for the complete co-ordination of the Works. This responsibility shall include but not be limited to :

- (a) Co-ordination of all trade sections or components one with the other for the compatible integration of the work.
- (b) Establishment of detailed logical sequence of work or erection schedules.
- (c) Provision of suitable and sufficient staff to ensure that the co-ordination procedures are followed to enable the expeditious completion of the Works within the time scale of the construction programme.
- (d) Carrying out any alteration work and indemnification of the Employer against all costs, charges, expenses and the like resulting from any failure to co-ordinate the Works.
- (e) Liaison with Nominated Sub-Contractors / Specialist Contractors undertaking installations and modernization of lifts, conduiting, etc. specialist installations to ensure that all trunking, ducts, piping, conduiting cast-in and related equipment are “built-in” in a logical sequence.
- (f) The Main Contractor’s attention is also drawn to the Attendance in co-ordinating and sequencing works programmes to be provided to all Nominated Sub-Contractors, Specialist Contractors, Government Departments and Utility Undertakers as described in “Schedule of Rates – Prime Cost and Provisional Sums”

The Main Contractor shall be responsible for any damage caused owing to lack of liaison with Sub-Contractors, and shall make good such damage and/or requirement for adjustment that might be necessary to the satisfaction of the Architect at the Main Contractor's expense.

The aim of co-ordinating the building services or work undertake by specialist contractors is to enable the services to be properly installed within the spaces designed to house the services without conflict of one service with another or with the building structure, architectural work or finishings and within the time scale of the construction programme.

“Building Services” in this context includes services installed by Separate Specialist Contractor or utility companies together with drainage systems or installations carried out by the Main Contractor or his sub-contractors.

Properly installed in addition to normal technical requirements, is the requirement for building services to be installed in such positions and sequence that a neat, logical and tidy appearance of all services is achieved and that adequate space for the future maintenance of all services is provided.

The aforesaid term "co-ordinate" shall be deemed to include the acquisition and checking of all design drawings from the Architect and those to be provided under Nominated Sub-Contracts for the compatible integration of all the work, including devising and recommending to the Architect for approval design solutions to eliminate any conflict between the positioning of any work, and to provide adequate space for the routing of all such work and for subsequent maintenance of the various installations in accordance with good practice together with technical checking of the compatibility of adjacent services.

**13. OVERALL CO-ORDINATION RESPONSIBILITIES OF THE MAIN CONTRACTOR (CONT'D)**

The Main Contractor shall bear the cost of carrying out any alteration work and shall indemnify the Employer against all costs, charges, expenses and the like resulting from any failure on the part of the Main Contractor to co-ordinate the design and installation of all service installations, as determined by the Architect.

The process of co-ordination will require the accurate location of services and their brackets etc. in the spaces designed to house the services. In the event of conflicts arising between the requirements of different parties, the Main Contractor will be required to negotiate satisfactory arrangements and to see that they are resolved. Conflicts of this nature shall be the sole responsibility of the Main Contractor and do not fall within the area of responsibility of the Architect who will not be expected to be involved in such matters.

Refer also to Annex 3 - "Particular Preliminaries for Builder's Works".

**14. STATUTORY OBLIGATIONS**

**14.01 Regulations**

The Main Contractor shall comply with any Ordinances, Regulations and requirements of the Government of the Hong Kong Special Administrative Region or statutory undertaker or utility company applicable to the Works, subject to Clause 4 of the General Conditions of Contract.

The Main Contractor's attention is drawn to the recent amendments made to the Immigration Ordinance by the Immigration (Amendment) Bill 2011 (C115). These amendments are now incorporated into the Immigration (Amendment) Ordinance 2011 and have legal effect.

The Main Contractor shall take all practicable steps and shall use his best and continual endeavours to prevent persons who are illegal immigrants from being and/or being employed on the Site which must include, but not only be limited to the following measures : -

- a) the Main Contractor shall make it known to sub-contractors that if they employ illegal immigrants and /or allow illegal immigrants to be within the Site, they will receive no further work from the Main Contractor,
- b) the Main Contractor shall not employ/permit nor knowingly permit his sub-contractors to employ/permit illegal immigrants on Site, default of this condition shall be considered as a serious breach of this Contract,
- c) the Main Contractor shall post signs or posters around the Site stating that illegal immigrants will not be employed/permitted on the Site and any found will be immediately reported to the Authorities,
- d) the Main Contractor shall post signs on the Site that state the no-one will be allowed to remain on the Site if they refuse to produce their HK Identity Card when requested by supervisory staff,

#### **14. STATUTORY OBLIGATIONS (CONT'D)**

##### **14.01 Regulations (Cont'd)**

The Main Contractor shall take all practicable steps and shall use his best and continual endeavours to prevent persons who are illegal immigrants from being and/or being employed on the Site which must include, but not only be limited to the following measures : -

- e) the Main Contractor shall keep and enforce all sub-contractors to keep a full list of workers' names and Identity Card numbers which must be formally produced to the Site office daily,
- f) the Main Contractor shall secure the Site at night and instruct the watchmen/security guards that no-one is to be permitted to sleep/live on the Site subject to the agreement by the Employer,
- g) the Main Contractor shall report any suspected illegal immigrants immediately to the Authorities,
- h) the Main Contractor shall contact the local police divisional commander and request a visit from the crime prevention officer who can advise on Site security,
- i) the Main Contractor shall fully brief all supervisory staff on such procedures and have a record of this in a company-written code of practice.

All personnel working on site shall have a personal site safety training certificate (known as green card) issued by authorized organizations approved by the Commissioner for Labour in accordance with Factories and Industrial Undertakings (Amendment) Ordinance 1999.

The Contractor shall be required to produce evidence to satisfy the Architect that he has carried out all of the above-mentioned measures.

No claims for extension of time, loss and/or expense from the Contract due to failure to observe these requirements

##### **14.02 Notices, Fees and Charges**

The Main Contractor shall comply with Clause 4 of the General Conditions of Contract relative to notices, fees and charges in respect of the Works.

**14. STATUTORY OBLIGATIONS (CONT'D)**

**14.03 Working hours, rates of wages etc.**

The Main Contractor shall comply with any current legislation or regulations regarding working conditions, working hours, or rates of payment to employees and accept the risk of any impending legislation or other conditions which alters any obligations or imposes new obligations.

**14.04 Safety supervision plan and safety precautions**

The Main Contractor shall, if not already previously submitted, immediately upon award of Contract complete and submit the Site Supervision Plan to the Architect not more than 3 days for the Works for approval by the Building Authority, and shall comply with such throughout the construction period.

The Main Contractor shall note that the Supervision Plan is a pre-requisite document for application for consent to the commencement of the Works. If the issue of consent from Building Authority is delayed (notwithstanding solely or partly) due to fault by the Main Contractor in the preparation of such plan, no extension of time shall be granted and the Main Contractor shall be responsible for the consequences of the full delay.

The review and approval by the Architect of the Main Contractor's Supervision Plan shall not reduce the Main Contractor's liability as specified above.

The Main Contractor shall constantly keep upon the works a competent Safety Officer to ensure the safety of all operations on the site during the Contract Period. The qualification of the Safety Officer should be submitted to the Architect for approval.

The Main Contractor shall allow for complying with the Labour Department's regulations for safety on Work Sites and Provision of First Aid Equipment and personnel.

The Main Contractor shall object in writing to any instruction issued by the Architect which he considers unsafe stating the grounds for his objection.

The Main Contractor shall provide sufficient safety helmets for the use of the consultants and other authorised persons visiting the site.

The Main Contractor shall display during the hours of daylight, such flags, signals and markings and during the hours of darkness such lights for the safety of Aircraft or the Public as required by the regulations for the time being in force in the Hong Kong Special Administrative Region.

**14.05 Industrial Training and Pneumoconiosis Levies**

The Main Contractor shall pay the levies in respect of his own works and the relevant Nominated Sub-Contract works and the Nominated Sub-Contractors shall reimburse the Main Contractor for the amounts paid by him in respect of the Nominated Sub-Contract works within twenty-one (21) days of receipt by the Nominated Sub-Contractors of the Main Contractors accounts for monies paid.

**15. PROTECTION OF PUBLIC PROPERTY, ETC.**

**15.01 Protection of public**

The Main Contractor is to take every precaution necessary to protect the public from injury or death during the course of the Works.

**15.02 Protection of public property**

The Main Contractor shall maintain and protect all public property and roads and property of the utility companies and bear all costs incurred in making good any damage caused thereto.

**15.03 Protection of adjoining property**

The Main Contractor shall take every precaution necessary to protect adjoining property from damage and shall bear all costs incurred in remedying damage caused through lack of proper care on his part.

**15.04 (not used)**

**15.05 Maintenance of existing roads, footpaths, steps, etc.**

Maintain all existing roads, footpaths, steps, etc. and reinstate any damage caused by any reason whatsoever during the progress of the Works.

It will be the Main Contractor's responsibility to ensure that the roads leading to and around the Site are kept free from obstruction brought about by the work on this Site and in no way shall he cause any hindrance to traffic or ancillary works either by his own vehicles, or by his workpeople, materials, etc.

The Main Contractor shall be responsible for repairing damage to private streets and access roads if deterioration occurs during the Contract Period.

**15.06 Maintenance of existing trees and shrubs**

Take every reasonable precaution possible to preserve all trees and shrubs not affected by the Works. No tree or shrub within the boundary lines shall be cut down without the prior approval of the Architect.



**15. PROTECTION OF PUBLIC PROPERTY, ETC. (CONT'D)**

**15.07 Maintenance of existing services**

The Main Contractor shall ensure that any existing services such as electric power, telephone, water, gas or drainage to adjacent properties and buildings which pass through the site of the Works are maintained and safe-guarded from any damage or contamination whatsoever during the course of the Works.

The Main Contractor shall arrange with statutory undertakers or the utility companies for any necessary disconnection or diversion of drains or other services.

Any services that the Main Contractor requires to be diverted to suit his method of construction shall be diverted by the relevant authority and/or adjacent owners and the Main Contractor shall bear all costs and charges in respect thereof.

Where alterations to services are necessitated by the Works, no adjacent work shall commence until the alterations have been made.

Refer also to Annex 3 - “Particular Preliminaries for Builder’s Works”.

**15.08 Restrict nuisance of dust and noise**

The Main Contractor is to take all necessary steps to restrict the nuisance of dust and noise. Pneumatic drills shall be fitted with silencers. Compressors shall be in good order to run as quietly as possible and shall be placed in position as far away as possible from adjoining premises. The Main Contractor shall take care to abate the nuisance caused by dust and shall sprinkle dusty areas with water frequently.

All plant and equipment supplied by the Main Contractor for the use on the works shall be effectively ‘sound reduced’ by means of silencers, mufflers, acoustic lining or sheets or acoustic sheds or screens to a level of 75 decibel (dBA) measured outside the nearest occupied property or to the satisfaction of the Architect.

The Main Contractor’s attention is drawn to the restrictions on construction activities as set out in the Noise Control Ordinance and subsequent amendments thereto.

The Main Contractor shall apply as soon as possible for a Construction Noise Permit in accordance with the Noise Control (General) Regulations and the Noise Control (Appeal Board) Regulations 1989, display the Permit as required and copy to the Architect.

**15.09 Suppressors**

All mechanical plant shall be fitted with radio and T.V. interference suppressors.

**16. INSURANCE AND SURETY (See also CIC’s General Conditions of Contract and Guidelines for Works or Services (2b-CAR))**

## **17. GENERAL OBLIGATIONS**

### **17.01 Overtime**

Should the Main Contractor consider that it may become necessary to cause overtime to be worked in order to complete the Works by the Date for Completion, he must allow for such a contingency in his Tender price. No claim for any extra in this connection will be considered.

The Main Contractor shall apply to the relevant Government Departments for approval and also give the Architect written notice of his intention to work overtime.

### **17.02 Labour**

The Main Contractor shall provide and employ on the Site in connection with the execution and maintenance of the work:

- a) Only such technical assistants as are skilled and experienced in their respective callings and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise; and
- b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

The Architect shall be at liberty to object to and require the Main Contractor to remove forthwith from the Works any person employed by the Main Contractor who in the opinion of the Architect misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Architect to be undesirable and such person shall not be again employed upon the Works without the written permission of the Architect.

Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Architect.

### **17.03 Foreman/Contractor's Management Team**

The Main Contractor shall constantly keep upon the Works a site management and supervisory team of sufficient strength with personnel of appropriate qualifications, seniority and experience, having regard to the size, complexity and nature of the Works, to organise, manage, plan, supervise, inspect and superintend the carrying out of the Works and carry out all other duties necessary to ensure that all the Main Contractor's obligations under the Contract are carried out properly and efficiently.

The site management and supervisory team shall be headed by a competent construction manager who shall be dedicated full time to the Works. The appointment of the construction manager shall have been consented to in writing by the Architect prior to the commencement of the Works and the Main Contractor shall not remove or replace him or any of the key management personnel without the Architect's written consent.

**17. GENERAL OBLIGATIONS (CONT'D)**

**17.03 Foreman/Contractor's Management Team (Cont'd)**

A services engineer shall be a member of the team and will act as a co-ordinator for all building services installations carried out by the Main Contractor, Nominated Sub-Contractors and specialist contractors. He shall be responsible for:

- a) The acquisition and checking of all design drawings from the Architect and those to be provided under any sub-contract or contract for specialist works for the compatible integration of all the works, including recommending to the Architect, for his approval, design solutions to eliminate any conflict between the positioning of any work, and to provide adequate space for the routing of all such work and for subsequent maintenance of the various installations in accordance with good practice.
- b) In conjunction with the sub-contractors, the production and provision of finalized master co-ordination drawings and/or combined services drawings incorporating all design solutions approved by the Architect and showing the integration of all services to be carried out by the Main Contractor and his sub-contractors.
- c) The establishment of a detailed sequence of work to enable the expeditious completion of the Works and all Specialist works.
- d) The co-ordination of all building services sub-contractors for the timely completion of all testing/commissioning works, submission of manuals and as-fitted drawings, including the completion of all outstanding works and rectification of defects during the defects liability period.

The members of the site management and supervisory team are to be approved by the Architect.

The Architect shall require details of their experience and qualifications, any may require his replacement if considered unsuitable.

**17.04 Visitors**

The Main Contractor shall not allow any unauthorised visitors on the site. He shall keep a visitors book for persons authorised to visit the site and provide safety helmets for such visitors.

**17.05 Workmen living on site**

Unless the Architect gives written permission no workmen will be allowed to live on the site apart from the necessary number of watchmen.

**17.06 Watching**

The Main Contractor shall provide watchmen on the Works during the day and night and all necessary lighting, guards, barriers and all safeguards for the prevention of fire, accidents and losses.

**17. GENERAL OBLIGATIONS (CONT'D)**

**17.06 Watching (Cont'd)**

The Main Contractor shall be solely responsible for the safety from damage or theft of all materials, plant, machinery, tools and scaffolding and also for all Nominated Sub-Contractor/ Specialist Contractors' fixed and unfixed materials, goods, etc. delivered to site.

The Main Contractor shall not be responsible for Nominated Sub-Contractors and Specialist Contractors' plant, tools, equipment and the like.

**17.07 Protection and cleaning of all trades**

The Main Contractor is to amply protect all finished Works including electrical and sanitary fittings, built-in fixtures, metal work, glass, tiles and other wall and floor finishings, and will be responsible for any damage caused by carelessness and negligence in this respect.

At the Completion of the Works, clean up after all trades and remove all marks, stains, finger prints and other soil or dirt from all finished surfaces, ease and adjust all doors, windows, drawers, etc., check and oil all hardware, cut out cracks in plastering and make good, clean all wall linings, floors and glass inside and out, touch up all painted and polished work and clean out all gutters and channels.

Clear away from the Site all plant, surplus building materials, earth and rubbish and leave the premises clean and fit for occupation to the entire satisfaction of the Architect.

**17.08 Trespass and Nuisance**

All reasonable means shall be used to avoid inconveniencing adjoining owners and occupiers.

No workpeople employed on the works shall be allowed to trespass upon adjoining properties. If the execution of the works requires that workpeople must enter upon adjoining property, the necessary permission shall be first obtained by the Main Contractor shall indemnify the Employer against any claim or action for damages on account of any trespass or other misconduct of the Main Contractor's employees.

The Main Contractor shall comply with all current Regulations and take all necessary precautions to prevent nuisance from noise, water, smoke, dust, rubbish, mosquito breeding and all other causes.

The Main Contractor shall not obstruct the public roadway or otherwise do or suffer to be done anything which may amount to nuisance or annoyance, and shall not interfere with any right of way or light to adjoining property.

Any notice received by the Main Contractor or left upon the site requiring the discontinuance or suspension of any part of the works if given verbally, shall at once be communicated by him to the Architect in writing, and the Main Contractor shall keep the Employer indemnified against any claim or loss consequent upon any act, neglect or omission of the Main Contractor or his agents or workpeople in this respect.

**17. GENERAL OBLIGATIONS (CONT'D)**

**17.09 Fire protection**

The Works shall be kept free from fire hazard and the Main Contractor shall take all possible precautions and provide all necessary fire fighting equipment and properly trained staff.

**17.10 Clearing away rubbish during the progress of the works**

The Main Contractor shall remove all rubbish, crates, wrappings, surplus materials, etc. from the Site as soon as is possible and at daily intervals during the progress of the Works so as to maintain unhindered access to and easy inspection of all work. The Main Contractor shall provide proper bulk bins of adequate size at the Site for storage of rubbish which shall be removed to disposal grounds in accordance with the regulations of any Authority having jurisdiction with regard to the Works.

If, in the Architect's opinion, the Main Contractor fails to provide proper bulk bins or remove rubbish from the Site after reasonable notice in writing has been given by the Architect or notice received from the relevant Authority the Employer reserves the right to employ outside labour to remove rubbish and deduct all costs and expenses incurred therefor from any money due or to become due to the Main Contractor.

The Nominated Sub-Contract documents require all Sub-Contractors to deposit their rubbish at the specific location in the works designed by the Main Contractor and the Main Contractor shall be solely responsible for further removal therefrom.

Burning of rubbish on site will not be permitted.

**17.11 Removal of water**

Keep the Site and the Works including all excavations free from water by pumping or otherwise. Allowance shall include for removal of all water and this shall be deemed to include rain, storm, percolating, spring or running water.

To prevent mosquitoes breeding no accumulation of water is to be permitted at any time.

The Main Contractor shall provide all things necessary including all additional temporary and permanent works to ensure that adequate measures are taken at all times and especially during typhoons, monsoons, rainstorms, etc. to properly and safely remove all surface and ground water in and around the site including run-off from adjoining roads, sites/properties, etc.

All such measures shall however be subject to the approval of the Architect.

**17. GENERAL OBLIGATIONS (CONT'D)**

**17.12 Setting out** (See also General Conditions of Contract Clause 5)

Set out the Works and provide all instruments etc. and labour required by the Architect for checking this work.

The Main Contractor shall verify all dimensions and ground levels shown before commencing work.

The Main Contractor shall check the levels and boundaries of the site within seven days of taking possession and report any discrepancies to the Architect. If any work required by this Contract is executed without first checking for and reporting discrepancies, all cost incurred in rectification will be at the Main Contractor's own expense.

**17.13 Preparation for Partial/Practical Completion**

The Main Contractor shall carry out all necessary preparatory works well in advance of the Dates of Partial/Practical Completion stated in the Appendix to the General Conditions of Contract.

**17.14 Blasting**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works".

**17.15 Smoking**

Smoking is not allowed within the Site. Any person who smokes on Site will be removed and not be allowed to return. The Main Contractor shall replace at their own expense, any of his employees, agents or sub-contractors at the Architect's request.

**17.16 Guarantee**

Refer to Annex 3 - "Particular Preliminaries for Builder's Works"

**18. TEMPORARY WORKS**

**18.01 Plant, tools, etc. and scaffolding**

Provide and maintain in good working order all mechanical equipment, plant, tools, implements, ladders, tarpaulins and the like necessary for the proper and timely execution and protection of the Works.

Provide, erect, alter if necessary and maintain all necessary scaffolding to the satisfaction of the Architect and remove on completion and make good all work disturbed.

The Main Contractor will not be permitted to take support from windows for erecting scaffolding or plant. The method of securing the scaffolding and plant shall be to the Architect's approval.

The maintenance of all plant shall be undertaken outside normal working hours and the Main Contractor shall provide sufficient reserve plant of all kinds to ensure that the work is not interrupted by breakdown of plant.

Erect and maintain suitable and safe ladders and gangways for the Architect, the Site Engineer, and the representative of the Employer to thoroughly inspect any portion of the Works, with complete safety.

The Architect reserves the right to instruct any unsuitable and/or unsafe safety equipment to be removed from site and replace with that of an approvable standard, all at the cost of the Main Contractor.

**18.02 Hoardings, screens, etc.**

Provide, erect, alter if necessary and maintain all necessary hoardings, screens, gates, covered walkways, footways, gangways, fans, gantries, temporary enclosures, barriers, etc., to the satisfaction of the Architect and as shown on Drawings and remove on completion and make good all work disturbed.

All hoardings, covered walkways, fencing etc. shall be erected BEFORE any excavation commences.

Provide all lighting to hoardings, covered walkways, fencing etc. as may be required by the Authorities.

All surfaces are to be prepared and painted with two coats of synthetic paint in colours to be selected by the Architect.

The hoardings, screens, etc. are to be removed on completion of the Works and all works disturbed are to be made good.

**18.03 Main Contractor's storage sheds, workshops and offices**

The Main Contractor shall provide for his own use all necessary workshops, messrooms, offices and sheds of suitable construction for the storage of materials, maintain them in good order to the satisfaction of the Architect, remove on completion of the Works and make good the sites.

**18. TEMPORARY WORKS (CONT'D)**

**18.03 Main Contractor's storage sheds, workshops and offices (Cont'd)**

As part of his offices the Main Contractor, shall also provide a meeting room fully furnished with reverse cycle air conditioning with a large table to seat 20+ persons. Internet services, facsimile machine, colour printer/photocopier, as well as other office furniture shall be provided by the Main Contractor for the Contractor and all sub-contractors.

Materials may be stored in completed sections of the Works provided that no section of the structure is loaded in excess of the design loading and no hindrance is caused to the progress of the Works or access thereto or to partial completion of Works where this is required.

All materials on the site and in the building shall be stored in a neat and orderly manner.

Separate inflammable goods storage sheds must be provided in an approved location. No inflammable goods such as oil based paints, kerosene, thinners, cellulose lacquers, bitumen or bitumen based products etc. will be permitted to be stored in the building under construction.

**18.04 (not used)**



**18. TEMPORARY WORKS (CONT'D)**

**18.05 Temporary latrines**

Provide and maintain efficient, clean and TEMPORARY sanitary latrine accommodation for the use of male and female labour employed for the Works and keep the whole of the Site and buildings in a clean and sanitary condition to the satisfaction of the Employer, Architect and of the appropriate Government Departments and remove on completion.

The latrines must be emptied daily if not connected to foul disposal pipes and cleared away on completion. The attention of the Main Contractor is especially drawn to the fact that he must instruct his workpeople and those of all Sub-contractors to use the temporary latrines and urinal down pipes, provided by the Main Contractor and warn all workpeople, under penalty of instant dismissal, from committing any unsanitary act. The Main Contractor is responsible for arranging the necessary connections to the sewers.

**18.06 Positions of all site offices, sheds, hoists and the like**

Submit to the Architect for approval proposals for the positions of all site offices, sheds, hoists and the like. After receiving approval from the Architect, submit the proposals with the required Form to the Building Authority for approval.

**18.07 Temporary supports**

Provide all necessary temporary supports including, inter alia, shoring, propping, strutting, planking and strutting, sheet piling, etc. whether for the support of excavation, new work under construction or of existing buildings and existing slopes. All such temporary supports shall be designed by the Main Contractor to the approval of the Architect and the Building Authority. The Main Contractor shall be responsible for its safety throughout the period of the Works and no indication of approval or disapproval of such temporary supports by the Architect shall be interpreted as in any way reducing the Main Contractor's responsibility in this respect. Should the Architect in lieu of the Main Contractor subsequently undertake to provide drawings detailing the requirements for temporary supports and should the Architect obtain the approval of the Building Authority to these proposals, then the Main Contractor shall construct the temporary supports in accordance with such drawings at no extra cost, as if they were his own design.

**18.08 Telephones and Facsimile**

The Main Contractor shall provide for himself and all his sub-contractors a telephone in his own office. The Main Contractor shall include for paying all fees, charge, telephone bills, etc. including removal of the facilities on completion.

The Main Contractor shall also provide a facsimile machine for himself.

**18. TEMPORARY WORKS (CONT'D)**

**18.09 Water for the Works**

Provide and distribute all necessary water at the Site for the carrying out of the Works, including the works of Specialist Contractors employed direct by the Employer, statutory undertakers and utility companies including the erection and removal of temporary plumbing and storage and the payment of all fees and charges.

The Main Contractor shall provide and distribute water free of charge to Specialist Contractors employed direct by the Employer, statutory undertakers and utility companies.

The Main Contractor shall provide at his own cost a meter at each water supply point for measuring the water consumption by the Main Contractor and shall reimburse the Employer the relevant water charge. The Main Contractor shall also pay all fees and charges and supply temporary storages tanks, pipe lines and plumber's work, remove the temporary installation and make good on completion of the Works.

Should the Main Contractor intend to use water from the Government mains he shall apply for a temporary water supply at early stage of the mobilization period. No extension of time will be granted for any delay in obtaining a temporary water supply.

**18.10 Lighting and power**

Provide all necessary electric lighting and power at the Site for the carrying out of the Works including the Works of Specialist Contractors employed direct by the Employer, statutory undertakers and utility companies and including all electric power to enable all Specialist Contractors, etc. to check, test and commission their installations to meet the requirements of the Architect and all others having jurisdiction.

The Main Contractor shall provide at his own cost a meter at each power point for measuring the electricity consumption by the Main Contractor and shall reimburse the Employer the relevant electricity charge.

The Main Contractor shall be responsible for all Site works in distributing electricity including, but not limited to, provision, installation and subsequent removal of temporary main switch board, distribution boards, cables, wiring, junction boxes, transformers, lights and all other accessories and making all necessary arrangements with the local supply authority and paying all charges.

The whole installation is to comply with the latest edition of the Institute of Electrical Engineers Regulations for Electrical Installations in Buildings, Code of Practice for the Electricity (Wiring) Regulations issued by EMSD and all requirements of the Electricity Supply Company.

The Main Contractor shall provide and distribute electricity free of charge to Specialist Contractors employed direct by the Employer, statutory undertakers and utility companies.

The Main Contractor shall remove the temporary electrically supply installation, make good all works disturbed, etc. on completion of the Works.

Should the Main Contract intend to use electricity from the main he shall apply for a temporary electricity supply at an early stage of the mobilization period. No extension of time will be granted for any delay in obtaining a temporary electricity supply.

**18. TEMPORARY WORKS (CONT'D)**

**18.11 Temporary roads**

Form and maintain all necessary temporary roads and paths to provide adequate access to and within the Site and reinstate the site and all Works damaged or disturbed upon completion of the Contract to the satisfaction of the Architect.

The layout of the proposed temporary roads and paths must be submitted to the Architect for his approval. The Architect may issue instructions to the Main Contractor regarding the layout and method of forming temporary roads and paths and the Main Contractor shall comply with these instructions at no extra cost.

Entrances and exits from works areas to internal/site roads shall be provided with tyre washing facilities such that mud, etc. is not deposited from vehicles onto roads.

**18.12 Restriction of advertising**

No advertising, other than that given by the name board specified will be permitted on site, except with permission in writing from the Architect. The Architect may instruct the Main Contractor to remove advertisements, etc., from the Works, whether erected by the Main Contractor or not.

Publicity releases relating to this project should be first submitted to the Employer and the Architect for approval.

**18.13 Other temporary works**

The Main Contractor will be required to carry out all necessary re-painting and re-writing of the name board that may be necessary during the progress of the works. No notice other than that approved by the Architect will be permitted on the Site.

Refer also to Annex 3 - “Particular Preliminaries for Builder’s Works”

**19.0 ATTENDANCE PROVIDED BY MAIN CONTRACTOR**

Refer to Annex 3 - “Particular Preliminaries for Builder’s Works”

## GENERAL SPECIFICATION

The Main Contractor shall be deemed to have examined the following General Specifications applicable to this Contract:

- (a) “General Specification for Building, 2012 Edition” published by the Architectural Services Department.
- (b) “General Specification for Electrical Installation in Government Buildings of the Hong Kong Administrative Region, 2012 Edition” published by the Building Services Branch of the Architectural Services Department.
- (c) “General Specification for Air-Conditioning, Refrigeration, Ventilation and Central Monitoring Control System Installation in Government Buildings of the Hong Kong Special Administrative Region, 2012 Edition” , published by the Building Services Branch of the Architectural Services Department.
- (d) “General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region, 2012 Edition” , published by the Building Services Branch of the Architectural Services Department.

In case of any conflict between the General Specification” and “Particular Specification A” , the latter shall take precedence.

Although a copy of the General Specification is not issued with these Contract Documents, the Main Contractor is advised to arrange for themselves a copy of such contract for their reference and use.

The General Specification may be purchased by the following means:-

- (i) Calling the Publications Sales Unit of ISD at 2537 1910,
- (ii) Visiting the online Government Bookstore at <http://www.bookstore.gov.hk>,
- (iii) Downloading the order form from the ISD website at <http://www.isd.gov.hk> and submit the order online or by fax to 2523 7195, or
- (iv) Placing order with ISD by e-mail at [puborder@isd.gov.hk](mailto:puborder@isd.gov.hk).

**Annex 3 – Particular Preliminaries for Builder's Works**  
**Renovation Works of**  
**Safety Experience Training Centre (SETC) at**  
**Kwai Chung Campus (KCC) of**  
**the Construction Industry Council**

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## **PARTICULAR PRELIMINARIES**

### **1.0 GENERALLY**

The preliminary items included hereunder apply to the whole of the works contained in this Contract and the rates and/or amounts inserted by the Main Contractor in the Schedule of Rates Section shall be deemed to apply to the whole of the works carried out under this Contract including all variations to the Contract.

The Main Contractor shall be deemed to have allowed in his tender for all costs in respect of all items described in this Preliminaries Section.

Reference shall be made to the Annex 1 - "General Preliminaries" document and allowance made for the items described therein.

In the absence of any sum against any item or items in Schedule or Rates, any monetary cost attributable thereto shall be deemed to be included elsewhere in this Preliminaries Section or in the unit rates for the work.

Any price entered for Preliminaries items in the Schedule of Rates shall be at the risk of the Main Contractor and no adjustment will be made at the settlement of accounts.

The documents forming the Contract are to be taken as mutually explanatory and the tendered Sum shall be deemed to cover the complete requirements of the Conditions of Tender, Special Conditions of Tender, Conditions of Employment, Conditions of Contract, Specification and Drawings.

In the event of a lump sum only being inserted in respect for Preliminaries items in the Schedule of Rates, the Main Contractor will be required to provide an itemised breakdown of the amount so included.

In the event of the amount inserted against an item for Preliminaries items in the Schedule of Rates for which whole payment or substantially whole payment would normally be made at the outset of the Contract (e.g. insurances) being higher than the amount which the Main Contractor can substantiate, payment for the excess amount will be effected over the period of the Contract.

Payments for amounts inserted against time related items for Preliminaries items such as overtime, plant, foreman, watching etc. will be effected over the period of the Contract in the same proportion as the value of Main Contractor's work carried out is to the total value of Main Contractor's work (excluding Preliminaries).

In the event of no amounts being inserted by the Main Contractor in respect for Preliminaries items in the Schedule of Rates, no relative payment whatsoever will be included in interim payments.

## **2.0      DEFINITIONS**

2.01      Employer / CIC

The Construction Industry Council

2.02      Architect

David S. K. Au & Associates Ltd

2.03      Structural Engineer

David S. K. Au & Associates Ltd

2.04      Building Services Engineer

David S. K. Au & Associates Ltd

2.05      Quantity Surveyor

David S. K. Au & Associates Ltd

2.06      Safety Specialist

Mainways Hong Kong Ltd

2.07      Main Contractor/ The Contractor

Terms such as “Main Contractor”, “The Contractor”, “such contractor” and the like, refer to the Contractor who is appointed to carry out the Works in this contract.

2.08      Direct Supplier

A Supplier employed by Employer in a separate contract, the Direct Supplier to supply materials or goods for Main Contractor to carry out installation / application of the Works.

2.09      (not used)

2.10      Separate Specialist Contractors

The Contractors under direct contracts with the Employer for the carrying out of specialist works which will be carried out during the course of this Contract but do not form parts of the Works under this Contract.

2.11      Month

The term “month” shall be regarded as meaning a calendar month

## **2.0      DEFINITIONS (Cont'd)**

### **2.12      Day**

The term “day” shall be regarded as meaning a calendar day.

### **2.13      Approved**

Terms such as “approved by”, “to approval”, “as directed” and the like, refer to approval or directions given by the Architect. Under no circumstances shall approval relieve the Contractor of his responsibilities as set out in the Tender Documents. No approval will be binding until given in writing.

### **2.14      British Standard (B.S. and BSEN )**

Current British Standard Specification including amendments and revisions published up to the date of tender.

### **2.15      Code of Practice (C.P.)**

Current British Standard Code of Practice and any other Code of Practice issued by any Government Department including amendments and revisions published up to the date of tender.

### **2.16      The Authority / Authorities**

The Authority shall mean the Building Authority or any Government Department or Public Utility or Statutory Undertaking having jurisdiction with regard to the Works or with whose systems the same are or will be connected.



### **3.0 DESCRIPTION OF THE WORKS**

#### **3.01 Generally**

The description of the scope of the Works and description of the Works given hereunder must not be considered as being completed.

The Tenderer is deemed to have read other related documents, Specification, etc. and in particular to have studied the tender drawings to be fully aware of the full extent of the Works.

#### **3.02 Scope of the Works**

The Works to be carried out under this Main Contract comprise of renovation / alteration and addition/ fitting-out / equipment installation / coordination works of designate area at G/F (called “SETC” hereafter) and provide temporary training area at designated area at 2/F of Kwai Chung Campus (called “KCC hereafter”) at 7-11 Kwai Hop Street, Kwai Chung, New Territories (lot no. KCTL 381) for the Construction Industry Council.

The scope of works generally includes but not limited to the following:

##### **(1) General**

- a) Design, provision and maintenance of all necessary precautionary and temporary works including but not limited to dust screens, protective wire netting, fencing, working platforms and other access facilities etc., and all necessary safety measures. Such temporary works/ safety measures etc. shall be removed after the completion of the Works with all affected finishes reinstated to match existing;
- b) Design, erection and subsequent removal of hoarding and / or covered walkway (as necessary) to comply with Government's regulations and to suit Contractor's operation needs for the works and subsequent removal of them after the works. Design, erection and subsequent removal of any fencing, barrier, gantries, temporary lighting or other measures to screen off the Works and protect the public as necessary for the Works.
- c) Reinstatement of the adjacent public road, pavement, paving, properties which are damaged by the Works.
- d) Special consideration should be taken during construction period on the protection of existing drains and avoid negative impact and pollution to the existing storm water drain.
- e) Accept the site as found, prepare and submit site condition record upon possession.
- f) Provision of all necessary F.S. exit sign and maintenance exit route to fulfill statutory requirement.

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02 Scope of the Works (Cont'd)**

- g) Submission of As-Built and As-Fitted Drawings, Testing and Commissioning and Operation and Maintenance Manual, etc.
- h) Liaison and co-ordination with Government Departments and Public Utilities for checking and diversion of all existing utility services where the Works are affected.
- i) Provision of tests conducted by accredited laboratories to complete works as per Drawings and Specifications.
- j) The Contractor shall cut or form all necessary chases, holes, openings, etc. of all sizes, all necessary additional trimming reinforcement around openings, filling and sealing around sleeves, pipes, conduits, ducts, etc through openings with approved fire resistant packing materials and sealant.
- k) The Contractor shall core and construct openings for all building services installation penetrating through wall and slab. No matter these openings are shown on architectural and building services drawings or not, the Main Contractor shall make good the openings after installation and fulfill Fire Resisting Construction requirement if so required, and match with existing colour and surface.
- l) Setting out and surveying to establish all required levels during the Contract Period.
- m) All associated external works.
- n) Obtaining all necessary permits, including noise permit if required, etc. and pay all fees and levies as may be required from the relevant government departments.
- o) Provision of all necessary preliminaries, Contractor's All Risks and Employee's Compensation insurances, and bond documents as required in the Contract.
- p) Making good and reinstate the disturbed area (no matter within or outside current phase of works) for normal functioning after completion of the construction works in any phase.
- q) Final cleaning and touching up works to bring disturbed areas to the same face, colour, texture, etc. to match the surrounding existing or already constructed works.
- r) Regular site clearance including removal of rubbish and debris.
- s) Provision of Site Safety Supervision and Quality Supervision Plan to the satisfaction of Building Authority and AP/RSE/RGE.
- t) Special consideration and care shall be taken during construction period on the existing utilities.

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02 Scope of the Works (Cont'd)**

- u) Provision for maintaining on-site management team for close and smooth execution of Contract works.
- v) The Contractor / his sub-contractors shall be Registered General Building Contractor (RGBC) to be appointed for the carrying out of the submitted building works of this Contract.  
The Contractor shall facilitate Authorized Person notifying Buildings Department (BD) for commencement of works (e.g. BA10), and report completion of works by prescribed forms. The Contractor shall comply statutory and facilitate the completion of works until the works is acknowledged by BD (e.g. BA14).  
  
This appointed RSE shall prepare all required structural submissions including any documents and testing, make amendments if necessary, to Buildings Department for BD's approval under Buildings Ordinance.
- w) The Contractor shall employ a Registered Structural Engineer (RSE) to be appointed as the RSE for the carrying out of the structural works of this Contract. This appointed RSE shall prepare all required structural submissions including any documents and testing, make amendments if necessary, to Buildings Department for BD's approval under Buildings Ordinance.
- x) If the works fall into the classification of the Minor Works Control System (MWCS), the contractor shall ensure that the works are completed in accordance with the Guidelines on Minor Works Control System for interior renovation / alteration and subdivision of a flat issued by the BD and all other relevant statutory requirements. And the contractor shall appoint the prescribed professional and submit the minor works to BD for approval, acknowledged under his own.
- y) Liaising and coordinating with the specialist contractors / other contractors, as may be employed by the Employer for the carrying out of specialist works within SETC and/or next to SETC and make due allowance in his sequencing, phasing, programming of works.
- z) Coordinate for all testing and commissioning works for all trades and to secure all operation and maintenance manuals for all systems and equipment.
- aa) All interfacing works including all temporary diversion and installation works and the subsequent reinstatement in connection with the construction works in the Site / SETC for the continuance of the Employer's usual and normal activities and operation.
- ab) All remaining works as shown on the Drawings and Specifications and all other works deemed to be necessary for the satisfactory completion of the whole of the Contract Works whether expressly stated or not.

#### **(2) Site Management**

- a) Accept the site as found, prepare and submit site condition record with site photos

### **3.0      DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02      Scope of the Works (Cont'd)**

within 7 days upon site possession.

- b) Provide preparation and submission of shop drawings in 14 days after contract commencement.  
To prepare As-Built and As-Fitted Drawings, Testing and Commissioning and Operation and Maintenance Manual as instructed by the Architect etc.
  - c) Provide design team for preparation and submission of design and build shop drawings as specified in the contract drawing.
  - d) Provide full time site agent of at least 10 years relevant qualified experience and Project Manager Building Services Co-ordinator, and Register Safety Officer of at least 8 years relevant qualified experience. CV of the project manager, Register Safety Officer, site agent and building services co-ordinator are required to be submitted with the tender.
  - e) Provide design team for preparation and submission of shop drawings.
  - f) Attend meetings and co-ordinate with all relevant parties including all relevant internal and external parties, whether planned or ad-hoc, as and **when required by the Architect /CIC .**
- (3) Builder's Works-  
Carrying out renovation works of SETC at G/F and provide temporarily training area at 2/F.

#### **(3.1) Demolition Works and Protective Measurement**

- a) The Contractor shall carry out demolition work and remove all existing non-structural wall, all existing partitions, finishes, fixture, furniture, equipment, facilities devices and any E&M provisions to the bare-shell condition in the site as specified. Demolish and cart away all unnecessary existing finishes, screeding, doors, fixed furniture, trucking & associated conduit, wiring to suit the proposed layout as shown on tender drawings.
- b) Construct the hoarding up to the structural ceiling or as indicated on tender drawings. When the hoarding panel in the open area, the panel height shall be at least 5 meter height.
- c) Provide all necessary protection to existing floor, wall and ceiling works of existing building outside work area.
- d) The Contractor shall remove existing RC steps as indicated in the drawing.
- e) Taking down with care of all logo, letterings, direction signs, name / building plates, etc. and hand over to the Employer as directed by the Architect. Other materials confirmed as debris by the Architect shall then be removed from Site by the Contractor.
- f) Retain and relocate all the existing training equipment as specified to the

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02 Scope of the Works (Cont'd)**

designated temporary training area at 2/F of KCC.

- g) All hoist beams at high level shall be removed

#### **(3.2) Alteration & Additions works and Fitting-out works for SETC at G/F, KCC**

- a) Setting out and surveying to establish all required levels during the Contract Period.
- b) Setting out of the fitting out items in appropriate material for agreement before actual commencement of the works.
- c) Produce Mock Up for wooden fins, tilt sample, reception model and other feature as specified for Architect's approval prior to construction.
- d) Remove existing steps and construct new RC steps as according to the drawing and building plans
- e) Construct external wall to enclose the opening of the site abutting the external road as specified.
- f) Remove all existing finishes of the site to bare shell structural floor, apply waterproofing layer and raised up the floor level as specified in the drawings.
- g) All existing trench to be filled with lightweight concrete in line with new finishes floor level as specified.
- h) Design, preparing calculations, shop drawings and details for the various installation works as described in the Specification or shown on drawings.
- i) Construct SETC area including but not limited to new reception and briefing area, office area, Zone A to H, CCTV server room and all storage area. Supply and install new ceiling, wall and floor finishes as shown on the drawings.
- g) Design and construct new dry wall system with wall finishes, with all necessary accessories in SETC as specified, including forming openings and chases for building services, expanded metal latch, lintel, stiffeners, supporting frame with fire retardant paint, fixing to walls, floors and ceilings for SETC. Contractor shall appoint Structural Engineer to certify the structural stability of the new installation and prepare relevant structural calculation as necessary.
- k) Supply and install new gypsum block wall system enclosure with all necessary accessories in SETC as specified
- l) Design, Supply and install a new reception counter with all necessary accessories for reception area.
- m) Construct glaze panel, glass door and/ or glaze partition with accessories and sub-frames per Drawings and Specifications. Shop drawings and samples submission for glass panel/ glass partition are required.

### **3.0      DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02      Scope of the Works (Cont'd)**

- n) Supply and install a proprietary locker all necessary accessories for reception / briefing area.
- o) Supply and install a proprietary automatic sliding glass door system with sensor and all necessary accessories for office area.
- p) Supply and install proprietary furniture (e.g. desks, chairs) all necessary accessories for SETC.
- q) Supply and install proprietary equipments (e.g.TV) all necessary accessories for the SETC.
- r) Install all simulation equipment of the SETC supplied by the director supplier from employer, coordinate with such supplier and it is sole responsible of the main contractor to apply for all relevant licensing application of the equipment installed, to obtain the license.
- s) Design, supply and install all built in furniture, cabinet signage and all fitting out works with necessary accessories for the SETC, according to specification and drawing.
- t) Supply and install name plate for each door unless specified on tender drawings.
- u) Carry out all builders' works required for the installation of E&M services.
- v) Make good finishes of all affected areas, no matter within or outside the works.
- w) Supply and construct the approved types of door, ironmongeries and louvers with accessories and sub-frames as shown on tender drawings and specifications. Shop drawings and samples submission for doors and louvers are required. Design and calculation preparation for the louver are required.

The type of door finishes / coating shall refer to the requirements as shown on the Drawings. All font type of the signage shall be silk screen at back

- x) Supply and construct the approved type of ceiling systems, including but not limited to gypsum board ceiling system, acoustic ceiling tiles and baffle ceiling systems) with associated fixing system including all necessary vertical bulkheads, access panels, finishes, opening for E&M services, associated builder's works and opening works, making good, galvanized metal support framing, anchor bolts, hangers, brackets, ties, clips and fasteners etc. and all necessary fitting and accessories and associated light fixture refer to E&M specification. All ceiling systems provide with specified painting in the SETC.
- y) Design, preparing shop drawings and fixing details for the various installation works as described in the Specification or shown on drawings. Particular submission on some items are highlighted shall not be treated as exhaustive as follows:-

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02 Scope of the Works (Cont'd)**

##### **i. Design and Build Items:**

- Reception counter
- Enclosure wall for zone H (VR cave)
- All TV wall and TV wall with leaflet.
- Office glass wall with automatic glass door sliding system
- All built-in furniture and loose furniture
- All room plate and zone signage.
- Aluminium plate for sealing up new louvres and all louvre.
- All notice panel for all zones
- All built in-feature works
- All form works / base for the renovated safety training centre from G/F to 2/F temporary training area.
- Drywall system
- Entrance display panel
- All baffle ceiling panel

##### **ii. Combined Service / Sectional Drawings for Building Services Engineer's Approval**

the Combined Service Drawing(CSD) shall consisted of detailed Reflect Ceiling Plans and detail sectional drawings showing the combination of all existing and new building services for engineer's review and approval.

- z) Coordinate builder's works and E&M works (including plumbing and drainage works), such that no pipes, cables, trunking (unless specified), or other E&M ducting is visible to the public.

#### **(3.3) Relocation and installation works for Fitting-out works for SETC at G/F, KCC**

- a) Setting out and surveying to establish all required levels during the Contract Period.
- b) Setting out of the fitting out items in appropriate material for agreement before actual commencement of the works.
- c) Design, supply and install all built-in base form work with painting as specified, for the relocated existing training equipments from G/F, location as specified in the drawings.
- d) Relocate all the existing training equipment as specified in the drawing from G/F to the temporary training area at 2/F.
- e) Upon completion of the site works at G/F and as specified by the Architect / Employer, the contractor shall remove all items (including all existing training equipment) in the temporary training area at 2/F and the layout reinstate back to existing after the completion of the site works at G/F.

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.02 Scope of the Works (Cont'd)**

**(4) Installation of Simulation Equipment of the SETC provided by Direct Supplier from CIC and preparation of Training Manual, Operation and Maintenance Manual of all the equipment as specified.**

The Main Contractor shall

1) Coordinate with the direct supplier from CIC for supply of simulation equipment for the SETC delivery on site. Assignment brief for such equipment of a separate tender are indicated in Annex 5 for information. The Main Contractor shall carry all the above-mentioned equipment from a designated area in Kwun Chung Campus to the site and carry out installation.

2) Install the equipment above-mentioned, under the supervision of such supplier to the location as specified in the contract drawing (Drawing no. AT-01-05).

3) Unless otherwise specified by the Architect / CIC, the contractor shall allow 7 calendar days for the installation of above-mentioned equipment, and another 14 calendar days for testing and commissioning for the installed equipment as mentioned above, with coordination with the equipment supplier as mentioned.

4) Obtain the required license for all related simulation equipment as above-mentioned, with coordination with the equipment supplier.

5) In liaison with the supplier to prepare the Training Manual, Operation & Maintenance Manual for all equipment installed on site, to the satisfaction of CIC/ Architect/ Engineer's representative.

**(5) Completion of works and Handover Cleaning**

Upon completion of all works, the main contractor shall provide photos & report showing before and after completion of the Works within Seven (7) calendar days after completion of the Works.

The main contractor shall also provide comprehensive cleaning by professions with the correct method for each finishes prior to handover.

**(6) Builder's works for Building Services System**

Provide and install builder's works for all building services system.

**(7) Building Services Installation**

The Main Contractor shall carry out building services installation as described in Particular Specification for M & E works (Annexes 1 to 12) and as shown on the drawings (if any).



### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **(8) Works Outside Boundary**

The Contractor is responsible for the construction, precautionary measures, as well as the coordination with and necessary application to the utility companies and government departments for works outside site boundary and interfaces connected therewith. For the avoidance of doubt and without prejudice to the scope of works of the Contractor specified elsewhere in the Contract, the following works are forming part of the scope of works of the Contractor.

- a) Protection / Remedial works for Entrance lobby to SETC and entrance gates and run-in out.

In addition to the repair and re-finishing works specified in the drawings, Contractor shall be responsible for the design, supply, modify and install of all temporary works and precautionary works, inter alia the hoarding or other kinds of protective barrier as accepted by the government and relevant authorities. Contractor shall also apply to the authorities for these temporary measures and get the necessary Excavation Permit from HyD, LandsD and/or other third parties.

The scope of works described above shall not be treated as exhaustive and the Main Contractor shall study the Tender Documents and satisfy himself as to the full extent, character and nature of the Works. No claims resulting from failure to do so will be entertained.

### **3.0 DESCRIPTION OF THE WORKS (CONT'D)**

#### **3.03 BD Submission**

The Contractor is required to prepare relevant documents and information for obtaining all necessary consents and approvals pertaining to the execution and completion of the building works from the Building Authority.

The Contract Sum and Contract Period shall be deemed to include for the design (if required), submission and testing as may be required.

The waiting time for the Building Authority to grant necessary approvals and consents pertaining to the Works is at the Contractor's sole risk. No monetary compensation or extension of time will be granted on the grounds of the waiting time being longer than allowed if such delay is arisen from the Contractor's documents and information for obtaining the approvals and consents.

Provision of Site Supervision to the satisfaction of Building Authority and AP/RSE/RGE.

The contractor shall provide the site supervision plan of RC's stream for Authorized Person to carry out BD submission to BD, within 7 days after the contract commencement date.

#### **3.04 BA14 Acknowledgement**

The Main Contractor should acquaint himself for obtaining BA14 Acknowledgement from Building Authority. The Main Contractor shall prepare the Works, submit relevant Statutory Forms, test reports, certificates and any other documents and submissions which are to be prepared by him to relevant authorities and make all necessary arrangements for inspections by the representatives of the Building Authority, Fire Services Department or other relevant authorities. The Main Contractor shall be deemed to have made due allowance in his tender and works programme for all measures, procedures and arrangement necessary for obtaining the said acknowledgement and/or permit.

The contractor shall complete all works as indicated in the BD approved plans and submit Architect the Contractor endorsed Form BA14 within 90 days from the contract commencement date.

#### **3.05 (N/A)**

#### **3.06 Works carried out by Direct Supplier from employer (CIC)**

The following works are also included in this Contract and shall be carried out by direct supplier from CIC

- a) Supply of Simulation equipment for the SETC (refer to Drawing no. AT-01-05)

The general and special attendance to be provided to the Supplier shall be allowed in Schedule of Rates - Provisional Sums.

### 3.0 **DESCRIPTION OF THE WORKS (Cont'd)**

#### 3.07 **Works to be carried out by Separate Specialist Contractors**

The following works shall be carried out by Separate Contractors employed directly by the Employer (CIC):

- a) Installation for supporting system and equipment for Zone H (VR Cave).  
(e.g. Drawing no. AT-03-17)
- b) Supply and installation of Smart door access for all doors in SETC and CCTV system
- c) Supply and installation of any telecommunication services in SETC such as telephone line, LAN cable line, Network Switches, Wi-Fi Access Points, Optical Fibre connections, etc.)
- d) Supply and installation of equipment for providing AR/VR game/ media illustration.

The aforesaid separate Specialist Contractors may carry out their works concurrently on site with this Contract. The Main Contractor shall provide attendance and facilities to the separate Specialist Contractors / Utility Undertakers for carrying out of their works.

The Main Contractor shall make due consideration in programming of his works and no claim for extra expense or time extension in this connection will be entertained.

Provisions shall be made by the Main Contractor to allow for attendance on the separate Specialist Contractors / Utility Undertakers including access, temporary works, attendance, coordination and carrying out all related ***builder's works***

The Main Contractor shall indemnify the Employer against any valid claim by the separate Specialist Contractors against the Employer due to disruption, damages, delay and/or additional cost caused to the separate Specialist Contractors' works by the Main Contractor.

The Main Contractor shall resolve all problems encountered, and settle all claims against or from the separate Specialist Contractors. The Employer may, but without obligation, assist in the settlement.

#### **4.0      SITE AND INSPECTION**

##### **4.01      Location**

**The site is located at Ground floor and Second Floor of Kwai Chung Campus, 7-11 Kwai Hop Street, Kwai Chung, New Territories.**

##### **4.02      Access and restrictions**

The Main Contractor shall allow for and observe, accommodate and comply with any restrictions imposed by competent authorities in respect of access and transportation to and from the Site.

No additional expense and / or extension of time shall be granted to the Main Contractor as a result of changes in the mode of access to the Site.

The Main Contractor shall be responsible for any costs of reinstatement of or making good damage to the access leading to and from the Site, unless the Main Contractor can substantiate with photographic evidence that he did not cause the damage. The Main Contractor shall keep the access clear of debris, dust, spoil and the like.

The Main Contractor's attention is further drawn to any dimensional constraint as may be imposed by the site access on the size of plant and equipment as well as the lengths of materials to be transported to and handled on the Site.

The Main Contractor shall ensure and exercise the greatest care during the progress of work to avoid damage to or interference with the existing utility services within the Site.

The Main Contractor shall be responsible for cleaning all vehicles and plant (regardless of ownership) before they leave the Site to ensure that no earth, mud, debris, etc. is deposited by them on roads.

##### **4.03      Site visit**

Refer to Annex 1 - "General Preliminaries".

##### **4.04      Sub-soil conditions, Investigation Reports and Utility Services Information**

Any site investigation report / utility services information which may be made available are given in good faith as a guide to Tenderers but no responsibility can be taken for their accuracy or applicability over the whole site. Should the Tenderer wish to ascertain the soil properties at parts where they consider necessary, they shall carry out an investigation themselves, by no means the site investigation report confirm a true picture of the strata or the subsoil conditions.

#### **4.0      SITE AND INSPECTION (Cont'd)**

##### **4.05      Accept Site as found**

The Main Contractor shall accept the Site AS FOUND on the Date for Possession of the Site and at his own expense clear the Site of any materials / items, confirmed as debris by the Architect, which may have been left by the Employer.

##### **4.06      Working area**

The Main Contractor shall immediately after acceptance of his Contract Proposal submit to the Architect for approval the proposed location and layout of the working area for his use exclusively for the Contract. Such working area shall be kept within the Site.

The Main Contractor shall at all times observe any police and AFCD regulations including those regarding the loading or unloading of or waiting by vehicles on the public road and shall allow for complying in all respects therewith.

The Main Contractor shall not be permitted to utilize as works areas any areas adjacent to or outside the boundary of the Site and he shall keep his work people strictly within these limits.

The storage, movement of lifting of equipment, materials and plant shall at all times be confirmed within the prescribed boundary of the Site.

Should the Main Contractor require off-site areas for storage etc. he should allow for all additional costs, including rent, in connection therewith.

##### **4.07      Weather and Underground Water Conditions**

The Main Contractor shall be deemed to have taken all possible weather, tides and underground water tables and conditions into account when preparing his Tender and he shall not be entitled to extra payment by reason of the occurrence or effect of change in water tables, tides, excessive rainfall, temperature or humidity, high winds, typhoons or any other meteorological phenomena.

Without limited his liabilities under the Contract, the Main Contract shall make suitable arrangements to protect the Works and temporary works against the effects of weather and underground water conditions.

No work shall be performed when in the opinion of the Architect such work is liable to be injuriously affected by the weather. The Main Contractor shall not be entitled to extra payment on account of loss alleged to have been sustained directly or indirectly by reason of the Architect declining to permit such work to start or continue or ordering any work damaged by the weather to be made good or removed and re-executed.

## **5.0 POSSESSION AND COMPLETION**

### **5.01 Possession of site**

The Main Contractor shall take over the Site and commence the Works within three calendar days of the Architect's written instruction. The tentative Date for Possession of the Site is **early April 2018**.

Prior to site possession, the Main Contractor should allow the statutory period and submit all necessary documents in accordance to Buildings Ordinance & Regulations for the application for consent to the commencement & carry out of building works or street works.

The Main Contractor should be aware that no guarantee can be given that the above anticipated date is definite and fixed, and that a certain amount of slippage may occur. Under no circumstances will the Main Contractor be entitled to any monetary claim as a result of possession of the site being delayed beyond the anticipated date stated above.

Refer also to Annex 1 - "General Preliminaries".

### **5.02 Completion**

The Works are to be completed in **180 calendar days** from the Date for Commencement including Sundays, Public Holidays and wet days falling within the Time for Completion or any extension to such Time for Completion as may be authorized in accordance with the terms of the Conditions of Contract. The Main Contractor shall carry out the works following building plans and report BA14 acknowledgement to Buildings Department after the commencement of contract works. The Main Contractor shall allow minimum of **100 calendar days** for completion of the remaining works (including fit out works, installation and testing & commissioning of simulation equipment for the SETC, prepare training manual such equipment and more).

It is essential that the Main Contractor completes the works on or before the date for completion stated above.

Refer also to Annex 1 - "General Preliminaries".

**6.0      (NOT USED)**

**7.0      TENDER, DRAWINGS AND SPECIFICATION**

7.01      Tender

Refer to Annex 1 - "General Preliminaries".

7.02      No adjustment for rises or falls in cost of labour and materials

Refer to Annex 1 - "General Preliminaries".

7.03      (NOT USED)

7.04      Ordering materials etc. from Drawings and/or Specification

Refer to Annex 1 - "General Preliminaries".

7.05      Drawings forming part of the tender documents

Refer to Annex 1 - "General Preliminaries".

## **7.0 TENDER, DRAWINGS AND SPECIFICATION (Cont'd)**

### **7.06 Drawings etc. at Site**

Refer to Annex 1 - "General Preliminaries"

### **7.07 Shop drawings**

Refer to Annex 1 - "General Preliminaries"

### **7.08 Working drawings and as-built record drawings**

Refer to Annex 1 - "General Preliminaries"

### **7.09 Combined Services Drawings**

The Main Contractor, in conjunction with the respective Sub-Contractors, shall be responsible for co-ordinating all working drawings for the various services installations with one another and with the fabric, architectural details and structure of the building to establish a detailed logical sequence of work and/or erection schedules, to enable all services properly installed within the spaces designed to house the services while ensuring provision of adequate space for future maintenance. The Main Contractor shall also be responsible for preparing "Combined Services Drawings" which shall include all builder's work in connection with building services installations inclusive of plumbing and drainage installation to facilitate co-ordination of the installation of all services in the correct sequence and position. The Main Contractor shall co-ordinate with the Nominated Sub-Contractors and arrange timely submissions of same to Architect.

### **7.10 Dimensions**

Refer to Annex 1 - "General Preliminaries"

### **7.11 Specification**

The Main Contractor is directed to examine the General Specification and Particular Specification "A" (referred to hereinafter as GS & PS) bound into and forming part of the tender documentation.

The Main Contractor should allow here or in his rates for complying with the requirements of the GS & PS.

### **7.12 Provisional Quantities**

The quantities described as PROVISIONAL in the Schedule of Rates are subject to remeasurement upon completion of the Works. The Contract Sum shall be adjusted accordingly. The provisional quantities are estimates only and no responsibility can be taken for their accuracy. No adjustment will be made to the contract rates used for pricing the remeasured quantities nor extension allowed to the Contract Period should the final quantities differ from the original provisional quantities.

### **7.13 Discrepancies**

Where there are discrepancies between the GS & PS and the Drawings, and the GS & PS and this Preliminaries Section, this Preliminaries Section and the Drawings shall take precedence over the GS & PS.



## **8.0      MATERIALS AND WORKMANSHIP**

- 8.01      Compliance with Regulations  
Refer to Annex 1 - "General Preliminaries".
- 8.02      Samples  
Refer to Annex 1 - "General Preliminaries".
- 8.03      Testing of materials  
Refer to Annex 1 - "General Preliminaries".
- 8.04      Safe custody of materials  
Refer to Annex 1 - "General Preliminaries".
- 8.05      Loading and unloading of materials  
Refer to Annex 1 - "General Preliminaries".
- 8.06      Method of Construction  
Refer to Annex 1 - "General Preliminaries".

## **9.0      INSTRUCTIONS, VARIATIONS AND METHODS OF MEASURING AND VALUING**

- 9.01      Site instructions  
Refer to Annex 1 - "General Preliminaries".
- 9.02      Stop Works Instructions  
Refer to Annex 1 - "General Preliminaries".
- 9.03      Main Contractor's claims for extras for verbal instructions  
Refer to Annex 1 - "General Preliminaries".
- 9.04      Measurement of Variations  
Refer to Annex 1 - "General Preliminaries".
- 9.05      Invoices, receipts, etc.  
Refer to Annex 1 - "General Preliminaries".
- 9.06      Main Contractor's expenses in connection with variations and settlement of accounts  
Refer to Annex 1 - "General Preliminaries".
- 9.07      Supportive documentation for a fair valuation  
Refer to Annex 1 - "General Preliminaries".

**9.0      INSTRUCTIONS, VARIATIONS AND METHODS OF MEASURING AND VALUING (CONT'D)**

9.08      Application for Payment for Variations

Refer to Annex 1 - "General Preliminaries".

**10.0      PROGRAMME AND REPORTS**

10.01      Programme and weekly reports

Refer to Annex 1 - "General Preliminaries".

10.02      Daily Reports

Refer to Annex 1 - "General Preliminaries".

10.03      Progress Photographs

Refer to Annex 1 - "General Preliminaries".

10.04      Site Meetings

Refer to Annex 1 - "General Preliminaries".

**11.0      SUB-CONTRACTS**

Refer to Annex 1 - "General Preliminaries".

**12.0      ARTISTS OR TRADESMEN NOT SUB-CONTRACTORS**

Refer to Annex 1 - "General Preliminaries".

### **13.0 OVERALL CO-ORDINATION RESPONSIBILITIES OF THE MAIN CONTRACTOR**

The Main Contractor shall employ a Building Services Co-ordinator, who shall have 8 years relevant qualified experience. The Main Contractor shall submit a detailed C.V. to the Architect / Engineer for approval. The Building Services Co-ordinator shall be responsible for:-

- a) Full coordination of building services installation and the related builder's works amongst the Main Contractor, Building Services Sub-Contractors, Contractor, and all other Specialist Contractors.
- b) Submitting all materials to the Architect / Engineer/ CIC for approval, satisfaction and reporting parties, prior to installation and preparing and submitting combined services drawings to the satisfaction of Architect / Engineer / CIC.
- c) Attending all kinds of meetings and site inspections.
- d) Closely monitoring, supervising and co-ordinating all building services installation works.
- e) Reporting to the Architect / Engineer / CIC the site progress of building services installation.
- f) Any other building services related matters.

Refer also to Annex 1 - "General Preliminaries".

### **14.0 STATUTORY OBLIGATIONS**

#### **14.01 Regulations**

Refer to Annex 1 - "General Preliminaries".

#### **14.02 Notices, Fees and Charges**

Refer to Annex 1 - "General Preliminaries".

#### **14.03 Working hours, rates of wages etc.**

Refer to Annex 1 - "General Preliminaries".

#### **14.04 Safety supervision plan and safety precautions**

Refer to Annex 1 - "General Preliminaries".

#### **14.05 Industrial Training and Pneumoconiosis Levies**

Refer to Annex 1 - "General Preliminaries".

**15.0     PROTECTION OF PUBLIC PROPERTY, ETC.**

15.01     Protection of public

Refer to Annex 1 - “General Preliminaries”.

15.02     Protection of public property

Refer to Annex 1 - “General Preliminaries”.

15.03     Protection of adjoining property

Refer to Annex 1 - “General Preliminaries”.

15.04     Protection and maintenance of existing slopes

Refer to Annex 1 - “General Preliminaries”.

15.05     Maintenance of existing roads, footpaths, steps, etc.

Refer to Annex 1 - “General Preliminaries”.

15.06     Maintenance of existing trees and shrubs

Refer to Annex 1 - “General Preliminaries”.

15.07     Maintenance of existing services

Refer to Annex 1 - “General Preliminaries”.

15.08     Restrict nuisance of dust and noise

Refer to Annex 1 - “General Preliminaries”.

15.09     Suppressors

Refer to Annex 1 - “General Preliminaries”.

**16.0**     **INSURANCE** (See also CIC's General Conditions of Contract and Guidelines for Works or Services (2b-CAR))

16.01     The Contractor shall arrange insurance for the Employee's Compensation (EC) and Contractor's All Risks and Third Party Insurance (CAR) at his own cost. For EC, such policy shall be endorsed to cover the CIC as an insured party and shall include endorsement W338, W348 and W204; For CAR, a minimum coverage for third party liability is HK\$30,000,000.00 and shall be endorsed joint name with the CIC.

16.02     **Third Party Insurance**

Maintain such insurances as are necessary to cover the liability of the Employer, the Main Contractor, any Sub-Contractors and any other contractors directly employed by the CIC to third parties, in respect of the simulation equipment and any representatives for the contract of supply and delivery of the simulation equipment directly signed by the CIC.

## **17.0     GENERAL OBLIGATIONS**

### 17.01     Overtime

Refer to Annex 1 - “General Preliminaries”.

### 17.02     Labour

Refer to Annex 1 - “General Preliminaries”.

### 17.03     Foreman/Contractor's Management Team (See also General Conditions of Contract, Clause 8)

Refer to Annex 1 - “General Preliminaries”.

### 17.04     Visitors

Refer to Annex 1 - “General Preliminaries”.

### 17.05     Workmen living on site

Refer to Annex 1 - “General Preliminaries”.

### 17.06     Watching

Refer to Annex 1 - “General Preliminaries”.

### 17.07     Protection and cleaning of all trades

Refer to Annex 1 - “General Preliminaries”.

### 17.08     Trespass and Nuisance

Refer to Annex 1 - “General Preliminaries”.

### 17.09     Fire protection

Refer to Annex 1 - “General Preliminaries”.

### 17.10     Clearing away rubbish during the progress of the works

Refer to Annex 1 - “General Preliminaries”.

### 17.11     Removal of water

Refer to Annex 1 - “General Preliminaries”.

**17.0     GENERAL OBLIGATIONS (Cont'd)**

17.12     Setting out

Refer to Annex 1 - "General Preliminaries".

17.13     Preparation for Partial/Practical Completion

Refer to Annex 1 - "General Preliminaries".

17.14     Blasting

Blasting will not be permitted.

17.15     Smoking

Refer to Annex 1 - "General Preliminaries".

17.16     Guarantee

The Main Contractor in offering specific pieces of equipment or apparatus, whether specified herein by name or whether of a make selected by him, shall be deemed to warrant its satisfactory performance under normal working and climatic conditions which may encountered.

In addition to the above requirements, the Main Contractor shall allow for entering into form of guarantee as approved by the Architect, jointly and severally bound with the sub-contractor for the satisfactory performance of the works as specified. A list of works for which guarantee are required and the periods of guarantee are:-

- |                                                         |            |
|---------------------------------------------------------|------------|
| a)    waterproofing works                               | - 15 years |
| b)    Vinyl floor system                                | - 10 years |
| c)    Clear tempered glass                              | - 5 years  |
| d)    Any painting system                               | - 5 years  |
| e)    Louvre system                                     | - 10 years |
| f)    Rendering / tile adhesive system                  | - 10 years |
| g)    Expansion movement joint system                   | - 10 years |
| h)    False ceiling system                              | - 5 years  |
| i)    Any other works as specified in the Specification |            |

The above guarantees must be submitted and approved by the Architect before the date for practical completion.

## **18.0     TEMPORARY WORKS**

18.01     Plant, tools, etc. and scaffolding

Refer to Annex 1 - "General Preliminaries".

18.02     Hoardings, screens, etc

Refer to Annex 1 - "General Preliminaries".

18.03     Main Contractor's storage sheds, workshops and offices

Refer to Annex 1 - "General Preliminaries".

18.04     (Not used)

18.05     Temporary latrines

Refer to Annex 1 - "General Preliminaries".

18.06     Positions of all site offices, temporary latrines, sheds, hoists and the like

Refer to Annex 1 - "General Preliminaries".

18.07     Temporary supports

Refer to Annex 1 - "General Preliminaries".

18.08     Telephones

Refer to Annex 1 - "General Preliminaries".

18.09     Water for the Works

Refer to Annex 1 - "General Preliminaries".

18.10     Lighting and power

Refer to Annex 1 - "General Preliminaries".

18.11     Temporary roads

Refer to Annex 1 - "General Preliminaries".

18.12     Restriction of advertising

Refer to Annex 1 - "General Preliminaries".



## **18.0 TEMPORARY WORKS (Cont'd)**

### **18.13 Other temporary works**

Provide all other necessary temporary works not specifically mentioned herein or in the Annex 1 - "General Preliminaries".

Refer also to Annex 1 - "General Preliminaries".

## **19.0 ATTENDANCE PROVIDED BY MAIN CONTRACTOR**

The Main Contractor shall allow for providing the following attendance to all Nominated Sub-contractors, separate Specialist Contractors, Government Departments or Public Utility Companies : -

### **19.01 Attendance in co-ordinating works**

The Main Contractor shall note the Attendance in co-ordinating and sequencing works programmes to be provided to all Nominated Sub-contractors, separate Specialist Contractors, Government Departments or Public Utility Companies as described in Schedule of Rates- Prime Cost and Provisional Sums

### **19.02 General attendance**

The Main Contractor is to provide the following services etc. free of charge to the direct supplier, separate Specialist Contractors, Government Departments or Public Utility Companies and to afford them all reasonable facilities for the proper execution of their work including:

- a) Space on site or in the building under construction to allow the direct supplier and direct contract to erect their own offices, amenities or stores.
- b) Use of access roads on the site and providing working space for and clear access to the direct Contractors' works
- c) Use of such plant, ladders, temporary hoists, scaffolding or staging as may have been provided or erected by the Main Contractor subject to the prior agreement and at the convenience of the Main Contractor and provided that there is no obligation to retain any such plant, ladders, scaffolding, hoists, or staging longer than is necessary for the Main Contractor's own use.
- d) Use of telephone, facsimile machine, copying machine, mess rooms, latrines and the usual conveniences of a building site.
- e) Watching over direct Contractors' works.

(The Main Contractor's responsibility is general and overall. The direct Contractors shall be responsible for ensuring that their plant, equipment, materials, goods, etc. are properly secured and/or stored prior to their installation and handing over to the Main Contractor.)

**19.0     ATTENDANCE PROVIDED BY MAIN CONTRACTOR (Cont'd)**

**19.02     General attendance (Cont'd)**

- f) Adequate water and electrical supplies at convenient positions throughout the Works under construction and to work and storage areas within the Site for lighting, operation of power tools and testing and commissioning up to and including final acceptance of the installations by the Architect.
- g) Protecting the Sub-Contract works including typhoon protection.  
  
(The Main Contractor's responsibility is general and overall. The Nominated sub-Contractors shall be responsible for their own works being properly protected before handing over to the Main Contractor).
- h) Any making good on completion of work disturbed by the removal of the preceding facilities.
- i) Final cleaning of the Nominated Sub-Contract works in conjunction with the cleaning of his own work prior to handing over the Works to the Employer.  
  
(The Direct Contractors shall be responsible for cleaning their own works prior to handing over to the Main Contractor).
- j) The Main Contractor shall ascertain from each Direct Contractor all particulars relating to his work with regard to the order of its execution and the positions in which chases, holes, mortices etc. will be required, before the work is put in hand. No claims for work arising out of lack of liaison with Nominated Sub-Contractors will be considered.
- k) The Main Contractor is to inform all direct Contractors of the casting of reinforced concrete, allowing enough time for the laying of their cables, conduits, pipes etc.
- l) Much of the Direct Contractors' work is of necessity very closely integrated with the Main Contract Works and close collaboration between the Main Contractor and Nominated Sub-Contractors is essential.

## **19.0 ATTENDANCE PROVIDED BY MAIN CONTRACTOR (CONT'D)**

### **19.02 General attendance (Cont'd)**

- m) The Main Contractor shall attend on all Direct Contractors and allow for cutting or forming chases, holes and openings, etc. of all sizes up to 1.00 square meter in area, all necessary additional trimming reinforcement around openings, installing or casting in of all embedded items provided by the Nominated Sub-Contractors, providing and building in non-fire rated sleeves and the like (fire-rated sleeves and the like shall be provided by Nominated Sub-Contractors), filling and sealing around sleeves, pipes conduits, ducts, etc. through openings with approved fire resistant packing materials and sealant, (packing the internal gap between pipes, etc. which pass through the sleeves etc. themselves shall be carried out by the Nominated Sub-Contractors), supplying cement mortar for fixing brackets, holderbats, bolts and the like, bedding and grouting behind frames including supplying cement or waterproof cement mortar, covering chases with a strip of metal lathing and fixing to wall, filling around and painting surface wiring exposed to view, painting conduits exposed to view, providing all necessary sealants, jointing materials, metal lathing etc. as required at the interfaces with the Nominated Sub-Contractor's works, making good all work disturbed, and all other necessary work of a like nature.

### **19.03 Special attendance**

In addition to the relevant items of general attendance the Main Contractor is to provide the following special attendance on:

- a) Installation of all simulation equipment of the SETC

-  
The Main Contractor shall provide their own carnage and hoisting facilities for the erection and installation of the simulator equipment of the SETC, supplied by the supplier of safety training equipment from CIC. The Main Contractor shall provide removal of such carnage and hoisting facilities after all equipment are installed.

#### Testing and Commissioning:

The Main Contractor shall coordinate with the supplier to perform Testing and Commissioning of all the abovementioned Equipment upon completely installed

The Main Contractor shall liaise with the supplier and it is the duty of the Main Contractor to apply for any licensing application to relevant licensing authority / fulfilling the statutory requirement of all equipment as specified in the contract, obtain the license / approval.

If there is comment from the licensing submission, the contractor shall in liaison with the supplier to modify the profile of equipment to comply with the relevant licensing equipment and until the relevant license is obtained.

**19.0     ATTENDANCE PROVIDED BY MAIN CONTRACTOR (CONT'D)**

**19.03     Special attendance (Cont'd)**

**a)     Installation of all simulator equipment of the SETC (Cont'd)**

The Main Contractor shall coordinate with the supplier to prepare training manual and maintenance & operation manual for all simulator equipment of the SETC installed with protection of users from any potential hazard in using the Equipment;

**b)     Supply and Installation of supporting system and equipment for Zone H (VR Cave).**

The Main Contractor shall coordinate with the contractor from CIC, for their installation of supporting system and equipment inside the VR cave. The Main Contractor is responsible to liaise with such contractor for any delivery of their equipment and installation works on site within the contract period.

**c)     Supply and Installation of smart card access to all door in SETC and provide CCTV system in SETC.**

**d)     Supply and Installation of any telecommunication services in SETC such as Telephone Line, Lan cable lines, Network Switches, Wi-Fi Access Points, Optical Fibre connections, etc.)**

**e)     Supply and Installation of equipment for providing any AR/VR game / media illustration.**

The Main Contractor shall coordinate with the contractor from CIC, for their installation of any AR/VR equipment, software and hardware works for safety training and other media. The Main Contractor is responsible to liaise with such contractor for any delivery of their equipment and installation works on site within the contract period.

**Annex 4 - Particular Specification for Builder's Works**  
**Renovation Works of**  
**Safety Experience Training Centre (SETC) at**  
**Kwai Chung Campus (KCC) of**  
**the Construction Industry Council**

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## **SECTION 1**

### **GENERAL**

#### **1.1 COMPLIANCE**

The Contractor shall execute and complete all the work in accordance with the drawings, the Conditions of Contract and the Specifications of the captioned tender.

#### **1.2 EXECUTION**

##### **1.2.1 Regulations**

Notwithstanding anything to contrary contained herein pertaining to this installation it shall be the Contractor's responsibility to ensure all works are in strict accordance with the following statutory obligations, regulations and specifications together with any amendments made thereto:

- British Standards Institution or other approved international Standards.
- Chartered Institution of Building Services Engineers.
- The Regulation of the Electrical Equipment of Buildings published by the Institution of Electrical Engineers.
- Electricity Ordinance 1990.
- Requirements and regulations of the local Fire Services Department.
- General Specification for Building, latest version.
- General Specification for Electrical Installation, latest version.
- Any other local authority having jurisdiction.
- Buildings Ordinance, its Subsidiary Regulations, relevant Codes of Practice and Practice Notes.

##### **1.2.2 Materials**

Materials shall be compatible with each other and used in accordance with the manufacturer's requirements. Details of all proprietary and other materials for the repair work including samples, specification and method statement shall be submitted to the Architect / Engineer / CIC for approval which shall be subject to the provision of relevant test data, tested within one year, in accordance with the requirements of the Specification.

The new equipment / materials offered shall compatible with the existing installation to ensure uniformity of standards and composition.

## 1.2 EXECUTION (CONT'D)

### 1.2.3 Conformance and Alternative Proposal

The Contractor shall secure the availability of the required materials specified in this tender. The Contractor may also propose alternative materials of equivalent or superior quality subject to the approval of the Architect / Engineer / CIC. In doing so the Contractor shall bear all risks in respect of the proposed alternative material's availability, quality and compatibility for use in the Works and, in the event the proposed alternative materials are unsatisfactory in these respects, the contractor will be solely responsible to remove the same (whether completed / partially completed / delivered or being deliver to site) forthwith and revert to the originally specified materials at no time and cost implication. For the avoidance of doubt the giving of such approval shall not affect or relieve the Contractor's obligations or liability in the tender.

### 1.2.4 Shop Drawing

The Main Contractor shall allow to produce shop drawing for any detail and method as request by Architect / Engineer / CIC on any single occasion, which may or may not have been specified in other sections of the specifications.

Such drawing shall be submitted within 14 calendar days after oral/written request made by the Architect / Engineer / CIC for approval. The Contractor shall note that the Architect may reject, request re-submit, amend or accept the said drawings, as the case may be, within 14 calendar days after receipt of such drawings. The Contractor shall well prepare and plan their works to allow sufficient time for at least three separate submissions to and/or two rejections of the submitted shop drawing vetting and approval by the CIC / Architect.

### 1.2.5 Workmanship

The Contractor shall submit a method statement for approval by the Architect / Engineer / CIC. Workmanship shall be in accordance to the material manufacturer's recommendation and specification or otherwise as instructed by the Architect.

The Architect may give instructions for further improvement of workmanship if it is not up to the Architect's satisfaction after the inspections, if any, the Contractor shall touch up those areas until receiving any approval from the Architect / Engineer / CIC, otherwise the Contractor shall not proceed any contractual works and any claims for loss and expenses and extension of time arose there from would not be entertained.

All electrical installation shall be carried out in accordance with the current supply rule of the Hong Kong Electric Company or CLP Power Hong Kong Limited, whichever applicable; latest edition of the IEE wiring regulations and Code of Practice.

Contractor shall carry out the testing and commissioning and submit the test report to the Architect / Engineer / CIC for approval before the whole installation is handed over.

## 1.2 EXECUTION (CONT'D)

### 1.2.5 Workmanship (Cont'd)

The Contactor is required to submit the delivery notes and invoices from the supplier.

The main contractor shall undertake all cleaning work in the final stage of the construction and provide a chemical wash or other appropriate cleaning materials and means to clean (the following list is not an exhaustive list):-

- New tiling surfaces;
- New paintwork surfaces;
- New metal works;
- New pipes;
- New floor, wall and ceiling finishes;
- New External floor and floor works;
- Any other Contract works;

to the Architect / Engineer / CIC's satisfaction.



### 1.2.6 Mock Up

Mock up samples for new materials shall be prepared on site to demonstrate and establish the quality, performance and colour for Architect / Engineer / CIC's comment and approval prior to the commencement of work. Suitable locations for mock up shall be approved by the Architect / Engineer / CIC. The Contractor shall at least conduct mock up for the following works (the following list is not an exhaustive list):-

<u>Item</u>	<u>Description of works</u>	<u>Mock up panel size</u>
a.	Painting Works	1m(L)x 1m(W) each pattern
b.	Internal floor finishes (Vinyl floor including skirting and wall tile)	1m(L)x 1m(W) x 1m (D)
c.	Non-FRR timber door with door frames	one set per type
d.	Metal Louvre	1 No.
e.	Glazed partition with glazed door	1 No.
f.	1:10 study solid model of reception counter at G/F showing profile, materials and colouring	N/A

Rejection of any mock up works by the Architect / Engineer / CIC, no matter due to workmanship, material quality or performance, etc., shall be rectified by the Main Contractor promptly at his own costs/expenses to the satisfaction of the Architect / Engineer / CIC. For the avoidance of doubt, all cost for mock up and its rectification works are deemed to be included in the Tender Sum and No claim for extension of time will be accepted.

## 1.2 EXECUTION (CONT'D)

### 1.2.7 CONTRACTOR'S RESPONSIBILITY FOR WELL PLANNING AND SCHEDULING OF WORKS

The Main Contractor shall notice that well-planning and scheduling the preparation, fabrication, execution of the Contract Works is required throughout the entire Contract period including any extended period granted according to the Conditions of Contract in order to minimize nuisance and maintain the normal operation of the site.

The Main Contractor shall be solely liable to submit their proposed manner, programme, methodology, etc. regarding the execution of Contract works for the Architect / Engineer / CIC's approval prior to commencement of the relevant works. For the avoidance of doubt, the approval of any manner, programme, methodology, etc. approved by the Architect / Engineer / CIC shall not relieve any liability of the Main Contractor under the Conditions of Contract.

### 1.2.8 SPARE MATERIALS

Prior to the issuance of the Practical Completion Certificate of the Main Contract, the Main Contractor shall provide the following spares:

- i. Tiles of all kind
  - a. 2% of approved size tiles of each type of finish specified, for each type of tiles used in the Contract.
- ii. Plastic laminate wall panel and PVC floor tiles
  - a. 2% of approved plastic laminate wall panels and PVC floor tiles of each type specified, for each type of plastic laminate wall panels and PVC floor tiles used in the Contract.
- iii. Paintwork
  - a. 2% of approved paintwork each type including any primer coat, texture coat and top coat used in the Contract.
- iv. Ceiling panels of all kind
  - a. 2% of approved ceiling panels of each type specified, for each type of ceiling panels used in the Contract.
- v. Carpet tiles and vinyl floor tile of all kind
  - a. 2% of approved carpet tiles and vinyl floor tile of each type specified, for each type of carpet tiles used in the Contract.

1.2.9      PROPRIETARY PRODUCTS

The Main Contractor shall refer to the manufacturer's recommendations for storage, preparation, proportioning, mixing, application, curing, etc. of all specified and/or approved proprietary products/systems according to different site situations and external conditions to ensure proper functioning and performance.

#### 1.2.11 Guarantee / Warranty

The Main Contractor in offering specific pieces of equipment or apparatus, whether specified herein by name or whether of a make selected by him, shall be deemed to warrant its satisfactory performance under normal working and climatic conditions which may encountered.

In addition to the above requirements, the Main Contractor shall allow for entering into form of guarantee as approved by the Architect / Engineer / CIC, jointly and severally bound with the sub-contractor for the satisfactory performance of the works as specified. A list of works for which guarantee are required and the periods of guarantee are:-

- |    |                                                   |            |
|----|---------------------------------------------------|------------|
| a) | Tempered glasses / laminated glasses              | - 10 years |
| b) | Expansion movement joints                         | - 10 years |
| c) | Tile joint system/ Rendering / tile adhesive      | - 10 years |
| d) | Internal and external tiles                       | - 5 years  |
| e) | Any waterproofing works and dampproofing system   | - 10 years |
| f) | False Ceiling System                              | - 5 years  |
| g) | Aluminum Louvers                                  | - 10 years |
| h) | Any other works as specified in the Specification |            |

The above guarantees must be submitted and approved by the Architect / CIC before the Practical Completion of the Works.

The Main Contractor shall allow for entering into form of Warranty as approved by the Architect / CIC, jointly and severally bound with the sub-contractor for the satisfactory performance of the works as specified. A list of works for which warranty are required and the periods of warranty are:-

- |    |                                                   |              |
|----|---------------------------------------------------|--------------|
| a) | Aluminum Coating System on Cladding               | - 10 years   |
| b) | Any vinyl flooring system                         | - 5 years    |
| c) | Any painting works                                | - 5 years    |
| d) | Any electronic products                           | As specified |
| e) | Any other works as specified in the Specification |              |

The above Warranty must be submitted and approved by the Architect / Engineer / CIC before the Practical Completion of the Works.

The period if guarantee and warranty shall be from the Date of Practical Completion of the Works.

## **SECTION 2**

### **ACC BLOCK WORKS**

#### **2.1 GENERALLY**

This section applies to all ACC block works indicated on the drawings and includes, but not limited to: partitions, door lintels, paneling, etc.

#### **2.2 MATERIALS**

Unless otherwise specified or which counter proposal had been approved by the Architect, all ACC blocks used in this project to be Y-Tong ACC Block.

#### **2.3 METHOD STATEMENT FOR ERECTING Y-TONG ACC BLOCK WALLS**

##### **a) Preparation Works**

All necessary accessories including dowel bars, steel members, etc. are properly installed as required by the manufacturer before block wall erection works.

All Y-Tong blocks to be laid shall be completely dry. I.e. No water curing is required.

Layer of non-shrink cement concrete shall be applied on floor substrate to provide leveled base before laying the first course of Y-Tong block.

##### **b) Mixing Y-Tong Mortar**

To Mix Y-Tong Mortar (25kg/bag) with 7-8 liters of water in a clean container and use a hand held powered mixer to stir thoroughly till a consistency of soft mud is obtained.

Let such mixture stand for 10-15 minutes before application. In case of such mixture begins to stiffen, temper it by mixing in a little water as recommended by the manufacturer.

##### **c) Erection of Y-Tong Block Works**

To spread 2-3mm thick Y-Tong Mortar and roughen the mortar surface by making shallow furrows with the point of the trowel, but in any case to be less than three blocks at a time. Then “butter” one end of a block with such mortar and shove it into the mortar bed with a downward movement so that the top of the block is level with the string line.

Lay the blocks in stretcher bond or “I” pattern. Blocks shall be cut with a handsaw or cutting machine.

## 2.3 METHOD STATEMENT FOR ERECTING Y-TONG ACC BLOCK WALLS (CONT'D)

### c) Erection of Y-Tong Block Works (Cont'd)

String shall be fixed across the wall vertically and diagonally to ensure the alignment of the block wall course by course.

After the blocks have been mortared in place and the mortar is "thumbprint" hard, the joints are "tooled", if found deviation.

Gaps between block and slab soffit (i.e. less than 50mm) shall be filled up with fire-rated sealant if required by the fire test report. Otherwise, it shall be filled up with 1:3 cement sand mortar.

### d) Application of Plaster

Unless otherwise specified or counter proposal approved by the Architect, Daido Base Plaster shall be applied to the ACC block work.

Substrate to receive plaster shall be clean, free of dust, grease and loosen material and to be dampen.

Mix by adding Daido Base Plaster into clean water (7ltr./25kg bag or as specified by the manufacturer). Mixing thoroughly by using a mechanical mixer until a smooth & homogeneous lump free mixture is obtained.

Such mixture shall be stand for 10 minutes before application. Stir mixture again and it is ready for use.

Apply 8mm thick plaster on both sides of ACC block wall in maximum 2 equal layers for each side as per manufacturer's recommendations. Only apply the second layer when the first layer underneath is dried.

Main Contractor shall submit at least 1-day prior written request for Architect's inspection to the dried first coat plastering before applying the second coat.

## 2.4 CONNECTION TO OTHER MATERIAL

For connection to other material, e.g. concrete, steel member, etc, anchors to other materials should be provided at every third course. Anchors shall be one of the following types:-

- a) 6mm diameter mild steel bar welded or embedded 50mm into other materials and projected 250mm into block wall;
- b) 10mm x 2mm thick galvanized steel strap anchored into other material and projected 250mm into block wall.

For block wall required top fixation, at least 2 anchors shall be provided and shall be at every third course. The anchor type can be same as the vertical joint anchor.

For mullion or stiffener, approved gypsum board/fire-rated board is used to cover up the steel member with backer rod and fire-rated sealant. Fixing details shall refer manufacturer's recommendations.

## 2.5 MULLION AND STIFFENER DESIGN

Mullions or stiffeners (steel members) shall be installed as per manufacturer's recommendations. For large openings and/or other site related adjustment which necessitate deviations to manufacturer's recommendations, contractor shall be responsible for the structural design. Contractor shall submit shop drawings and structural calculations to the satisfaction of the Architect. No works shall be commenced before the approval of the submissions.

## 2.6 DOOR LINTELS

Prefabricated lintel shall be used for internal wall openings in this project. Lintels shall sit on bearing block with sufficient length (i.e. of not less than 150mm wide for concrete lintel and preferably be on a full block).

Installation of such lintel shall refer manufacturer's recommendations.

## 2.7 OPENINGS ON ACC BLOCK WALL

Opening less than 300mm x 300mm can be performed during block installation accordance to BS 5628-3:2005. Details shall refer manufacturer's recommendations.

Larger service opening can be obtained by adding prefabricated lintels and according to manufacturer's recommendations.

All openings shall be sealed up with approved fire resisting sealant of fire resistance rating (FRR) of not less than that of the wall. Samples shall be submitted for Architect's approval.

### **SECTION 3**

#### **METAL WORK**

##### **3.1 STAINLESS STEEL – GENERALLY**

Shall be high chromium, high nickel austenitic type 304 18/10 for internal use and type 316 18/10 for external use unless otherwise specified.

All finishes shall be hairline unless specified as mirror, satin or polished in accordance with BS EN 10029:1991, BS EN 10048:1997, BS EN 10051:1992, BS EN 10258:1997, BS EN 10095:1999 and BS EN 10259:1997. Hairline finishes shall have grain running vertically. Polished finish shall be No 4 finish; mirror finish shall be No 8 finish. Minimum thickness shall be 2mm.

The contractor shall provide samples of all finishes proposed for approval by the Architect.

All work shall be undertaken by a skilled metalworker experienced in the working and finishing of stainless steel. All welding shall be carried out in the workshop and sections shall be delivered ready for incorporation into the completed assembly. Welds shall be concealed as far as possible on visible surfaces and all visible welds shall be ground down and made perfectly flush and smooth.

All visible fastenings shall be in stainless steel to match the finish of the adjacent surfaces. All joints shall be flush and hairline width and corners shall be mitred. As far as possible, all fixings shall be concealed. All visible welds shall be polished. All visible connections, whether mechanical or welded, shall be agreed with the Architect before fabrication.

##### **3.2 PROTECTIONS AND STORAGE**

All metal components shall be delivered, stored and handled to prevent damage of whatever nature. Factory finished articles shall be protected with removable plastic wrapping / film, with protected corners etc. as appropriate during transportation and until installation. Protection shall only be removed when directed. Finished surfaces of work shall be cleaned to leave it free from stains, markings, and defects etc. of any kind and burrs or sharp edges / corners shall be removed from exposed work.

All exposed G.M.S. material in the Contract shall be painted as specified in Section 5 of this Specification.



### 3.3 STEEL FRAMEWORK – GENERALLY

Steel frames fixing should be constructed according to the detail drawings which are prepared and submitted by the contractor, approved by the Architect together with structural calculations. The framework shall be designed to take all loads imposed and wind load on external thereon with adequate sized and centred horizontal and vertical members, cross braced as necessary to create a rigid framework and fixed back to structure with suitable sized anchor bolts. Steel members to be hot-dipped galvanized mild steel unless otherwise specified comprising flat, angle, channel, tee shape or other profiles to suit. Joints shall be fillet welded all round unless otherwise specified.

All mullions and transoms shall be securely fixed at all intersections, whether welded or bolted, to prevent any loss of stability. All sections abutting walls and all bases and ceiling plates shall be securely bolted.

### 3.4 WELDING

Welding of steel shall be in accordance with BS 499, BS EN 1011-2:2001 and BS EN 1011-1:1998.

Welding of aluminum shall be to BS EN 1011-4:2000 and tested to BS EN 895:1995, BS EN 910:1996, BS EN 1320:1997 and BS EN 1321:1997.

The type, size and spacing of welds shall be as shown on the agreed shop drawings. Welding materials and methods shall be such as not to cause distortion, discoloration, or result in any other adverse effect on the required profiles and finishes of the exposed cladding.

Weld spatter and welding oxides on exposed surfaces shall be removed, and prime painted with zinc rich coating.

Unless otherwise shown or specified, weld beads on exposed surfaces shall be ground and finished to match and blend with finish on adjacent metal. Grinding and polishing of non-ferrous metal shall be done only with clean wheels and compounds free from iron and iron compounds. No soldering and / or brazing shall be allowed.

### 3.5 SUBMISSIONS

Mill certificates and delivery notes of all metal members including flat, angles, channel, tee shape or other profiles shall be submitted by the Main Contractor to the Architect for acceptance.

The contractor shall provide samples of all finishes proposed for approval by the Architect.

### 3.6 ELECTROLYTIC ACTIONS

Contact of dissimilar metals shall be avoided. In case contact between dissimilar metals are not avoidable, the Main Contractor shall submit protective means/measures to prevent electrolytic actions between metals for Architect's approval.

### 3.7 EQUIPOTENTIAL BONDING

Connect all exposed metalwork and metal subframes with equipotential bonding conductors as required by the I.E.E. Wiring Regulations. Screw holes or other connection points shall be provided to the approval of the Architect.

## **SECTION 4**

### **FIRE RESISTING CONSTRUCTION**

#### **4.1 GENERALLY**

This section applies to all fire resisting construction works indicated on the drawings and includes, but not limited to: doors, frames, enclosures, etc.

#### **4.2 WORKMANSHIP**

The whole of the works is to be accurately set out, framed and finished in a proper and workmanlike manner and in accordance with good practice.

Shop Drawing and other specific details shall be provided as requested by the Architect. The contractor shall not commence fabrication until the shop drawings have been approved by the Architect.

#### **4.3 DELIVERIES AND STORAGE**

All timber, finished joinery articles, doors and frames etc. shall be carefully delivered and stored, complying with the following:-

- Programme delivery to coincide with installation requirements
- Transport under total weather protection
- Keep dry and store off ground on leveled bearers
- All board materials shall be stacked flat on leveled bearers or upright on purposely made racks.
- Stained timbers shall be replaced at no extra cost.
- All edges, corners of finished articles shall be protected until installation into the works.

#### **4.4 SAMPLE SUBMISSION**

The Main Contractor shall submit samples of all specified fire resisting doors including glazing, ironmongeries and fire rated enclosures for Architect's approval.

#### **4.5 FIRE RESISTING CONSTRUCTION - GENERALLY**

The Contractor shall be responsible for the design and detailing of all fire rated materials as required in the drawings and submit full size detail for Architect's approval.

Information in contractor's detail drawings shall be supported by valid test report and/or assessment report. Contractor shall arrange for the testing of materials or particular details whenever necessary and allow for sufficient time to acquire the aforesaid assessment reports. All the costs involving with the employing of accredited laboratories shall be borne by the contractor.

#### 4.5 FIRE RESISTING CONSTRUCTION – GENERALLY (CONT'D)

The fire properties of materials, products or construction component should be tested in accordance with or assessed against the standards stipulated in the Part E – Fire Properties of Building Elements and Components of the Fire Code 2011 and certified as being capable of achieving such fire properties. Such certification should be established by:

- (a) a test report from the testing laboratory indicating the material, product or construction component being capable of achieving such fire properties. The testing laboratory should be a laboratory recognized by HOKLAS; or
- (b) An assessment report against the standards stipulated in this Part E that the materials, product or construction component being capable of achieving such fire properties. The assessment report should be prepared by –
  - (i) a laboratory recognized by HOKLAS; or
  - (ii) a certification body recognized by the Hong Kong Certification Body Accreditation Scheme (HKCAS)

Only the laboratories accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS to be accepted by the Architect.

#### 4.6 FIRE RESISTING DOORSETS

##### 4.6.1 Timber Fire Resisting Doorsets

###### 4.6.1.1 Timber

All timber is to hardwood of first quality, mature growth, perfectly dry, well-seasoned, sawn die square, and free from sap, shakes, wane edges, loose and dead knots, knots over 25mm diameter, worm holes or other defects and shall be suitable for its function in the works. Natural defects which do not affect the durability or performance of the timber in use are acceptable for general carcass work. Knots shall not exceed 1/3 width of the member, subject to size stated above. No timber shall show evidence of decay, rot or having been true flat backgrounds for supporting other materials.

Timber used in finished joinery shall be free from knots on the exposed faces unless agreed with the Architect. Timber generally to be to BS EN 942:1996 as applicable to hardwoods, clear finished joinery etc.

###### 4.6.1.2 Plastic Laminate Finishes

Plastic laminate finishes shall be of brand "Formica" of timber pattern finishes, minimum thickness of 1mm, unless shown otherwise on drawings or counter proposal approved by the Architect. Samples of plastic laminate finish shall be submitted to Architect for approval, minimum size of samples to be 300mm x 300mm. Timber pattern of plastic laminate finish shall be selected to match adjacent similar veneers and/or solid timber of the same species.

###### 4.6.1.3 Doorsets

All timber fire rated doors must be wood solid core.

All fire rated timber doors are to be constructed of timber with hardwood solid core as a proprietary system. The doors shall complete with the appropriate ironmongery and proprietary glazed panels in cloak or monolux bead (channel) as provided by the manufacturer. Locally fabricated hardwood door frames or stainless steel door frames compatible with the proprietary doors shall be used in all cases unless otherwise specified. It is contractor's responsibility to make sure that the whole system, inter alia the door, the frame, their fixings and all associated ironmongery to be covered by a valid test report or assessment report as stipulated in 4.5.

#### 4.6 FIRE RESISTING DOORSETS (CONT'D)

##### 4.6.1.3 Doorsets (Cont'd)

###### All timber fire rated doors must be wood solid core. (Cont'd)

The doors are to be plastic laminated finish (brand “Formica”) or veneer finish of approved color stained lacquer finish on both sides. Unless otherwise shown on the drawings, solid core fire resisting doors shall be constructed to match existing door openings.

Unless otherwise specified, all doors to be lipped with 12mm hardwood lipping, pinned and glued to all edges. All lippings shall match colour of plastic laminate finishes or other approved finishes.

All doors required to have fire resistance rating (FRR) shall be self-closing. Doors to staircases and lobbies intercepting them from the accommodation of a storey must remain closed. All such doors shall be closely fitted around their edges to impede the passage of smoke or flame. The bottom gap between such doors and the floor shall not exceed 10mm.

All doors required to have FRR shall be provided with a notice on both sides stating in English letters and Chinese characters, not less than 10mm high “FIRE DOOR TO BE KEPT CLOSED” “防火門應常關”.

All doors required to have smoke seal should be tested at ambient temperature and medium temperature and demonstrated to comply with the smoke leakage rate criteria in accordance with the standards as stated in the Code of Practice for Fire Safety in Buildings 2011

Unless shown to be satisfactory when tested as part of a door assembly, and hinge on which such doors are hung should be made entirely of materials having a melting point of at least 800deg.C. and

The maximum area of un-insulated glazing used in doors which are not required to be insulated should not exceed 25% of the area of the door leaf.

All tested fire rated doors should be “tagged” or otherwise labelled to ensure ease of identification.

#### 4.6 FIRE RESISTING DOORSETS (CONT'D)

##### 4.6.1.3 Doorsets (Cont'd)

All timber fire rated doors must be wood solid core. (Cont'd)

Proprietary doors proposed by the Main Contractor when registered with the Fire Services Department as having a blanket approval shall be acceptable. The Contractor shall provide evidence on the current F.S.D. approval on the door system. Meanwhile, the Main Contractor is to submit photo-copies of the test report and certification of the fire resistance period of the door given by the testing laboratory/institute acknowledged by the F.S.D., for the retention of the Architect.

All doors supplied and installed shall bear the identification of the door as released from the manufacturer.

##### 4.6.1.4 Ironmongery

All ironmongeries to be fixed to doors requiring fire resisting rating (FRR) must have inclusion in relevant fire test certificates issued by a recognized test laboratory as specified in 4.5 to certify that the fire rated door when fixed with door frame including any sub-frames and such ironmongeries comply with the fire resisting rating requirement in accordance with Part E – Fire Properties of Building Elements and Components as stipulated in the Fire Safety Code in Buildings 2011 issued by BD. Should the ironmongeries selected and installed be required by the governmental inspection officer to have the test to prove its compliance during his inspection, the Main Contractor shall bear all the costs incurred for conducting such tests and submitting aforesaid certificate to the Architect.

##### 4.6.2.1 Glazing

To refer Section 7 – Glazier of the Specification.

##### 4.6.2.2 Stainless Steel

To refer Section 3 – Metal Works of the Specification.

#### 4.6 FIRE RESISTING DOORSETS (CONT'D)

##### 4.6.2 Glass Fire Resisting Doorsets

###### 4.6.2.3 Doorsets

All fire resisting glass doorsets of proprietary system shall have F.R.R. certificate or test reports endorsed by recognized laboratories under the HKOLAS scheme and as specified in 4.5 and in any case be complying with Buildings Department's and Fire Services Department's requirements, B.S.476 Part 20-24:1987 and the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department.

###### 4.6.3 Smoke Seal for Fire Rated Doors and Non-Fire Rated Door

All smoke seals to FRR Doors and non-FRR Door as specified under the Contract shall comply with Part E – Fire Properites of Building Elements and Components under the Fire Safety in Building Code 2011.

#### 4.7 FIRE RATED ENCLOSURE

Unless otherwise approved by the Architect, fire rated enclosures together with fire rated access panels shall be constructed either with “Fires”, “Durasteel” or “Promatect board” in strict accordance with the installation details and requirements of the manufacturer.

All working and fixing method are to be in strict accordance with the manufacturer's instruction and fire certificates/test reports/assessment reports by recognized laboratories under the HKOLAS scheme so as to attain the full performance and properties as described in the technical specification of the system.

All fire rated enclosures shall be designed and constructed to occupy minimum space and cause no obstruction to the escape route.



#### 4.8 FIRE RESISTING FIXED LIGHT

##### 4.8.1 Glazing

To refer Section 7 – Glazier of the Specification.

##### 4.8.2 Metal Frame and Paintwork Finish

To refer Section 3 – Metal Works and Section 5 – Painting System of the Specification.

##### 4.8.3 Fixed Light

All fire resisting fixed light as a proprietary system shall have FRR certificate or test reports endorsed by recognized laboratories under the HKOLAS scheme and in any case be complying with Buildings Department's and Fire Services Department's requirements, and the standards as stated in the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department.

#### 4.9 INTUMESCENT SEALANT

All openings through walls and slab shall be sealed up with fire resisting silicone sealant to provide FRR of not less than that of the walls or slabs. Material samples, shop drawings with certified details, FRR certificate or test reports endorsed by recognized laboratories under the HKOLAS scheme and product catalogue of proposed intumescent sealant shall be submitted to Architect for approval before placing order.

Application of the same shall strictly follow manufacturer's recommendations.

All tested fire rated doors, fire shutters and fire windows should be “tagged” or otherwise labeled to ensure ease of identification.

#### 4.10 PART - E - FIRE PROPERTIES OF BUILDING ELEMENTS AND COMPONENTS

Please refer to Appendix A for Part - E - Fire Properties of Building Elements and Components of Code of Practice for Fire Safety in Buildings 2011.

## **SECTION 5**

### **PAINTING SYSTEM**

#### **5.1 GENERALLY**

This section applies to all painting works indicated on the drawings.

Mock up samples for paintwork shall be prepared on site for approval of Architect/CIC prior to material ordering.

While the paintwork is being carried out, all items other than areas to receive new paintwork shall be fully protected and secured by plywood board or tarpaulin sheet.

The paint system shall be applied in accordance with the manufacturer's recommendations.

The colour shall be specified or approved by the Architect /CIC.

The Main Contractor obliges to report the schedule of completion of each coating of paintwork including cleaning substrate, substrate preparation and spray works. The progress of each step had to be inspected by the Architect/CIC and to their satisfaction before applying the next coat/work (The employer may also involve in the join inspection upon request). Otherwise, no application of any new coat/work shall be allowed/accepted.

Main Contractor shall submit at least 7-days prior written request for Architect and the Employer's inspection to the dried sealer and the 1<sup>st</sup> top coat respectively.

#### **5.2 EXTERNAL/INTERNAL WALL PAINTING**

##### **5.2.1 Surface Preparation**

Completely remove all existing paintwork finishes, dirt, dust and foreign matter etc. on the external walls of residential towers, tower soffits and car park interior areas to bare concrete by 3-phase high pressure water jet at 3,000 psi, paint remover and/or mechanical scrapper.

Remove all loosen and/or defective paintworks, powdery skim coat, dirt, dust and foreign matter on other external walls (excluding residential towers), towers interior areas including common staircases and lobbies to sound substrate by scrapper.

Any loose materials left-in the concrete substrate to be removed by all means and have defects (including voids, gaps, etc.) repaired in accordance with Section 3 & 4 of this Specification for well receiving the subsequent paintworks.

Substrate to receive paintwork shall be dust free. All dust should be cleaned/ removed by brush and/or airless spray gun.

## 5.2 EXTERNAL/INTERNAL WALL PAINTING (CONT'D)

### 5.2.1 Surface Preparation (Cont'd)

When the subject areas are wet, adequate time for drying out shall be allowed before application. Make sure the surface is dry for application. Substrate moisture content should be 14% or below checked with protimeter. For the avoidance of doubt, no painting work shall be conducted during rain or about to rain or at temperatures below 10°C or when the Relative Humidity exceeds 85%. Approved anti-fungus solution has to be applied if fungus found on substrate.

Substrate and all undulated surfaces shall be well prepared to give a true, plumb, flat, continuous and even surface to receive new paintwork. For the avoidance of doubt, **two layers of approved tile filler as “SK TILE FILLER” (of brand SKK)** or approved equivalent shall be used for this purpose.

## 5.2 EXTERNAL/INTERNAL WALL PAINTING (CONT'D)

### 5.2.2 External Paintwork

Unless otherwise specified or counter proposal approved by the Architect and the Employer, as instructed by the Architect and the Employer, the **SKK Water Based Silicon Resin Protective Coating System** shall be applied to external wall as shown in drawings. Mixing, consumption, application of paintwork shall strictly follow the manufacturer's recommendations.

#### SKK Water Based Silicon Resin Protective Coating System

##### A) Primer Coat:

Apply ONE coat of **SKK MIRAC SEALER W** by roller to the dried tile filler in accordance with manufacturer's recommendations.

- Consumption : 0.14~0.16 kg/m<sup>2</sup>
- Coating Interval : minimum 2 hours prior to 1<sup>st</sup> coat of Compo Silicon W
- Mixing Ratio : pre-mixed (15kg)

##### B) Texture Coat:

Apply ONE coat of **SOFT SURG SG** by roller matching with the existing texture to the dried coat in accordance with manufacturer's recommendations.

- Consumption: 0.45-1.06 kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 16 hours prior to the 1<sup>st</sup> top coating
- Mixing Ratio: Soft Surf SG/Clean Water  
100% / 2-8% by weight

##### C) Protective Top Coat:

Apply TWO coats of **SKK COMPO SILICON W** by roller to the dried coat in accordance with manufacturer's recommendations.

- Consumption: 0.25-0.30kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 2 hours prior to the 2<sup>nd</sup> top coating
- Final Curing: over 24 hours
- Mixing Ratio: Compo Silicon W/Clean Water  
100% / 0-20% by weight

## 5.2 EXTERNAL/INTERNAL WALL PAINTING (CONT'D)

### 5.2.3 Internal Paintwork

Unless otherwise specified or counter proposal approved by the Architect, **SKK Compo Urethane W P.U. Resin Coating System** shall be applied to internal wall as shown in drawings. Mixing, consumption, application of paintwork shall strictly follow the manufacturer's recommendations.

#### A) Sealer Coat:

Apply ONE coat of **Mirac Sealer W** by roller (Pre-mixed Water Based Sealer) to well-prepared, smooth, even plaster substrate in accordance with manufacturer's recommendations.

- Consumption : 0.14~0.16 kg/m<sup>2</sup>
- Coating Interval : minimum 2 hours prior to 1<sup>st</sup> coat of Compo Urethane W
- Mixing Ratio : pre-mixed (15kg)ded

#### B) P.U. Resin Top Coat:

Apply TWO coats of **Compo Urethane W** by roller (P.U. Resin Water Based Protective Top Coating) to the cured primer in accordance with manufacturer's recommendations.

- Consumption: 0.25-0.30kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 2 hours prior to the 2<sup>nd</sup> top coating
- Final Curing: over 24 hours
- Mixing Ratio: Compo Urethane W/Clean Water  
100% / 0-20% by weight

### 5.2.4 Washable Distemper

Washable distemper is to be "ICI Maxilite A923-1000" or other approved equivalent washable oil-bound water paint or washable oil-free distemper to B.S. 1053 : Type A.

Anti-mould washable distemper shall be with an approved fungicidal additive.

Arsenical colouring matter shall not be used.

### 5.3 PAINTS ON METAL WORKS

#### 5.3.1 Surface Preparation

All exposed galvanized mild steel shall be painted unless otherwise finished as specified.

Remove all dirt, grease, oil, salt or other contaminants and loose materials by washing the surface with “Rust-Oleum 3599 Industrial Pure Strength Cleaner/Degreaser”, detergent, or other approved cleaner. Rinse thoroughly with fresh water and allow to fully dry. Hard or glossy previous coatings which are very smooth should be sanded to maximize adhesion.

#### 5.3.2 Metal Paintwork

Unless otherwise specified or counter proposal approved by the Architect, **SKK “Compo Urethane” P.U. Resin Water-based Coating System** shall be applied to all metal works including all metal pipes works, metal pipes, metal gates and metal railings. Mixing, consumption, application of paintwork shall strictly follow the manufacturer's recommendations.

### 5.3 PAINT ON METAL WORK (CONT'D)

#### SKK “Compo Urethane” P.U. Resin Water-based Coating System

##### A) Primer:

Apply ONE coat of **Mirac # 100 Primer** by spray or roller and diluted with **Mirac # 100 Thinner** in accordance with manufacturer's recommendations.

- Consumption: 0.15~0.20kg/ m<sup>2</sup>
- Interval Process: around 8 hours prior to the 1<sup>st</sup> coat of Compo Urethane W
- Mixing Ratio: Base of Mirac #100 Primer + Mirac #100 Primer/  
Mirac #100 Thinner  
-16kg+ 4kg /0-10% by weight

##### B) Top Coat:

Apply TWO coats of **Compo Urethane W** by spray or roller in accordance with manufacturer's recommendations.

- Consumption: 0.25-0.30kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 2 hours prior to the 2<sup>nd</sup> top coating
- Final Curing: over 24 hours
- Mixing Ratio: Compo-Urethane W/Clean Water  
100% / 0-20% by weight

## 5.4 PAINTS ON WOODWORK

### 5.4.1 Surface Preparation

Remove all cracked, flaked, blistered, loose, deteriorated or otherwise defective paint by the use of coarse sand paper, scraping, back to a sound substrate.

Feather all undulation, etc. and thoroughly sand down with fine sand paper.

Remove all dirt, oil, etc., clean all surfaces and allow to fully dry.

Ensure the wood is thoroughly dry before commencing. The moisture content must be less 15% before paint commences, use a moisture meter to determine the moisture content.

Allow for surface filling of all indents and for sanding down to leave a flat smooth surface.

### 5.4.2 Varnishing for Woodwork

Apply THREE coats of Polyurethane varnish in accordance with the manufacturer's instruction.

Lightly sand between coats to remove used loose and to ensure a smooth flat surface.

The main contractor shall submit the paint system with manufacturer catalogue, specification, technical method statement for Architect's comment and approval.

## 5.5 PAINTS ON PIPEWORK

### 5.5.1 For Ductile Pipes

Unless otherwise specified or counter proposal approved by the Architect, SKK Painting System as described below shall be applied to all D.I. pipeworks as shown in drawings. Mixing, consumption, application of paintwork shall strict follow the manufacturer's recommendations.

- a) Surface Preparation  
Clean and remove dust, dirt and foreign matter etc. by brush.

#### SKK "Compo Urethane" P.U. Resin Water-based Coating System

##### A) Primer:

Apply ONE coat of **Mirac # 100 Primer** by spray or roller and diluted with **Mirac # 100 Thinner** in accordance with manufacturer's recommendations.

- Consumption: 0.15~0.20kg/ m<sup>2</sup>
- Interval Process: around 8 hours prior to the 1stcoat of Compo Urethane W
- Mixing Ratio: Base of Mirac #100 Primer + Mirac #100 Primer/  
Mirac #100 Thinner  
-16kg+ 4kg /0-10% by weight

##### B) Top Coat:

Apply TWO coats of **Compo Urethane W** by spray or roller in accordance with manufacturer's recommendations.

- Consumption: 0.25-0.30kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 2 hours prior to the 2<sup>nd</sup> top coating
- Final Curing: over 24 hours
- Mixing Ratio: Compo-Urethane W/Clean Water  
100% / 0-20% by weight



## 5.5 PAINTS ON PIPEWORK (CONT'D)

### 5.5.2 For uPVC Pipes

Unless otherwise specified or counter proposal approved by the Architect, SKK Painting System as described below shall be applied to all uPVC pipeworks as shown in drawings. Mixing, consumption, application of paintwork shall strict follow the manufacturer's recommendations.

- a) Surface Preparation  
Clean and remove dust, dirt and foreign matter etc. by brush.

#### SKK "Compo Urethane" P.U. Resin Water-based Coating System

##### A) Primer:

Apply ONE coat of **Mirac # 100 Primer** by spray or roller and diluted with **Mirac # 100 Thinner** in accordance with manufacturer's recommendations.

- Consumption: 0.15~0.20kg/ m<sup>2</sup>
- Interval Process: around 8 hours prior to the 1stcoat of Compo Urethane W
- Mixing Ratio: Base of Mirac #100 Primer + Mirac #100 Primer/  
Mirac #100 Thinner  
-16kg+ 4kg /0-10% by weight

##### B) Top Coat:

Apply TWO coats of **Compo Urethane W** by spray or roller in accordance with manufacturer's recommendations.

- Consumption: 0.25-0.30kg/m<sup>2</sup> depends on site conditions
- Internal Curing: Min. 2 hours prior to the 2<sup>nd</sup> top coating
- Final Curing: over 24 hours
- Mixing Ratio: Compo-Urethane W/Clean Water  
100% / 0-20% by weight

## **SECTION 6**

### **FINISHES**

#### **6.1 GENERALLY**

This section applies to all finishing works indicated on the drawings and includes, but not limited to, internal rendering, external rendering, floor screeds etc. Finishing works, from structural substrate to the layer below top finishes shall form ONE complete system supplied by a single manufacturer. The completed finishes shall be left sound with all surfaces left clean and free from stains, scratches or damage of any kind to the satisfaction of the Architect / CIC.

#### **6.2 SAMPLE SUBMISSIONS**

All samples of materials must be submitted to and approved by the Architect / CIC before ordering. Samples of all finishes requested by the Architect / CIC are to be set up in panels for approval, as directed by the Architect / CIC.

#### **6.3 PREPARATION OF BACKGROUND OF EXISTING STRUCTURE FOR RENDER, PLASTER OR SCREED ETC.**

All existing finishes (including rendering/plastering/screeding) to be hacked off by hand held power tools down to bare concrete (or masonry depends on site condition). Hammer-tap the entire surface of the bare concrete (or masonry) for hollowness and other defects. All spalls, cracks, honeycombs and defects shall be repaired in accordance with Section 11 and 12 of this Specification. For the avoidance of doubt, all embedded or loose materials including left-in foam, timber blocks, conduits, plywood particles, voids, papers and the like have to be removed by contractor and repaired with approved repair mortar or other means approved by the Architect. No extension of time and loss/expenses claims arose therefrom will be granted. All defective concrete and defects shall be repaired before other trades of work commence.

Clean surface thoroughly to remove efflorescence, laitance, dirt, dust, oil, paint and other loose materials. Hack surface to expose aggregate to form key. Concrete surfaces shall be thoroughly wetted for several hours prior to laying subsequent layers. On hardened concrete surfaces where difficulty may be experienced in achieving a good bond between materials, apply a PVA bonding if appropriate.

At junctions between dissimilar solid backgrounds in the same plane with the same coating, fix strip of expanded metal lath, galvanized extending 300mm (minimum) on each side of the junction. Fix each edge of strip to plugs at 100mm centres with 40mm galvanized screws. SBR Latex modified cementitious waterproofing slurry to be applied at the junction extending min. 150mm on each side.

Unless otherwise approved by the Architect, all the rendering layers above the bare concrete (or masonry if applicable), including but not limited to the Bond Coat/Spatterdash, Plastering/Rendering, Screeds, Tile Adhesive, Tile Grout, Waterproofing Slurry etc. shall be of one single approved system by one manufacturer.

## 6.4 BOND COAT/ SPATTERDASH COAT

### 6.4.1 Generally

Before application of render/plaster/screed, approved bond coat and/or spatterdash coat shall be applied to the substrate to ensure sufficient bonding conditions for subsequent layers, subjected to manufacturer's recommendations.

Bond Coat/Spatterdash Coat to be

- a. **Laticrete (L3642 + Cement/Sand)**; or
  - b. **E-mix (EVA Admix + Cement/Sand)**; or
- other approved equivalent.

### 6.4.2 Substrate Preparation

Surface must be cleaned and all soil, dust, curing compounds, salts, form oil, sealant or grease shall be cleared. All possible debonding agents that affect bonding shall be removed. Surface to be adequately trued and leveled. Thorough rinsing of the surface with clean water is necessary to remove any weakened residue. Dampen dry substrate surface before applications.

### 6.4.3 Application

(a) For Laticrete product

Fortified Slurry Bond Coat: Dilute 1 part of Laticrete 3642 Concentrate with 3 parts of water. Thoroughly mix Laticrete 3642 diluted latex with dry ordinary Portland cement (mixing ratio = 1 part Laticrete 3642 diluted latex : 2 parts cement) by electric mixer to obtain the slurry mortar. Apply the slurry mortar onto concrete surface by trowel. Latex fortified render shall be place onto the wet, tacky slurry bond coat.

Spatterdash: Dilute Laticrete 3642 with water by volume 1 : 3. Mix Pre-diluted LATICRETE 3642 Latex Concentrate with cement and sand in the ratio of 2 liters : 5.5 kg : 5.5 kg approximately (Or by volume 1 : 1.5 : 1.5) to form a thick slurry. Stir thoroughly and continue to stir throughout the application process. Consumption per sqm is approximately 0.5 litre diluted L3642 + 1.4 kg cement + 1.4 kg sand.

Use a stiff bristle brush to apply the spatterdash mix in patches such that the space between patches does not exceed 50 mm and the space to the perimeter of any face of the concrete does not exceed 50 mm. Confirm soundness of the spatterdash by brushing with a wire brush prior to rendering. Loose / weak area must be reapplied and re-tested. Allow sufficient time for the spatterdash coat to be cured before the application of the latex fortified leveling bed. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

#### 6.4 BOND COAT/ SPATTERDASH COAT (CONT'D)

##### 6.4.3 Application (cont'd)

(b) For E-mix product

Existing structure –

Hack off existing surface to form mechanical key. Mix 1 part E-mix EVA Admix with 1 part Ordinary Portland Cement by weight, Stir thoroughly using mechanical mixer until a homogeneous slurry coat is obtained. Apply a layer of slurry coat by brush on the concrete surface as well as exposed steel reinforcement while the surface is still damp. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

New structure –

Prepare the spatterdash by mixing “E-mix EVA Admix” with water, sand and ordinary Portland cement at a ratio of 1:3:10:5 by weight. Stir the mixture thoroughly using electric mixer until a homogeneous slurry coat is obtained.

Apply spatterdash right after the concrete is off-form. Use a stiff bristle brush to apply the spatterdash mix in patches such that the space between patches does not exceed 50 mm and the space to the perimeter of any face of the concrete does not exceed 50 mm. Confirm soundness of the spatterdash by brushing with a wire brush prior to rendering. Loose / weak area must be reapplied and re-tested. Allow sufficient time for the spatterdash coat to be cured before the application of the latex fortified leveling bed. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

#### 6.5 POLYMER MODIFIED RENDERING/SCREEDING

##### 6.5.1 Generally

Rendering / screeding / polymer modified rendering / screeding to be

- a. **Nitobond SBR by (Fosroc);** or
  - b. **Laticrete Latex Fortified Mortar (3642 + Cement/Sand + 9237);** or
  - c. **E-mix Cementitious coating “WP High Performance Elastic Slurry + WP Render Coarse”;** or
- other approved equivalent.

##### 6.5.2 Substrate Preparation

For Floors and Concrete Toppings

Concrete surfaces should be clean, sound, free from laitance, efflorescence, dust, curing compounds and contamination. Surface or concrete should be saturated and surface dry (SSD).

## 6.5 POLYMER MODIFIED RENDERING/SCREEDING (CONT'D)

### 6.5.2 Substrate Preparation (Cont'd)

#### For Wall Surfaces


Wall surfaces should be clean, free of contamination. Dusty surfaces should be washed and excess water allowed to run off, leaving the surface damp. Make sure mechanical key were formed either by scratching of existing structure or applying spatterdash on new concrete surface.

## 6.5 POLYMER MODIFIED RENDERING/SCREEDING (CONT'D)

### 6.5.3 Application

#### (a) Nitobond SBR

Application and specification refer to below:


**FOSROC**  
*constructive solutions*

## Nitobond SBR\*

**Polymer bonding aid and additive for mortars, screeds and renders**

**Uses**

For improving the physical properties of cementitious mixes. Typical uses include, but are not limited to, the following :

- Bonding concrete repair mortars
- Floor toppings and screeds
- Waterproof renders and cementitious slurries
- Bonding agent for slip bricks, ceramic tiles, etc.
- Spatterdash for bonding render and plaster

**Advantages**

- Single component liquid can be easily gauged as required
- Improves cohesion and workability
- Improves mortars to provide waterproof repairs, renders and toppings which are highly resistant to freeze/thaw cycling
- Improved tensile and flexural properties allow thin applications
- Excellent bond to concrete, masonry, stonework, plaster and blockboard
- Contains no chloride admixtures

**Specification**

**Polymer bonding aid and mortar additive**

The polymer bonding aid and site-batched mortar shall be modified by the use of Nitobond SBR, a single component styrene butadiene rubber emulsion.

**Description**

Nitobond SBR is a modified styrene butadiene rubber emulsion which is supplied as a ready to use white liquid. It is designed to improve the quality of site-batched cementitious mortars and slurries. Being resistant to hydrolysis, it is ideal for internal and external applications in conjunction with cement.

**APPROVALS**

- Contact with drink water
- WRAS - Water Regulations Advisory Scheme
- Passed full test of effect on water quality - BS 6920

**Typical Properties**

The results listed below were achieved by assessing the mechanical properties of a 3:1 sand:cement mortar containing Nitobond SBR in the proportions 10 litres per 50 kg cement against a 3:1 sand:cement control mortar. The test methods used were in full accordance with BS 6319 at 28 days - air cured.

Test method	Typical result
<b>Compressive strength</b> (BS 6319, Pt 2:1983)	: 50-60 N/mm <sup>2</sup>
<b>Tensile strength</b> (HKHA/MTS 2002-04 Specification clause 2.1-3):	: >3.0 N/mm <sup>2</sup>
<b>Flexural strength</b> (BS 6319, Pt 3:1983)	: >5.0 N/mm <sup>2</sup>
<b>Bond strength</b> (HKHA/MTS 2002-04 Specification Part D clause 2.1.14)	: 1.7 N/mm <sup>2</sup>
<b>Water Absorption</b> (BS 1881:Part 122:1983 (AMD6108))	: <0.9% (Control Sample:4.5%)
<b>Chemical resistance</b>	: Cementitious materials have limited chemical resistance. The addition of Nitobond SBR to cement mortars reduces permeability and therefore helps reduce the rate of attack by aggressive chemicals, acid gases and water.

**Design criteria**

The application parameters for mortars modified by the use of Nitobond SBR will differ depending on the actual mix design used, but should always be subject to a minimum applied thickness of 6 mm.

Nitobond SBR-modified mortars can generally be applied in sections of up to 40 mm thickness in horizontal locations and 15 mm in vertical locations, without the use of formwork.

In overhead locations the thickness achievable without the use of formwork is largely dependent on the profile of the substrate. Consult the local Fosroc office for further information.

## Nitobond SBR\*

The slurry primer should be scrubbed well into the surface of the substrate, being careful to avoid 'ponding'. The repair mortar, topping or render must be applied on to the wet slurry primer. If the slurry primer dries before application of the mortar, it must be removed and the area reprimed before continuing.

### Low temperature working

In cold conditions down to 5°C, the use of warm water (up to 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted.

### High temperature working

At ambient temperatures above 35°C, the material should be stored in the shade and cool water used for mixing.

### Mixing

Care should be taken to ensure that Nitobond SBR mortars are thoroughly mixed. A forced-action mixer is essential for large volume applications. Mixing in a suitably sized drum using an approved spiral paddle in a slow speed (400/500 rpm) heavy-duty drill is acceptable for minor areas.

Weigh the cement, sand and, where required, aggregate into the mixer and dry blend together for one minute. With the machine in operation, add the pre-mixed Nitobond SBR and clean water. Continue mixing for 3 minutes to ensure complete dispersal into the sand and cement.

Make any small adjustment to the quantity of clean water but do not significantly exceed the literage shown above, additional water should be kept to a minimum.

Continue mixing up to a maximum of 5 minutes until a smooth and fully homogeneous consistency is achieved with the required workability and application properties. It is critical that allowance is made for the moisture content of the sand and aggregate, particularly where stored on site.

### Application

For application to all surfaces, Nitobond SBR mortars, toppings and renders must be well-compacted on to the primed substrate by trowel. It is frequently beneficial to work a thin layer of the mortar into the slurry primer and then build the mortar on to this layer. Exposed steel reinforcement should be completely encapsulated by the mortar.

Nitobond SBR mortars can be applied at a minimum thickness of 6 mm and up to 40 mm thickness, dependent on the location and configuration of the repair zone. Refer to the recommended thicknesses shown in the 'Mix design' section.

If the recommended thickness is exceeded and sagging occurs, the affected section must be completely removed and reapplied in accordance with the procedure described above. The use of formwork may facilitate achieving the required build. If formwork is used, it should have properly sealed faces to ensure that no water is absorbed from the repair material.

Where thicker sections (up to a total thickness of 40 mm) are to be built up by hand or trowel application, the surface of the intermediate layers should be scratch-keyed and cured with Nitobond AR. Application of the slurry primer and a further application of Nitobond SBR mortar may proceed as soon as this layer has set.

### Spatterdash Application

Mix thoroughly the Spatterdash mix and maintain consistency during application by occasional stirring. If necessary, the dosage of Nitobond SBR can be increased to 1.5 parts at the maximum. The materials should be mixed with a slow speed drill and mix for 3-5 minutes until the mix is consistent.

Apply the spatterdash to the clean, prepared surface. Allow to fully cure before application of render.

### Finishing

Nitobond SBR mortars can be finished with a steel, plastic or wood float, or by a damp sponge technique, to achieve the desired surface texture. The completed surface should not be overworked.

### Curing

Nitobond SBR mortars, toppings and renders are cement-based. In common with all cementitious materials, they must be cured immediately after finishing in accordance with good concrete practice.

The use of Nitobond AR or Concure RB90, sprayed on to the surface of the finished mortar in a continuous film, is recommended. In harsh drying conditions, supplementary curing with polythene sheeting must be used.



## Nitobond SBR\*

### Overcoating with protective decorative finishes

Nitobond SBR mortar repairs are extremely durable and will provide excellent protection to the embedded steel reinforcement within the repaired locations.

The surrounding parts of the structure will generally benefit from the application of a barrier/decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repair itself.

Fosroc recommend the use of the Dekguard range of protective, anti-carbonation coatings. These products provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment.

Dekguard products may be applied over the repair area without prior removal of the Nitobond AR curing membrane. Concure RB90 curing membrane must be removed prior to the application of Dekguard products. This is best achieved by light grit or sand-blasting.

### Cleaning

Nitobond SBR and Nitobond AR should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically. Equipment used with Nitoprime Zincrich (WB) and Concure RB90 should be cleaned using suitable solvent.

### Limitations

- Nitobond SBR mortars, toppings and renders should not be applied when the temperature is below 5°C and falling.
- Nitobond SBR mortars should not be exposed to moving water during application. Exposure to heavy rainfall prior to the final set may result in surface scour.
- If any doubts arise concerning temperature or substrate conditions, consult the local Fosroc office.

### Technical support

Fosroc offers a comprehensive technical support service to specifiers, end users and contractors. It is also able to offer on-site technical assistance, and dedicated specification assistance in locations all over the world.

### Estimating

#### Supply

Nitobond SBR	: 25 and 200 litre drums
Nitoprime Zincrich (WB)	: 0.75 litre packs
Nitobond AR	: 20 litre drums
Concure RB90	: 25 and 200 litre drums

#### Coverage

Nitobond SBR	: Refer to mix designs
Nitobond SBR (as slurry primer)	: Approx. 2 to 3 m <sup>2</sup> /litre
Nitoprime Zincrich (WB)	: 6.5-8.5m <sup>2</sup> /litre
Nitobond AR	: 6 to 8 m <sup>2</sup> /litre
Concure RB90	: 3.5 to 5 m <sup>2</sup> /litre

**Note:** The actual usage of Nitobond SBR will depend on the mix design used. The coverage figures for liquid products including the Nitobond SBR slurry primer are theoretical - due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

**Note:** In accordance with Commercial or Health & Safety requirements packaging detail may alter. Please contact your local Fosroc office for detail.

### Storage

#### Shelf life

If kept in a dry store in the original, unopened bags or packs, all products(except Nitoprime Zincrich (WB)) have a shelf life of 12 months, Nitoprime Zincrich (WB) has a shelf life of 6 months.

#### Storage conditions

Store in dry conditions in the original packs. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced. Nitobond SBR and Nitobond AR should be protected from frost.



## Nitobond SBR\*

### Precautions

#### Health and safety

Cementitious mortars and slurries modified with Nitobond SBR contain cement powders which, when mixed or become damp, release alkalis which can be harmful to the skin. During use, avoid inhalation of dust and contact with skin and eyes. Wear suitable protective clothing, gloves, eye protection and respiratory protective equipment. The use of barrier creams provide additional skin protection. In case of contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately - **do not** induce vomiting.

Nitoprime Zincrich (WB), Nitobond products and Concure RB90 should not come in contact with the skin and eyes, or be swallowed. Ensure adequate ventilation and avoid inhalation of vapours. Some people are sensitive to resins, hardeners and solvents. Wear suitable protective clothing, gloves and eye protection. If working in confined areas, suitable respiratory protective equipment must be used. The use of barrier creams provide additional skin protection.

In case of skin contact with Nitoprime Zincrich (WB) and Concure RB90, remove immediately with resin removing cream followed by washing with soap and water. Do not use solvent. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately - **do not** induce vomiting.

### Fire

Nitobond SBR, Nitobond AR are non-flammable.

Nitoprime Zincrich (WB) mixture is non-flammable.

Nitoprime Zincrich (WB) powder is flammable. Keep away from water. Keep away from sources of ignition. In the event of fire, extinguish with CO<sub>2</sub> or foam. Do not use a water jet.

For further information see relevant Material Safety Data Sheet.



constructive solutions

## Nitobond SBR\*

	Mixing Ratio	Age	MIX A (Patching and repair mortar)	MIX B (Heavy-duty floor screed)	MIX C (Render)	MIX D (Bonding mortar for slip bricks,tiles,etc)	MIX E (Spatterdash for bonding render)
1) Bond Strength HKHA/MTS 2002-04 Specification Part D clause 2.1.1.4	Mixing E 7d	7d	—	—	—	—	1.6 MPa
2) Compressive strength of mortar cube BS 6319, Part 2:1983	Mixing A- Mixing D 28d	28d	50-60 MPa	50-60 MPa	30-40 MPa	50-55 MPa	—
3) Tensile strength HKHA/MTS (2002-04) Specification Part D clause 2.1.3	Mixing A- Mixing D 28d	28d	>3.0 MPa	>5.0 MPa	>3.0 MPa	>4.0 MPa	—
4) Flexural strength (BS 6319, Part 3:1990)	Mixing A- Mixing D 28d	28d	>7.0 MPa	>9.0 MPa	>5.0 MPa	>7.0 MPa	—
5) Water Absorption of 75mm concrete core (Including drilling of core from 100mm cube) BS 1881, Part 122:1983	Control & Mixing A- Mixing D		0.4~0.5% (4.5% for Control Sample)	0.2% (4.5% for Control Sample)	0.8~0.2% (4.5% for Control Sample)	0.2~0.3% (4.5% for Control Sample)	—

\* The above are typical laboratory test results. Different cement brands may result in variation of strengths and water absorption.

\* Denotes the trademark of Fosroc International Limited

† See separate data sheet



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## 6.5 POLYMER MODIFIED RENDERING/SCREEDING (CONT'D)

### 6.5.3 Application (Cont'd)

#### (b) Laticrete product

##### Floor Screed

Dilute 1 part of Laticrete 3642 Concentrate with 3 parts of water. Thoroughly mix Laticrete 3642 diluted latex with dry ordinary Portland cement with ratio 1 : 2 by electric mixer to obtain the slurry mortar. Apply the slurry mortar onto the concrete slab surface by trowel. Latex fortified render must be place onto the wet, tacky slurry bond coat.

Dilute 1 part of Laticrete 3642 Concentrate with 3 parts of water. Thoroughly mix Laticrete 3642 diluted latex with dry ordinary Portland cement and fine sand in ratio 1 : 2 : 5 by volume, with electric mixer to obtain the leveling mortar. Apply the leveling bed on top of the slurry bond coat when the bond coat is still wet. The thickness of the leveling mortar is to be nominal 20mm.

##### External Wall Render

Dilute 1 part of Laticrete 3642 Concentrate with 3 parts of water. Thoroughly mix Laticrete 3642 diluted latex with dry ordinary Portland cement and fine sand in the ratio of 1 : 2 : 5 by volume, with electric mixer to obtain the leveling mortar.

Plumb, square and true wall with applications of mortar when the bond coat is still wet. The thickness of the first layer shall be 15mm.

Apply a liberal coat of Laticrete 9237 Waterproofing Membrane, approx. 10cm to each side of corners, coves, board joints and changes in plane. Double application of fabric and liquid is required for all such locations. Fold a 15cm wide fabric in half and embed in the wet liquid. Press firmly with brush or roller to allow complete “bleed through” of liquid. Top-coat the fabric with Laticrete 9237 liquid. Afterwards, use a paint roller to apply a liberal coat of the Laticrete 9237 liquid (0.5-0.75mm) wet over the entire external wall surface, going back over fabric reinforced areas.

After the application of Laticrete 9237, apply the aforesaid leveling bed on top when the 9237 membrane is fully cured. The thickness of this second layer leveling mortar is nominally 10mm.

## 6.5 POLYMER MODIFIED RENDERING/SCREEDING (CONT'D)

### 6.5.3 Application (Cont'd)

For application under cold and hot weather, contractor shall strictly follow the manufacturer's recommendations. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

#### (c) E-mix product

##### Floor Screed

Prepare Bond Coat Slurry by mixing "E-mix Bond Coat Admix" with water and Ordinary Portland Cement at a ratio of 2:3:5 by weight. Stir the mixture thoroughly by using an electric mixer until a homogeneous slurry coat is obtained. A layer of slurry coat shall be applied by brushing on the floor surface.

Mix a bag of dry mix powder "WP Screed" (40kg) with 5.2-6L (13-15%) of water by electric mixer. Pour the mixture on the floor to a maximum thickness of 50mm when the priming Bond Coat Slurry is still wet. Tiles or other top coat floor finishes to be applied after 28 days of curing. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

##### External Render

Mix the dry-mix powder component (25kg) gradually to the admixture (18L) of "E-mix WP High Performance Elastic Slurry" in a container and avoid lump formation until a smooth consistent mix is achieved. Apply the slurry onto the prepared substrate with a total thickness of 1-1.2mm in a 2-layer stifling action.

Mix a bag of dry mix powder (40kg) of "E-mix WP Render Coarse" with app. 5.2-6L (13-15%) of water by electric mixer. Apply the mixture by hand to a nominal 25mm thickness. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

## 6.6 WORKMANSHIP OF FLOOR SCREED

Apply screeds over existing concrete surfaces to bring the hacked surface to level. Screeds shall be minimum thickness of 25mm or as specified on drawings or elsewhere. Screeds shall be 1 coat unless over 40mm where 2 nos. equal coats shall be used. Allow correct and sufficient falls; avoid water ponding.

Water : Cementitious ratio shall be kept as low as practicable to reduce drying or shrinking. Laid screed shall be protected from rapid drying with polythene sheets.

Screeds shall be thoroughly compacted by tamping and finished with a screed board prior to steel trowelling. Where screed battens are used they should be temporarily fixed to permit easy removal.

## 6.7 TILES

### 6.7.1 Generally

Refer to finishes schedule and drawings for details.

## 6.8 TILE ADHESIVE

### 6.8.1 Generally

Except tile adhesive to Artificial Granite/Granite Tiles, tile adhesive to be

- a. **H40 Ideal**
- b. **Laticrete Latex Fortified Thin-bed Adhesive (L4237 + L211)**; or
- c. **E-mix (Tile Fix 303)**; or  
other approved equivalent.

### 6.8.2 Substrate Preparation

The substrate surface must be sound and clean, free of dust, oil, paint and other loose particles. It is essential to dampen the surface before application of tile adhesive.

### 6.8.3 Application

- (a) For H40 Ideal Product

Application, specification refer to the attached catalog:



**LAYING DIVISION**

**PROFESSIONAL ADHESIVES  
WITH SAS TECHNOLOGY**

Professional, single-component adhesive with SAS (Shock Absorbing System) Technology, high resistance to sulphates and no vertical slip, suitable for high-resistance laying up to 10 mm thickness of homogeneous tiles, klinker, glass mosaic, ceramic tiles of all types, large-format paving slabs and stable natural stone on substrates with a gypsum or anhydrite base.



**H40® IDEAL**

**TECHNOLOGICAL INNOVATION** – H40® IDEAL develops a high degree of insensibility to chemical attack of sulphates in substrates with a gypsum or anhydrite base, ensuring laying of covering materials without the need to apply an insulation primer. The innovative H40® IDEAL technology neutralises the expansive chemical reaction of plasters and screeds with a gypsum or anhydrite base, facilitates and speeds up the process of laying and establishes superior levels of safety, ensured by the use of anti-sulphate micro-components with a chemical structure specifically designed for adhesives.

**NO VERTICAL SLIP** – Diagonal laying, with a top-down sequence of progression, of low-absorbency or non-absorbent ceramic coverings, also without spacers, requires immediate adhesion to ensure the tiles are supported, while maintaining a long adjustability time. The H40® IDEAL technology develops a prolonged workability time and no vertical slip, ensured by thixotropizing and water-release adjustment polymers for rapid, secure laying.

**SAS - (SHOCK ABSORBING SYSTEM) TECHNOLOGY** – The exclusive SAS testing method reproduces real on-site conditions by simulating the most severe sulphate attacks, which no other adhesive has ever had to withstand. H40® IDEAL reflects technological superiority to the cycles of chemical strain used in the most highly advanced Safety-Test developed for cement-based adhesives.

Developed by the Research and Development Division and guaranteed by the Training Center.  
Compliant with the CARE Project for the Protection of Health and the Environment:  
Laying Division (Method M1 – Action P307).

**KERA KOLL**  
SUPERIOR BUILDING TECHNOLOGY

## H40<sup>®</sup> IDEAL

### AREAS OF USE

**Laying of ceramic and homogeneous tiles of all types, stable marble and natural stone, on both flooring and walls, directly on substrates with a gypsum or anhydrite base. Thicknesses up to 10 mm.**

**Materials:**

- homogeneous tiles, ceramic tiles, klinker, cotto, glass and ceramic mosaic, of all types and formats
- natural stone, recomposed materials and marble not subject to deformation or staining due to water absorption

**Substrates:**

- plasters and screeds with a gypsum or anhydrite base
- anhydrite screeds
- cement plasters and cement-lime mortar
- cement-based screeds or screeds produced with REKORD<sup>®</sup> and KERACEM<sup>®</sup> as binder or ready-mixed
- prefabricated concrete or fresh concrete castings
- underfloor heating systems
- waterproofing, cement-based products such as the waterproofing, two-component IDROBUILD<sup>®</sup> system
- walls in concrete blocks and cellular concrete
- walls in plasterboard and plastered brickwork

**Use**

Flooring and walls, indoor/outdoor use, in civil, commercial and industrial applications and for street furniture, also in areas subject to thermal shock and freezing.

**Do not use**

On plastic or resilient materials, metals and wood; on substrates subject to continuous moisture rising.

### PREPARATION OF SUBSTRATES

In general, the substrate must be free from dust, oil and grease, dry and free from any rising damp, with no loose, flaky or imperfectly anchored parts such as residual traces of cement, lime and paint, which must be totally removed. The substrate must be stable and without cracks, must have already completed curing hygrometric shrinkage and must present suitable mechanical resistance levels. Non-planar areas must be corrected with suitable smoothing and finishing products.

**Substrates with a gypsum and anhydrite base:** plasters with a gypsum base must present a residual humidity  $\leq 1\%$  and screeds with an anhydrite base  $\leq 0.5\%$ , both of which should be measured with a carbide hygrometer. Follow the manufacturer's instructions. Make sure that the substrate has been applied in a single layer without any thin finishing, that may be imperfectly anchored and therefore not suitable for the tile covering.

**High-absorption substrates:** on screeds and plasters which are highly absorbent and have dusty, flaky surfaces it is advisable to apply one or more coats of PRIMER A professional, surface insulation product, in accordance with the instructions, to reduce water absorption and to improve spreadability of the adhesive.

### ABSTRACT

*High-resistance laying of ceramic tiles, homogeneous tiles, marble and natural stone on substrates with a gypsum or anhydrite base must be performed with a professional adhesive with high resistance to sulphates, compliant with EN 12004 - class C2 TE, SAS (Shock Absorbing System) Technology such as H40 IDEAL<sup>®</sup> manufactured by Kerakoll. The substrate must be compact, free from any flaky, loose parts and must be clean and cured, having already completed the shrinkage stage. For application, a \_\_\_\_ mm toothed spreader must be used for an average coverage  $\approx$  \_\_\_\_ kg/m<sup>2</sup>. Existing joints must be respected and elastic fractionizing joints must be created for every \_\_\_\_ m<sup>2</sup> of continuous surface. Ceramic tiles must be laid with joint-gap spacers with a width of \_\_\_\_ mm.*



## INSTRUCTIONS FOR USE

### Preparation

Prepare H40® IDEAL in a clean container, first of all pouring in a quantity of water equal to approximately ¾ of that which will be required. Gradually add H40® IDEAL to the water in the container, mixing the paste from the bottom upwards with a low-rev (≈ 400/min.) helicoidal agitator. Then add more water until the desired consistency is obtained. The mixture must be homogeneous and without any lumps. Specific polymers with high-dispersion properties ensure that H40® IDEAL is immediately ready for use. The amount of water indicated on the packaging is an approximate value. It is possible to obtain mixtures with a more or less thixotropic consistency, depending on the type of application. Adding extra water does not improve the workability of the product, and may cause shrinkage in the plastic phase of drying and result in less effective final performance with a reduction in compressive and shear strength and adhesion to the substrate.

### Application

H40® IDEAL should be applied with a suitable toothed spreader, to be chosen according to the size and characteristics of the rear surface of the tiles. It is best to use the smooth part of the trowel to spread a fine initial layer, pressing down hard so as to obtain maximum adhesion to the substrate and to regulate water absorption, after which the thickness can be adjusted as required by tilting the spreader at an angle. Spread the adhesive over a surface area which will allow for laying of the surface materials within the indicated open time, and check for suitability at regular intervals. The open time may vary considerably even during the application, depending on various factors such as exposure to sunlight, air currents, absorbency of the substrate, temperature and relative humidity of the atmosphere. Press down each tile to allow for complete, uniform contact with the adhesive. In the case of laying in environments subject to heavy traffic, in outdoor locations, on underfloor heating systems or with materials to be smoothed on-site and with formats > 900 cm², the double-spread technique must be used, which ensures laying procedures on fresh adhesive, 100% coverage of the rear of the tiles and maximum adhesion. In general, ceramic tiles do not require preliminary treatment, however these materials should be checked to ensure they are free from traces of residual dust or materials not properly anchored to the surface.

### Cleaning

Residual traces of H40® IDEAL can be removed from tools and covered surfaces with water before the product hardens.

## SPECIAL NOTES

**Special applications:** replacement of mixing water with TOP LATEX professional, elastomer latex enhances the adhesive's capacity for transversal deformation. The real necessity for deformability of the laying system must be verified, as use of an excessively deformable adhesive together with highly-rigid substrates and laying materials may cause breakage and early, unexpected yielding of the covering materials when placed under heavy and concentrated strain or loads. To define the percentage of TOP LATEX to be added, on the basis of the various factors related to the system, consult the Kerakoll Global Service.

**Elastic joints:** provide desolidarisation joints and elastic fractionizing joints for areas of 20 – 25 m² in indoor applications, 10 – 15 m² in outdoor applications and for every 8 metres length in the case of long, narrow applications. Structural and string-course joints have to be marked on the covered surface.





#### TECHNICAL CHARACTERISTICS

Appearance	White ready-mixed	
Apparent volumetric mass	$\approx 1.14 \text{ kg/dm}^3$	UEAtc/CSTB
Mineralogical nature of inert material	Silicate-crystalline carbonate	
Granulometric interval	$\approx 0 - 400 \mu\text{m}$	
CARE	Method M1 – Action P307	
Storage	$\approx 12$ months in the original packaging in dry environment	
Packaging	Bags 25 kg	

#### TECHNICAL DATA compliant with Kerakoll Quality Standard

Mixing water	$\approx 8.2 \text{ l} / 1 \text{ bag } 25 \text{ kg}$	
Specific weight of the mixture	$\approx 1.61 \text{ kg/dm}^3$	UNI 7121
Pot life	$\geq 4 \text{ h}$	
Temperature range for application	from $+5 \text{ }^\circ\text{C}$ to $+35 \text{ }^\circ\text{C}$	
Max thickness obtainable	$\leq 10 \text{ mm}$	
Open time	$\geq 30 \text{ min.}$	EN 1346
Working time	$\geq 30 \text{ min.}$	
Foot traffic	$\approx 24 \text{ h}$	
Grouting	$\approx 3 \text{ h}$ on walls / $\approx 24 \text{ h}$ on flooring	
Interval before normal use	$\approx 7 \text{ days}$	
Coverage *	$\approx 2.5 - 4 \text{ kg/m}^2$	

Values taken at  $+23 \text{ }^\circ\text{C}$ , 50% R.H. and no ventilation. Data may vary depending on specific conditions at the building site, i.e. temperature, ventilation and absorptency level of the substrate and of the materials laid.  
(\*) Can vary depending on the irregularity of the substrate and the format of the tile.

#### FINAL CHARACTERISTICS

Adhesion to concrete after 28 days	$\geq 1 \text{ N/mm}^2$	EN 1348
Adhesion after action of heat	$\geq 1 \text{ N/mm}^2$	EN 1348
Shear strength:		
- for stoneware/stoneware overlaying after 28 days	$\geq 1.5 \text{ N/mm}^2$	ANSI A-118.1
Expansion toward sulphates after straining cycles:		
- Anstett assay	$\leq 1.5\%$	SAS Technology
- immersion in sulphate water	$\leq 0.5 \text{ mm/m}$	SAS Technology
Working temperature	from $-40 \text{ }^\circ\text{C}$ to $+90 \text{ }^\circ\text{C}$	

Values taken at  $+23 \text{ }^\circ\text{C}$ , 50% R.H. and no ventilation. Data may vary depending on specific conditions at the building site.

#### WARNING

- **Product for professional use**
- do not use the adhesive to correct substrate irregularities greater than 10 mm
- lay and press tiles onto fresh adhesive, making sure it has not formed a surface film
- protect against direct rain and freezing for at least 24 h
- the temperature, ventilation and absorption of the substrate and covering materials may vary the workability and setting times
- use a toothed spreader suitable for the format of the tiles
- use a carbide hygrometer to measure and ensure that the humidity of the gypsum is  $\leq 1\%$  and of the anhydrite  $\leq 0.5\%$  at the moment of laying. Follow the manufacturer's instructions.
- if necessary, ask for the safety data sheet
- for further information please consult the **Kerakoll Worldwide Global Service +39-0536.811.516**

## 6.8 TILE ADHESIVE

### 6.8.3 Application (Cont'd)

#### (b) For Laticrete Product

Mix LATICRETE 4237 Latex with LATICRETE 211 Powder in a ratio of 1 litre : 4 kg (1 : 3 by volume) approximately, by low speed electric mixer to obtain the adhesive mortar.

Adjust quantity of liquid and powder to obtain creamy, wet and tacky consistency. Allow the mortar to slake for 5 - 10 minutes. Then apply the tile adhesive with a 6x6mm notched trowel to the recommended thickness. Mortar should be spread on the wall surface in a small area. (Back butter the tiles with size larger than 200x200mm). Tile should be fixed into the treated surface before the mortar surface skins over. After the tile has been fixed, a flat wood block or soft hammer is recommended to give uniform and flat tiling finish.

Excess adhesive mortar must be removed from the tiles surface by a damp cloth before the mortar gets hardened. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

#### (c) For E-mix product

Mix a bag of dry mix powder (40kg) of "Tile Fix 303 Grey" with app. 10.4 – 11.6L (26 - 29%) of water. Stir the mixture thoroughly to obtain a creamy paste with lumps and let the additives to dissolve. Apply the adhesive by using a notched trowel directly onto substrate, over which tiling can be achieved within 30 minutes under normal temperature and humidity condition.

Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

## 6.9 TILE GROUTING

### 6.9.1 Generally

Except tile grout to Artificial Granite/Granite Tiles, tile grouting to be

- a. **"Laticrete 1500 Series Sanded Grout"**; or
  - b. **"E-mix Tile Grout Fine"**; or
- other approved equivalent.

### 6.9.2 Substrate Preparation

Grouting should be done at least 6 hours after tile installation. All adhesive mortar, dust and dirt in grout joints should be removed by using a wet sponge.

Joint width should be nominal 5mm and at least 3mm under any circumstances.

## 6.9 TILE GROUTING (CONT'D)

### 6.9.3 Application

#### (a) For Laticrete product

Mix clean water (2 litre approximately) with LATICRETE SANDED GROUT (11.3 kg) by low speed electric mixer to obtain the grout mortar.

Then work the grout mortar into the joints until completely filled. Ensure that joint is filled and grout is not just sitting on top.

Remove excess grout from the face of tiles with the edge of the grout float. Clean the grout with a damp sponge or damp towel within 5 hours and allow for curing. When the grout joints are firm, polish the surface with a coarse nylon pad and minimal water.

Protect grout for at least 12 hours before foot traffic, and DO NOT expose grout to acid cleaners for 7 days. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

#### (b) For E-mix product

Notwithstanding Clause 6.8.2, "E-mix Tile Grout Fine" can be applied one day after tiling. Before application, dampen the surface with clean water and allow excess water to drain away. Mix the dry mix powder of 25kg/bag with app. 6.3 – 7L (25 - 28%) of water with an electric mixer. Stir the mixture thoroughly to a creamy paste without lumps and let the additives to dissolve.

Apply the tile grouting to the tiled wall with a rubber, or sponge trowel, or other suitable tool diagonally over the tiles. Clean the tiled surface with a wet cloth after the tile grout dried. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

## 6.10 SITE TESTING

### 6.10.1 Pull-out Test

THREE (3) pull-off tests shall be conducted by a HOKLAS accredited laboratory after completion of each 180m<sup>2</sup> rendering/screeding works. The pull-off stress shall not be less than 0.50 N/mm<sup>2</sup> at 28 days (and 70% of 0.50N/mm<sup>2</sup> at 7 days). The method of testing shall be as follows:-

Coring through the thickness of the external wall finishes, well into the substrate. The core shall have a diameter of between 75mm and 150mm, which shall be proposed by the Contractor for the Architect / Engineer's approval.

Coring shall be carried out such that damage to both the finishing material and to its bond to the substrate is minimized and so that reinforcement is not cut. This shall include rigidly supporting coring equipment during all cutting operations and marking the location of reinforcement at the side of the repair before repairing and / or the use of a covermeter after repairing.

Pull-off testing shall be carried out by adhesively fixing a suitable metal attachment to the surface of the cored repair. Using a device specifically designed and calibrated for adhesion testing, tensile axial force shall be carefully applied to the cored repair area so as not to transversely stress the core. The force is to be increased until failure occurs.

New finished areas represented by non-compliant results shall be re-tested by the Contractor at his own cost as follows:-

Identify the location and areas of repair to be tested. Carry out SIX (6) additional no. pull-off tests in these areas on a random basis, jointly selected by the Contractor and the Architect/Engineer.

If a minimum of FOUR (4) test results are satisfactory represented areas shall be considered generally acceptable, except for the local areas of non-compliance which shall be replaced.

If TWO (2) or more test results fail, then the finished areas represented shall be rejected and replaced at the cost of the Contractor.

The Contractor shall be responsible for the cost of all the requisite pull-out tests including all the extra tests necessary for the unsatisfactory test results, the reinstatement of the tiled areas after such tests and rectification of the defective tiled areas solely at his own cost and time.

For avoidance of doubt, locations for the pull-out test (including those extra tests as may be required) are to be decided or as directed by the Architect / Engineer.

## 6.10 SITE TESTING (CONT'D)

### 6.10.2. Wooden Mallet

Repairs shall be tested for voids or delamination by lightly tapping the area, at least 3 days after the new finishes has been completed, with a wooden mallet. The cost of this tapping and reporting shall be included in the cost of the rendering. Finishes sounding "hollow" indicate a possible lack of bond or other defect and shall be reported to the Architect and made good by the Contractor at his own cost.

The tests are to be conducted by an independent accredited laboratory.

### 6.10.3 Visual Inspection

Visual inspection for all finishing works shall be carried out at the same time as the mallet test to detect cracks and other superficial defects. The cost of this visual inspection and reporting shall be included in the cost of the rendering. All cracks and defects found shall be reported to the Architect/CIC and made good by the Contractor at his own cost.

### 6.10.4 Infra-red Thermographic Scanning

Infra-red Thermographic Scanning shall be carried out upon direction by Architect.

Testing methodology shall follow "Interim Technical Guidelines on The Inspection, Assessment and Repair of Buildings for The Building Safety Inspection Scheme (BSIS)" August 1998, published by Buildings Department and ASTM D4788.

Minimum Requirement : No possible void found for the tile surface.

Minimum time limit : Infra-red Thermographic Scanning shall be carried out before the end of Defect Liability Period.

Locations : All external wall

If any void is found, the contractors shall be required to re-instate the tile areas and to test again by Wooden Mallet Tapping Test until all these areas meet the minimum requirement as mentioned above.

The Contractor shall be responsible for the cost of all the above tests as stipulated in the contract, including all the further tests mentioned above, the reinstatement of the tiled areas after such tests and rectification of the defective tiled areas.

Full report(s) on the testing shall be submitted by the Contractor to the Architect for acceptance.

#### 6.11 TILE ADHESIVE TO ARTIFICIAL GRANITE/GRANITE TILES

For fixing new Artificial Granite/Granite Tiles to wall,

- a. Laticrete "LATAPOXY 210 Modified Epoxy Adhesive"; or
  - b. E-mix "Tile Fix 383"; or
- other approved equivalent by the Architect shall be used.

Storage, preparation, mixing, application and curing shall strictly in accordance with the manufacturer's recommendations.

#### 6.12 TILE GROUT TO ARTIFICIAL GRANITE/GRANITE TILES

For grouting up tile joints of the completed artificial granite/granite tiling works,

- a. Laticrete "SoectraLOCK PRO Grout"; or
  - b. E-mix "Tile Grout Fine"; or
- other approved equivalent by the Architect shall be used.

Storage, preparation, mixing, application and curing shall strictly in accordance with the manufacturer's recommendations.

Colour of tile grout to be approved by the Architect.

#### 6.13 PLASTERING

##### 6.13.1 Generally

Plastering to be

- a. Conventional Internal Plastering; or
  - b. "E-mix Easi Render"; or
- other approved equivalent.

##### 6.13.2 Application

###### (a) Conventional Internal Plastering

Plastering generally to be to BS5492.

The internal plaster shall be applied in two coats to total finished thickness of not exceeding 15mm on walls and 10mm on soffits and as follows:

- (1) Undercoats shall be 10mm (maximum) thick on walls and 5mm (maximum) thick on soffits and shall consist of 1 part of Portland cement, 4 parts of lime putty and 16 parts of coarse sand (measured by volume) applied from the float, trued off, scratched and allowed to set for a minimum period of seven days.
- (2) The finishing coat shall be 5mm thick and shall consist of 1 part of Portland cement, 12 parts of lime putty and 30 parts of fine sand (measured by volume) mixed and applied from the float, trued off and trowelled or floated to a smooth finish.

## 6.13 PLASTERING (Cont'd)

### 6.13.2 Application (Cont'd)

Undercoats are to be dubbed out as necessary to give the required finished level and keyed whilst still green.

Plaster used to touch up and make good damaged internal plastering shall consist of cement and sand in the proportion of 1:3 (measured by volume).

All plastering works shall be made good around pipes, brackets, balusters, gratings, etc. to continue into grooves of all joinery grooved for same and finished against metal windows, etc. with a slightly coved internal angle.

#### (b) E-mix Product

Mix a bag of dry mix powder (40kg) with 6.4-7.2L (16-18%) of water by electric mixer. Apply the render by hand to a nominal thickness of 15mm in layers. Detail to refer the product data sheet with recommendations and instructions from the manufacturer.

## 6.14 PLASTER SKIM COAT

### 6.14.1 Generally

Plaster Skim Coat to be

- a. Conventional Skim Coat; or
- b. "E-mix Finish (white)"; or  
other approved equivalent.

### 6.14.2 Application

#### (a) Conventional Skim Coat

Plaster skim coat applied to walls to be applied in one coat of nominal 1mm thick, finished smooth with a steel trowel and shall composed of 1 part of Portland cement, 12 parts lime and 24 part sand to every cubic metre of the mixture.

#### (b) E-mix product

Mix the 25kg/bag dry mix powder "E-mix Finish (white)" with app. 9.5 - 10L (38-40%) water with electric mixer. Apply plaster of 0.5 - 2mm thick in one coat, and another 0.5 - 1 mm for final finishing. Plastered surface for painting or for wall covering shall be smoothened by spatula and wait for at least 3 days before painting.

#### 6.15 SELF-LEVELLING SCREED /SMOOTHING COMPOUND FLOORING SYSTEM

For concrete floors to be finished with PVC or vinyl sheet/tiles or carpet tiles, a layer of proprietary brand levelling screed shall be applied in accordance with the manufacturer's instructions to ensure a flat surface prior to the application of the floor finish.

In the use of PVC or vinyl sheet/tiles, acrylic dispersion adhesive or products having equivalent function or performance shall be applied for bonding the PVC or vinyl sheet/tiles to the concrete floor after application of the self levelling screed. Nominal application thickness to be 10mm.

For new Self-Levelling Screed / for Smoothing Compound Flooring System ,  
E-mix "Flowment 550"; or  
other approved equivalent by the Architect shall be used.

Storage, preparation, mixing, application and curing shall strictly in accordance with the manufacturer's recommendations.



6.15 SELF-LEVELLING SCREED /SMOOTHING COMPOUND FLOORING SYSTEM (CONT'D)

Particular Specification for Smoothing Compound Flooring System

(A) General

Smoothing compound should be fast hardening, cementitious flooring for epoxy painting and vinyl sheet, carpet and other finishing. The product is supplied as a pre-blended, dry power. The component does not contain casein and other protein bearing additive. (Supplier: Signal Plus Building Supplies Ltd; Contact Anita Ho Tel.: 2803 5600)

(B) Location

Internal Floor to received smoothing compound

(C) Execution

- (1) Material shall be delivered in original unopened packages, fully identified as to manufacturer's brand or other identifying data.
- (2) Material shall be stored under cover and in a dry location until time of use. Prevent damage or contamination to materials by water, freezing, overheat, foreign matter or other causes. Stock of material is to be rotated and used prior to its expiration date.

(D) Site Condition

Maintain environmental conditions and protect work during and after installation to comply with reference standards and manufacturer's recommendations.

(E) Material

System and Requirement

The material shall be fulfilled the standards and physical performance of listed below:

(a) Primer

The material shall be complied with the listed physical properties:

Adhesion to concrete	:
Dry adhesion	2 N/mm <sup>2</sup>
Wet adhesion	1 N/mm <sup>2</sup>

(b) Smoothing Compound

The material shall be complied with the listed Standards:

British Standard: BS 8204: 2002

European Norm: EN 13813 class CT-C30F5

Adhesion to concrete (EN 13892-8, BS 8204: Pt 3, : 1.2 N/mm<sup>2</sup>  
SS 92 35 07)

HKHA MTS(2002/2004

Spec. Part D, Cl. 2.1.15)

Compressive strength (EN 13892-2)	:	1 day : 15 N/mm <sup>2</sup>
		3 days : 20 N/mm <sup>2</sup>
		7 days : 25 N/mm <sup>2</sup>
		28 days : 30 N/mm <sup>2</sup>

Flexural strength (EN 13892-2)	:	5 N/mm <sup>2</sup>
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## 6.15 SELF-LEVELLING SCREED /SMOOTHING COMPOUND FLOORING SYSTEM (CONT'D)

Abrasion resistance	(Rolling Wheel Abrasion :: (Class RWFC 350) EN 13892-7)	
Flow ring test	(EN 13813)	: 140 – 150 mm
Free shrinkage	(EN 13454-2) (ASTM C 531)	: 0.02 – 0.07%
Air-cured		0.01%

Unless specified, all technical data are average values and refer to 28 days curing time.

### (F) Mixing and Installation

Substrate should be firstly primed by brushing diluted primer. For the first coat, primer diluted with clean water at a ratio of 1:5 should be applied. Allow the first coat to become tacky and dry before applying the second coat. For the second coat, primer diluted with clean water at a ratio of 1:3 should be applied. Wait for the second coat to become tacky and dry before applying smoothing compound.

**Hand application:** Mix a bag of dry mix powder (25 kg) with 5 – 5.5 L (20 – 22%) water by using an electrical mixer for 3 – 4 min.

Apply **3-5mm** smoothing compound within 20 minutes on primed substrate and under working condition over 10 °C. For continuous application, adequate mixing of material is necessary. smoothing compound can be finished by using a trowel or a serrated steel spatula.

**Machine application:** Adjust the flow rate of the machine until a smooth and homogenous mixture is obtained without segregation. A flow ring with volume of 50 cm<sup>3</sup> can be applied to check the spreading of the mixture, whose diameter should be approx. 140 mm.

**3-5mm** smoothing compound is pumped onto the surface through the discharge hose, which is moved across the substrate surface at a constant pace for screed with uniform thickness. The required thickness must be achieved in one operation. The best performance is achieved when pouring and leveling is in a continuous process.

The freshly applied material can be gently trowelled with a serrated steel spatula to release bubbles trapped in smoothing compound and dissipate lines left by the hose. The semi-hardened material may easily be formed or cut for any necessary adjustments.

Smoothing compound must be applied to substrates under working condition over 10 °C, and must be protected from frost for 48 hours after application.

Finishing such as vinyl sheets and carpet can be applied 24 hours after applying smoothing compound.

#### 6.16 TRUING OF SURFACES

All finishes to walls and floors shall be brought to true, plumb, continuous, correct fall, and even surfaces by means of screeds temporarily fixed at angles and the surfaces trued off with a straight edge before trowelling or floating.

Where applied to uneven surfaces the undercoat to finishings of any type shall be dubbed out as required. The thickness shown or given is exclusive of any key and any necessary dubbing out.

#### 6.17 GUARANTEE

The Contractor shall, in the joint names of the finishes supplier and the manufacturer of the respective rendering / tile adhesive system adopted, submit a written guarantee for the materials, workmanship and performance of the proposed system(s) to the Architect for review. No bulk materials and systems ordering shall be proceeded prior to the Architect's confirmation of no adverse comment on the submitted guarantee content and format. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory guarantee will be entertained.

The guarantee shall also warrant that any defective materials, structure, construction, workmanship revealed during the guarantee period shall be made good at the contractor's own expense to the satisfaction of the Architect and the Employer.

#### 6.18 SUBMITTAL

Tenderers should submit, together with their return tenders, drawings (including plans, sections, details) showing the extent, brands, types and combination of various rendering/plastering/skim-coat/tile adhesive and tile grout employed at different locations/areas of the proposed development as described under this specification for checking and demonstrating the tenderer's understanding of the requirements as laid down in the drawings and this specification.

Should tenderers decide to propose alternative systems other than those specified under this specification, full documentary evidences showing the technical performance, test reports and their conformity with relevant B.S. standard, codes of practice and/or other international standards, and the equivalency in technical performances of the proposed systems with those of the specified systems and acceptable to the Architect are to be submitted for consideration.

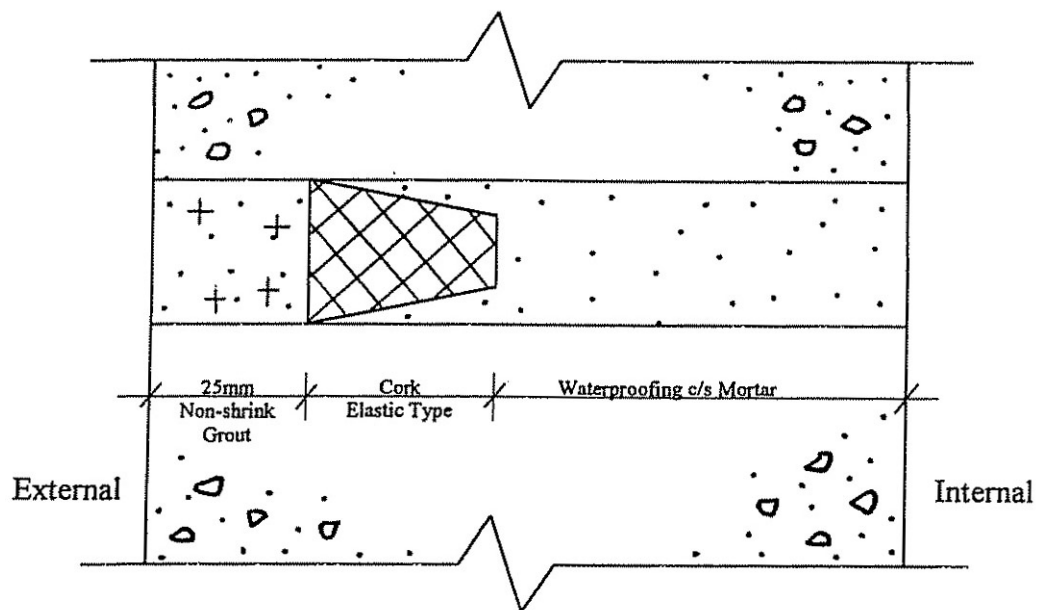
Documents to be submitted upon Award of Contract

- i. Within 4 weeks or such earlier time as instructed by the Architect, upon award of contract, the contractor shall submit to the Architect for approval drawings (including plans, sections and details) showing the extent, type and combination of finishes systems, as described under this specification, employed at different locations and areas of the proposed development. Construction details at the interfacing of different finishes, both horizontally and vertically is expressly included.

6.18 SUBMITTAL (Cont'd)

- ii. Sample, technical literature and quality plan showing the method statement, application procedures, and quality control of the site works, etc. shall be submitted for Architect's approval prior to commencement of works.
- iii. Any delay of works resulted from late submission of documents, samples and information as requested by the Architect shall be the sole liability of the contractor, and no subsequent monetary and time claim will be entertained.

6.19 SEALING UP OF TIE BOLT HOLES ON EXTERNAL WALL



1. Remove the P.V.C. tie sleeve completely
2. Place the cork (elastic type) into tie hole
3. Wet the concrete surface around tie hole
4. Seal up tie hole with approved non-shrink grout on the EXTERNAL side
5. Seal up tie hole with approved waterproofing c/s mortar on the INTERNAL side
6. Water penetration test is to be conducted
7. If water leakage found, remove the grout, cork and mortar completely and redo the sealing up and water test again.

## **SECTION 7**

### **GLAZIER**

#### **7.1 GENERALLY**

Glass generally to be to BS 952 and glazing to be to BS 6262. Glass is to be accurate size, with clean undamaged edges, un-disfigured surfaces and free from bubbles, smoke waves, air holes and other defects.

Glazing to be wind and watertight on completion. Unless otherwise specified all windows and doors shall be glazed from the inside.

#### **7.2 SAMPLE SUBMISSIONS**

All samples of glazing materials must be submitted for approval by the Architect before fabrication.

#### **7.3 WIRED GLASS**

Wired glass is to be reinforced with wire in the form of a 13mm square mesh with the wire electrically welded at intersections. Wired cast glass is to be of standard quality and 8mm nominal thickness.

#### **7.4 INSULATED GLASS**

Unless otherwise specified or counter proposal submitted to and approved by the Architect, insulated glass used shall be PILKINGTON - PYROSTOP possess fire resistance rating (FRR) as shown in the drawings.

All insulated glass should be tested or assessed in accordance with the standards as stated in the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department and certified as being capable of resisting the action of fire for the specified periods. Such certification shall be established by:-

- a) A test report indicating the material, product or construction is capable of resisting the action of fire for the specified period. The test should be carried out and the test report prepared by a laboratory recognized by the Hong Kong Laboratory Accreditation Scheme or the Building Authority; or
- b) An assessment report against the standards as stated in the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department that the material, product or construction is capable of resisting the action of fire for the specified period. The assessment should be carried out and the assessment report prepared by:-
  - i. A laboratory recognized by the Hong Kong Laboratory Accreditation Scheme or the Building Authority;
  - ii. An establishment or professional having the appropriate qualifications and experience in fire resisting construction recognized by the Building Authority.

## 7.5 CLEANSING GLASS

Remove all smears and excess glazing compound. Remove mortar, plaster or concrete spillage/dropping whilst wet. Clean all glass inside and out, replace all stained, cracked or broken panes and leave the whole in good condition.

## 7.6 MIRROR TO LAVATORIES/CHANGING ROOMS/BATHROOMS

Mirror to lavatories, changing rooms or bathrooms shall be of min. 6mm thick clear plate silvering quality glass mirror with ground, polished and bevelled edges, backed with an even coating of silver and two coats of shellac varnish.

## 7.7 OBSCURED (TRANSLUCENT) GLASS

Obscured glass shall be translucent glass cast or figure rolled of the type and quality for glazing. Obscured glass shall have the required degree of obscuration and diffusion to the approval of the Architect.

Obscured glass shall generally be used for windows to all toilets and bath rooms.

## 7.8 SETTING AND LOCATION BLOCKS

Setting and location blocks shall be dense extruded neoprene, silicone or EPDM. Neoprene and EPDM blocks are acceptable for insulating glass units only when permitted by the fabricator of these units. Shims shall be of the same material, hardness, length and width as the setting blocks.

Dense gaskets shall comply with ASTM C 864. External gaskets shall be neoprene or Santoprene. Internal gaskets shall be neoprene, santoprene or EPDM. Reversible gaskets for re-glazing if used shall not be EPDM.

Sponge gaskets shall comply with ASTM C 509 and designed to provide 20-35% compression.

Gasket profiles shall be designed to produce a glass edge pressure of between 0.7N/mm minimum and 1.75 N/mm maximum. Gaskets shall be hot melt injection moulded at corners where compatible with installation procedures.

## 7.9 HEAT STRENGTHENED / TEMPERED GLASS

7.9.1 Provide heat strengthened glass and/or tempered glass where shown on drawings or as required by the glass product selected, design wind pressures, anticipated thermal stress. Where practical increased glass thickness is to be provided to meet the requirements of design pressures, subject to architect endorsement of appearance variation caused thereby.

## 7.9 HEAT STRENGTHENED / TEMPERED GLASS (CONT'D)

- 7.9.2 Heat strengthened and tempered glass shall be examined by the glass manufacturer to detect and discard any lights which exceed the following tolerances : 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9mm bow in 4500mm. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13mm, and the difference between adjacent peaks shall not exceed 0.08mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design.
- 7.9.3 All tempered glasses shall be heat soak tested or subjected to the other quality control measures acceptable to the Architect to minimize the occurrence of nickel sulfide stones. This specification defines nickel sulfide stones as a glass material defect. Installed tempered glass which breaks due to nickel sulfide stones shall be considered a material defect and shall be replaced (at no charge) under the warranty provisions.
- 7.9.4 All tempered glass supplied / installed by the contractor shall receive "Heat Soak Test" (i.e. the contractor shall carry out and certify 100% Heat Soaked Test for all tempered glasses) in accordance with the following requirements :-
- i) Standards  
Heat soaked test in compliance with DIN 18516: Part 4, paying particular attention to temperature and duration of treatment.
  - ii) Temperature & Duration for Heat Soaked Test  
To demonstrate that, despite temperature tolerances, the air temperature in all parts of the oven was maintained at 290 deg. C +/- 10 deg. C for minimum 3 hours for each batch of glass.
  - iii) Before Test  
Prior to heat soaking, contractor shall submit method statement (including without limitation of written report to demonstrate oven and thermocouple calibration and temperature tolerances by **an independent party** acceptable to the Architect ), job references, Quality Assurances & Quality Control procedures, and sample record forms for the test.
  - iv) Before Manufacture  
Prior to commencement of manufacture, the contractor shall solicit the Architect's acceptance of the proposed glass supplier and the premises where fabrication and processing are to be carried out. The contractor shall also arrange transportation for the Architect to visit the glass manufacturer's premises during fabrication and/or processing.



## 7.9 HEAT STRENGTHENED / TEMPERED GLASS (CONT'D)

### v) Before Delivery & Installation

The contractor shall submit full set of detailed records of heat soaked test for each batch of glasses, with endorsement by the manufacturer, prior to delivery to Site for installation. He/she shall also demonstrate with documentary evidence endorsed by an independent party acceptable to the Architect that the glass has been heat soaked for the prescribed periods. Such evidence shall include, as a minimum, the following :-

- source of supply and evidence of batching;
- dates and records of toughening and heat soaking of each batch of glass;
- certification that the glass meets the performance requirements of the specification; and
- records to include details of all units that failed during the heat soak test.

### vi) Warranty

The contractor shall submit 10-year joint warranty with the manufacturer with performance pledge that the breakage rate of glass with heat soaked test shall not be more than 1:100 pieces ( i.e. 1% ).

7.9.5 Records of test shall indicate test conditions, date of test, number and size of lights tested per load, spacing of lights in oven, time glass was in the heat soak furnace, test results (i.e. number of light which broke).

7.9.6 The glass proposed by the contractor shall be of a thickness not less than the specified minimum thickness and shall have structural integrity and shall not have any harmful scratches, pinholes and uneven, sharp angled or filed edge.

## **SECTION 8**

### **SEALANTS**

#### **8.1 GENERALLY**

This section applies for all expansion/movement joints in concrete structure, masonry, construction joints and windows sealing, etc.

#### **8.2 MATERIALS**

Unless otherwise specified or counter proposal approved by the Architect, the joint sealant used shall be "Dow Corning 790 or 732".

Backing material to be "Sof Rod" in accordance with manufacturer's instructions.

#### **8.3 SAMPLE SUBMISSIONS**

Material Samples to be submitted for Architect's approval. Colour shall be specified by the Architect.

#### **8.4 APPLICATIONS**

Applied strictly in accordance with manufacturer's instruction and to B.S. 6213.

##### **8.4.1 Surface Preparation**

Thoroughly clean the joint substrate(s) from grease, dirt, dust and loose materials before new sealant applications.

Make good the joint substrate(s) where applicable to give a clear edge or joint profile.

##### **8.4.2 Installation**

The horizontal joint shall be installed with approved electrometric sheeting together with sealant in accordance with manufacturer's instruction.

Areas adjacent to joints may be masked to assure neat sealant lines. Do not allow masking tape to touch clean surfaces to which the silicone sealant is to adhere. Tooling should be completed in one continuous stroke immediately after sealant application and before a skin forms. Masking should be removed immediately after tooling.

Caulk the sealant, tool to require appearance and allow the cure.

Sealants shall be applied to a sectional profile in accordance with manufacturer's instructions where applicable, or otherwise to such profile to enable effective elongation while maintaining secure adhesion to both sides of the joint and optimum joint performance. When used as window sealant the sealant must be applied to bridge the window/wall joint sufficiently leaving no gap thereat.

## **SECTION 9**

### **WATERPROOFING WORKS**

#### **9.1 GENERAL**

- 9.1.1 Structural slabs of all newly constructed flat roofs and workshop floors shall be with structural fall to avoid water accumulation and to enhance effective discharge of surface water. Structural works of other areas should also be in structural fall to avoid water accumulation as far as practicable or as directed by the Architect.
- 9.1.2 Prior to receiving architectural finish and other waterproofing system, concrete surfaces shall be inspected and tested to ensure it is free of cracks, cavities and leaking points, etc. Visible defects shall be made good to Architect's satisfaction before application of waterproofing systems and finishes.
- 9.1.3 Whenever waterproofing concrete is cast, it shall be extended monolithically up to kicker at a height of 300mm minimum from finished floor level, or such other more stringent criteria as stipulated under the relevant sections of this specification or drawings, to ensure integrity of protection. For roof construction, it means that the 300mm high kicker have to be cast monolithically with the roof slab including roof parapet wall, dog house, pipe duct, etc.
- 9.1.4 Formwork Fixing & Removal
- i. In watertight construction, method of formwork fixing which result in voids through concrete section when the formwork is removed must never be used. All wall ties shall have water barriers.
  - ii. Premature removal of formwork, often after only 12 hours, will greatly increase the incidence of shrinkage cracking in walls and slabs, etc., and are not acceptable.
  - iii. Premature removal of propping and premature loading of slabs by contractors for storage of building materials and for access, etc. will result in weakening of the structural slabs and cracking, and are therefore strictly prohibited.
  - iv. When slipform or jumpform is used, the design of the formwork and the jacking and gripping mechanism used in the system shall not cause harmful damages to the watertightness and structural integrity of the concrete.
  - v. Where internal metal ties are permitted in formwork erection, they or their removable parts shall be extracted without damage to the concrete and the remaining holes shall be properly filled with non-shrink grout. No permanently embedded metal part shall have less concrete cover than that indicated for adjacent steel bar reinforcement.

## 9.1 GENERAL (CONT'D)

- 9.1.5 Whether shown on drawing or not, wherever expansion joints are indicated, stainless steel or otherwise approved gutter shall be provided thereunder to drain away water to the nearest drainage system in case of leakage. Shop-drawings to be prepared by the contractor to Architect's satisfaction in this respect.
- 9.1.6 All revealed honeycomb, cracking, excessive creep or shrinkage on concrete to be made good before receiving waterproofing and / or plaster.
- 9.1.7 Plugging / grouting to openings after passage of sleeves and pipes must be made good solidly by approved material to the satisfaction of the Architect. All sleeves shall be removed before the backfilling of approved material. Flushing test to be performed to ensure its waterproofing effectiveness.

For avoidance of doubt, any gap / space between any pipe sleeve and the surrounding concrete substrate should be properly filled / grouted with approved material to the satisfaction of the Architect. (Where such openings are through compartment walls or separating walls between different uses, the plugging / grouting material should achieve the required fire rating performance of the walls / partitions / separation through which the pipes / sleeves are situated.)

- 9.1.8 All flat roofs and floor slabs (whether at internal or external areas) requiring waterproofing application should be water tested by forming temporary bunds along the edges / periphery of the testing area to ensure their integrity prior to application of waterproofing, screeds and / or finishes, etc. The bunds should be sufficiently high and robust to enable the crown (highest point) of the testing area be submerged by 100mm (min.) of water for a period of 7 days to identify any sources of water leakages. Such irregularities must be duly rectified in a timely manner and with such approved method to Architect's satisfaction, and a further water testing be conducted to ensure the irregularities are fully rectified prior to the application of waterproofing, screeding and / or finishings, etc.
- 9.1.9 No hi-rib is allowed for the construction joint if waterproofing is required, timber stop ends should be used instead.
- 9.1.10 The contractor is required to apply waterproofing to all rooms and areas with floor drains, including but not limited to lavatories, washbays, janitor rooms, plant rooms, duct rooms, technical areas, flat roofs, roofs and existing canopies, as specified on drawings.
- 9.1.11 Substrate shall be smooth or have a light and even texture. Masonry surfaces shall be flush pointed. To achieve an even membrane thickness, surfaces must be clean, dust free, sound, any loose, defective or debonded areas shall be repaired and made good prior to application. A sample area shall be tested to check the adhesion of the waterproofing system with the substrate.

## 9.2 LOCATION

### 9.2.1 On top of Ground floor slab

- i. Unless otherwise specified by the Architect, Damp proof vapour barrier membranes applied at internal of ground floor slab shall be " Proofex Geomembrane " by Fosroc Hong Kong Limited, or equivalent.
- ii. Waterproofing Membrane "Proofex Geomembrane" to be applied to on top the ground floor slab in SETC area, to prevent the ground water enter the work area from the concrete slab below.
- iii. The extent of this application refer as specified in the drawing and finishes schedule.

### 9.2.2 External Wall and Internal Area

- i. Unless otherwise specified by the Architect, the waterproofing system for the external wall and internal area shall be " Brushbond FLXIII " cementitious" water proofing supplied by Fosroc Hong Kong Limited, or equivalent.
- ii. Waterproofing slurry "Brushbond FLXIII" to be applied to the floor surfaces, upturns with angle fillet and block walls up to required height as specified in finishes schedule.
- iii. Top finishes as per finishing schedule on minimum 25mm thk. water resistant cement/sand screeds with admixture as specified in Section 6 laid to fall (unless the floor slab is of structural fall) with wire mesh.

### 9.2.3 (not used)

### 9.2.4 Pipe Ducts,

- i. Unless otherwise specified by the Architect, the waterproofing system for pump Rooms, Pipe Ducts, A/C Plant Rooms shall be " Brushbond FLXIII " cementitious" water proofing supplied by Fosroc Hong Kong Limited, or equivalent.
- ii. Waterproofing slurry "Brushbond FLXIII" to be applied to the floor surfaces, upturns with angle fillet and block walls up to required height as specified in finishes schedule.
- iii. Top finishes as per finishing schedule on minimum 25mm thk. water resistant cement/sand screeds with admixture as specified in Section 6 laid to fall (unless the floor slab is of structural fall) with wire mesh.

9.2.5 (not used)

9.2.6 (not used)

9.2.7 Around Sleeves of external wall openings (e.g. Gas Flue Aperture)

Clearance between structural opening and wall sleeve to be solidly plugged by approved waterproof foam sealant "Permatite INSTA-SEAL" free of cavities. Sealant to be allowed to cure for 8 hours and excessive foam to be trimmed off.

9.2.8 (not used)

### 9.3 APPLICATION

9.3.1 Damp proof vapour barrier membranes applied at internal of ground floor slab shall be "Proofex Geomembrane" or equivalent as supplied by Fosroc HK Ltd..

Specification and Application to refer attached method statement below

#### **DAMP-PROOFING MEMRBANE FOR GROUND FLOOR SLAB**

Damp proof vapour barrier membranes applied at internal of ground floor slab shall be "Proofex Geomembrane" or equivalent as supplied by Fosroc HK Ltd..

The membrane shall be a prime virgin base material of 0.6mm thick perfect for providing damp proofing function to the building .

The membrane possess the following properties:

PROPERTY	TEST METHOD	TYPICAL VALUE
Thickness	-	0.6mm
Density g/cm <sup>3</sup>	BS 6398: 1983	1.01
Tensile Strength	SS 374: 1994 Appendix B	22.66N/mm <sup>2</sup>
Elongation at Break %	SS 374:1994 Appendix B	749.75
Water Vapour Transmission (Water Method), g/hr/m <sup>2</sup>	SS 374:1994 Appendix B	0.21
Dimensional Stability	SS 374:1994 Appendix A	0.02% (Transverse Direction) / -0.01% (Longitudinal)

### 9.3 APPLICATION (CONT'D)

The membrane shall be applied on concrete floor surface and to be protected by a c/s screed of minimum 50mm thick. The concrete floor surface shall be troweled to a flat, smooth surface, and shall be dry, free of dirt and any sharp aggregates protruding out from the surface.

The membrane suited in this position shall protect the internal structure against moisture penetration.

Prior to any jointing being made, the Proofex Geomembrane sheet must be clean and free from dirt and grease.

Adjacent sheets are overlapped by at least 100mm. The lapping shall be sealed with Fosroc 50mm wide premium quality Proofex Adhesive Tape or Proofex Engage Detail Strip cut to 50mm width to complete the overlap sealing process.

The Proofex Geomembrane shall end by sealing with a Proofex LM rubberized liquid bitumen membrane at min 20mm by 20mm.. Any penetrations through the membrane shall be sealed with a 20mm by 20mm size of Proofex LM liquid membrane.

The Proofex Geomembrane shall be protected by a Nitobond SBR modified waterproof cement sand screed of minimum 50mm thickness.

The high performance heavy duty screed shall be Nitoflor SBR modified screed or equivalent, a cement sand screed incorporate with styrene butadiene rubber emulsion to provide a high strength and low water absorption floor screed system.

The high performance screed is produced typically with the following mix, using Nitobond SBR or equivalent with Portland cement, granite chips and sharp sand.

	<b><i>Per m<sup>3</sup></i></b>
Ordinary Portland Cement	500 kg
3 to 6mm granite chips	750 kg
Grade C/M Sharp sand	750 kg
Nitobond SBR	100 litres
Water	60 litres (approximately)

The screed system shall be applied in the range of 10mm to 50mm, and shall achieve the For apply in over 50mm thickness, the floor screed shall be applied in two layers with each layer not exceeding 50mm thick.



### 9.3 APPLICATION (CONT'D)

The floor screed system shall comply with the following typical properties :

PROPERTY	STANDATD	TYPICAL VALUE
Compressive Strength	BS6319 Part 2	50-60 N/mm <sup>2</sup>
Tensile Strength	HKHA/MTS 2002-04 Spec Clause 2.1-3	➤ 3 N/mm <sup>2</sup>
Flexural Strength	BS6319 Part 3	➤ 3 N/mm <sup>2</sup>
Bond Strength	HKHA/MTS 2002-04 Spec Clause Part D Clause 2.1.14	➤ 1.5 N/mm <sup>2</sup>
Water Absorption	BS1881 Part 122	< 0.9%

Clean the surface and remove any dust, unsound or contaminated material, plaster, oil, paint, grease, corrosion deposits or algae. Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser.

If for apply on concrete substrate directly, the substrate should be thoroughly soaked with clean water and any excess removed prior to commencement. A slurry primer should be prepared consisting of 1 volume Nitobond SBR to 1 volume clean water to 3 volumes fresh cement. To obtain a smooth consistency, the cement should be blended slowly into the premixed liquids. The slurry primer should be stirred frequently during use to offset settlement.

The slurry primer should be scrubbed well into the surface of the substrate, being careful to avoid 'ponding'. The screed must be applied on to the wet slurry primer. If the slurry primer dries before application of the mortar, it must be removed and the area reprimed before continuing.

In cold conditions down to 5°C, the use of warm water (up to 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted.

At ambient temperatures above 35°C, the material should be stored in the shade and cool water used for mixing.

Care should be taken to ensure that Nitobond SBR screed are thoroughly mixed. A forced-action mixer is essential for large volume applications. Mixing in a suitably sized drum using an approved spiral paddle in a slow speed (400/500 rpm) heavy-duty drill is acceptable for minor areas. Weigh the cement, sand and, where required, aggregate into the mixer and dry blend together for one minute. With the machine in operation, add the pre-mixed Nitobond SBR and clean water. Continue mixing for 3 minutes to ensure complete dispersal into the sand and cement.

### 9.3 APPLICATION (CONT'D)

Make any small adjustment to the quantity of clean water but do not significantly exceed the literage shown above, additional water should be kept to a minimum. Continue mixing up to a maximum of 5 minutes until a smooth and fully homogeneous consistency is achieved with the required workability and application properties. It is critical that allowance is made for the moisture content of the sand and aggregate, particularly where stored on site.

For application to all surfaces, Nitobond SBR screed must be well-compacted on to the primed substrate by trowel. It is frequently beneficial to work a thin layer of the screed into the slurry primer and then build the screed on to this layer.

Nitobond SBR screed can be applied at a minimum thickness of 10 mm and up to 50 mm thickness, Where thickness of over 50mm, thicker sections are to be built up the surface of the intermediate layers should be scratch-keyed and cured with Nitobond AR. Application of the slurry primer and a further application of Nitobond SBR screed may proceed as soon as this layer has set.

Nitobond SBR screed can be finished with a steel, plastic or wood float, to achieve the desired surface texture. The completed surface should not be overworked.

The screed must be cured immediately after finishing in accordance with good concrete practice. The use of Nitobond AR, sprayed on to the surface of the finished mortar in a continuous film, is recommended. In harsh drying conditions, supplementary curing with polythene sheeting must be used.

#### 9.3.2 (NOT USED)

### 9.3 APPLICATION (CONT'D)

#### 9.3.3 Cementitious Waterproofing Materials – BrushBond FLXIII from Fosroc

Specification and Application to refer attached method statement below

#### **ELASTOMERIC CEMENTITIOUS WATERPROOFING FOR EXTERNAL WALL**

- A. The Contractor shall provide the following elastomeric cementitious system including all ancillary materials for the designated locations.
- B. The Contractor shall supply and install liquid applied cementitious waterproofing system such as “Fosroc Brushbond FLXIII” or equivalent.
- C. The elastomeric cementitious waterproofing shall be compatible with any subsequent tile adhesive or cement sand mortar (with a bond coat) without necessary addition of wire mesh reinforcement. The waterproofing coating shall be applied in two coats at a minimum thickness of 0.5 mm per coat.
- D. The waterproof coating shall have the following typical properties .:

Properties	Test Method	Typical Value
Ultimate elongation	BS903 : Part A2 : 1995	≥250%
Tensile Strength	ASTM D412	0.97 MPa
Crack bridging ability	ASTM C836: 1995	2mm
Hydrostatic test at water pressure of 5 bars	DIN 1048	No penetration
Water Vapour Permeability	ASTM E96	< 4 g/m <sup>2</sup> /day
Shore A hardness at 25°C, 7 days cure	ASTM D2240	60
Pull off strength to concrete after storage at 23 °C and 50% R.H. for 28 days	BS EN24624 : 1993	2.0 N/mm <sup>2</sup>
Pull off strength to fibre cement board after storage at 23 °C and 50% R.H. for 28 days	BS EN24624 : 1993	2.0 N/mm <sup>2</sup>
Pull off strength to tiles after storage at 23 °C and 50% R.H. for 28 days	BS EN1348	1.22 N/mm <sup>2</sup> (Non-vitrifiedTile) 1.26 N/mm <sup>2</sup> (VitrifiedTile)

### 9.3 APPLICATION (CONT'D)

Properties	Test Method	Typical Value
Pull off strength to tiles after heat storage at 70 °C for 14 days	BS EN1348	1.4 N/mm <sup>2</sup> (Non-vitrifiedTile) 1.6 N/mm <sup>2</sup> (VitrifiedTile)
Pull off strength to tile adhesive after storage at 20 °C and 60% R.H. for 14 days	BS 5980 : 1980	2783 N
Pull off strength to tile adhesive after storage under water for 7 days	BS 5980 : 1993	2789 N
Evaporation time after first coat	23 °C and 50% humidity	1 hour
Evaporation time after second coat (ready for subsequent tiling)	23 °C and 50% humidity	1to 2 hour
Ponding Test in 3% Sodium Chloride Solution	HKHA Method	No sign of leakage and other anomalies

- E. All surfaces which are to receive the waterproofing coating must be free from oil, grease, wax, dirt or any other form of foreign matter which might affect adhesion. All damaged areas shall be made good to the satisfaction of the Engineer prior to the commencement of the waterproofing work. Concrete surfaces shall be a light steel trowel finish. All surface irregularities shall be removed to ensure a flat, smooth surface.
- F. The substrates which are to receive the waterproofing coating shall be dampened with clean water. The application method shall be in accordance with published data.
- G. The liquid component is poured from the plastic container into the metal drum supplied and mixed mechanically with a slow speed drill. Add the powder component gradually to the liquid avoiding lump formation and mix for 4-5 minutes until a smooth consistent mix is achieved.
- H. Use a short stiff bristle brush preferably to apply Brushbond FLXIII or equivalent at a theoretical coverage of 0.8kg per sqm per coat. Allow 30 minutes to 1 hour prior to application of the second coat.
- I. After completion of each section of work, and prior to water testing or application of subsequent finishes, the waterproofed areas shall be inspected for error and damage.
- K. The Contractor shall ensure that any areas damaged during installation of the cementitious coating are repaired to the satisfaction of the Engineer and strictly in accordance with the manufacturer's printed literature.

### 9.3 APPLICATION (CONT'D)

- L. If waterproof cement sand render are to be applied on top of the waterproofing on external wall, a Nitobond SBR Spatterdash shall be applied on top of the Brushbond FLXIII surface and allow to cure.
- M. Further apply Nitobond SBR slurry primer on the cured waterproofing before laying c/s render. Prepare the slurry primer by mixing 1 volume of Nitobond SBR or equivalent to 1 volume of clean water and 3 volume of fresh cement. To obtain a smooth consistency, the cement should be blended slowly into the premixed liquids. The slurry primer should be stirred frequently during use to offset settlement. Apply the slurry primer to the substrate. Avoid apply too thickly and avoid 'puddling'.
- N. Apply the rendering onto the wet slurry primer. If the slurry primer dries before application of the rendering, the slurry primer must be removed and the area reprimed before continuing.
- O. The waterproof cement sand render shall be Nitoflor SBR modified render or equivalent, a cement sand render incorporate with styrene butadiene rubber emulsion to provide a low water absorption render system.
- P. The waterproof render is produced typically with the following mix, using Nitobond SBR or equivalent with Portland cement, granite chips and sharp sand.

	<i><b>Per m<sup>3</sup></b></i>
Ordinary Portland Cement	500 kg
Grade C/M Sharp sand	1500 kg
Nitobond SBR	100 litres
Water	60 litres (approximately)

- Q. The render system shall be applied in the range of 6mm to 15mm.
- R. The render must be cured immediately after finishing in accordance with good concrete practice. The use of Nitobond AR, sprayed on to the surface of the finished mortar in a continuous film, is recommended. In harsh drying conditions, supplementary curing with polythene sheeting must be used.
- S. Ancillary Materials:
  - i. All ancillary material shall be from the same waterproofing or tank lining manufacturers and they shall be compatible with each other.
  - ii. Bond coat for subsequent render/screed : Nitobond SBR or equivalent slurry primer.
  - iii. Other required ancillary materials and product as indicated in the approved shop drawings, waterproofing and tank lining manufacturer's written installation instructions.

9.3 APPLICATION (CONT'D)

- 9.3.4 High Performance Cementitious Waterproofing Materials for water tanks – “Nitocote CM210”
- 9.3.5 Spray-applied Polyurea-based waterproof membrane waterproofing Materials for Planters – “Fosroc Polyurea WPE”

#### 9.4 SUBMITTALS

Tenderers should submit, together with their return tenders, the name of the waterproofing specialist sub-contractor and his job references. Drawings (including plans, sections, details) showing the extent, types and combination of various waterproofing systems employed at different locations/areas of the proposed development as described under this specification shall also be submitted for checking and demonstrating the tenderer's understanding of the requirements as laid down in the drawings and this specification.

Should tenderers decide to propose alternative waterproofing systems other than those specified under this specification, full documentary evidences showing the technical performance, test reports and their conformity with relevant B.S. standard, codes of practice and/or other international standards, and the equivalency in technical performances of the proposed systems with those of the specified systems and acceptable to the Architect are to be submitted together with the tender return for consideration.

Documents to be submitted upon Award of Contract

- i. Within 4 weeks or such earlier time as instructed by the Architect, upon award of contract, the contractor shall liaise with his waterproofing sub-contractor and submit to the Architect for approval drawings (including plans, sections and details) showing the extent, type and combination of various waterproofing systems, as described under this specification, employed at different locations and areas of the proposed development. Construction details at the interfacing of different waterproofing systems, both horizontally and vertically is expressly included.
- ii. Sample, technical literature and quality plan showing the method statement, application procedures, and quality control of the site works, etc. shall be submitted for Architect's approval prior to commencement of waterproofing works.
- iii. Any delay of works resulted from late submission of documents, samples and information as requested by the Architect shall be the sole liability of the contractor, and no subsequent monetary and time claim will be entertained.

#### 9.5 WATER PONDING TEST

Water ponding test shall be conducted to all completed waterproofing works to ensure watertightness. The test shall include sealing of all outlets, construction of temporary curbs at door entrances and cleaning of all debris at the waterproofed areas for subsequent water ponding test. Flood the entire areas at least 72 hours. Depth of water shall be at least 150mm or flush with the height of the lowest curb.

After flooding, all temporary curbs, outlet blockages and dams are removed to drain the area, do not permit any debris to enter into drainage pipework. At a period between 24 and 48 hours from release of the water an infra-red scan shall be carried out by an independent specialist contractor to establish if moisture/water has been penetrated through the membrane/waterproofing system.

#### 9.5 WATER PONDING TEST (CONT'D)

The report (Totally 2 original copies for each water ponding test) shall be sent directly by the infra-red scanning contractor to the Architect and the Employer. The cost of materials and labour for the aforesaid test including the infra-red thermography survey, preparation and submission of reports, any defects repairing works and its corresponding water damages resulted therefrom shall be borne by the Main Contractor directly.

#### 9.6 AS-BUILT DRAWINGS

As-built drawings as required in Preliminaries showing the actual layout and alignment of construction joints, expansion joints and extent / systems of waterproofing protection used should be prepared and submitted upon completion of the waterproofing works to be Architect.

#### 9.7 GUARANTEE

The Contractor and the respective waterproofing specialist/suppliers shall provide a joint guarantee on the performance of the entire specific waterproof system, (including but not limited to the waterproofing concrete, membranes, cementitious waterproofing slurry / screeds, internal tiling and roofing tiling) and guarantee that the waterproofing installation remains watertight and free from defects as specified in section 1 from Substantial Completion Date of the Main Contract Works.

Provide that the Contractor and the respective waterproofing specialists/suppliers shall not be held responsible for defects in the roofing or tanking installations due to structural movement if such structural movement is not attributable to any default of the Contractor.

Contents and format of the joint guarantee shall be submitted to the Architect for approval before commencement of waterproofing works. Delay of work due to delay in submission and approval of the joint guarantee would be the responsibility of the Contractor and no claim of time and cost for the same would be entertained.



## **SECTION 10**

### 10.1 **GENERALLY**

This section applies to all acoustic block works indicated on the drawings and includes, but not limited to, all the wall surround Zone H, the VR Cave area.

Unless otherwise specified by the Architect, the acoustic block wall shall be " Multigips High Density Gypsum Block wall System " or equivalent.

Specification as follows:

#### **MULTIGIPS HIGH DENSITY GYPSUM BLOCK WALL SYSTEM**

Section 1	Description of Works
Section 2	Materials
Section 3	Performance ~ Technical base
Section 4	Performance ~ Environmental base
Section 5	Installation
Section 6	Tolerances
Section 7	Technical Submission
Section 8	Quality Control

## **HIGH DENSITY GYPSUM BLOCK WALL SYSTEM**

### **1.0 Description of Works**

- 1.1 Proprietary Gypsum Block Wall shall be **MultiGips VG Orth** or Architect's approved equivalent.
- 1.2 The works shall include supply and installation of the High Density Gypsum Block Wall system, including high density & hydro high density gypsum blocks, stiffening steel post and beam, dowel bar, gypsum based adhesive, gypsum filler, fire resistant sealant and the gypsum block work accessories such as ties, anchors and isolation joints with adjacent structural elements.
- 1.3 The whole system to be erected to each type of finishes and locations, including the high density gypsum blocks, hydro high density gypsum blocks, gypsum based adhesive proposed to be used by the Contractor must be from the same source of manufacturer with over 10 years of manufacturing history unless otherwise approved by the Architect. The Contractor must ensure that all components of the system would be suitable for use for the specific purpose of each individual case and be compatible with one another and the finishing material.
- 1.4 The origin of material shall be in Europe and the compliance of gypsum based products with the European Standard EN12859 is documented on all delivery notes and all packaging with the CE Mark.
- 1.5 The manufacturer must have the quality standards of ISO 9001, 14001 and ISO 50001;
- 1.6 The manufacturer shall provide a material insurance cover amounts to 25,000,000 EUR for bodily injuries and 10,000,000 EUR for property damages.

### **2.0 Materials**

- 2.1 MultiGips Gypsum Block color:  
High Density Gypsum Block : Reddish  
Hydro High Density Gypsum Block : Greenish
- 2.1 The High Density and Hydro High Density Gypsum block shall be with tongue or groove profile on four sides, smooth finished surface and ready to receive the surface finishes, fire rated to the specified rating and in size of 80/100mm Thick x 500mm High x 500mm.
- 2.2 Supply of material shall be consistent in quality, color, batch to batch and within same batches.
- 2.3 Density of the High Density Gypsum Block and Hydro High Density shall be classified 1,200kg/m<sup>3</sup> in accordance with EN 12859, with a compressive strength not less than 14N/mm<sup>2</sup>. Water Absorption rate of the Hydro High Density shall be 0.53% H1 class in accordance with EN12859 standard.

- 2.4 The High Density and Hydro High Density Gypsum Block shall be manufactured and complied with EN 12859 to the tolerance within +/- 2.0mm, +/- 1.5mm and +/- 0.5mm respectively for length, height and thickness.
- 2.5 The STC rating of 80mm and 100mm thick High Density Gypsum Block wall system shall achieve a standard of STC 41 and STC45 as tested in accordance with ASTM E-90-04 "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
- 2.6 The 80mm and 100mm thick High Density Gypsum Block wall system shall be tested to achieve **2 hours** and **4 hours fire rating with 100mm thick block** in accordance with BS 476 Part 22 and ASTM E119-11a. The FRP requirements for partitions shall refer to Architect's drawings. The Contractor shall submit the respective certificates, test reports and assessment certificates to the Architect for approval. All tests shall be carried out by HOKLOS accredited Laboratories.
- 2.7 The High Density Gypsum Block wall system shall be designed to withstand a lateral loading of 1.5kPa in accordance with Building Department code.
- 2.8 The Gypsum based adhesive shall be made and supplied by the same Gypsum Block manufacturer as the High Density Gypsum Blocks to ensure compatibility and overall performance of the Gypsum Block Wall system. It shall be applied as a bonding agent for all interlocking joints of the High Density Gypsum Block Wall. It shall also be used to make good the joints of the High Density Gypsum Block in order to receive the finish.
- 2.9 The whole system to be erected to each type of finishes and locations, including the high density gypsum blocks, hydro high density gypsum blocks, gypsum based adhesive proposed to be used by the Contractor must be from the same source of manufacturer with over 10 years of manufacturing history unless otherwise approved by the Architect. The Contractor must ensure that all components of the system would be suitable for use for the specific purpose of each individual case and be compatible with one another and the finishing material.
- 2.9.1 The origin of material shall be in Europe and the compliance of gypsum based products with the European Standard EN12859 is documented on all delivery notes and all packaging with the CE Mark.
- 2.9.2 The manufacturer must have the quality standards of ISO 9001, 14001 and ISO 50001;
- 2.9.3 The manufacturer shall provide a material insurance cover amounts to 25,000,000 EUR for bodily injuries and 10,000,000 EUR for property damages.
- 2.9.4 Not detected denotes result of Heavy Metal and Organic Compounds in accordance with US EPA 1311 and HKGBC Green Product Accreditation and Standards.

3.0 Performance - Technical Issue based on 100mm thick wall system

- 3.1 Density of the High Density Gypsum Block and Hydro High Density shall be 1,200kg/m<sup>3</sup> with a compressive strength not less than 14N/mm<sup>2</sup>. Water Absorption rate of the Hydro High Density shall be 0.53% H1 class in accordance with EN12859 standard.
- 3.2 The High Density Gypsum Block wall system shall have a minimum FRP of 4 hours FRP (100mm thick) in accordance with BS476 Part 22 and ASTM E119-11a
- 3.3 The STC rating of 80mm and 100mm thick High Density Gypsum Block wall system shall achieve a minimum value of STC41 and STC45 as tested in accordance with ASTM E-90-04 "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
- 3.4 The High Density Gypsum Block wall system shall comply with the following when tested in accordance BS 5234 part 2 1992
  - 3.4.1 Determination of Partition Stiffness-  
Maximum deflection of 0.33mm with Apply Load of 500N
  - 3.4.2 Surface Damage of a Wall Partition by Small Hard Body Impact  
Depth of Indentation not exceed 4.99mm with an impact energy of 6N.m
  - 3.4.3 Resistance of a Wall Partition to Damage by Impact from Large Soft Body  
Permanent Deformation of not exceeding 0.13mm
  - 3.4.4 Determination of Partition Stiffness-  
Maximum deflection of 0.33mm with Apply Load of 500N
  - 3.4.5 Resistance of a Wall Partition to Structural Damage by Multi-Impacts  
No collapse or Dislocation with Impact Energy of 120N.m
  - 3.4.6 Resistance to Crowd Pressure  
No Collapse or Damage with Applied Load of 1.875kN or 3.75kN.
  - 3.4.7 Light Weight Anchorage Pull Out Test  
No Release of Shim Plate or Damage to the Partition
  - 3.4.8 Light Weight Anchorage Pull Down Test  
No Release of Shim Plate or Damage to the Partition
  - 3.4.9 Heavy Weight Anchorage (Wash Basin)  
Deformation not exceed 0.56mm Observed at a loading
  - 3.4.10 Heavy Weight Anchorage (High Level Wall Cupboard)  
Test Grade of Heavy Duty (4,000N)

3.0 Performance - Technical Issue based on 100mm thick wall system (Cont'd)

3.4.11 Effects of Door Slamming  
Test Grade of Medium and Heavy Duty

3.5 The content of Calcium Sulfate Dihydrate in the High Density Gypsum Block shall not be lower than 95% by weight as tested in accordance with BS 1191-1:1973

3.6 The content of Chloride in the High Density Gypsum Block shall be 0.1% by weight or less as tested in accordance with CSI:2010

3.7 The pH Value of the High Density Gypsum Block shall be within pH 5 to 9 as tested in accordance with Geospec 3:2001, C1.9.5 at the temperature of 22°C.

3.8 Not detected denotes result of Heavy Metal and Organic Compounds in accordance with US EPA 1311 and HKGBC Green Product Accreditation and Standards.

4.0 Performance – Environmental Issue

4.1 The High Density Gypsum Block shall fall within the definitions of Environmental Product Declaration ISO 14025 and Sustainability in Building Construction as per the drafts of CEN/TC 59 Building Construction SC 17

4.2 The High Density Gypsum Block shall fulfill the emission test in compliance with DIN EN ISO 16000-9/-11

4.3 The High Density Gypsum Block shall be tested and complies the life cycle assessment in accordance to DIN ISO 14040 et seq.

5.0 Installation

5.1 Beginning of installation work shall constitute the installer's acceptance of the conditions of the substrate in which the Work to be installed or affixed to. Nothing in the material, workmanship or construction method used in the Work of this section shall invalidate any manufacture's warranties or reduce their warranty period.

5.2 For the installation of wet area, Water Repelling Hydro High Density Gypsum Block shall be used for the bottom course and moisture sealant shall be applied.

5.3 The High Density Gypsum Block wall shall be erected full height to the ceiling soffit. Opening for equipment and services installation will then be formed as marked on completed wall.

5.4 Cut Gypsum Block with power saws to provide, clean and sharp edges. Cut Gypsum Block to provide continuous pattern and to fit adjoining construction. All cutting process of Gypsum Block should be provided with sufficient vacuum cleaner to minimize dust generated on site. Use full-size Gypsum Block without cutting where possible.

## 6.0 Tolerances

Materials, products and support system specified in this section shall be installed to meet the following requirements on tolerances. Tolerances are non-cumulative.

### 6.1 Plumb

Variation from vertical lines and surfaces of column, internal corners shall not exceed +/- 8mm for 8m heights

### 6.2 Level

Variation from level for bed joints and lines of exposed sills, parapets, horizontal grooves and other conspicuous lines shall not exceed

+/- 6mm for 6m lengths

+/- 12mm for 12m lengths or more

### 6.3 Surface Accuracy

Surface of the finished gypsum block wall shall be to a true plane and to correct line and level. Maximum deviation permitted in surfaces shall be 3mm when measured with a 1800mm straight edge in any direction. Angles and corners shall be right angles unless otherwise required, with walls and reveals plumb and square.

### 6.4 Notwithstanding the above, the Work shall have a satisfactory visual appearance, being square, regular, true to line, level and plane with a close fit to all junctions, all to match approved trial panel. Stepping at joints between Gypsum Blocks, or other sudden irregularity is not permissible.

## 7.0 Technical Submission

### 7.1 Calculations

Calculations shall be prepared by an Engineer and verified by a Register Structural Engineer confirming that the Gypsum Block wall systems have been designed to satisfy the specified performance requirements, in particular regard to the specified loading criteria and maximum deflection limits

### 7.2 Shop Drawing

The Contractor shall be responsible for the preparation of shop drawing with all demarcation plans, installation details and interfacing details to the Architect for Approval before placing orders.

## 7.0 Technical Submission (Cont'd)

### 7.3 Method Statement

#### I. Installation Procedure

Step1 - Set out position of the wall & opening position on the floor and intersecting walls.

*The following information shall be provided by the Main Contractor prior of gypsum block wall erection:*

- *Setting out lines for start and end of gypsum block wall erection*
- *Setting out lines for thickness of gypsum block wall erection*
- *Setting out lines for door opening with sub frame installed.*

Step 2 - Plumb bob at the beginning and end of the wall to the verticality and alignment of the new built wall.

Step 3 - For connection adjacent to existing floor slab/ ceiling soffit, 8mm diameter dowel bars shall be installed at a spacing of 500mm for walls. Dowel bars shall be 8mm diameter Grade 43. Refer to shop drawings for detail arrangement.

*(Paint Brush will be used to clean the surface prior of drilling of re bar)*

Step 4 - Prior to the erection of the MultiGips High Density Gypsum Block, use electrical stirrer to mix the Gypsum Block Adhesive with water at a ratio of (1.25 : 1). Opening time of mixed Gypsum Block adhesive will be approximately 90 minutes

*(In order to ensure the adhesive is used up within the opening time, the site supervisor will record the time for the Gypsum Block Adhesive mixed and ensure only the adhesive is used within the time frame recommended)*

Step 5 - Once the Gypsum Block Adhesive is ready mixed, apply Adhesive by using a broad knife or trowel to all leading edges of the block. Set the first block in place with the groove edges facing down and adjacent to the intersecting wall.

Step 6 - Tap each block into position by hand to ensure a tight joint with joint width 2mm to 5mm. Also, line string is also used to ensure the alignment. Excessive compound squeezed out shall trowel cut to provide a smooth joint.  
*(Bonding agent shall be applied for the whole length of block joint)*

Step 7 –Once the first row is erected, start alternative courses with half block (Please refer to attached shop drawing for detail arrangement). Apply Adhesive into the horizontal edge of the bedding plane and position the second course of blocks, again working from the intersecting wall. Check each block for correct alignment in all directions.

## 7.0 Technical Submission (Cont'd)

Step 8 - For connection adjacent to existing wall & column/ block wall, applying adhesive to the edge of gypsum block and tap each block into position by hand.

Step 9 - For the location in which required half blocks and short modules, all those blocks shall be sawn before bonding into place.  
*(In order to minimize the dust spreading around, vacuum cleaner will be used during the sawn cut of the gypsum block)*

Step 10 - For the last piece in which is reaching the ceiling soffit, MultiGips Gypsum Block must be accurately cut to height with ceiling gap of (20mm +/- 5mm) for the application of Gypsum Block Adhesive.

Step 11 - Once the MultiGips Gypsum Block wall is erected, E & M services/ openings could be marked on gypsum block wall. The erected block wall could be chased on the following day.  
*(In order to maintain the accuracy for the depth of the grooved formed, imported machine with special cutting disk will be used to achieve the designated width and depth of the recess groove)*

Step 12 - For openings formed for the building services as required, other contractors should be responsible for filling the gaps after the installation of services. For openings custom reserved for installation of sleeves for building services, Gypsum Block adhesive will be used to fill around the gap between the opening and the sleeves. Gaps between the sleeve and the services will be filled up by other contractors

Step 13 - For chasing of E & M services, the following method is recommended to use:

- Firstly, mark the routing and location of all concealed conduit and junction box on the erected block wall.
- Secondly, use electrical sawing machine sawn a groove lines on the concealed conduit location and all sides for junction box location.
- Thirdly, form the routing of concealed conduit and junction boxes by hammer and spade with due care.
- E & M services will then be installed.
- Lastly, after the installation of E & M services, the installed conduit shall be cover by a minimum thickness of 10mm Gypsum Block adhesive for having the best result at the MultiGips Gypsum Block wall surface.  
*(In order to minimize the dust spreading around, vacuum cleaner connecting to the groove forming machine will be used during the forming of E & M recess groove prior of conduit laying)*

Step 14 - After the installation of all E & M services, Gypsum Block adhesive as prepared in accordance to Step 4 should be used to fill the access and socket. Adhesive shall be flushed with the base of junction box.



## 7.0 Technical Submission (Cont'd)

### II. Application Method for Finishing Material

#### a MultiGips High Density Gypsum Block with Paint Finish

Step 1 - Apply skim coat to the completed MultiGips High Density Gypsum Block Wall as per the recommendation of skim coating manufacturer.

Step 2 - Apply painting material on to the skimmed surface

#### b MultiGips High Density Gypsum Block with Wall Paper Finish

Step 1 - Apply skim coat to the completed MultiGips High Density Gypsum Block Wall as per the recommendation of skim coating manufacturer.

Step 2 - Install the wallpaper as per the recommendation of Wall Paper Manufacturer.

#### c MultiGips High Density Gypsum Block with Tile Finish

Step 1 - Mix and apply the tile adhesive as per the recommendation of Tile Adhesive Manufacturer

Step 2 - Install the tiles as per the recommendation of Tile's supplier.

### III. Mounting of Fixtures onto MultiGips High Density Gypsum Block

a Dowels – Dowels and anchors to Architect's approval to be used for mounting fixtures in gypsum blocks. To be taken into account in each case are the values given by the manufacturer of the dowel for the depth of the drilling and recommended working load.

b Drillings – The drilling should be carried out using HSS drills without impact and in accordance with the manufacturer's recommendations.

c Edge Separations – To prevent spalling, there is to be sufficient separation (50mm min.) between the drilling hole and the edges of the wall.

d Screws and Plastic Plugs – Screws and plastic plugs to Architect's approval shall be used for the mounting of fixtures on MultiGips High Density Gypsum Blockwall.

e The recommended working loads given in the table below is an example for reference only. The figures are provided by the manufacturer of the anchor system. Details of the anchor system shall be obtained from the manufacturer.

## 7.0 Technical Submission (Cont'd)

Hilti Anchor System <i>or equivalent approved</i>	Recommended Tension Capacity (kg)	Recommended Shear Capacity (kg)
Universal plastic anchor HUD-1 6x30	12	12
Universal plastic anchor HUD-1 8x40	102	102
Universal plastic anchor HUD-1 10x50	100	100
Door frame plastic anchor & screw HRD-UGT 10	134	134
Screw anchor HUS-H 6x45	35	35
Screw anchor HUS-H 10x75	148	148

## 8.0 Quality Control

- 8.1 Mock-up Panel or agreed size shall be prepared to demonstrate the installation procedures of gypsum block wall systems. The approved panels shall be used and set as the control reference quality for the work.
- 8.2 The manufacturer shall provide training and guidelines to the Main Contractor for the installation of gypsum block work. Regular site inspections shall be carried out by the manufacturer/ material supplier to ensure that the gypsum block work is carried out in full accordance with the Specification.
- 8.3 The Main Contractor shall in conjunction with the Architect's representative, carry out periodic random sampling check and regular surveillance weighting test of products for matching the surface-mass tolerance and density of gypsum block.
- 8.4 When deemed necessary, the Main Contractor shall also engage the help of an independent laboratory accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) to carry out on site compressive strength test to CSI : 2010 selected by the Architect.

## **SECTION 11**

### **CONCRETE REPAIR**

#### **11.1 TRIAL MIX AND REPAIR**

The Contractor shall submit details of trial mixes to the Architect/Engineer and carry out trial repairs on site using the plant and materials proposed for the Works and shall be witnessed by the Architect/Engineer. A batch of the repair material for each mix shall be sampled. One sample of each mix shall be tested for compliance with the requirements stated in this Specification. All tests shall be carried out by a laboratory which is HOKLAS accredited. No repair material shall be used in the works until the Architect/Engineer has approved the seven days trial mix tests and trial repair as specified.

#### **11.2 MATERIALS**

##### **11.2.1 Reinforcement Primer**

The primer shall be two component epoxy resin incorporating zinc particles, supplied in pre-batched quantities and shall be one of the following products or approved equivalent by the Architect/Engineer:-

- i. "Sika MonoTop 610" by Sika
- ii. "Nitoprime Zincrich" by Fosroc
- iii. "Pre-packed "Unicell Primer" by Ronacrete
- iv. "EVA Admix" by "E-mix

The primer shall be used before the expiry of the shelf life and pot life and shall have a pot life suitable for the application.

The zinc rich primers shall contain zinc dust as a suspension in a two component epoxy resin binder and comply with BS 4652:1971 Metallic zinc-rich priming paint.

##### **11.2.2 Bond Coat**

The Bond Coat shall be one of the following brands or approved equivalent by the Architect/Engineer:-

- i. "Sika MonoTop 610" by Sika
- ii. "Nitoprime Zincrich" by Fosroc
- iii. "Pre-packed "Unicell Primer" by Ronacrete
- iv. "EVA Admix" by "E-mix

##### **Cement based**

Cement based bond coats shall be an approved blend of cementitious materials incorporating a polymer emulsion and compatible with the repair mortar.

## 11.2 MATERIALS (CONT'D)

### 11.2.2 Bond Coat (Cont'd)

#### Epoxy based

Epoxy based bond coat shall be an approved two component material based on epoxy resin. It shall be supplied in pre-batched quantities and shall be used before the expiry of the shelf life and pot life.

### 11.2.3 Polymer Modified Cementitious Mortar (Repair Mortar)

The Polymer Modified Cementitious Mortar (PMCM) shall be one of the following brands or approved equivalent by the Architect/Engineer:

- “Sika MonoTop-612” by Sika
- “Renderoc HB40” by Fosroc
- “Unicell 40” pre-packed Vinyl Acetate Co-polymer Modified High Build Mortar by Ronacrete
- “Patchbond 25” by E-mix

#### PMCM

The mortar shall be a mixture of cement, aggregate, water, polymer, filler and admixtures (where approved) in approved proportions and requiring only water to be added during mixing, no other materials are to be added. The mortar shall be suitable for applying in layers with a thickness of 50mm for vertical, overhead and invert surface repair. The PMCM shall have the following properties:

- (i) Alkali content  $< 4.0 \text{ kg/m}^3$ .
- (ii) Total chloride content to be less than 0.1% by mass of cement.

#### Requirements for PMCM

Tests Required	Minimum Requirement
(a) B.S. 6319: Part 2: 1983 for Compressive Strength	$> 20 \text{ N/mm}^2$ at 7 days
(b) B.S. 6319: Part 6: 1984 for Elastic Modulus	$> 23 \text{ N/mm}^2$ at 28 days
(c) B.S. 6319: Part 7: 1985 for Tensile Strength	$9-15 \text{ kN/mm}^2$ at 28 days
(d) B.S. 6319: Part 3: 1990 for Bond Strength	$> 1.5 \text{ N/mm}^2$ at 7 days
(e) Coutinho ring test for Shrinkage Cracking	No cracking at 21 days
(f) Figg's test for Air Permeability	$> 150$ seconds at 28 days
(g) Polymer Content	Comply with Clause 11.2.5

### 11.2.4 Cement for plastering / rendering-only repairs

Cement, unless otherwise specified, shall be Ordinary Portland Cement complying with BS12.

## 11.2 MATERIALS (CONT'D)

### 11.2.5 Water

Water for repair materials, for curing test specimens and for curing repairs shall be mains water of potable quality supplied by the Hong Kong Water Supplies Department.

### 11.2.6 Polymer

Polymer for use in the repair mortar system shall be based on either a SBR or Acrylic Styrene Copolymer (ASC)

The cement / polymer ratio shall comply with the following with a tolerance in the weight of polymer not exceeding 5%:-

Cement :SBR                                      minimum 8%

Cement: ASC                                      minimum 5%

or as per manufacturer's instructions, approved by the Engineers.

Polymer shall have a shelf life suitable for shipment, storage and use.

Polymer shall contain an antioxidant and antifoaming agent. This requirement may be waived if the contractor can produce the results of laboratory tests and evidence of previous applications to show that they are not necessary.

### 11.2.7 Curing Compound

Curing compound shall, when applied, become stable and impervious to evaporation of water from the surface of the mortar within 60 minutes after application. They shall not react chemically with the repair mortar to be cured and shall not crack, peel or disintegrate within three weeks after application.

Curing compounds shall be applied strictly in accordance with the manufacturer's instructions and have a minimum curing efficiency of 75 percent.

## 11.3 WORKMANSHIP

### 11.3.1 Breaking Out

- i) Initial breaking out shall be to the extent marked out during the defect identification and verification inspection and as agreed by the Architect. If defects are found to extend or located outside the area directed by the Architect to be repaired then further direction shall be obtained from the Architect.

### 11.3 WORKMANSHIP (CONT'D)

#### 11.3.1 Breaking Out (Cont'd)

- ii) The Contractor shall ensure all spalls, hollow areas, existing defective repair material and concrete are removed to expose sound concrete substrate and reinforcement. Concrete shall be removed so as not to damage the remaining substrate. If the reinforcement is found corroded, remove concrete to at least 20mm around each bar and at least 50mm beyond the corroded area along bars. Make a vertical cut with a concrete disc saw around the perimeter of the repair to a depth of 10mm but without cutting the reinforcement. The perimeter of the cut area shall be a well shaped polygon to encompass the area broken out and to minimize the repair area. The polygon shall not necessarily be a square or rectangle. The invert of the repair area shall be roughened to provide a mechanical key with the repair material and all loose, damaged and cracked material shall be removed, unless directed otherwise by the Architect, so as to expose a dense and sound substrate for the repair.
- iii) All leaks shall be sealed and all cracks wider than 0.3mm width shall be sealed prior to commence the repair work.
- iv) The exact sizes and locations of all areas that have been broken out shall be entered by the Contractor onto record sheets in duplicate. These records shall be in a form approved by the Architect and will be signed by him when accepted as correct. The original shall be kept by the Architect and the duplicate by the Contractor.

#### 11.3.2 Replacing Reinforcement

After the reinforcement has been fully cleaned, a check of steel deterioration should be made. If the cross-section of the steel has been reduced significantly on an individual bar, additional reinforcement shall be fixed. The advice of the Architect/Engineer should be sought in this case.

The replacement reinforcement must be carefully tied in position with No. 16 gauge soft iron wire and overlapped adequately (45d for high yield steel and 30d for mild steel) with the original reinforcement. If adequate overlapping cannot be provided, because of the short length of exposed reinforcement, then the replacement reinforcement must be welded to the existing reinforcement. Testing might be required to confirm the weld ability of the existing reinforcements. Approval must be obtained from the Architect/Engineer prior to any such welding works. Electric arc welding method must be used, using the appropriate electrodes to BS 639. After welding the weld slag should be removed by hammer and chisel.

The reinforcement and the hacked concrete should then be brushed clean using a dry brush.

### 11.3 WORKMANSHIP (CONT'D)

#### 11.3.2 Replacing Reinforcement (Cont'd)

If the reinforcement is considered not sound when inspected by the Architect/Engineer then it shall be replaced as directed with new clean reinforcement. Corroded reinforcement shall be cut and new reinforcement of the same size may be spliced by welding, except of bars larger than 20mm diameter which shall be spliced by couplers, CADWELD by Erico or approved equal.

#### 11.3.3 Cleaning Reinforcement

The exposed lengths of existing reinforcement which are retained shall be cleaned to the standard as specified below or as direct by the Architect/Engineer.

##### Standards for Preparation of Reinforcement

Option	Cleaning Method	Standard
A	Manual wire brushing and scraping	Remove loose mill scale and rust
B	Machine brushing, grinding etc.	Swedish Standard St 2
C	Machine brushing, grinding etc.	Swedish Standard St 3
D	Grit blasting	Swedish Standard Sa 2 1/2

Care shall be taken to clean the far side of the bar.

Replacement shall be cleaned to the same standard as specified for remaining reinforcement unless otherwise directed by the Engineer.

All weld slag shall be removed by hammer and chisel.

After breaking out and preparation of reinforcement, the reinforcement and concrete substrate shall be brushed with a dry brush to remove all loose dust and dirt.

Immediately after the completion of breaking out, preparation of concrete substrate and reinforcement, the Main Contractor shall submit in good time to the Engineer the request for inspection of workmanship. The contractor shall identify the worker(s) for each patching area and submit to the Engineer this worker's record.

Upon receipt of the request the Engineer shall inspect the workmanship of all the patches concerned and give instructions for further improvement of workmanship, if any, or give approval to proceed with the application of primer, bond coat, repair mortar and curing agent, if any.

### 11.3 WORKMANSHIP (CONT'D)

#### 11.3.4 Samples of cleaned reinforcement

The Main Contractor shall within 14 days of Commencement of the works submit 4 nos. Y25 severely corroded reinforcing bars (each 300mm long) to the Architect/Engineer, carry out surface preparation to the reinforcing bars in accordance with the standards of preparation specified in Clause 11.3.3 of this Specification and shall then thoroughly coat them with a layer of transparent epoxy. The samples shall be retained on site and shall become the standard with which the contractor's workmanship shall conform.

#### 11.3.5 Priming Reinforcement

All reinforcement after thoroughly cleaned shall be primed immediately after cleaning and drying to prevent flash rusting and to protect the rebars from further corrosion. The reinforcement shall be free from moisture, rust, oil and other contamination before priming. If the reinforcement does not so conform then cleaning shall be repeated at the contractor's own cost. The primer shall be applied in two (2) coats and in such thickness recommended by the manufacturer, and allowed to cure for 3 hours or as specified by the manufacturer and approved by the Architect/Engineer. The area with primed reinforcement shall be repaired within 48 hour after the primer has cured.

#### 11.3.6 Bond Coat

A bond coat shall be applied to the concrete substrate and the primed reinforcement bars.

100% coverage shall be achieved but care shall be taken to avoid covering too large an area at one time to ensure that the repair material is applied during the open time of the bond coat. The bond coat shall be cement based unless directed otherwise by the Engineer.

The area to be repaired shall be wet down for 20 minutes to achieve saturation. The bond coat shall be applied by a stiff short bristled brush with a stipple action or by pushing into the surface and by painting on to the reinforcement.

Epoxy based bond coats shall be used in accordance with the manufacturers instructions.



### 11.3 WORKMANSHIP (CONT'D)

#### 11.3.7 Batching and Mixing

Water shall be volume batched or separately weigh batched as approved by the Architect/Engineer. The weigh batcher shall be calibrated and the readings shall be accurate to within 2%.

Mixing shall be carried out in an approved mechanical pan mixer for at least two minutes or in accordance with the manufacturer's instructions such that all constituents shall be uniformly dispersed throughout the mixture. However, prolonged mixing shall not be allowed. Free-fall mixers shall not be used and mixing of part bags shall not be allowed.

#### 11.3.8 Application

Mortar shall be placed so as to avoid voids. The mortar shall be placed in thickness not less than 10mm and not greater than 50mm unless otherwise recommended by the manufacturer and approved by the Architect/Engineer. Particular care shall be taken to fill all voids behind the reinforcement. Where thickness of more than 50mm are required, the mortar shall be built up in layers of 35mm (or as approved). Between 18 and 24 hours shall be left between placing layers or such time as is recommended by the manufacturer of the mortar and approved by the Architect/Engineer.

Inner layers shall be scratched to provide a mechanical key for subsequent layers and have a bond coat applied as specified in Clause 11.3.6. All preparation work and the placing of each layer of mortar are to be inspected by the Engineer.

Cover to reinforcement of the outermost layer of at least 25mm shall be provided by the mortar over reinforcement. Where the existing cover is 25mm or greater the mortar shall be finished flush with the existing surface. Where the cover is less than 25mm the reinforcement shall be hammered and tied back and the mortar is to be finished 25mm proud of the existing surface over the whole area of that mortar repair.

#### 11.3.9 Curing

The repaired surfaces shall be cured immediately after finishing by the application of approved curing compound or polythene sheeting sealed to the concrete using adhesive tape around the edges. The sheeting shall be supported as necessary to maintain close contact with the repair surface. Do not apply curing compound to surfaces which are to receive a subsequent layer. If the surface is to be coated the curing membrane material is to be compatible with the coating material, or polythene sheeting is to be used.

## 11.4 SITE TESTING

### 11.4.1 General

The Contractor shall carry out regular checks and tests on the materials used to demonstrate that the level of quality control by the Contractor is acceptable to the Architect/Engineer. The frequency of testing shall be determined by the results of the tests on the materials and as directed by the Architect/Engineer.

Tests shall be carried out by a laboratory which is HOKLAS Accredited for carrying out the particular test. Costs for testings and deemed to be included in the cost of the repair.

All core holes are to be made good by the Contractor at no extra cost.

### 11.4.2 Compressive Strength

For every 20m<sup>2</sup> of repair on site, a set of SIX (6) 100mm cubes shall be prepared on site from one batch before repair work is due to commence or as ordered by the Engineer. Three of these cubes shall be tested at 7 days and three at 28 days for compressive strength in accordance with Section 15 of the Construction Standard CS1:1990, Testing Concrete, by the Hong Kong Government.

In assessing the results of the compressive tests on cubes, the total repair areas represented by the cubes are deemed to comply with the specification if the average estimated insitu cube strength (Clause 15.7.2 of CS1:1990) of the cubes is greater than the specified strength and individual results are greater than 85% of the specified strength.

In case of any failed test result, the repaired area within the works represented by the particular test result shall be retested at the Contractor's own cost as follows:-

- i) Identify areas of repair that are represented by that failed test.
- ii) Take 2 no. 100mm diameter core samples from each of the respective finished repair areas on a random basis for test in accordance with BS1881.
- iii) In assessing the results of the compressive tests on cores, the total repair area represented by the cores are deemed to comply with specification if the average strength of the cores when adjusted for length / diameter ratio and corrected to the estimated insitu cube strength in accordance with BS1881 is greater than the specified strength and any individual results are greater than 85% of the specified strength.
- iv) Do not take cores for strength test at ages less than 28 days, avoid zones of tension stress if possible and no adjustment is to be made to the measured strength in respect of the age of the core when tested.
- v) If the test results pass the requirement as required for that acceptable and core holes are to be made good by the Contractor at his own cost. Otherwise, repairs for that particular represented area shall be rejected and replaced at the cost of the Contractor.

## 11.4 SITE TESTING (CONT'D)

### 11.4.3 Pull-off

Two Pull-off tests are required for each 20 square metres of the repair areas. The pull-off stress shall not be less than 0.7 N/mm<sup>2</sup> at 28 days or 70% of 0.70 N/mm<sup>2</sup> at 7 days. The method of testing shall be as follows:-

- i) Coring through the thickness of the repair, well into the substrate. The core shall have a diameter of between 75mm and 150mm, which shall be proposed by the Contractor for the Engineer's approval.
- ii) Coring shall be carried out such that damage to both the repair material and to its bond to the substrate is minimized and so that reinforcement is not cut. This shall include rigidly supporting coring equipment during all cutting operations and marking the location of reinforcement at the side of the repair before repairing and / or the use of a covermeter after repairing.
- iii) Pull-off testing shall be carried out by adhesively fixing a suitable metal attachment to the surface of the cored repair. Using a device specifically designed and calibrated for adhesion testing, tensile axial force shall be carefully applied to the cored repair area so as not to transversely stress the core. The force is to be increased until failure occurs.
- iv) Repaired areas represented by non-compliant results may be retested by the Contractor at his own cost as follows:
  - a) Identify the location and areas of repair to be retested.
  - b) Carry out 3 no. pull-off tests in these areas on a random basis, jointly selected by the Contractor and the Engineer.
  - c) If a minimum of two test results are satisfactory represented areas shall be considered generally acceptable, except for the local areas of non-compliance which shall be replaced.
  - d) If two or more test results fail, then repair areas represented shall be rejected and replaced at the cost of the Contractor.

### 11.4.4 Hammer tapping test

Repairs shall be tested for voids or delamination by lightly tapping the area, at least 3 days after the repair has been effected, with a wooden mallet. The cost of this tapping and reporting shall be included in the cost of the repair. Repairs sounding "hollow" indicate a possible lack of bond or other defect and shall be reported to the Engineer and made good by the Contractor at his own cost.

#### 11.4 SITE TESTING (CONT'D)

##### 11.4.5 Visual Inspection

Visual inspection for all repairs shall be carried out at the same time as the mallet test to detect cracks and other superficial defects. The cost of this visual inspection and reporting shall be included in the cost of the repair. All cracks and defects found shall be reported to the Engineer and made good by the Contractor at his own cost.

##### 11.4.6 Warranty Against Defects

All repair works required, carried out, with or without modifications under this section shall achieve and deemed to have included in the tendered prices to provide to the Employer a written Warranty issued by the Main Contractor against shrinkage, cracking, spalling, delamination or debonding or other defects in materials and / or workmanship for a period of as specified in section 1 from the Date of Practical Completion of Main Contract certified where the Main Contractor shall repair any such defects or damage resulted from such defects occurring within the warranty period including provision of all necessary facilities to enable the works proceed, at no cost to the Employer. The content of the form of warranty shall be submitted to the Architect for approval.

## **SECTION 12**

### **CRACKS REPAIR**

#### **12.1 GENERALLY**

All cracks to be established, ascertained, verified and must be repaired by the Main Contractor before subsequent trades.

All cracks shall be well-recorded with photos and plans clearly showing sizes, extent and locations for the information of the Architect. Such record shall be submitted in duplicated form after verifying by the Clerk of Works or site staff as designated by the Architect on site.

The Main Contractor shall submit together with the abovementioned records the proposed repair methods for the Architect's approval. For the avoidance of doubt, a minimum of 7 days shall be allowed for Architect's approval of such proposed repair methods. In case the proposed repair method is not approved by the Architect, the Architect shall direct the Main Contractor to repair the corresponding cracks by his means and such direction shall be final in any occasion. No time and cost implication therefrom in this regard will be entertained.

After the cracks have been repaired, the Main Contractor shall hammer tap the surface of the repaired areas by a wooden mallet to avoid delamination. All such tapping tests shall be witness by the Clerk of Works on site and all "hollowed" patches found shall be removed and repaired at the own cost of the Main Contractor. Totally 2 sets of photo records of all repaired cracks shall be submitted to the Architect for record.

#### **12.2 INJECTION METHOD**

##### **12.2.1 Generally**

Material shall be "Sikadur 752" as two part materials which are mixed to form a free flowing epoxy resin.

##### **For Pump Application**

Mix the Component A with Component B in the ratio 2:1 by volume until a uniform yellowish colour is achieved.

##### **For Hand Gun Injection**

The Component A and Component B will mix inside the nozzle of the spray gun, turning yellowish to indicate proper mixing.

##### **12.2.2 Site Conditions**

Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's recommendations.

## 12.2 INJECTION METHOD (CONT'D)

### 12.2.3 Execution

Material shall be delivered in original unopened packages, fully identified as to manufacturer's brand or other identifying data.

Materials shall be stored under cover and in a dry location until time of use. Prevent damage or contamination to materials by water, freezing, overheat, foreign matter or other causes. Stock of material is to be rotated and used prior to its expiration date.

### 12.2.4 Method Statement

#### Identify Areas In Need of Crack Injection

A complete diagnostic survey must be carried out by the Main Contractor as per 12.1 of this Specification to identify all areas in need of crack injection.

#### Surface Preparation

- a. All concrete substrate must be sound and stable that will receive the injection epoxy resin.
- b. All cracks must be cleaned and free from dust, oils, grease, curing compounds, laitance, impregnations, foreign particles, disintegrated materials and surface contaminants that may prevent adhesion of resin to the substrate.
- c. Cracks may be dry, damp or wet but no standing water.

#### Mixing of Epoxy Grout

- a. Stir each component before mixing. Measure out 1 part component B and 2 parts component A into a clean container.
- b. Mix thoroughly with a mixing paddle attached to a low-speed electric drill for 3 minutes until uniformly blended.
- c. Mix only that quantity that can be used within its pot life.

#### Application of Epoxy Grout

#### Grouting for Horizontal Cracks

Neat "Sikadur 752" may be gravity fed or pressure injected into horizontal cracks.

#### Pressure-Injection for Vertical and Overhead Cracks

- a. "Sikadur 752" is injected into cracks via a pressure pump through polyethylene valves or corks and grommets or injection ports into clean drill holes in face of crack. The injection port must be fixed and bonded with "Sikadur 731".
- b. The distance between injection ports is approx. 200mm center to center along the crack (actual length is subject to site conditions).

## 12.2 INJECTION METHOD (CONT'D)

### 12.2.4 Method Statement (Cont'd)

#### Pressure-Injection for Vertical and Overhead Cracks (Cont'd)

- c. The surface of the crack should be sealed with "Sikadur 731" to prevent the resin seeping out before it cures. Crack injection can be started once the "Sikadur 731" has dried or hardened.
- d. Injection can be applied by standard caulking gun, 2-component grout-injection unit, or other means. Maintain slow, steady pressure.
- e. Starting from the bottom port at the base of the crack, epoxy is injected until the epoxy has filled up the void between the bottom port and the port immediately above it (resin flows out from the next injection port). Plug or seal the current port and continue injecting through the next port until the whole crack has been filled.
- f. For soffit repair, inject from one end of the crack to the other.
- g. After 24 hours, the injection port can be broken off and any surface imperfection filled with "Sikadur 731" to be ground down to leave a smooth finishing.

#### Seal Slabs

Spread neat "**Sikadur 752**" over slab with flat-rubber squeegee or roller. Allow time to penetrate. Squeegee off excess while still in liquid form.

#### Protection

- a. Protect from impact, vibration and heavy hammering on adjacent and opposite walls for at least 1 day after installation.
- b. Avoid application in strong direct sunlight or in drying winds.

### 12.2.5 Performance Requirements

"Sikadur 752" epoxy resin when prepare and apply according to the material and installation specification shall achieve the following physical properties:

- c. Viscosity at @30 °C : 180 +/- 25 cps (Mixed)
- d. Compressive Strength @30 °C : 64 N/mm<sup>2</sup>
- e. Flexural Strength @30 °C: : 40 N/mm<sup>2</sup>
- f. Tensile Strength @30 °C: : 27 N/mm<sup>2</sup>
- g. Bond Strength @30 °C: : 3 N/mm<sup>2</sup> (cohesive failure of concrete)  
9 N/mm<sup>2</sup> (steel)

### 12.2.6 Training and Supervision

The manufacturer shall provide training for the method of installation to the representative from Client and Main Contractor related to the application. Random site inspection shall be arranged by the manufacturer together with site representative for checking whether the application is according to the material and installation specification.

## 12.3 V-CUT WITH REPAIR MORTAR

### 12.3.1 Generally

Material shall be “Sikadur 31CF Normal” as a 2-component, solvent free, thixotropic adhesive and repair mortar. Thoroughly mix by low speed drill before use.

### 12.3.2 Site Conditions

Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's recommendations.

### 12.3.3 Execution

Material shall be delivered in original unopened packages, fully identified as to manufacturer's brand or other identifying data.

Materials shall be stored under cover and in a dry location until time of use. Prevent damage or contamination to materials by water, freezing, overheat, foreign matter or other causes. Stock of material is to be rotated and used prior to its expiration date.

### 12.3.4 Method Statement

#### Identify Areas In Need of Crack Injection

A complete diagnostic survey must be carried out by the Main Contractor as per 12.1 of this Specification to identify all areas in need of crack injection.

#### Surface Preparation

All surfaces should be sound, clean and free from dust, grease, oils, laitance, loosely adhering particles and standing water.

#### Surface treatment:

#### a. Concrete/Mortar/Brickwork

Mechanically abrade the surface with a needle gun, mechanical wire brush, sandblast or grind. All surface laitance must be removed. Cement and concrete should be at least 4 weeks old.



### 12.3 V-CUT WITH REPAIR MORTAR (COND'T)

b. Metals

Remove any paints, oils, grease, rust and oxide films by grit blasting. Where required, apply one coat of Friazinc R Icosit EG1 as primer/travel coat (refer to separate Data Sheet for more information). **“Sikadur 31CF Normal”** may be applied after approx. 8 hours. Note : in the event of extended waiting times, the surface of the Friazinc R or Icosit EG1 should be thoroughly cleaned with fresh water.

c. Plastic Components (Epoxy, polyester)

Abrade and rinse with Sikadur Cleaner.

#### Mixing of Epoxy Grout

Mixing the entire Component A with all of the Component B until an even grey colour is obtained. Mix well using a spatula or low speed drill and paddle. If part mixing, mix ratio must be strictly adhered to (A:B=2:1 by weight or volume).

#### Application of repair Mortar

Apply by trowel, serrated spreader, spatula or stiff brush (thickness per layer: 1mm (minimum) and 30mm (maximum). Work “Sikadur 31CF Normal” well into the substrate, especially if the substrate is damp. Bond any subsequent materials onto “Sikadur 31CF Normal” whilst it is still tacky. Tools and equipment must be cleaned with Sikadur Cleaner immediately after use. Hardened material can only be removed mechanically.

#### Protection

- a. Protect from impact, vibration and heavy hammering for at least 1 day after installation.
- b. Avoid application in strong direct sunlight or in drying winds.

### 12.3.5 Performance Requirements

“Sikadur 31CF Normal” when prepare and apply according to the material and installation specification shall achieve the following physical properties:

- |    |                       |                                                                                             |
|----|-----------------------|---------------------------------------------------------------------------------------------|
| a. | Adhesive Strength     | : 3.5-4.5 N/mm <sup>2</sup> (concrete failure)<br>14 N/mm <sup>2</sup> (grit blasted steel) |
| b. | Compressive Strength  | : 70-90 N/mm <sup>2</sup>                                                                   |
| c. | Flexural Strength     | : 36 N/mm <sup>2</sup>                                                                      |
| d. | Tensile Strength      | : 14.8 N/mm <sup>2</sup>                                                                    |
| e. | Shear Strength        | : >21 N/mm <sup>2</sup> (3,000 psi)                                                         |
| f. | Modulus of Elasticity | : 7-7.5 x 10 <sup>4</sup> kg/cm <sup>2</sup>                                                |
| g. | Shrinkage             | : Negligible                                                                                |

## 12.3 V-CUT WITH REPAIR MORTAR (COND'T)

### 12.3.6 Training and Supervision

The manufacturer shall provide training for the method of installation to the representative from Architect and the Employer, Main Contractor and Sub-contractor related to the application. Random site inspection shall be arranged by the manufacturer together with site representative for checking whether the application is according to the material and installation specification. Frequency of visit and the format of site visit report shall be approval by the Architect.

#### Quality Inspection

Representative from Architect, the Employer and the Contractor shall visual inspect or hammer test on completed area no less than 7 days after the installation. Should any result not satisfy with the requirement, the Architect can instruct the Contractor to carry out the remedial works accordingly.

## **SECTION 13**

### **EXPANSION MOVEMENT JOINT SYSTEM**

#### **13.1 SCOPE OF WORK**

The work shall consist of design, supply and installation of all internal and external, fire rated, non fire rated, and waterproof expansion joints at the whole buildings.

#### **13.2 MATERIAL**

All materials specified below shall be installed in strict accordance to manufacturer specification and instruction and be carried out by an approved Applicator.

##### **(i) Tolerance**

- Expansion joint gap throughout development is 50mm.
- Perpendicular joint movement =  $\pm 25\text{mm}$ .
- Parallel to joint movement =  $\pm 25\text{mm}$ .
- Vertical/settlement joint movement = 0mm.
- Allowable loading on floor joint cover plates and E.J. shall not be less than
  - 16112.3 kg/m<sup>2</sup> uniform, and 204kg concentrated load for podium internal areas.
  - 65766 kg/m<sup>2</sup> uniform and 954kg concentrated load for podium driveway pavement, parking and loading/unloading areas and main roofs.

##### **(ii) Material Specification**

Aluminum :	6063-T6, extrusions; 6061-T651 plate; 5052-H32 sheet. 6082-T6, for driveway and vehicular parking areas.
Stainless Steel :	Type 304 Hairline.
Bronze :	Alloy 385 extrusions; Alloy 280 sheet and plate.
PVC Vinyl :	Extruded wall and ceiling joint cover.
Silicone :	Extruded elastomeric flat seal.
Extruded Thermoplastic Elastomer :	Extruded wall and ceiling joint cover.
Polyurethane :	Factory installed sealant.
Abrasive :	Two part epoxy combined with aluminum oxide grit.
Water Barrier :	Flexible polyvinyl chloride 30 mils, E.D.P.M 45 mils thick or butyl rubber of 3mm CT Fastener, accessories and other materials required for complete installation to manufacturer's instructions.
Centering Bars:	<ul style="list-style-type: none"> <li>- C-1074 tempered steel with protective coating.</li> <li>- Carbon steel</li> <li>- Pantograph bar.</li> </ul>

### 13.3 INSTALLATION

- (i) Fabricate joint cover assemblies as detailed. Provide centering bars, sealing washers, gaskets, splice covers, and closures as necessary for complete installation:
  - Fabricate special transitions and corner fittings as required.
  - Miter and weld joints as applicable.
  - Provide necessary and related parts, devices, water barrier, anchors, form clips, and other items required for water-barrier installation.
  - Provide corners, tees, transition, curb risers, etc. assembled with connection [mitered] and secured to ensure proper fit and alignment.
  - Special conditions shall be shop fabricated.
  - Wall and floor cover plates shall have smooth surface unless heavy duty areas surface.
  - Flexible GMS type expansion joint cover with expandable and contractible water barrier and cast in anchor to withstand heavy container loading.
- (ii) Shop-assemble components and package with anchor and fittings. Provide components in single lengths where possible; site splicing.
- (iii) Finishes:
  - Aluminum:
    - a. Floors and Roofs : Anodized.
    - b. Wall and Ceilings : Color anodized to match.
    - c. In contact with concrete : Zinc chromate coated.
  - Bronze : Satin finish. [Provide lacquer coating for wall and ceiling joint cover].
  - Stainless Steel : satin finish.
  - Vinyl : Gray(standard). Option colors to be selected by the Architect.
  - Filler strips : Gray (Standard).
- (iv) Install joint covers to manufacturer's instructions. Align work plumb, level, and flush with adjacent surface rigidly due to difference between installation and building operating temperatures. Set Centering bars diagonally at 508mm on center maximum (or 254mm on center for heavy duty models). Centering bars shall be fully engaged with the base members. Provide water barrier at exterior joints and where called for on drawings. Provide drainage fittings where called for on drawing.
- (v) Adjusting and protection
  - Adjust joint cover to freely accommodate joint movement.
  - Protect installation from damage by work of the other section. Where required, remove and sore cover plate and install temporary protection over joints; re-install cover plate before completion of work.

### 13.3 INSTALLATION (COND'T)

#### (vi) Installation Procedure

- Raking out of joint fillers shall be provided by the contractor for all floor and wall joints at location where E.D.P.M membrane are required to install below the joint covers. Flat and smooth block-out surfaces as required per the approved shop-drawings shall be provided by the contractor. All patching works shall be of high strength and waterproofed cement mortar. The block-out surface in the vicinity of the gap shall be cleaned. All dirt, dust, laitance and loose material shall be removed.
- Fixing:  
Prior to lifting the aluminum edge beams into position, check the level and alignment of the joint on site. Waterproofing membrane shall be installed both on top of and prior to installation of the expansion joint. Contractor should coordinate sequence of works to ensure watertight installation. The aluminum edge beams shall be secured in position with fixing hardware supplied by the expansion joint manufacturer. The expansion joint shall then be protected by P.V.C. tape.
- The void of the recess shall be grouted with high strength waterproof cement and adjacent floor finish shall be supplied immediately.

### 13.4 TEST

The contractor shall submit a proposed testing method one month before completion of the installation work to the Architect for review in the proposal. The contractor shall propose at least one reliable and common testing method for demonstrating the performance of the installed system or material is in accordance with the contract requirement.

The Architect can modify, or delete any test proposed by the contractor and request the contractor to perform additional test at the contractor's expenses if the contractor's proposal is considered not acceptable.

The contractor shall arrange the field test work and invite the Architect's site staff to witness the test. Each test shall be recorded and submitted together with photo record in a consolidated report format within one week's time after the test to the Architect for record.

### 13.5 SUBMISSIONS

Manufacturer's catalogues, test certificate, and installation method, material samples and shop drawings for all relevant materials and equipments shall be submitted to the Architect for review or approval. The extent of information or samples required shall be adequate and sufficient to demonstrate that the proposed system and materials are in compliance with the contract requirements. However, the Architect can request the contractor to submit any additional or supplementary information to substantiate the performance of the proposed system or material.

No bulk materials and systems ordering nor fabrication shall be proceeded prior to the Architect's confirmation of no adverse comment on the submitted information or samples. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory system will be entertained.

- Submit manufacturer's specifications and technical data, including material safety data sheets, installation instruction, as required, and catalogue cut and templates where required to explain construction and to provide for incorporation into the project.
- Submit certificates, copies of independent test reports or research reports shown compliance with fire resistance rating or other specified performance requirements.
- Submit shop drawings showing complete fabrication details for all joint cover, including required anchorage to surrounding construction, recesses, blocking, backing, and connections between similar and dissimilar joint cover assemblies
- Submit samples of the specified system.

### 13.6 GUARANTEE

The contractor shall submit a written guarantee for the materials, workmanship and performance of the proposed system(s) to the Architect for review. No bulk materials and systems ordering work shall proceed prior to the Architect's confirmation of no adverse comment on the submitted guarantee content and format. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory guarantee will be entertained.

The guarantee shall warrant that the entire system(s) including materials, structure, installation, workmanship and performance will be in proper and normal function in accordance with the contract requirements.

The guarantee shall also warrant that any defective materials, structure, construction, workmanship revealed during the guarantee period shall be made good at the contractor's own expense to the satisfaction of the Architect.

## **SECTION 14**

### **VINYL FLOORING SYSTEM**

#### **14.1 GENERALLY**

Unless otherwise specified or counter proposal approved by the Architect, the vinyl flooring system shall be the following:

**“Tarkett – Granit Safe.T ”** fully flexible homogeneous PVC sheet flooring  
**“Tarkett – Eclipse Premium”** fully flexible homogeneous PVC sheet flooring  
**“Tarkett – Acczent Excellence 70 Ruby”** fully flexible homogeneous PVC sheet flooring

The type of the product refer to the material code as specified in the tender drawing.

All supplied by Signal Plus Building Supplies Ltd.

#### **14.2 SAMPLES SUBMISSIONS**

Material Samples to be submitted for Architect and the Employer's approval.

#### **14.3 SPECIFICATION / APPLICATION**

Application refer to the follow attached specification / method statement

Sub-section:

Particular Specification for Fully Flexible PVC Sheet Flooring for **Tarkett – Granit Safe.T**

## **1 Material Description**

- 1.1 The Swedish origin flooring shall be “**Tarkett – Granit Safe.T**” fully flexible homogeneous PVC sheet flooring (Supplier: Signal Plus Building Supplies Ltd; Contact: Chris Pang, Tel.: 2803 5600) in 2.0mm thickness.
- 1.2 The flooring materials should be reinforced with Polyurethane to significantly reduce cleaning & maintenance cost. The manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 1.3 The product should conform to the European Norms of EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).

## **2 Environmental Attributes**

- 2.1 The flooring shall be Phthalate (PHT) Free (Except for recycled content).
- 2.2 The flooring shall be 100% recyclable.
- 2.3 In consideration of eco-friendliness, the flooring shall contain no less than 25.5% recycled materials and at least 59% natural raw materials.
- 2.4 To ensure low cost for maintenance and low consumption of energy, the manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 2.5 The polyurethane reinforced wearing layer of the flooring shall create a unique Surface Restoration System where a dry-buffing maintenance is only required for life time.
- 2.6 To ensure indoor air quality, the flooring shall achieve the TVOC after 28days:  $<10\text{ }\mu\text{g}/\text{m}^3$  regarding VOC emission. The product should provide the certificate of VOC emissions data which is classified as “Excellent” Class for Hong Kong Environmental Protection Department IAQ Objectives.



### **3 Physical Properties**

- 3.1 The flooring materials shall conform fully to the requirements of EN649: 1996.
- 3.2 In accordance with EN649: 1996, the flooring shall be classified as class 34/43 as defined in EN685, i.e. suitable for heavy commercial/institutional areas and heavy light industrial areas.
- 3.3 In respect of flamespread, the flooring shall have been fully tested to EN ISO13501-1 and certified as having Class B<sub>f1</sub> - S1, achieving the criteria EN ISO9239-1  $\geq 8\text{kW/m}^2$ . In relation to DIN4102, the product must be classified as B1.
- 3.4 The submitted flooring materials shall have a permanent static resistance under test of EN1815 at  $<2\text{kV}$ .
- 3.5 With regards to the proposed European requirement for slip resistance, the flooring shall conform to the DIN51130 – R10, making it suitable for use in area, which are predominantly dry, but with occasional spillage.
- 3.6 The flooring shall be laid in accordance with the instructions of manufacturer with coved PVC skirting. All joints shall be hot welded.
- 3.7 The product must have been fully tested for abrasion resistance to the EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).
- 3.8 To ensure PVC floor quality, the weight should not be more than  $2950\text{g/m}^2$ .
- 3.9 The floor sheeting must be available in 2.0 meter width and 25 meter long to minimize the number of joints.
- 3.10 The submitted PVC floor must be tested under the Chemical Resistance test of EN423 and achieve Good Resistance.
- 3.11 The flooring shall be conforms to the colour-fastness test of EN ISO105-B02 as having a pass to  $\geq 7$ .
- 3.12 The submitted PVC floor collection must provide not less than 16 colours.
- 3.13 The residual indentation of the submitted PVC floor collection should be 0.02mm according to the EN433 test.
- 3.14 The submitted PVC floor collection should pass the test of Fungi and bacteria resistance DIN EN ISO 846-A/C Test with does not favour growth.
- 3.15 In order to provide the perfect matching, the welding rods should be multi-colour with contrasting colour chips.

### **4 Product Quality**

- 4.1 The manufacturer of the floor covering must be in possession of a valid quality system certificate showing compliance with ISO9001 quality system.
- 4.2 The manufacturer of the floor covering must be in possession of a valid environmental

certificate showing compliance with ISO14001 environmental management system.

## **5 Specialist Contractor**

Authorized agents of the manufacturer shall carry out the works as the Specialist Contractor, thoroughly experienced with the installation of the named proprietary brand or equivalent, where the works comprising flooring of a minimum of 50,000sqm had been satisfactorily completed for at least 10 years.

## **6 Installation**

- 6.1 The floor for installation must be smooth, clean, dry and structurally sound. If direct-to-earth installation is required, an effective waterproof membrane must be incorporated. A moisture test must be carried out to ensure that the subfloor has dried out to a level consistent with the application of vinyl flooring. All according to the flooring manufacturer recommendation.
- 6.2 The PVC floor adhesive and smoothing compound used shall come from manufacturer's recommended quality to ensure full product compatibility.
- 6.3 Products must be fully conditioned to the environment in which they are to be installed as outlined by PVC flooring manufacturer.
- 6.4 Installation must be carried out in accordance with BS8203 and the instructions of PVC flooring manufacturer.
- 6.5 All joints must be grooved and then hot welded.

Particular Specification for Fully Flexible PVC Sheet Flooring for **Tarkett – Eclipse Premium**

**1 Material Description**

- 1.1 The Swedish origin flooring shall be “**Tarkett – Eclipse Premium**” fully flexible homogeneous PVC sheet flooring (Supplier: Signal Plus Building Supplies Ltd; Contact: Chris Pang, Tel.: 6179 5088) in 2.0mm thickness.
- 1.2 The flooring materials should be reinforced with Polyurethane to significantly reduce cleaning & maintenance cost. The manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 1.3 The product should conform to the European Norms of EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).

**2 Environmental Attributes**

- 2.1 The flooring shall be Phthalate (PHT) Free (Except for recycled content).
- 2.2 The flooring shall be 100% recyclable.
- 2.3 In consideration of eco-friendliness, the flooring shall contain no less than 25.5% recycled materials and at least 62% natural raw materials.
- 2.4 To ensure low cost for maintenance and low consumption of energy, the manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 2.5 The polyurethane reinforced wearing layer of the flooring shall create a unique Surface Restoration System where a dry-buffing maintenance is only required for life time.
- 2.6 To ensure indoor air quality, the flooring shall achieve the TVOC after 28days:  $<10 \mu\text{g}/\text{m}^3$  regarding VOC emission. The product should provide the certificate of VOC emissions data which is classified as “Excellent” Class for Hong Kong Environmental Protection Department IAQ Objectives.

**3 Physical Properties**

- 3.1 The flooring materials shall conform fully to the requirements of EN649: 1996.
- 3.2 In accordance with EN649: 1996, the flooring shall be classified as class 34/43 as defined in EN685, i.e. suitable for heavy commercial/institutional areas and heavy light industrial areas.
- 3.3 In respect of flamespread, the flooring shall have been fully tested to EN ISO13501-1 and certified as having Class B<sub>fl</sub> - S1, achieving the criteria EN ISO9239-1  $\geq 8\text{kW}/\text{m}^2$ . In relation to DIN4102, the product must be classified as B1.
- 3.4 The submitted flooring materials shall have a permanent static resistance under test of EN1815 at  $<2\text{kV}$ .

- 3.5 With regards to the proposed European requirement for slip resistance, the flooring shall conform to the DIN51130 - R9, making it suitable for use in area, which are predominantly dry, but with occasional spillage.
- 3.6 The flooring shall be laid in accordance with the instructions of manufacturer with coved PVC skirting. All joints shall be hot welded.
- 3.7 The product must have been fully tested for abrasion resistance to the EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).
- 3.8 To ensure PVC floor quality, the weight should not be more than  $3000\text{g/m}^2$ .
- 3.9 The floor sheeting must be available in 2.0 meter width and 22 meter long to minimize the number of joints.
- 3.10 The submitted PVC floor must be tested under the Chemical Resistance test of EN423 and achieve Good Resistance.
- 3.11 The flooring shall be conforms to the colour-fastness test of EN ISO105-B02 as having a pass to  $\geq 6$ .
- 3.12 The submitted PVC floor collection must provide not less than 66 colours.
- 3.13 The residual indentation of the submitted PVC floor collection should be 0.03mm according to the EN433 test.

#### **4 Product Quality**

- 4.1 The manufacturer of the floor covering must be in possession of a valid quality system certificate showing compliance with ISO9001 quality system.
- 4.2 The manufacturer of the floor covering must be in possession of a valid environmental certificate showing compliance with ISO14001 environmental management system.

#### **5 Specialist Contractor**

Authorized agents of the manufacturer shall carry out the works as the Specialist Contractor, thoroughly experienced with the installation of the named proprietary brand or equivalent, where the works comprising flooring of a minimum of 50,000sqm had been satisfactorily completed for at least 10 years.

#### **6 Installation**

- 6.1 The floor for installation must be smooth, clean, dry and structurally sound. If direct-to-earth installation is required, an effective waterproof membrane must be incorporated. A moisture test must be carried out to ensure that the subfloor has dried out to a level consistent with the application of vinyl flooring. All according to the flooring manufacturer recommendation.
- 6.2 The PVC floor adhesive and smoothing compound used shall come from manufacturer's recommended quality to ensure full product compatibility.
- 6.3 Products must be fully conditioned to the environment in which they are to be installed as outlined by PVC flooring manufacturer.
- 6.4 Installation must be carried out in accordance with BS8203 and the instructions of PVC flooring manufacturer.
- 6.5 All joints must be grooved and then hot welded.

Particular Specification for Fully Flexible PVC Sheet Flooring for **Tarkett – Acczent Excellence 70 Ruby**

**1 Material Description**

- 1.1 The Luxembourg origin flooring shall be **“Tarkett – Acczent Excellence 70 Ruby”** fully flexible homogeneous PVC sheet flooring (Supplier: Signal Plus Building Supplies Ltd; Contact: Chris Pang, Tel.: 6179 5088) in 2.0mm thickness with 0.7mm Pure PVC transparent wearlayer.
- 1.2 The flooring materials should be TopClean XPTM PUR Reinforcement for ease cleaning & maintenance property when in use. The manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 1.3 The product should conform to the European Norms of EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).

**2 Environmental Attributes**

- 2.1 The flooring shall be Phthalate (PHT) Free (Except for recycled content).
- 2.2 The flooring shall be 100% recyclable.
- 2.3 In consideration of eco-friendliness, the flooring shall contain no less than 31% recycled materials and at least 53% natural raw materials.
- 2.4 To ensure low cost for maintenance and low consumption of energy, the manufacturer must provide a life-time wax-and-polish-free guarantee upon request.
- 2.5 The polyurethane reinforced wearing layer of the flooring shall create a unique Surface Restoration System where a dry-buffing maintenance is only required for life time.
- 2.6 To ensure indoor air quality, the flooring shall achieve the TVOC after 28days:  $<100 \mu\text{g}/\text{m}^3$  regarding VOC emission. The product should provide the certificate of VOC emissions data which is classified as “Excellent” Class for Hong Kong Environmental Protection Department IAQ Objectives.

### **3 Physical Properties**

- 3.1 The flooring materials shall conform fully to the requirements of EN649: 1996.
- 3.2 In accordance with EN649: 1996, the flooring shall be classified as class 34/43 as defined in EN685, i.e. suitable for heavy commercial/institutional areas and heavy light industrial areas.
- 3.3 The Pure PVC transparent wearlayer should not be less than 0.7mm to ensure for heavy traffic use.
- 3.4 In respect of flamespread, the flooring shall have been fully tested to EN ISO13501-1 and certified as having Class B<sub>fl</sub> - S1.
- 3.5 The submitted flooring materials shall have a permanent static resistance under test of EN1815 at <2kV.
- 3.6 With regards to the proposed European requirement for slip resistance, the flooring shall conform to the DIN51130 – R10, making it suitable for use in area, which are predominantly dry, but with occasional spillage.
- 3.7 The flooring shall be laid in accordance with the instructions of manufacturer with coved PVC skirting. All joints shall be hot welded.
- 3.8 The product must have been fully tested for abrasion resistance to the EN660: Part 2 and be in Abrasion Group T ( $\leq 2\text{mm}^3$ ).
- 3.9 The floor sheeting must be available in 2.0 meter width and 23 meter long to minimize the number of joints.
- 3.10 The submitted PVC floor must be tested under the Chemical Resistance test of EN423 and achieve High Resistance.
- 3.11 The flooring shall be conforms to the light-fastness test of EN ISO105-B02 as having a pass to  $\geq 6$ .
- 3.12 The submitted PVC floor collection must provide not less than 36 colours.
- 3.13 The collection should also provide min. of 5dB impact sound resistance as required in ISO717/2 requirement.
- 3.14 The residual indentation of the submitted PVC floor collection should be 0.1mm according to the EN433 test.
- 3.15 The dimensional stability of the submitted PVC floor collection should be  $\leq 0.10\%$  & Curl resultant to heat  $\leq 8\text{mm}$  according to the EN434 test.

### **4 Product Quality**

- 4.1 The manufacturer of the floor covering must be in possession of a valid quality system certificate showing compliance with ISO9001 quality system.
- 4.2 The manufacturer of the floor covering must be in possession of a valid environmental certificate showing compliance with ISO14001 environmental management system.

## **5 Specialist Contractor**

Authorized agents of the manufacturer shall carry out the works as the Specialist Contractor, thoroughly experienced with the installation of the named proprietary brand or equivalent, where the works comprising flooring of a minimum of 50,000sqm had been satisfactorily completed for at least 10 years.

## **6 Installation**

- 6.1 The floor for installation must be smooth, clean, dry and structurally sound. If direct-to-earth installation is required, an effective waterproof membrane must be incorporated. A moisture test must be carried out to ensure that the subfloor has dried out to a level consistent with the application of vinyl flooring. All according to the flooring manufacturer recommendation.
- 6.2 The PVC floor adhesive and smoothing compound used shall come from manufacturer's recommended quality to ensure full product compatibility.
- 6.3 Products must be fully conditioned to the environment in which they are to be installed as outlined by PVC flooring manufacturer.
- 6.4 Installation must be carried out in accordance with BS8203 and the instructions of PVC flooring manufacturer.
- 6.5 All joints must be grooved and then hot welded.



## **SECTION 15**

### **CARPET**

#### **15.1 GENERALLY**

Unless otherwise specified or counter proposal approved by the Architect, all carpet shall be VOXFLO® - COLORSPRING® carpet tile or equivalent. Detail specification of the carpet type are specified in the following:

#### **15.2 Material Description**

- 1) The face yarn materials should be **100% Solutia Nylon 66** for applications in public areas, offices, hospitality.
- 2) The carpet size shall be in 50 x 50cm.
- 3) The carpet shall be with 1/10" gauge **Multi-level Loop & Tip Shear** construction.
- 4) To ensure carpet quality, the **pile weight should not be no less than 22 OZ/yd<sup>2</sup>**.

#### **15.3 Physical Properties**

- 1) In respect of flamespread, the carpet shall have been fully tested to ASTM E 648 Class 1, GB8624-2012 B1©.
- 2) In respect of smoke density, the carpet shall have been fully tested to ASTM E 662 less than 450, GB/T 8627-1999.
- 3) For the static propensity, AATCC-134≤3.5kV, GB/T 18044-2008.
- 4) The **pile height should not be no less 4.5mm**.

#### **15.4 Product Quality**

- 1) The manufacturer of the carpet must be in possession of a valid quality system certificate showing compliance with ISO9001 quality system.
- 2) The manufacturer of the carpet must be in possession of a valid environmental certificate showing compliance with ISO14001 environmental management system.

#### **15.5 Installation**

- 1) The installer must be in possession of a valid quality system certificate showing their operation is in compliance with ISO9001: 2000 quality system.
- 2) The floor for installation must be smooth, clean, dry and structurally sound.
- 3) Products must be fully conditioned to the environment in which they are to be installed as outlined by carpet manufacturer.

## **SECTION 16**

### **METAL DOOR**

#### **16.1 GENERALLY**

Unless otherwise specified or counter proposal approved by the Architect, all metal doors shall be a) "Dormakaba" or b) "Ceco" or c) "Pyropanel-Pyrolite" honeycomb core stainless steel doors. Steel doors shall be provided with or without glazed viewing panels as required in door schedule and to be in hairline/satin stainless steel finish both sides. Door frames shall be in matching stainless steel finish and from the same door manufacturer.

All Fire Rated doors are to be proprietary steel doors with certificates to substantiate the fire resistance rating required, inclusive of intumescent strips where necessary. Fire Rated doors shall match the appearance of doors used generally in the building.

#### **16.2 SUBMITTAL**

Manufacturer's catalogues, test certificate, and installation method, material samples and shop drawings for all relevant materials and equipments shall be submitted to the Architect for review or approval. The extent of information or samples required shall be adequate and sufficient to demonstrate that the proposed system and materials are in compliance with the contract requirements. However, the Architect can request the contractor to submit any additional or supplementary information to substantiate the performance of the proposed system or material.

No bulk materials and systems ordering work shall proceed prior to the Architect's confirmation of no adverse comment on the submitted information or samples. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory system will be entertained.

## **SECTION 17**

### **METAL LOUVRES**

#### **17.1 GENERAL**

All works under this section shall be executed by a specialist to be approved by the Architect.

The Contractor shall design, supply and install all construction necessary to provide a complete system of Windows / Louvres / Grilles.

#### **Scope of Works**

The works shall include, but not limited to the followings,

- i. Design, fabricate, supply, delivery and installation of all aluminum windows, louvers and grilles systems as specified or shown on Drawings, and relevant statutory submissions to governmental departments.
- ii. G.M.S. or aluminum mullions and transoms / stainless steel framing members, including capping to transom and / or mullion members as shown on detail drawings.
- iii. Fixings, connections and provision of anchorages. All Aluminum / Steel Supporting Frames should be anchored to the concrete structure. Cast-in embedment in concrete is expressly included.
- iv. Glass and glazing materials such as glass spacers, setting blocks, gaskets, sealants, structural sealant, backer rod, Norton tape, etc.
- v. Louvers and associated backing G.M.S. plate, which should be of the size that the louvers can be covered up.
- vi. Ironmongery, sills, copings, water bars, flashings, seals and other attachments.
- vii. Isolation of dissimilar metals and moving parts.
- viii. All preparatory work to the adjoining structure for attachment of the works.
- ix. Sealing off surroundings to the aluminum frames first by waterproof grout and then with waterproof slurry coat.
- x. Test mock-up and corresponding tests (including but not limited to safety performance tests as required by Buildings Department under PNAP APP-37 and its appendix) carried out by an independent laboratory approved by the Architect and to the satisfaction of relevant government authorities.

## 17.1 GENERAL (CONT'D)

### Scope of Works (Cont'd)

- xi. 100% Field water tests to window frame grouting, as well as another 100% Field tests to the window themselves for demonstrating their resistance to water leakage.
- xii. Material tests by recognized laboratories.
- xiii. Final cleaning and appropriate protection to the installed window system against accidental damages during the course of construction works and prior to handover to the Employer all to the satisfaction of the Architect. Proposed method and means of protection to be submitted for Architect's Approval.
- xiv. Provide spares and tools as required in this Specification.
- xv. Shop drawings, engineering proposal, structural calculations, test reports endorsed by an independent testing laboratory upon completion of performance tests as required by Buildings Department, structural sealant compatibility tests to be performed by an independent laboratory to be approved by the Architect / relevant authorities, impact load tests to tempered glazing to demonstrate their capability in withstanding the designed wind load and / or the horizontal imposed loads as referred to in Table 3 of Building (Construction) Regulations, and all other relevant documents and data of the window frame, sealant, window glass, canopy and aluminum window unit to be endorsed by a Registered Structural Engineer acceptable to the Architect for submission to Buildings Department for obtaining necessary approvals and consent for his works. The Contractor shall bear the consequences of any delay due to the failure in obtaining the necessary government approvals and consent.
- xvi. Samples, full size unit mock-ups and test units.
- xvii. Design, supply and install the window system's earthing / equipotential bonding in accordance with I.E.E. regulations and provide a termination point for the connection and integrate it into that of the rest of the building.
- xviii. Make good and replace any damaged parts.
- xix. Calculate the glazing areas and openable areas of all windows and ensure the areas satisfy the statutory requirements before fabrication.

It is the prime responsibility of the Contractor for the watertightness and structural stability of the whole Aluminum Window and Louver System. Any defect or leakage found within the Guarantee Period shall be made good and sealed all at the expense of the Contractor. Contractor's attention is drawn to that 100% field water tests to window grouting and another 100% field water tests to all final aluminum window assemblies are required for all works under this contract.

## 17.1 GENERAL (CONT'D)

This specification and the architectural drawings showing the external window units are for the sole purpose of defining the design intent and performance requirements only. To avoid any misunderstanding or lack of interpretation, it is Contractor's responsibility for the works, including but not limited to the design, structural calculations, submissions to governmental departments, waterproofing performances, carrying out of performance testing and preparation of corresponding reports to be endorsed by an independent testing laboratory acceptable to relevant government authorities and the Architect, shop drawings, material installation, guarantees, and related documentation and certification as required by Buildings Department and other relevant authorities, and those stipulated under the Buildings Ordinance (Cap. 123), its subsidiary legislations, and/or other enactments as stipulated in this specification.

## 17.2 GUARANTEE

- a) The contractor shall provide a written warranty (in any event to be backed by a guarantee from the parent company or companies) agreeing to repair or replace defective materials and workmanship during the warranty period.
- b) In case the design, engineering or supply of any part of the Contract Works are to be done by a manufacturer other than the Contractor, the Contractor's warranty shall be backed by a guarantee from the manufacturer(s) for repairing or replacing defective materials and workmanship during the warranty period. Defective materials and workmanship include, but are not limited to,
  - i. Any abnormal deterioration, deformation, clippings, aging, rusting, corrosion or weathering of the work.
  - ii. Water leakage and air leakage exceeding specified limits.
  - iii. Failure of operating parts to function normally.
  - iv. Sealant (including structural silicone) loss of adhesion, loss of cohesion, cracking or discoloration.
  - v. Spontaneous breakage of tempered glass.
  - vi. Cracking, peeling or discoloration of glass reflective coating.
- c) The warranty does not include damage caused by vandalism, or natural conditions exceeding the performance requirements. However, the guarantee does include failures or defects for which the causes cannot be determined. The warranty and its enforcement shall not deprive the Employer of other action, right or remedy available to him.

## 17.2 GUARANTEE (CONT'D)

- d) The warranty period for the various systems under this contract works shall be as specified in section 1 from either the end of Defects Liability Period or the certified date shown on the Defects Rectification Certificate issued by Architect, whichever is the later, of the main contract. The system warranty includes all materials, plant and labour. All costs and expenses arising out of or in connection with the obligation herein shall be solely borne by the Contractor and manufacturers.
- i. Certain materials are required to have special warranties, which shall not limit or reduce the requirements of the system warranty. Special warranties may originate, in part or in whole, with manufacturers or fabricators and pass through the contractor to the Owner. However warranties as written or interpreted by manufacturer or fabricators shall not limit or reduce the special Warranties.
- e) All guarantees are to include the cost of removal and replacement of all defective work at no extra cost to the Employer at such time as designated by the Employer during the warranty period.

## 17.3 MEASUREMENTS

All true measurements as shown on the tender drawings are in the metric system. The Contractor shall be responsible for verifying all the dimensions and actual conditions on site.

#### 17.4 TENDER DRAWINGS AND SPECIFICATIONS

The tender drawings do not purport to identify or solve completely the problems of thermal or structural movements, watertightness, pressure equalization, vapour barriers, fixture and anchorage, flatness and stability of facing and moisture disposal.

The tender drawings do not purport to solve problems at the glass line associated with glass movement, pressure fracture or thermal shock.

The tender drawings indicate profile and configuration required together with relationship to structural frame and building interior elements only.

The tender drawings contain details which suggest directions for solving some of the major design requirements and the Contractor may use these details and develop them as he deems best.

Specifications are "Performance" type and include the minimum requirements of the Aluminium Window and Louvre, without limiting the Contractor to the method of achieving such performance.

#### 17.5 SUBMITTALS

##### a) Particulars of the Specialist Sub-Contractor

Contractor shall submit the particulars and job reference of the aluminum windows specialist sub-contractor and the CV of their site representatives by the time of tender return.

##### b) Submission Schedule

Immediately after award of the contract, the contractor shall submit a complete submission schedule (in a format to be approved by the Architect) to the Architect for approval listing all the items requiring approval from the Architect, their programme of submission and expected date for getting approval from Architect for their ordering and fabrication of materials.

##### c) Shop Drawings

Contractor shall submit, for Architect's approval, within one month upon award of the contract the shop drawings. It is the responsibility of the Contractor to verify at the building site all dimensions shown on Architect's drawings. Copy of the final approved drawings as required in Preliminaries shall be submitted for the Architect's and Owner's use.

## 17.5 SUBMITTALS (CONT'D)

The contractor shall provide drawings showing all building materials in place and drawings shall include sufficient elevations, floor plans, sections, full size details and explanatory notes that fully substantiate the various systems under this contract. Different types of elements such as fixed panels, openable ventilators, window units, louvres and the like must be identified clearly on the elevation drawings. The types, dimensions, and sectional properties of all structural elements, temporary or permanent fixings, weldings, fire stop details, protection to metals and dissimilar metals must be identified clearly in all details & sections.

### d) Structural Calculation and Submission Drawings

If as required, within 4 weeks of the date of award of the Contract, the Contractor shall :-

1. Furnish structural calculation and relevant government submission drawings verified and endorsed by a Registered Structural Engineer approved by the Architect/Engineer, in connection with the design of the contract works which are in compliance with all applicable current Hong Kong Codes and other statutory enactments. The drawings shall include details of the materials, method of fixing, structure details including erection procedure and calculations to show that the window, louvre, sliding doors, glass and window wall, and railing are of adequate strength and stability.
2. The design calculation shall include a synopsis stating the relevant codes and standards, the design loadings and the design consideration, and relevant calculations that substantiate all glass and window wall types and other systems under this contract, and their connection and anchorage satisfy the requirements of strength and stiffness under both the working and the test load conditions.

The contractor shall prepare calculations to satisfy the wind load indicated for the glass and window wall and other systems under this contract and in accordance with good and practical theory and current design practice and in accordance with the rules of the Aluminium Association, AISC, AISI, ACI, Building Ordinance (Cap. 123), its subsidiary regulations, codes of practice and other relevant enactments, including analysis for wind and dead loads on framing members, anchors and concrete inserts. Show section property computations for framing members and submit full-size drawings.

These structural calculations and submission drawings must be prepared specific for this project works. Existing test reports, data from other projects, or untried or unproven theories shall not be acceptable. Where a conflict between the various codes, legislations, specifications or agencies exists, that code, legislation, specifications, or agencies which have the most conservative requirements shall govern.



## 17.5 SUBMITTALS (CONT'D)

### d) Structural Calculation and Submission Drawings (Cont'd)

3. These calculations shall include static and dynamic analysis for wind and dead loads e.g. B.M.U. cradles on framing members, structural connectors, anchors, concrete inserts etc. where applicable. Section property computations should also be submitted. Where there are conflicts between codes, legislation, specification, or agencies the most conservative requirements shall govern.
4. The verified and endorsed, structural calculations shall be submitted to the Architect/Engineer for checking, endorsement by the Register Structural Engineer of the project for submission to Buildings Department. The checking and endorsement by the Project RSE shall not relieve the responsibility of the Contractor in obtaining on time approval and consent for the works.
5. The Architect/Engineer shall review the structural calculations to insure their conformity to the Contract Documents. Architect/Engineer's approval of structural calculations will not relieve the Contractor from any of the responsibilities and requirements as herein specified.

### e) Method Statement and Detailed Programme

Contractor shall submit a comprehensive method statement and a detailed programme for the installation to the Architect/Engineer. The programme shall show various stages of design, shop-drawings and structural calculations preparation / submission, submission of drawings / calculations to Buildings Department, carrying out of performance tests, sampling, testing, fabrication, delivery, mock-up preparation, installation of the works, field water testing, etc.

These documents may be modified from time to time to suit site conditions and shall be used to monitor progress and quality.

Should the contractor consider it necessary to fabricate in bulk before endorsement in order to meet completion date, it is entirely at his own risk and no compensation in time or cost will be granted if the material and / or workmanship is eventually not acceptable to the Architect/Engineer.

### f) Samples

Submit for approval 3 sets of labeled samples of each required types of glass. Samples to be of the required colour, thickness and photometrical performance as specified; size of samples to be 600 x 600mm. Samples must show extremes of light transmission, reflectance and colour of transmitted light as viewed on a white surface

## 17.5 SUBMITTALS (CONT'D)

### f) Samples (Cont'd)

Submit for review 3 sets of samples of (where applicable samples shall be 300mm in length) :

1. Glazing sealants (including structural sealants)
2. Setting blocks
3. Gaskets
4. Ironmongery (e.g. locks, four-bar hinges, handle, supporting arms, limit states)
5. Extruded aluminum sections for the various window systems
6. Brackets, channels, bolts and other fixing systems

### g) Planning of Delivery

The Contractor shall submit preliminary planning reports of the whole stage of the delivery from the factory to the site paying careful attention to the traffic and site condition. The planning shall include packing, storage and unpacking.

The Contractor shall include in the above planning a description of the procedure of delivery, hoisting, storage, fixing, scaffolding, temporary working stage or gondola, protection and cleaning.

The Contractor shall submit a preliminary schedule on the procedure for inspection during installation so as to maintain quality control on the site.

### h) Record Drawing and Photographs

Before the date of completion of the work the Contractor shall prepare and supply to the Architect, for forwarding to the Employer, Record Drawings of the whole of the work as installed and Record Photographs as requested by the Architect.

These drawings and photographs shall be specially prepared for record purposes and the copies as finally provided to the Architect shall consist of two (2) sets of reduced size prints together with soft copy of the drawings and two (2) sets of photographs.

## 17.6 MATERIALS

### a) Metals

- A. Aluminium :
- Extrusions; 6063-T5 : shall conform to ASTM B-221.
  - Sheet / plate; 3003 or 3004 : shall conform to ASTM B-209
- B. Carbon Steel :
- Rolled shapes, plates, and bars : shall conform to ASTM A-36.
  - Tubing shall conform to ASTM A-500 or A-501.
- C. Carbon Steel :
- Cold rolled sheet, stretcher leveled : shall conform to ASTM A-446.
  - Non-tubular cold formed steel : shall conform to ASTM A-446.
- D. Carbon Steel :
- Fasteners : shall conform to ASTM A-307
  - Cold formed carbon steel shall be hot dip galvanized to meet or exceed the requirements of classification G60 of ASTM A-525.
  - Rolled carbon steel shall be hot dip galvanized in conformance with ASTM A-123.
- N. B. : Structural steel sections, plates, flats and belts shall refer to structural steel specifications.
- E. Stainless Steel :
- Bars, sheet & strip for interior use shall be AISI type 302 or 304.
  - For all exterior use : shall be AISI type 316.
- F. Stainless Steel-fasteners :
- Shall be AISI type 302 or 304 non-magnetic conform to ASTM A-167.

### b) Fire Protection Material

Fire protection material shall be selected from the approved material list of the Building Authority or subject to their and the Architect's approval. In any case, test reports from recognized laboratories acceptable to the Architect / relevant authorities on these materials indicating that their fire rating performances are in conformity with those stipulated under the Building Ordinance / Regulation and the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department, and relevant British Standards (B.S. 476) should be submitted.

## 17.6 MATERIALS (CONT'D)

### c) Protective Materials for metals

- A. Protective materials for steel shall be one of the following :-
  - 1) Zinc coating (hot dip galvanizing) for shapes plates, bar and strip shall conform to ASTM A-123.
  - 2) Zinc coating (hot dip galvanizing) for fasteners and hardware shall conform to ASTM A-153.
  - 3) Zinc coating (hot dip galvanizing) for sheet shall conform to ASTM A-525, coating weight 0.61 kg/m. (2 oz./sq.ft).
- B. All other steel except anchoring fasteners shall be galvanized and receive two coats of Zinc Chromate Primer; one coat applied in shop and one coat in field where be any damage of shop applied coating.
- C. Cadmium plating shall conform to ASTM A-165 type NS.
- D. Zinc chromate primer shall conform to FS TT-P-645.
- E. At aluminium surfaces in contract with masonry, concrete or steel, prime paint with zinc chromate or bituminous paint. Before applying the primer, the aluminium surface shall be washed with white spirit to remove dirt and grease and any surface corrosion shall be removed by brushing with a wire brush.
- F. After field welding, remove weld slag and touch up finished surfaces with an approved coating. Before applying touch-up coating, the steel surface shall be thoroughly cleaned of all dirt, dust, grease, stains, rust, mortar spatter, loose material or other foreign matter.
- G. Provide minimum dry film thickness of 0.025mm for each coat of zinc chromate and 0.75mm for bituminous paint. Zinc chromate primer shall conform to GSA specification TT-P-645.
- H. Bituminous paint shall conform to FS TT-C-494.
- I. All galvanised steel surfaces are to be thoroughly degreased and given one coat mordant solution, composed of one part each of chloride of copper, nitrate of copper, k sal-ammoniac and hydrochloric acid, mixed with 64 parts of soft water. Mordant is to be brushed on and allowed to dry at least forty-eight hours before painting.

## 17.6 MATERIALS (CONT'D)

### d) Sealant & Glazing Compounds

- A. Locate and identify all sealants by product name on shop drawings
- B. In using specified sealants or approved alternatives, strictly observe the printed instructions of the sealant manufacturer regarding joint size limitation. Where printed instructions are indefinite on the use of a primer, a primer shall be used. Unless printed instructions advise to the contrary, do not apply sealants when substrates are wet or when the temperature is below 4.5°C.
- C. Sealant back-up material shall be polyethylene foam, sponge neoprene conforming to ASTM C509, or Denver Foam as recommended by sealant manufacturer.
- D. All sealant shall be tooled as a separate operation after application.
- E. Colour for sealants to be selected by Architect/CIC.
- F. Alternative glazing technique may be proposed to suit the sash frame and the respective thicknesses of the glass.
- G. The Contractor must ensure that the silicone proposed is compatible with the type of glass used for the project. The Contractor shall obtain from the glass manufacturer a guarantee stating his acceptance of glazing details, conditions and glazing material. Endorsement of any sealant or silicone or glass product by the Architect shall not relieve the Contractor of such requirement.
- H. The silicone for structural glazing should have a minimum bond strength to the metal of 480kpa (70 PSI). The sealant when properly applied shall transfer the wind load from the glass to the structural members. This structural glazing application should conform with the design stress on the silicone joint configuration not exceeding 20 PSI which represents a 3 to 1 safety factor recommended by sealant manufacturer (Dow Corning). Evidence must be furnished to the Architect that the sealant manufacturers have reviewed their shop drawings and accepted the details for silicone performance. Details of the design width of sealant shall be submitted with the tender.

#### 17.6 MATERIALS (COND'T)

- I. Compatibility tests conducted by recognized laboratories to be carried out whenever structural sealant is adopted, and test reports should be submitted to Architect/Engineer and relevant authorities where deemed necessary.
- J. Tensile or shear stress in sealants should not exceed the figures as recommended by sealant manufacturers.
- K. Consistent and periodic adhesion protesting especially for structural glazing shall be carried out to identify potential problems before materials are put into place on the building.
- L. Shop Sealant

All joints which are sealed in the manufacturer's plant as part of the assembly procedure shall be sealed with GE Silpruf, Dow Corning 790 or approved equal.

Alternate sealant materials will be considered if technical data sheets and cured and uncured sample are submitted. However, acrylics, polybutane, oleoresinous, asphaltic, butyl, and polyisobutylene sealant are not acceptable for shop use.

## 17.6 MATERIALS (COND'T)

### M. Field Sealant

For Glazing - acceptable sealants are Dow Corning 732 or similar products approved by the Architect/Engineer.

For other joints - select an appropriate sealant for joint size, movement, and substrates.

Acceptable materials are - Dow Corning 732, 790.

For the avoidance of doubt, trade sealant is not acceptable and strictly prohibited for use by the contractor.

Field application of sealants shall not be unduly delayed. Sealant work shall be performed at not more than two weeks to prevent contamination of sealant contact surfaces and the accumulation of deleterious water infiltration within the wall cavity.

### N. Products :

- 1) Dow Corning 793 is acceptable for exposed and internal nonstructural seals.
- 2) Dow Corning 795 and 983 are acceptable for structural seals.
- 3) Data sheets and samples may be submitted for consideration of other silicone sealants, which are subject to approval.

### O. Alternate sealant materials will be considered if technical data sheets and cured and uncured samples are submitted. However, polybutane, oleoresinous, asphaltic, and other oil base sealants are not acceptable for field use.

## 17.7 MATERIALS (CONT'D)

### e) Hardware

- A. Supply and install all finish hardware as indicated on drawings and specifications, and all other hardware that may be necessary to make the work complete.
- B. Finish hardware is specified by general types only; select the proper size, model, and weight suitable for the specific application. Modify finish hardware where necessary to meet special conditions.
- C. All cutout and mortises for finish hardware shall be made in shop and as far as possible finish hardware shall be installed in shop.
- D. Reinforce all work for the attachment of finish hardware.
- E. All finish hardware shall be fitted in shop and as far as possible be installed in shop.
- F. Finish for all exposed hardware shall be polish stainless steel.
- G. Where required to prevent leakage into the building, flashing shall be :
  - (i) stainless steel 1.00mm thick; or
  - (ii) aluminium 1.00mm thick; or
  - (iii) sheet neoprene 1.5mm thick.All joints to be lapped and sealed to a minimum of 150mm.
- H. Sliding off-set hinges shall be of robust stainless steel construction, with a minimum thickness of the support stainless steel straps of 2.5mm and of sliding channel of at least 2mm.

Hinges shall have a check mechanism to allow for a half and full opening position.
- I. All locks and latches shall be of robust stainless steel construction and be fully concealed, and operated by keys. Mastered keyed with the whole building system.
- J. Concealed type multi-point locks shall be used for all openable windows (both side-hung & top-hung windows ) of aluminum windows as well as all ventilators. The Contractor shall submit structural calculations to prove that the provided number of locking points is sufficient to cater for the design wind load stipulated in this Specification.

The Contractor shall ensure that design of the aluminum extrusions, transoms & mullions is compatible with the installation of the concealed type multi-point locking system.



## 17.7 MATERIALS (CONT'D)

- K All top-hung openable windows shall be fitted with limit-state device unless otherwise stated.
- L Schedule of Window and Door Hardware
- a) Horizontal Slide Projecting (Side Hung) Window (Each Leaf) :-
- 2 Nos. of non-magnetic stainless steel concealed 4 bar parallel link arm hinges by “YKK 300 Series”, “Lip Hing” or approved equivalent, minimum plate thickness 2.5mm, width 20mm and length not less than 60 percent of the sash width.
  - 2 No. of aluminum handle.
  - 1 No. of stainless steel or aluminum die-cast dual action locking handle with solid stainless steel pivot pins. Locking points are to be so spaced to assume even compression of weather stripping over entire length and height of sash.
- b) Vertical Slide Projecting (Top Hung) Window (Each Leaf) :-
- 2 Nos. of non-magnetic stainless steel concealed 4 bar parallel link arm hinges by “YKK 300 Series”, “Lip Hing” or approved equivalent, minimum plate thickness 2.5mm, width 20mm and length not less than 60 percent of the sash width.
  - 2 No. of aluminum handle.
  - (For sashes under 800mm wide) 1 No. of stainless steel or aluminium die-cast locking handle with solid stainless steel pivot pins.
  - (For sashes over 800mm wide) 2 Nos. of the same pivot as above.
- c) Vertical Slide Projecting (Top Hung Fan Light) Window Under 1,200mm wide x 400mm High (Each Leaf) :-
- 2 Nos. of non-magnetic stainless steel concealed 4 bar parallel link arm hinges by “YKK 300 Series”, “Lip Hing” or approved equivalent, minimum plate thickness 2.5mm, width 20mm and length not less than 200mm.
  - 1 No. of aluminium handle.
  - 2 Nos. of stainless steel typhoon bolts.
- d) Horizontal and/or vertical Center Pivot Window (Each Leaf) :-
- 2 Nos. of stainless steel heavy duty friction pivot hinges.
  - 1 No. of aluminium handle.
  - 1 No. of stainless steel or aluminium die-cast dual action locking handle with solid stainless steel pivot pins.

## 17.7 MATERIALS (CONT'D)

- e) All key operated stainless steel or aluminium die-cast lockable handles shall be provided with three (3) keys.

M Where "Gear Operation" is specified in the particular specification or indicated on drawings, all high windows shall be fitted with imported chain type gear boxes at positions as shown on drawings.

N Confirm with the Architect/Engineer for locks that are to be keyed alike or master keyed before manufacturing.

### f) Glass

The contractor is to be fully responsible for the thickness selection and the suitability of the glass product selected to meet the performance specifications. Special attention shall be paid to the selection of spandrel glass panels where heat-soaked tempered glass or equivalent shall be used.

- A. All glass shall be the manufactured product of the approved manufacturer.
- B. All glass used shall be of the quality specified in BS952:1964 and of approved manufacture free from bubbles, smoke vanes, air holes, scratches or any other defects and cut to fit the rebates with due allowance for expansion.
- C. All thickness and type of glass stated on drawings / specification are indicative and illustrative minimum for reference only.

It is the responsibility of the contractor to calculate the actual sizing and to check whether the thickness of glazing specified can comply with the requirements as described in this specification, and to propose alternative thickness to meet such requirements where necessary, subject to Architect/Engineer's approval.

- D. Glass shall conform, as a minimum, to the following standards.
  - 1) Flat glass shall conform to GSA Specification DD-G-451d or ASTM C 1036-85.
  - 2) Heat-treated flat glass shall conform to GSA Specification DD-G-1403c or ASTM C 1048-85.
  - 3) Tempered and laminated glass shall conform to ANSI Z97.1-1984 and BS Code of Practice BS 6262 : 1982.

## 17.7 MATERIALS (CONT'D)

- E. The contractor shall provide safety glass in conformance with requirements of the Building Ordinance (Cap. 123), its Subsidiary Regulations, Codes of Practice, Practice Notes and other relevant enactments or statutes. The contractor shall also be responsible for the carrying out of relevant tests for the safety glass as required by the Buildings Department and/or this specifications, and to prepare / submit the corresponding test reports / certificates to the satisfaction of the relevant authorities and the Architect/Engineer.

Safety glass shall be provided in areas where necessary to avoid unreasonable risk of injury resulting from use of Architect/Engineer ural glass.

- F. Permanent identification marking shall be accomplished by a technique selected by the manufacturer. The location of the marking shall be proposed by the Manufacture and endorsed by the Architect/Engineer.

G. Heat strengthened / Tempered glass

- 1) Provide heat strengthened glass and / or tempered glass where shown on drawings or as required by the glass product selected, design wind pressures, anticipated thermal stress. Where practical increased glass thickness is to be provided to meet the requirements of design pressures, subject to Architect/Engineer endorsement of appearance variation caused thereby.
- 2) Heat strengthened and tempered glass shall be examined by the glass manufacturer to detect and discard any lights which exceed the following tolerances : 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9mm bow in 4500mm. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13mm, and the difference between adjacent peaks shall not exceed 0.08mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with Architect/Engineer ural design.
- 3) All tempered glasses shall be heat soak tested or subjected to the other quality control measures acceptable to the Architect/Engineer to minimize the occurrence of nickel sulfide stones. This specification defines nickel sulfide stones as a glass material defect. Installed tempered glass which breaks due to nickel sulfide stones shall be considered a material defect and shall be replaced (at no charge) under the warranty provisions.

## 17.7 MATERIALS (CONT'D)

- 4) All tempered glass supplied / installed by the contractor shall receive "Heat Soak Test" (i.e. the contractor shall carry out and certify 100% Heat Soaked Test for all tempered glasses) in accordance with the following requirements :-

i) Standards

Heat soaked test in compliance with DIN 18516: Part 4, paying particular attention to temperature and duration of treatment.

ii) Temperature & Duration for Heat Soaked Test

To demonstrate that, despite temperature tolerances, the air temperature in all parts of the oven was maintained at 290 deg. C +/- 10 deg. C for minimum 3 hours for each batch of glass.

iii) Before Test

Prior to heat soaking, the contractor shall submit method statement ( including written report to demonstrate oven and thermocouple calibration and temperature tolerances by an independent party acceptable to the Architect/Engineer ), job references, Quality Assurances & Quality Control procedures, and sample record forms for the test.

iv) Before Manufacture

Prior to commencement of manufacture, the contractor shall solicit the Architect/Engineer's acceptance of the proposed glass supplier and the premises where fabrication and processing are to be carried out. The contractor shall also arrange transportation for the Architect/Engineer to visit the glass manufacturer's premises during fabrication and/or processing.

## 17.7 MATERIALS (CONT'D)

### v) Before Delivery & Installation

The contractor shall submit full set of detailed records of heat soaked test for each batch of glasses, with endorsement by the manufacturer, prior to delivery to Site for installation. He shall also demonstrate with documentary evidence endorsed by an independent party acceptable to the Architect/Engineer that the glass has been heat soaked for the prescribed periods. Such evidence shall include, as a minimum, the following :-

- source of supply and evidence of batching;
- dates and records of toughening and heat soaking of each batch of glass;
- certification that the glass meets the performance requirements of the specification; and
- records to include details of all units that failed during the heat soak test.

### vi) Warranty

The contractor shall submit 10-year joint warranty with the manufacturer with performance pledge that the breakage rate of glass with heat soaked test shall not be more than 1:50 pieces ( i.e. 2% ).

- 5) Records of test shall indicate test conditions, date of test, number and size of lights tested per load, spacing of lights in oven, time glass was in the heat soak furnace, test results (i.e. number of light which broke).
- 6) The glass proposed by the contractor shall be of a thickness not less than the specified minimum thickness and shall have structural integrity and shall not have any harmful scratches, pinholes and uneven, sharp angled or filed edge.

## H. Laminated Glass / Decorative Glass

- 1) Laminated glass must be protected with an approved material at edges against delamination caused by moisture vapour, oil, solvent or reagents contained in sealants.
- 2) The interlayer PVB film must be fabricated and supplied by “Dupont” or equivalent approved by the Architect.
- 3) The Tenderer must include the name and details of the factory to be employed for carrying out the lamination process for all glass balustrades, canopies, skylights ... etc. in the submitted tender. The Tender will be taken into consideration only when the said factory is approved by the CIC/ Architect.

## 17.7 MATERIALS (CONT'D)

### I. Float Glass

- Float glass shall be of thicknesses shown on drawings manufactured in continuous ribbon form floated in molten condition upon liquid metal at controlled temperatures. The finished product to be completely transparent, both surfaces of the glass being flat, parallel and fine polished, giving clean undistorted vision.

### J. Obscured / Translucent Glass

- Translucent glass to be cast or figure rolled of the typed and quality required.
- Obscured glass to have the required degree of obstruction and diffusion.

### K. Wired Glass

- Wired cast glass and wired polished glass to have a square mesh wire electrically welded at each intersection.

### L. Tinted Glass

- Tinted glass to be body tinted of the colour and intensity specified hereunder.

### M. Mirror Glass

- Mirror glass to be selected float suitable for silvering. Mirrors to have square or bevelled edges and backed with an even coating of silvering and two coats of shellac varnish or other approved treatment to resist moisture.

- N. All glass shall be free from scratches, cracks, etc. when inspected 1m away from the glass surface from the interior under normal daylight condition.

### O. Photometrical Properties

#### (i) Tinted Glass

Shading coefficient	0.53
Visible light reflectance	5%
Visible light transmittance	26%
U value	6.4 W/m <sup>2</sup> K

## 17.7 MATERIALS (CONT'D)

### (ii) Clear Glass

Shading coefficient	0.95
Visible light reflectance	8%
Visible light transmittance	88%
U value	6.0 W/m <sup>2</sup> K

### P. Acoustic Properties

The glass proposed shall together with the window system framing have a minimum STC of 37 dB.

### Q. Standards

Glass products supplied shall conform to the following codes and specifications standards :

- (i) GSA specifications, for flat glass products to control quality thickness and dimensional; set forth in FSDD-G-451D, glass, plate, sheet, figured.
- (ii) Tempered glass shall conform to GSA specification FS DD-G-1403B. (All tempered glass to be heat soaked in the manufacturer's plant for not less than 6 hours at 554°F).
- (iii) The Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials - 16 CFR 1201.

### R. Glass Edge Quality

Edge quality criteria for annealed and heat strengthened glass are as follows :-

- 1) Shark teeth shall not penetrate more than half of glass thickness.
- 2) Serration hackle may occur within 150mm of corners.
- 3) Flare shall not exceed 1mm as measured perpendicular to glass surface across the edge. Flare shall not occur at setting blocks.
- 4) Bevel shall not exceed 1.5mm.
- 5) Flake chips may occur only within 200mm of corners; depth shall not exceed 1mm and length or diameter shall not exceed 6mm.
- 6) Rough chips are not permitted. Rough chips are those which exceed any of the dimensional limits for flake chips.

## 17.8 WATERPROOF TREATMENT

- A. The contractor shall apply waterproof treatment to external concrete/block wall face including all areas to be concealed behind cladding and to provide approved waterproof grouting and slurry coating around all aluminium window frames as shown on contract drawings.
- B. Waterproof grouting shall be “Fosroc Renderoc HB40” and slurry coating shall be “Sealotak SBR” or approved equivalent.
- C. The contractor shall comply with the manufacturer's specification and method of application and shall include all necessary cleaning of concrete face and prewatering prior to waterproof treatment.

## 17.9 GASKET AND SETTING BLOCKS

- A. Sponge gaskets shall be extruded black neoprene with a hardness of 40 +/- 5 durometer Shore A and conforming to ASTM C 509-70. Design sponge gaskets to provide 20% to 35% compression.
- B. Dense gaskets shall be black extrusions with a Shore A hardness of 75 +/- 5 for hollow profiles and 60 +/- 5 for solid profiles, and conforming to ASTM C 864-79. Outdoor gaskets shall be neoprene. Indoor gaskets shall be neoprene or EPDM.
- C. Injection mold all corners of gaskets where compatible with installation procedures.
- D. Interior and exterior gasket profiles shall be designed to produce a glass edge pressure of not less than 182N (4 lb.), nor more than 450N (10 lb.) per 25.4mm.
- E. Gaskets used in contact with structural silicone glazing materials shall be of extruded silicone, acceptable to the sealant manufacturer.
- F. Due to the interaction of the exterior weather seals with the exterior gasket, the exterior gasket must be compatible with and adhere to the weather seal sealant.
- G. As an alternate to extruded silicone gaskets for the gaskets used at structural silicone joints, Norton V-2100 tape could be used, if proper detailing is provided. (Compatible neoprene gaskets should be considered only as the last alternative).



#### 17.9 GASKET AND SETTING BLOCKS (CONT'D)

- H. Setting blocks, where required, shall be dense extruded neoprene or silicone with a hardness of 85 +/- 5 durometer Shore A, a minimum length as required by the glass manufacturer and a minimum width corresponding to the glass thickness and retaining member. Locate setting blocks at quarter points.
- I. Shims used in conjunction with setting blocks must be of the same material, hardness, length and width as the setting blocks.
- J. Setting blocks and chair shall be secured against migration.
- K. Locate side blocks within the upper half of each jamb for each light. Blocks shall be 55 +/- 5 durometer Shore A dense neoprene or silicone. Install block with 3mm clearance between block and bearing surface. Block shall be sufficient length to prevent point loading on the glass.
- L. Side blocks are not required where an individual glass light is continuously sealed with silicone on two or more edges.
- M. The tenderer shall submit with his tender the proposed material and specifications for all gaskets, weather-strips, setting blocks, spacers, channel cleaner, channel primer / sealer, etc. to be reviewed by the Architect.
- N. Exposed gasket to be in a colour closet to aluminium finish or as approved by the Architect/CIC.

#### 17.10 ANCHORS IN CONCRETE AND MASONRY

- A. Anchors embedded in concrete and masonry shall be hot dip galvanised rolled steel, or hot dip galvanised cold formed steel.
- B. Strength of embedded anchors shall be developed by integral projections of the steel anchor, or be welded deformed bars or headed studs.
- C. At masonry, through bolts are acceptable provided that bearing plates are used on both sides of masonry surface.
- D. Expansion bolts set into drilled holes are acceptable at concrete but not at masonry. Self drilling, self threading screws are not acceptable.
- E. Powder actuated fasteners are not acceptable.

#### 17.11 FASTERNERS

- A. Fastener requirements listed herein are applicable to screws, bolts, nuts, washers, rivets and pins.
- B. Fasteners in contact with cementitious materials shall be stainless steel type 304.
- C. Fasteners exposed to weather or within a glazing pocket, gutter, flashed cavity or other potentially wet location (after completion of construction) shall be stainless steel type 304. Fasteners inboard of potentially wet locations shall be stainless steel type 304, cadmium plated carbon steel or zinc plated carbon steel.
- D. Provide lock washer or other locking device at all bolted connections.
- E. Powder actuated fasteners are not acceptable.
- F. Fastener metals for joining various metal combinations.
  - (i) Aluminum to aluminum :  
Use only aluminum or stainless steel.
  - (ii) Aluminum to stainless steel :  
Use only stainless steel.
  - (iii) Stainless to stainless steel :  
Use only stainless steel.
  - (iv) All exposed fastener materials are to be in stainless steel.
- G. At least 2 fasteners shall be used on each & every fixing lug in window installation.

#### 17.12 OPENABLE SASHES

- A. Openable sash shall be provided of types and at locations as shown on the drawings. The sash when in closed position shall remain watertight under all weather conditions and pass the water tightness test as described under Technical Specification.
- B. Openable windows are required to meet the performances requirements of this specification. Except as otherwise specified herein, openable windows shall conform to ANSI/AAMA 101-85 classification.
- C. Glazing spacers and setting blocks shall be extruded silicone.
- D. Weather-strips shall be extruded dense neoprene.

#### 17.12 OPENABLE SASHES (CONT'D)

- E. The required test sample size is the maximum size for this project (not the size required by ANSI/AAMA 101-85).
- F. Locks and strikes shall be white bronze or type 302 or 304 stainless steel. Locks shall be cam type for positive compression of weathering, with removable handles for restricted use. Locks and strikes shall be openable in single action.
- G. Provide tubular sash frame with continuous double line of weather strip. Weather strips shall have a continuous spline engaged in a continuous aluminum groove. Corners of weatherstrips shall be molded or permanently shop jointed and sealed.
- H. Sash shall be shop glazed using structural silicone sealants, and shall comply with the requirements for structural silicone listed herein.
- I. Each openable sash shall be provided with adjustable hardware, similar to concealed four-bar friction hinges, capable of supporting it in any open position.
- J. Each openable window shall have a limit stop device to limit the opening of the window to a maximum dimension of 152mm (6 inches).

#### 17.13 LOUVRES

- A. Louvres shall consist of storm proof type aluminum blades set into the typical aluminum framing system. Blade ends shall be welded, or fastened to the aluminum framing members with concealed stainless steel fasteners. Provide concealed aluminum stiffeners for blades, such that the vector sum of blade deflections parallel to blade principal axes does not exceed 1/175 times span at design pressure. Assume that pressure acts perpendicular to the plane formed by the corners of the perimeter frame, and that the tributary area for one blade equals its projected area on the same plane. The contractor shall coordinate the installation programme of the louvres with the Main Contractor.
- B. Louvres shall be openable at locations shown on drawings.
- C. Blades shall be so fitted as to extend in front of vertical mullion framing and shall align horizontally with blades on adjacent units after installation.
- D. As required by Architect/Engineer to provide 60% or such others of free area of louvres to suit mechanical requirements.
- E. Inactive louvres shall be closed by aluminum sheet with minimum 0.125 inch (3.2mm) nominal thickness, fastened and sealed watertight to the internal surfaces.
- F. Provide aluminum bird screen mesh at active louvres. Mesh wire shall have 1.6mm (0.063 inch) minimum nominal thickness. Openings within mesh shall be 12.7mm (0.5 inch).

### 17.13 LOUVRES (CONT'D)

- G. Finish for louvres shall be matched colour of the aluminum member of the window wall system or such others as required and approved by Architect/Engineer. Frame corners and extruded blade ends shall be welded or fastened with 300 series stainless steel screws, and back panels and bird screens will be painted aluminum.
- H. Provide drip pans, flashing anchors and clips as well as related elements as required for a complete and watertight installation.
- I. Aluminum framing members at louver opening must be finished to match louver blades.
- J. All interior sill closures and duct attachments at active louvres must be completely sealed watertight.

### 17.14 REMEDIAL WORK FOR OVERSIZED OPENINGS

The contractor shall check the accuracy of the structural openings before proceed with window installation. The remedial works for oversized openings would be done by the Main Contractor.

If the permitted total clearance is exceeded as the foregoing, it shall be rectified as the following methods :-

A. Openings between 30 - 40mm each side

Shot fixing wire mesh on the concrete side and make up with non shrink grout equivalent to Protex-Kwikset with Bonding agent equivalent to Protex - Probond Epoxy.

B. Openings between 40 - 100mm each side

Drill dowel bars at 150mm centres to the concrete. Spot-weld horizontal 10mm bar every 15mm or BRC mesh. Scrap the existing concrete surface and recast concrete with approved bonding agent.

On no account are these gaps to be made up using waterproof cement grout without the approval of Architect/Engineer.

#### 17.15 ANTIGALVANIC ACTION & ELECTROLYTIC PROTECTION

- A. Isolate dissimilar metal surfaces to prevent galvanic action. Materials used for this purpose shall be non-absorptive.
- B. All steel parts shall receive a protective treatment commensurate with their respective functions. The treatment shall be one or more of those described above, and approved by the Architect/Engineer.
- C. Aluminum surfaces in contact with mortar, concrete fireproofing, plaster, masonry and absorptive materials shall be coated with an anti-galvanic, moisture-barrier material as specified in other sections of this specification.

#### 17.16 DESIGN REQUIREMENTS

The contractor shall design the aluminum window/ aluminum louvre/ grilles works to meet or exceed the following design requirement :

- A. Water Tightness  
No water infiltration shall occur when subject to the effect of water sprinkler at 5 litres/min./sq.m. for 10 minutes together with 100% field water test on all installed aluminium windows, glass walls, window walls, canopies and other works under this sub-contract in full accord with the testing method shown in Appendix B of PNAP 248 (APP-116). Double-seal or pressure equalization system shall be provided to maintain this water tightness and proper drainage system shall be provided to drain out any water which may leak through the external sealing. Ventilators shall also be provided with proper drainage system which may effectively drain out leaked water from the Perimeter of the Ventilator.
- B. Air-Infiltration  
The air infiltration shall not exceed 0.2 metre cube/hour per linear metre of ventilator perimeter when subject to a static pressure difference of 10kg/sq.m.
- C. Window Washer  
Air cushion type to be used, no guide track is required.
- D. Weight  
Total weight of the window wall / glass wall including glass and reinforcement members shall not be more than 100 kg/sq.m. (window wall / glass wall area) or as the building's structural system can be allowed.
- E. Treatment Against Cracking Noise  
Proper treatment shall be done to minimize the cracking noise caused not only by thermal expansion and contraction of metal parts but also by the deflection of the building structure.

## 17.16 DESIGN REQUIREMENTS (CONT'D)

### F Window Washer Tiebacks

Window washer tiebacks will be required at locations indicated on tender drawings. The system shall be capable of withstanding a minimum concentrated force of 2.5KN acting in and out and left and right and 1.0KN acting up and down without failure or gross permanent distortion of the track or any other component of the exterior wall. Location of tie backs is to be in accordance with the tender drawings. Materials for window washer tiebacks shall be stainless steel of hairline finish.

## 17.17 WATER TEST

### Water-tightness Tests to Aluminium Windows Units (Field Test)

Scope : The field test should be applied to 100% of the Aluminium Windows

### Testing Method and Procedure

- a) After the window is glazed, conduct water-tightness test as early as practicable before the scaffolding is removed.  
  
(Note : The test can still be feasible after scaffolding is demolished, but it will be more difficult to carry out remedial works if any).
- b) Carry out the test with the waterjet from the outside, with the window in a closed position.
- c) The water shall be applied using a Type B-25, #6.030 brass nozzle with “½” FPT (as manufactured by Monarch Manufacturing Works, Inc., 2501 East Ontario Street, Philadelphia, USA, PA 19134). The nozzle shall be used with a “¾” garden hose and shall be provided with a control valve and a pressure gauge between the valve and the nozzle. The water flow to the nozzle shall be adjusted to produce 30 to 35 p.s.i. ( 210 – 240kPa ) water pressure at the nozzle inlet.
- d) Working from the exterior, with the window in a closed position. A continuous jet of water is to be sprayed from the above specified spraying device and at the specified pressure, at 300mm from perpendicular and directly to the window joints, including joints between window frame and concrete surround, & between glass and window frame and around openable window sash. The nozzle of the spraying device shall be moved manually back and forth along the joints, starting from the lowest horizontal joint at the cill, then the middle horizontal joints, then the vertical joints and lastly the topmost horizontal joint at window head.

#### 17.17 WATER TEST (CONT'D)

- e) All Joints should be tested for a period of 1 min. in every 2m of joint length.
- f) Observe the whole water-tightness test from the inside of the flat to check for water leakage / seepage. The test is passed if no water leakage occurs.

If water leakage occurs, identify the location for making good and then repeat for the test. Method statement for making good shall be submitted well in advance for the Architect's consideration, and the Architect shall have the absolute discretion in requiring the total replacement of the whole defective window unit at the sub-contractor's own time / cost as considered necessary by the Architect.

##### Method for Leakage Identification

If water leakage occurs but the spot of the leakage cannot be identified, the following steps shall be followed :-

- After allowing the window and wall to dry, tightly cover all joints with waterproofing adhesive masking tape.
- Starting from the bottom, the masking tape shall be removed from the lowest horizontal joint in not more than 1.5m of length, and this exposed length shall be subjected to the nozzle spray as described above.
- If no leakage occurs during the 5-minute test period, this length of joint shall be considered satisfactory and shall remain uncovered. If leakage has occurred at any point, record down the leakage point and re-taped it to prevent further leakage during the subsequent checking.
- This process shall then be repeated on all joints and joint intersections within the designated area, expose joint length by removing masking tape not more than 1.5m each time and continue the checking by always working upward.

Notes: In some case, due to unforeseen delays or other causes, more than one working day may be required to completely check the designated area, necessitating that some or all of the masking tape be left in place over night. The tape should not be left on finished metal surfaces any longer than necessary, especially where subjected to strong sunlight, as this may make it difficult to remove and may also cause staining. It is recommended that in no case should the tape be left in place more than 24 hours.

## 17.17 WATER TEST (CONT'D)

### Test to Window Grouting

- Scope: The field test should be applied to 100% of the Aluminium Windows and Louvres.
- Time: Conduct test as early as practicable before commencement of external wall rendering.  
(Curtain wall system, internal windows and aluminium louvers shall be exempted from the testing)
- Method:
- a) To conduct test after window surround grouting has been completely dried and hardened but before waterproof coating application, normally 3 days after grouting.
  - b) To pour a continuous and unpressurized flow of water by garden hose evenly along the entire length of the grouted joints at a rate of 2m per minute.
  - c) To start the test from the lowest horizontal joint at the sills, then upward along window jambs, and lastly the topmost horizontal joint at window head.
  - d) Detail testing method and requirements shall be referred to the specification.
- Inspection:
- e) To observe the inner surface of the grout for any water stain or leakage, the test is passed if no water leakage occurs.
  - f) If water leakage occurs, identify the location for making good, and then repeat from step “b” to “e”.
  - g) If there is still water leakage after the second test, all grouting have to be hacked off and re-applied for a repeat of the test.
  - h) The waterproof coating can be applied onto the outside surface of the grouting only after satisfaction of the test result.



#### 17.18 HEAT SOAK TEST OF TEMPERED GLASS

- (a) All tempered glass shall be heat soak tested at approximately 290°C. Test shall be conducted so center of glass temperature is at 290°C for a minimum of 3 hours.
- (b) The minimum heat up times of the furnace shall be as follows :

<u>Glass Thickness</u>	<u>Min. Heat Up Time</u>
6mm	30 minutes
10mm	70 minutes
12mm	120 minutes
19mm	270 minutes

- (c) Heat output of the furnace and glass area in each test batch shall be monitored and controlled to comply with the above.
- (d) Cool down time to be approximately one half the heat up time.
- (e) Hold glass vertically during testing, with a minimum space of 25mm between glass lites.
- (f) Each glass lite (100%) shall be subjected to one cycle of testing.

#### 17.19 IMPACT TEST

- (a) All glass to be used should comply with the impact test requirements for safety glazing materials given in recognized testing standards such as ANSI Z 97.1 "Safety performance specifications and methods of testing for safety glazing used in buildings" or BS6206 "Impact performance requirements for flat safety glass and safety plastics for use in buildings".
- (b) All glass should achieve impact resistance not inferior to the impact grade class A to BS 6206.
- (c) Test certificates on the glass material to prove its impact resistance should be submitted to the Architect/Engineer for consideration.

## 17.20 TEST REPORT

Within 4 weeks of the completion of the tests described earlier, submit 5 copies of the test reports in a standard format. The reports shall include :

- (i) Visual observations and measured results.
- (ii) 200 x 250mm glossy colour photographs taken at various stages of the tests.
- (iii) Drawings of the specimen and its constituent parts, including a full record of all details utilised in the construction.

## **SECTION 18**

### **CLADDING**

#### **18.1 SCOPE OF WORKS**

The work shall include the design, supply, fabrication and installation of the aluminium composite panel wall cladding, the structural supporting frame and all necessary anchors, fittings and accessories to the wall cladding with extent shown on contract drawings. All associated statutory submissions and tests as stipulated on PNAP APP-16 are included. Safety performance test as delineated in Appendix B of PNAP APP-37 is also included if so requested by the Buildings Authority. The Contractor shall appoint a separate Registered Structural Engineer to prepare the design and to supervise the carrying out of the works.

The wall cladding shall be designed and constructed complete with matching copings, flagings etc. by a specialist sub-contractor to carry out local installation works with the capacity and relevant experience (minimum 5 years) to carry out works of similar size and complexity.

#### **18.2 DESIGN**

The Contractor shall detail the design by producing coordinated drawings taking into account the aluminum cladding as a whole, all interface conditions, and where appropriate, on-site dimensions, in order to ensure that the aluminum wall cladding is installed without alteration to the design intent as shown on tender drawings unless otherwise agreed with the Architect. The Contractor shall be responsible for the interface with the main structure, the external wall structure and the windows and other openings on the external walls.

The Contractor shall design and perform the System in accordance with all Hong Kong building regulations, by-laws Codes of Practice (e.g. Code of Practice on Wind Effects in Hong Kong, 2004), Practice Notes for Authorized Persons and Registered Structural Engineers and requirements of the local authority in effect.

The Contractor shall submit all necessary documents and drawings as required by the regulatory authorities in due time and perform all tests if required, to obtain the required approval, consents and permit. The Contractor's documents and drawings shall be submitted to the Architect before submission to the regulatory authorities for review. The Contractor shall ensure his submissions and resubmissions will not delay the subsequent inspections and tests required by the regulatory authorities concerned.

The Contractor shall:

- i) Design all necessary expansion and movement joints to accommodate the maximum movements derived from the specified design load and movements. Under maximum movements the joints shall meet all the performance requirements of this Specification.

## 18.2 DESIGN (CONT'D)

- ii) Design and install all components and couplings to withstand all static and dynamic design loads, and accommodate all deflection and tolerance within this Specification, without causing permanent deformation of components or the failure of members or seals, and transmit such loads safely to the points of support.

All materials specified shall be in strict accordance with manufacturer specification and instruction. The system shall be the proprietary product of “Alucobone” Aluminium Wall Cladding System, aluminum layer thickness of 0.5mm in PVDF finish with 60kg/m<sup>3</sup> rockwool insulation.

### A) Design Concept

The “ALUCOBONE” cladding shall be designed and based on a watertight cassette panel system. The cladding shall be laid out as shown and specified in the drawings. Individual panel shall be of tray panel type fastened with 3mm thick aluminum bracket by blind rivet and screw on the min. 3mm thk. GMS sub-frame that in turn is anchored on to the wall.

Typical horizontal and vertical joints between panels shall be 15mm wide. Install backing material or join filler, setting blocks, spacer shims and tapes as specified. Apply “DOW CORNING 791” silicone building sealant with light pressure to spread the sealant against backing material and the joint surfaces before a skin forms.

All fasteners shall be concealed within the panel joints. All fixings and jointing shall be designed with provision for un-impeded expansion and contraction of the components without causing buckling, opening of joints, undue stress on the fasteners, or other detrimental effects to the panels. All fasteners, bracketing and anchorage shall be designed to facilitate three-dimensional adjustment to accommodate all inherent building tolerances and movements.

Horizontal cladding / copping shall be purposely designed and constructed to ‘fall’ app. 5 degree. This is to facilitate draining rainwater inwards and onto the roof terrace, thus preventing ‘streaking’ on the front vertical cladding surface.

### B) Design Criteria

All aluminum composite panel cladding shall be designed to meet or exceed the specified performance requirement of the local climatic/weather conditions.

Design Basic Wind Pressure to be 2.5kPa. No cladding element shall sustain permanent deformation or failure under loading equivalent to 1.5 times the design wind pressure as specified. The deflection of any aluminum frame shall not exceed 1/150 of the clear span.

The ALUCOBOND cladding shall be designed with provisions for noiseless contraction and expansion of component materials for temperature change, ranges from 0 to 40 degree Celsius without buckling, opening of joints, undue stress on fasteners, or other detrimental effects.

## 18.2 DESIGN (CONT'D)

### B) Design Criteria (Cont'd)

With a gloss of 30% according to GARDNER Scale, the cladding surface taken individually shall not have any irregularities such as oil canning, waves, buckles and other imperfections when viewed at any position but not less than an angle of 15 degrees to the true plane of the panel, with natural lighting of incident of not less than the same angle.

### 18.3 MATERIALS

All cladding shall be of 4.0mm thick "ALUCOBOND" aluminum composite panel comprising a polyethylene core sandwiched between two skins of aluminum alloy PERALUMAN-100, EN AW-3003(Al-Mn1Cu), H42/H44, acc. To EN485-2

- |    |                        |                                                 |
|----|------------------------|-------------------------------------------------|
| a) | Aluminum Skin:         | 0.5mm thick                                     |
| b) | Mechanical Properties: |                                                 |
|    | Tensile strength:      | $R_m > 130 \text{ N/mm}^2$                      |
|    | 0.2% proof stress:     | $R_{p0.2} > 90 \text{ N/mm}^2$                  |
|    | Elongation:            | $A_{50} > 5\%$<br>(acc. DIN EN 435-2)           |
|    | Modulus of elasticity: | $70,000 \text{ N/mm}^2$                         |
| c) | Vibration dampening:   | Loss factor $d = 0.0087$<br>(acc. To DIN 53440) |
| d) | Rigidity (E.J.):       | $0.240 \text{ kNm}^2/\text{m}$                  |
| e) | Panel weight:          | $5.5 \text{ kg/m}^2$                            |
| f) | Finish:                |                                                 |

The external cladding panel surface shall be factory pre-finished by the manufacturer with a PVDF (Fluorocarbon) coating applied through a 'REVERSE ROLLER COATING' process. Total dry-film thickness of the coating shall be 25 microns minimum consisting of a chromate conversion coating, an inhibitive primer and a top coat. The coated surface shall comply strictly with the 'Specification for coated coil for exterior building applications' issued by ECCA (European Coil Coating Association) to achieve The Quality Label Category 1. The finished surface shall be factory protected with a self-adhesive peel off foil, tested to withstand at least 6 months exposure to local weather condition without losing the original peel off characteristic or causing stains or other damages.

Application of the PVDF coating system by means of spray coating after forming and shaping of the cladding elements is not permitted. Colour to be "100 Pure White 10".

- |    |               |                                                                                 |
|----|---------------|---------------------------------------------------------------------------------|
| g) | Colour/Gloss: | As per standard colour chart with approx. 30% gloss according to GARDNER scale. |
|----|---------------|---------------------------------------------------------------------------------|

Extrusions shall be of aluminum alloy AA 6063-T5, conforming to BS 1474:1987 in mill finish.

Fasteners, including concealed screws, nuts, bolts and other items required for connecting aluminum to aluminum or aluminum to steel shall be of non-magnetic stainless steel. Blind rivets used for fastening panel to aluminum sub-frame shall be of aluminum alloy with stainless steel mandrel. All fixing anchors, brackets and similar attachments used in the erection shall be of aluminum or non-magnetic stainless steel.

### 18.3 MATERIALS (COND'T)

When two surfaces of dissimilar materials come into contact, such surfaces shall be insulated with a layer of PVC or Polyethylene tape.

### 18.4 FABRICATION

All cladding panels shall be factory fabricated and assembled in compliance with the manufacturer's Data Sheets and to the best standard of workmanship under agent supervision and control.

All panels shall be cut and routed using equipment and tools recommended and approved by the panel manufacturer.

If the panel is designed with the perimeter edge(s) folded and framed with extruded aluminum profile, the latter shall be fixed with aluminum blind rivets with stainless steel mandrel or self-drill and tap screws to the panel with edge distance not less than 15mm. These rivets or screws shall be spaced not more than 500mm apart.

If reinforcement of the panel will be required, an extruded aluminum profile of suitable cross-section and strength shall be bonded to the reverse side of the ALUCOBOND panel using double sided adhesive tape "Scotch VHB 4950" or PU adhesive "Sikaflex-221". Application of bonding systems shall be in strict conformity with the manufacturer's specification. The ends of the stiffener shall be mechanically joined to the panel sub-frame.

Each panel shall be marked on the reverse side for easy identification of size and location.

Finished panels shall be stored and transported to site in vertical position, face-to-face respectively back-to-back, with adequate protection to prevent scratches and dents.

The factory applied protective peel-off foil shall only be removed after the panels have been installed on site.

### 18.5 INSTALLATION

Panels shall be stored on site in vertical position, face-to-face respectively back-to-back, with adequate protection to prevent scratches and dents.

Any component parts, which are observed to be defective in any way, including warped, bowed, dented, and broken, must not be installed. Members of parts which have been damaged during installation or thereafter before the time of final acceptance shall be removed and replaced.

No cutting, trimming, welding or brazing of component parts during erection in any manner that would damage the finish, decrease the strength or result in visual imperfection or failure in performance shall be executed during erection. Component parts that require alteration shall be returned to the shop for correction, and if necessary replaced with new parts.

## 18.5 INSTALLATION (COND'T)

Anchorage of the cladding structure to the building structure shall be by approved methods in strict compliance with the specification and approved shop and erection drawing. Supporting brackets shall be so designed as to provide three-dimensional adjustments and accurate location of cladding components.

All components parts shall be installed level, true to line with uniform joints and reveals.

Typical installation detail to refer attached drawing (on page PB/126)

## 18.6 WORKMANSHIP

Do not commence fabrication or site installation works until all shop drawings have been approved by the Architect.

Erect at contractor's own cost a full size (min. 2m x 2m) sample of the cladding panel, in accordance with the Approved shop drawings and as directed by the Architect. Prepare the sample in accordance with the requirements of the testing regime.

## 18.7 WARRANTY

Upon Completion of the Main Contract, the Contractor shall provide a warranty in the approved form as specified in Section 1 from Substantial Completion Date as certified by the Architect, in respect of material and workmanship for the Aluminium Coating System against defects which include but are not limited to:

- i) Any abnormal deterioration, aging or weathering
- ii) Deterioration and discoloration of finish

In addition, the Contractor shall assign to the Employer free of charge and without in anyway limiting or reducing the warranty requirement of this specification, the benefits of all long term warranties and guarantees that may originate in part or in whole with manufacturers, fabricators and licensed applicators.



## **SECTION 19**

### **FALSE CEILING SYSTEM**

#### **19.1 SCOPE OF WORKS**

Suspending ceiling systems as shown in the drawings & schedules shall be supplied and installed by the Contractor. Location of respective false ceiling refers to drawings and finishes schedule.

##### **Internal System (Aluminum Baffle Ceiling)**

- System : Bradfon Baffle Ceiling System
- Composition : Aluminium Suspended Ceiling Grid System (concealed).  
With G.M.S. angle bracket with paint finish
- Pans Material : 100 x 25mm Press-formed Aluminum panel in 1mm thick
- Pans Finish : Powder-coated finish (colour and pattern to be selected by Architect).

##### **Internal System (Acoustic Rock Wool Ceiling)**

- System : 600mm x 600mm x 15mm Mineral Fibre Acoustic Rockwool ceiling panel system. Assumed profiled.
- Composition : Aluminium Suspended Ceiling Grid System (concealed).
- Finish : Matt white vinyl emulsion paint with pattern to be selected by the Architect.

##### **Internal System (Gypsum Board Ceiling)**

- System : Min. 12mm thk. standard gypsum board ceiling system as per finishing schedule and drawings
- Composition : Concealed suspension system
- Composition : Aluminium Suspended Ceiling Grid System (concealed).
- Finish : Internal paint as specified.

## 19.2 MATERIALS

### A. Internal System (Metal Ceiling)

Metal ceiling tiles shall have 25mm thick fibre glass mat on top (25kg/m<sup>3</sup>) and a black neoprene coating. Thickness and density of absorbent shall be dependent upon test data produced in accordance with BS3638. Surface finish of all panels shall be factory applied, washable electrostatic polyester powder coating in 70-85 microns thick, colour to be selected and approved by Architect.

All panels shall be incombustible to BS 476 Part 6 and 7 and the standards as stated in the Code of Practice for Fire Safety in Buildings 2011 issued by the Buildings Department.

Provide panels filler pieces and holes as required. Cutting of panels to be kept minimum and all panels to be factory cut..

Colour consistency should be accurate, and the Contractor shall make every effort to achieve uniformity of colour. Components with colour deviations will be rejected.

### B. External Linear System (Metal Ceiling)

Requirement shall be the same as internal system. In addition, the whole ceiling system shall withstand typhoon and wind load as stipulated under the Building Ordinance prevailing in the H.K. climate. Testing certificate, calculations, shop drawings, etc. should be submitted for Architect approval.

## 19.3 SUSPENSION SYSTEM

Suspension system shall be leveled to within 3mm for any 3m run. No cumulative variation greater than 3mm is allowed. Maximum deflection shall not exceed 1/360 of span under maximum design load and with no apparent defection under normal circumstances.

The suspension system shall be designed to carry the ceiling dead load.

Hangers shall not be spaced in excess of 1m centre to centre in either direction. Hanger support for terminal end of each cross runner or main runner shall be independent of walls and within 200mm of walls.

The Contractor shall provide trapeze hangers or other special arrangement of suspension system to suit the layout of F.S. sprinkler pipes, electric conduits and all other services as required.

## 19.4 SUPPORT STRUCTURE

### A. Internal System

The ceiling system shall be suspended from the structural slab and beam above only, the concrete can accept red-head fixings. All bolts into concrete shall be stainless steel and anchorage into concrete shall be maximum 75mm.

The Contractor shall calculate the length and diameter of anchor bolts appropriate to carry the ceiling system and obtain the Architect's approval of the location, diameter and depth of all anchorages prior to installation. The Contractor shall do all necessary drilling, tapping cutting welding and/or other preparations of such surrounding construction in the field as necessary for the attachment and support of the installation.

Suspension shall be by means of rigid suspension hanger (screw rod or the like) fixed directly to the structural soffit above in line with the centre of the supports at maximum 1200mm centre to centre.

### B. External System

#### 19.4.1.1 Suspension System

- It shall comprise of GMS U-shape runnerangle and channels with Z & L profiles assembled at the back of the ceiling and secondary furring channels. Members shall be coupled together to form continuous rows of linear grid at maximum 1200mm centres.
- All profiles shall be rigidly braced by GMS angle to prevent vertical and horizontal movement.
- Suspension shall be by means of rigid suspension hanger fixed directly to the structural soffit above in line with the centre of the supports at 1200mm maximum centres.
- Hanger brackets and security slips shall be fixed directly to the rigid suspension hanger by means of M6 nuts above and below the bracket, and leveled.
- The space occupied by the suspension system in the ceiling void shall be kept to minimum. The level measured from top of any furring channel to concrete slab / soffit shall not be more than 100mm.
- Wall connectors shall be fixed to profiles and perimeter walls to prevent movement.

#### 19.4.1.2 Perimeters

- At perimeters all panels are laid on the perimeter trims to suit.
- Gema aluminum edge profiles shall be fixed to perimeters butt.

#### 19.4.1.3 Materials

- Suspension hangers - Electro-galvanized mild steel with size and thickness to be determined in the calculations and shop drawings.
- Z & L profiles - 1.5mm or 2.0mm thick electro-galvanized mild steel.
- Couples/Wall-anchors - min. 1.5mm thick electro-galvanized mild steel.

#### 19.4 FASTENING

All fixing lugs and anchors, supporting members, hangers, bracings, brackets, straps and similar attachments shall be of non-magnetic, stainless steel, zinc-coated steel or galvanized steel, aluminum and shall be concealed.

Where mild steel framing is used, all surfaces shall be thoroughly cleaned by effective means and painted.

#### 19.5 SHOP CUTS FOR SERVICES

The Contractor shall make shop cuts to sprinkler heads, downlights, and other services in accordance with the approved layout.

Should the location of any above-mentioned services differ from the approved layout during installation, the Architect should be notified immediately before the further site or shop cutting.

#### 19.6 INSTALLATION AND ERECTION

The suspension system shall be installed by an experienced specialist approved by the Architect.

Prior to the ordering and fabrication of suspension ceiling system, specialist and contractor shall submit shop drawings to illustrate all the ceiling pattern, levels, openings for light fittings and E/M services installation for Architect approval and endorsement.

Sample of ceiling panel and accessories should be submitted for approval before commencement of works.

All typical panel to panel joints shall be in accordance with approved detail with maximum tolerance of  $\pm 1$ mm. Field cuts shall be straight, sharp, cause no damage to adjacent finishes and shall be field painted to close match.

All joints shall align on centre. The maximum deviation from the nominal plane shall not exceed  $\pm 2$ mm in every 3m run. Every effort should be made by the Contractor to achieve a monolithic plane.

##### Cleaning

- Right after installation, all soiled surface of ceiling units shall be cleaned. This procedure is to be repeated on completion of installation & prior to final handover of the works by the Contractor.
- Remove and replace units which are damaged, decolourized or improperly installed, to the satisfaction of the Architect.
- Dust and loose dirt shall be removed with a soft brush or vacuum cleaner. Cleaning must be in one direction only. Pencil marks, smudges or blemishes may be removed with an art gum eraser or with a moist cloth or sponge with mild soap, wiped off with a clean damp cloth or sponge.

## 19.6 INSTALLATION AND ERECTION (COND'T)

On completion of all the works, the contractor is to carry out a complete final clean down of the ceilings. This final clean down is to be carried out in addition to any other cleaning that the contractor may have done on a floor by floor or section by section basis.

## 19.7 SUBMISSION

Manufacturer's catalogues, test certificate, and installation method, material samples and shop drawings for all relevant materials and equipments shall be submitted to the Architect for review or approval. The extent of information or samples required shall be adequate and sufficient to demonstrate that the proposed system and materials are in compliance with the contract requirements. However, the Architect can request the contractor to submit any additional or supplementary information to substantiate the performance of the proposed system or material.

No bulk materials and systems ordering work shall proceed prior to the Architect's confirmation of no adverse comment on the submitted information or samples. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory system will be entertained.

## 19.8 GUARANTEE

The contractor shall submit a written guarantee for the materials, workmanship and performance of the proposed system(s) to the Architect for review. No bulk materials and systems ordering work shall proceed prior to the Architect's confirmation of no adverse comment on the submitted guarantee content and format. It is the contractor's sole responsibility to ensure that the required materials or systems can be ordered according to the contractor's master programme. No claim for any additional time or cost due to any delayed submission of a satisfactory guarantee will be entertained.

The guarantee shall warrant that the entire system(s) including materials, structure, installation, workmanship and performance will be in proper and normal function in accordance with the contract requirements for a period of not less than FIVE (5) years from the date of practical completion of the main contract works as certified by the Architect.

The guarantee shall also warrant that any defective materials, structure, construction, workmanship revealed during the guarantee period shall be made good at the contractor's own expense to the satisfaction of the Architect.

Release of the retention upon practical completion is subject to the presentation of a duly executed guarantee.

## 19.9 SPARE PARTS

Prior to issuance of final certificate of practical completion of the project, the contractor shall provide 2% or 10 sq. m., whichever is more, of each type, each color, each model of ceiling panels for use in all areas in the contract.

## 19.10 PRODUCTS

Unless otherwise specified or counter proposal approved by the Architect, anyone of the following systems or products shall be from the list below for this project. However, the contractor can submit an equivalent or equal system or product to the Architect for approval as an alternative. No claim for any additional cost or time for the use of any alternative as proposed by the contractor will be entertained by the Architect.

Any cost saving as a result of the Architect's approval for any alternative system or product shall be adjusted according to the contract conditions.

Due allowance shall be made by the contractor to ensure all necessary ordering and delivery works will be carried out in accordance with the contractor's master programme.

Specification of ceiling are systems as follow:

### General Specification

The contractor shall install the metal baffle ceiling system to the area as indicated in the tender drawing. The baffle panels are cuboid in squared edges, in 100mm high and 25mm width, made of 1mm thickness of aluminum alloy with electrostatics powder coating in wood-look pattern, non-perforated. The baffle panels are suspended by the perforated L-angle main runners made by galvanized steel painted in black color with runner clamps. The runner should be directly fixed to the sub-frame (the details of the sub-frame should be proposed by the contractor according to the requirements of the KAP). The distance between each runner is about 1200-1500mm. The baffle panels are directly fix to the runner by screws, and the distance could be adjusted from difference center to center. All of the suspension units are made by galvanized steel. Installation of the ceiling system shall be in accordance with manufacturer's recommendation.

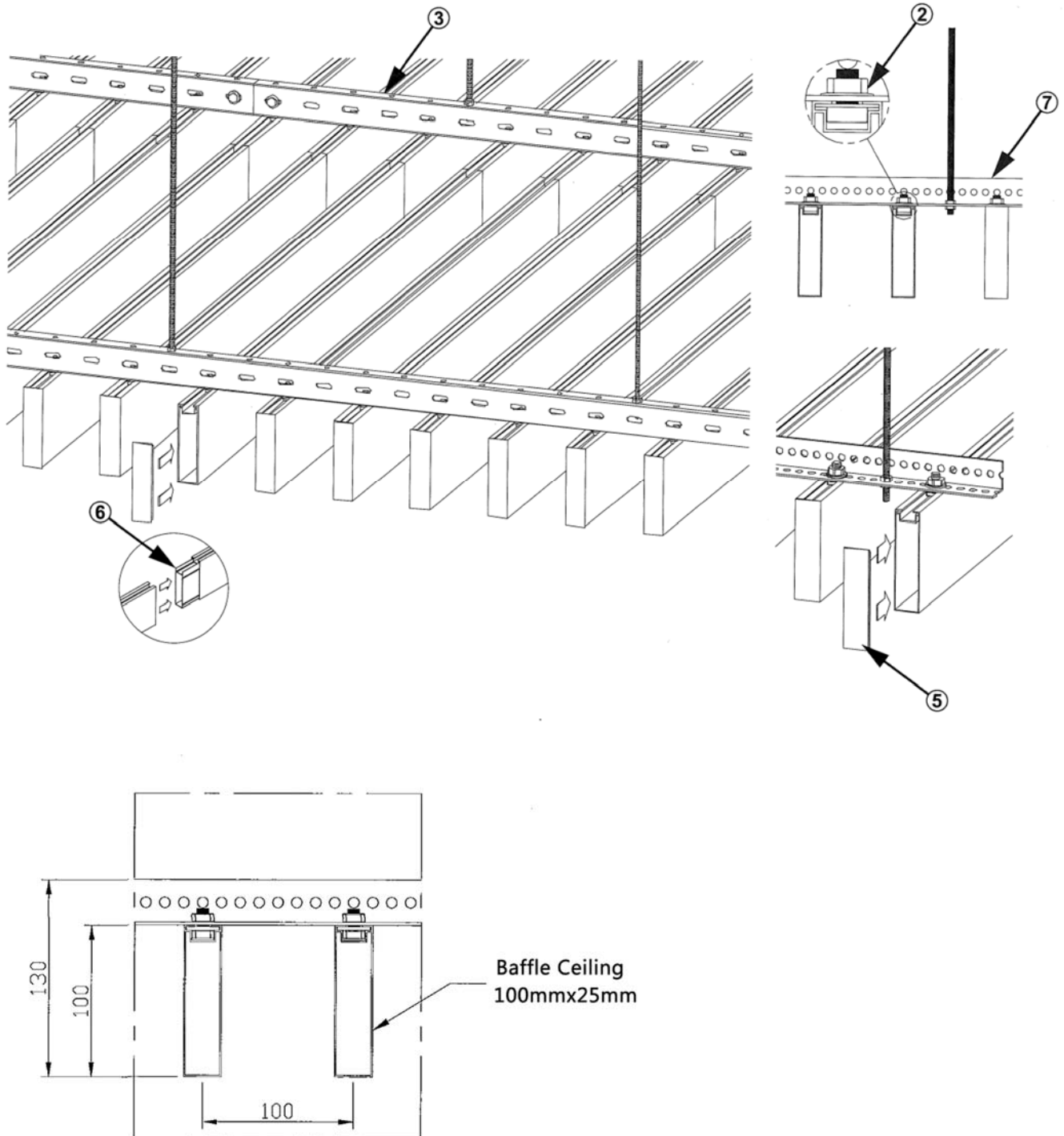
### Particular Specification

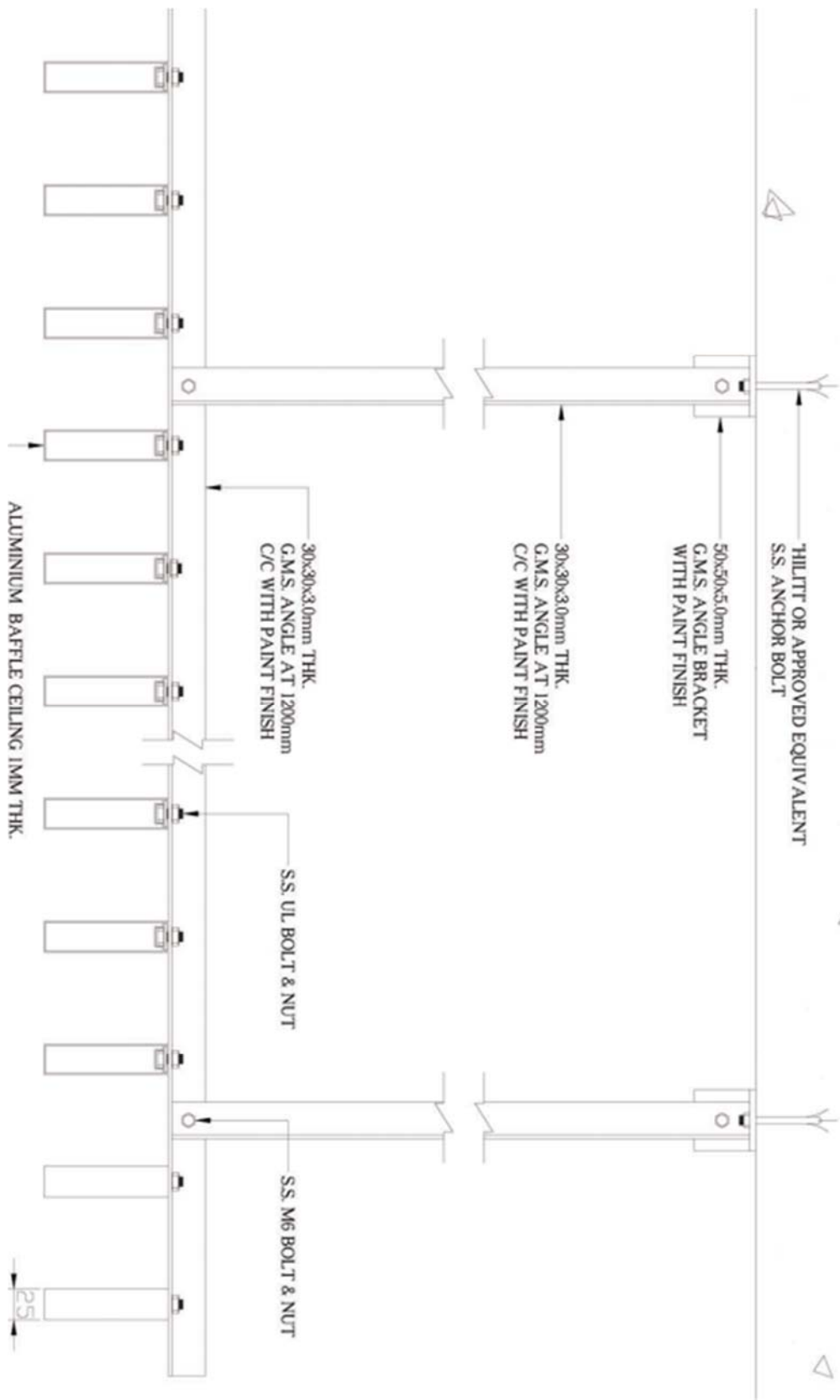
Brand	: Bradfon
Country of Origin	: Denmark (production line in China)
Pattern	: Non-Perforated
Material	: Aluminum Alloy
Baffle Size	: 100mm high, 25mm wide
Thickness	: 1.0mm
System	: Baffle Ceiling System
Coating	: Polyester PE Powder Coating
Pattern / Color	: Wood-Look Pattern (to be confirmed by the architect)
Moisture Resistance	: 100%
Fire Safety	: The suspended ceiling shall meet Class 1 Surface spread of Flame to BS 476: Part 7: 1997 and Fire Propagation Test to BS 476: Part 6: 1989. Class 0 as defined by Building Regulations.

**Demounting Ability** : The ceiling tiles shall be fully demountable and should withstand frequent, and handling without deterioration.

**Exclusive Distributor** : Vertex Building Materials Ltd. – Wade Luk (wadeluk@vertexbm.com / 2317 6612)

**Drawings:**





*For Acoustic Rock wool ceiling system -*

**General Specification**



Suspended Ceiling System should be proprietary and to consist of rockwool acoustic ceiling panels – 600 x 600 x 15mm made from 100% inorganic rockwool (stone wool), with micro-textured white painted fleece surface; fixed by exposed but recessed ceiling grid system; 100% humidity resistant; Fire resistance classed as A1 product according to EN 13501-1; Sound Absorption  $\alpha_w$  0.95 and NRC 0.90 (ISO Class A); Certified by Class E1 (EN 717-1), M1 Emission Class and The Indoor Climate Label for low emission; Materials are 100% recycled; Production is qualified with the environment management system ISO 14001:2004 and the quality management system ISO 9001:2008 for sustainability and environment friendliness; as Rockfon Koral E24S8 ceiling tiles which are installed by Rockfon recessed ceiling grid system T24 A/E and supplied by the local authorized distributor Vertex Building Materials Ltd.

### **Suspension System**

The suspended ceiling system complied with EN 13964:2004 and fulfil the fire performance requirement in EN 13501-1:2002.

The ceiling shall have its own supporting system and shall consist of galvanized steel hangers, brackets, ties, clips, fasteners, anchorages and leveling devices, runners, couplings and clips, wall moldings, joint trimmings and other accessories necessary for suspending from the structural ceiling, making leveling adjustment, and the proper assembling of the ceiling system.

The galvanized concealed grid system comprises main runner, cross tees, hangers, perimeter trims and a variety of accessories. Tiles installed in this system should be fully demountable.

The system shall be suspended from M6 threaded rods by means of a proprietary direct hanger (21.8) mounted with the top of the profile. Hangers shall be at maximum 1200mm C/C and not more than 800mm from perimeter edge. Cross tees when cut to the perimeter edge and in excess of 800mm in length, shall be supported independently.

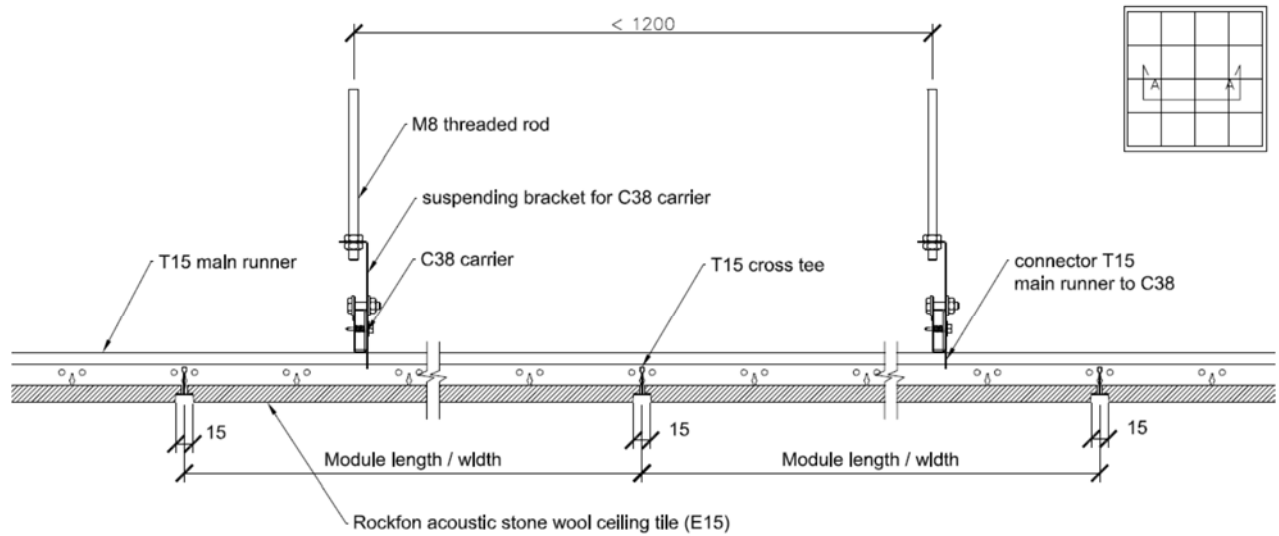
The suspended system shall be designed and calculated to carry the total load of the ceiling, in according to ASTM C-635.

No suspension system is permitted to be fixed to the fire resisting false ceiling above (supply and install by others) unless the proposed installation method and detail will not affect or disturb the fire rating and structural stability of the fire resisting false ceiling and shall be approved in writing by the architect.

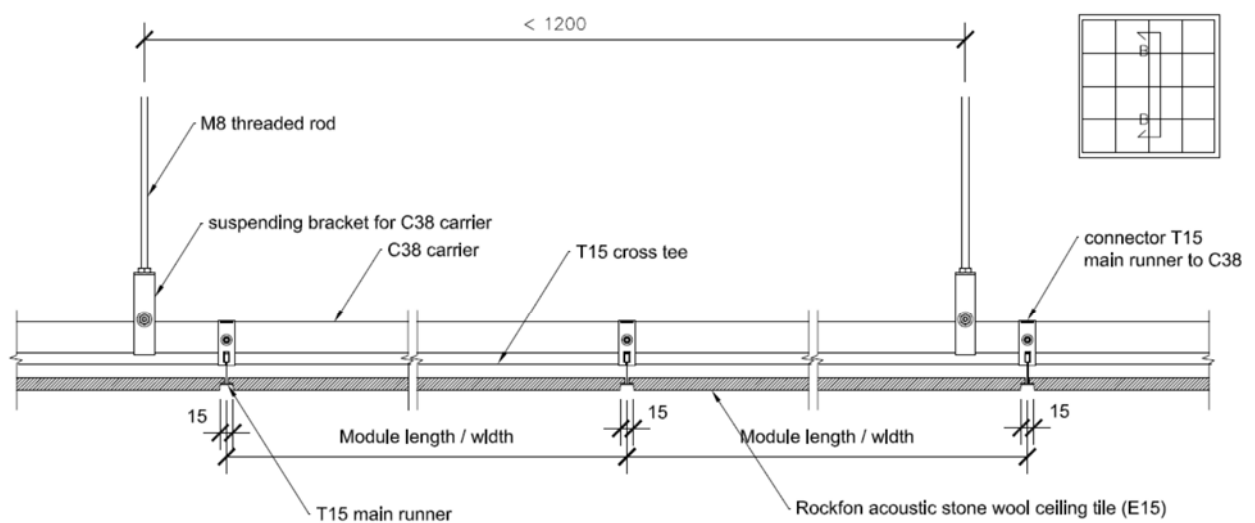
<u>Brand</u>	<b>Rockfon®</b>		
<u>Item</u>	<b>KORAL™ E15S8</b>		
<u>Description</u>	Suspended Acoustic Rockwool Ceiling Tiles		
<u>Raw Materials</u>	Rockwool – 100% inorganic raw materials		
<u>Origin</u>	Poland		
<u>Surface</u>	Micro-textured white painted fleece surface		
<u>Dimension</u>	600x600mm	<u>Thickness</u>	15mm
<u>Weight</u>	Light weight 2.5 Kg/m <sup>2</sup>	<u>Colour</u>	Standard White
<u>Edge</u>	Tegular edge mounted with 15mm profiles		
<u>Grid System</u>	Rockfon Recessed Ceiling Grid System T15 A/E, all details in accordance with manufacturer instruction.		
<u>Demounting Ability</u>	All ceiling tiles shall be fully demountable.		
<u>Moisture Resistance</u>	Up to <u>100% RH</u> and can be installed at all temperatures ranging from 0°C to 40°C. No acclimatization is necessary.		
<u>Sag Resistance</u>	Class 1/C/0N (EN 13964)		
<u>Sound Absorption</u> (200mm suspension)	Sound Absorption Classification = ISO Class A (Highly Absorbing) $\alpha_w = 0.95$ in accordance with EN ISO 11654:1997 NRC = 0.90 in accordance with ASTM C 423-01		
	Hz	125	250
	$\alpha_p$	0.45	0.75
<u>Reaction to Fire</u>	500	1000	2000
	4000	1.00	
<u>Light Reflection</u>	86%		
<u>Cleaning</u>	Vacuum cleaner fitted with a soft brush / Damp cloth		
<u>Hygiene</u>	Rockwool (stone wool) provide no sustenance to harmful micro-organisms.		
<u>Release of Asbestos</u>	It does not contain asbestos.		
<u>Release of Formaldehyde</u>	Class E1 (EN 717-1) – the best class, means that formaldehyde release is either nil or negligible.		

<u>Indoor Climate</u>	<u>M1 Emission Class</u> , the best class in accordance with the Finnish emission classification of building materials which concerns the emission of TVOC, 1A and 1B Carcinogens (EU classification), Formaldehyde, Ammonia, and Odour. <u>The Danish Indoor Climate label</u> takes into account the emission decay of volatile organic compounds (VOCs) from new building materials according to their impact on comfort and health.
<u>Demounting Ability</u>	The ceiling tiles shall be demountable
<u>Guarantee</u>	15-year product guarantee against sagging
<u>Sustainability &amp; Environment Friendliness</u>	The products are fully recyclable. Products contribute materially toward earning points in a <u>LEED</u> certification in terms of construction waste management, recycled content, acoustical performance, construction indoor air quality management, low-emitting materials and innovation in design.
<u>Quality Standard</u>	CE-marked in accordance with BS EN 13964
<u>Environment Management System</u>	Certification ISO 14001:2004
<u>Quality Management System</u>	Certification ISO 9001:2008

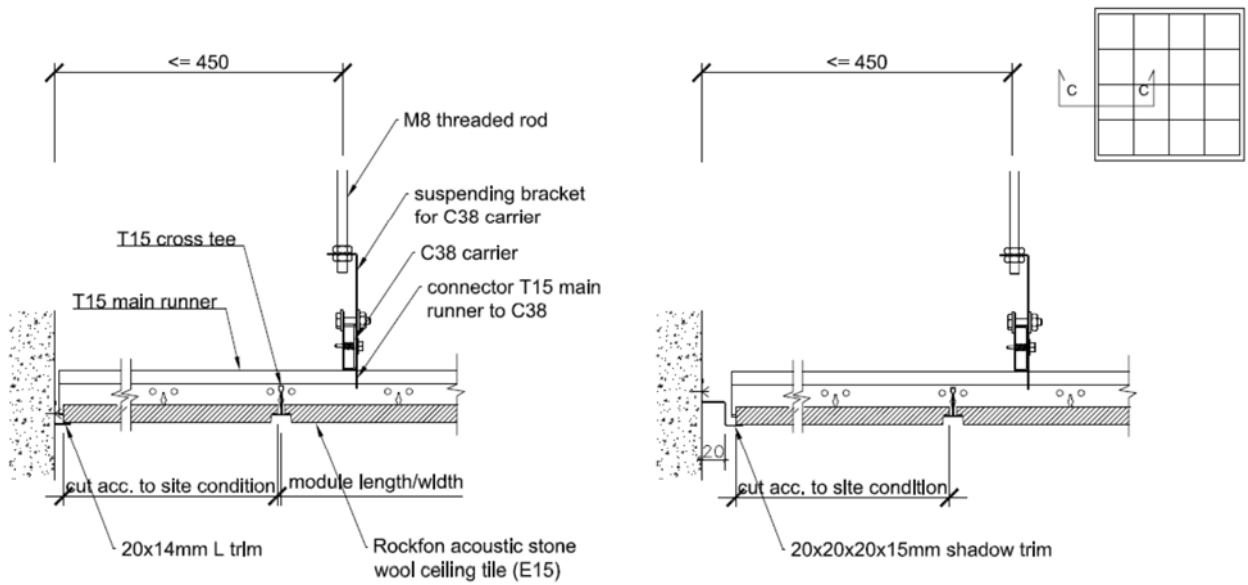
## Drawing



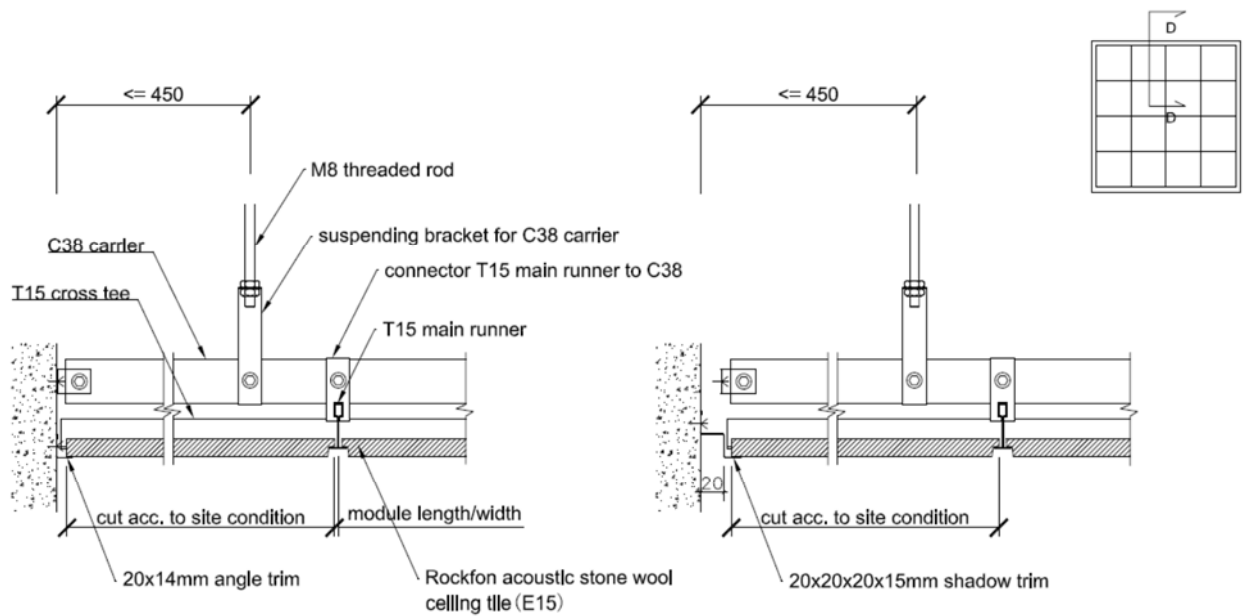
A-A (1:3)



B-B (1:4)



C-C (1:3)



D-D (1:3)

## **SECTION 20**

### **GYPSUM BLOCK WALL WORKS**

#### **20.1 GENERALLY**

Unless otherwise specified or counter proposal approved by the Architect, all gypsum shall be MULTIGIPS HIGH DENSITY GYPSUM BLOCK WALL SYSTEM or equivalent. Detail specification of the carpet type is specified in the following:

#### **HIGH DENSITY GYPSUM BLOCK WALL SYSTEM**

##### **1.0 Description of Works**

- 1.1 Proprietary Gypsum Block Wall shall be **MultiGips VG Orth** or Architect's approved equivalent.
- 1.2 The works shall include supply and installation of the High Density Gypsum Block Wall system, including high density & hydro high density gypsum blocks, stiffening steel post and beam, dowel bar, gypsum based adhesive, gypsum filler, fire resistant sealant and the gypsum block work accessories such as ties, anchors and isolation joints with adjacent structural elements.
- 1.3 The whole system to be erected to each type of finishes and locations, including the high density gypsum blocks, hydro high density gypsum blocks, gypsum based adhesive proposed to be used by the Contractor must be from the same source of manufacturer with over 10 years of manufacturing history unless otherwise approved by the Architect. The Contractor must ensure that all components of the system would be suitable for use for the specific purpose of each individual case and be compatible with one another and the finishing material.
- 1.4 The origin of material shall be in Europe and the compliance of gypsum based products with the European Standard EN12859 is documented on all delivery notes and all packaging with the CE Mark.
- 1.5 The manufacturer must have the quality standards of ISO 9001, 14001 and ISO 50001;
- 1.6 The manufacturer shall provide a material insurance cover amounts to 25,000,000 EUR for bodily injuries and 10,000,000 EUR for property damages.

## 2.0 Materials

- 2.1 MultiGips Gypsum Block color:  
High Density Gypsum Block : Reddish  
Hydro High Density Gypsum Block : Greenish
- 2.1 The High Density and Hydro High Density Gypsum block shall be with tongue or groove profile on four sides, smooth finished surface and ready to receive the surface finishes, fire rated to the specified rating and in size of 80/100mm Thick x 500mm High x 500mm.
- 2.2 Supply of material shall be consistent in quality, color, batch to batch and within same batches.
- 2.3 Density of the High Density Gypsum Block and Hydro High Density shall be classified 1,200kg/m<sup>3</sup> in accordance with EN 12859, with a compressive strength not less than 14N/mm<sup>2</sup>. Water Absorption rate of the Hydro High Density shall be 0.53% H1 class in accordance with EN12859 standard.
- 2.4 The High Density and Hydro High Density Gypsum Block shall be manufactured and complied with EN 12859 to the tolerance within +/- 2.0mm, +/- 1.5mm and +/- 0.5mm respectively for length, height and thickness.
- 2.5 The STC rating of 80mm and 100mm thick High Density Gypsum Block wall system shall achieve a standard of STC 41 and STC45 as tested in accordance with ASTM E-90-04 "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
- 2.6 The 80mm and 100mm thick High Density Gypsum Block wall system shall be tested to achieve **2 hours** and **4 hours fire rating with 100mm thick block** in accordance with BS 476 Part 22 and ASTM E119-11a. The FRP requirements for partitions shall refer to Architect's drawings. The Contractor shall submit the respective certificates, test reports and assessment certificates to the Architect for approval. All tests shall be carried out by HOKLOS accredited Laboratories.
- 2.7 The High Density Gypsum Block wall system shall be designed to withstand a lateral loading of 1.5kPa in accordance with Building Department code.
- 2.8 The Gypsum based adhesive shall be made and supplied by the same Gypsum Block manufacturer as the High Density Gypsum Blocks to ensure compatibility and overall performance of the Gypsum Block Wall system. It shall be applied as a bonding agent for all interlocking joints of the High Density Gypsum Block Wall. It shall also be used to make good the joints of the High Density Gypsum Block in order to receive the finish.

- 2.9 The whole system to be erected to each type of finishes and locations, including the high density gypsum blocks, hydro high density gypsum blocks, gypsum based adhesive proposed to be used by the Contractor must be from the same source of manufacturer with over 10 years of manufacturing history unless otherwise approved by the Architect. The Contractor must ensure that all components of the system would be suitable for use for the specific purpose of each individual case and be compatible with one another and the finishing material.
- 2.9.1 The origin of material shall be in Europe and the compliance of gypsum based products with the European Standard EN12859 is documented on all delivery notes and all packaging with the CE Mark.
- 2.9.2 The manufacturer must have the quality standards of ISO 9001, 14001 and ISO 50001;
- 2.9.3 The manufacturer shall provide a material insurance cover amounts to 25,000,000 EUR for bodily injuries and 10,000,000 EUR for property damages.
- 2.9.4 Not detected denotes result of Heavy Metal and Organic Compounds in accordance with US EPA 1311 and HKGBC Green Product Accreditation and Standards.
- 3.0 Performance - Technical Issue based on 100mm thick wall system
- 3.1 Density of the High Density Gypsum Block and Hydro High Density shall be 1,200kg/m<sup>3</sup> with a compressive strength not less than 14N/mm<sup>2</sup>. Water Absorption rate of the Hydro High Density shall be 0.53% H1 class in accordance with EN12859 standard.
- 3.2 The High Density Gypsum Block wall system shall have a minimum FRP of 4 hours FRP (100mm thick) in accordance with BS476 Part 22 and ASTM E119-11a
- 3.3 The STC rating of 80mm and 100mm thick High Density Gypsum Block wall system shall achieve a minimum value of STC41 and STC45 as tested in accordance with ASTM E-90-04 "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
- 3.4 The High Density Gypsum Block wall system shall comply with the following when tested in accordance BS 5234 part 2 1992
- 3.4.1 Determination of Partition Stiffness-  
Maximum deflection of 0.33mm with Apply Load of 500N
- 3.4.2 Surface Damage of a Wall Partition by Small Hard Body Impact  
Depth of Indentation not exceed 4.99mm with an impact energy of 6N.m
- 3.4.3 Resistance of a Wall Partition to Damage by Impact from Large Soft Body  
Permanent Deformation of not exceeding 0.13mm
- 3.4.4 Determination of Partition Stiffness-  
Maximum deflection of 0.33mm with Apply Load of 500N



- 3.4.5 Resistance of a Wall Partition to Structural Damage by Multi-Impacts  
No collapse of Dislocation with Impact Energy of 120N.m
- 3.4.6 Resistance to Crowd Pressure  
No Collapse or Damage with Applied Load of 1.875kN or 3.75kN.
- 3.4.7 Light Weight Anchorage Pull Out Test  
No Release of Shim Plate or Damage to the Partition
- 3.4.8 Light Weight Anchorage Pull Down Test  
No Release of Shim Plate or Damage to the Partition
- 3.4.9 Heavy Weight Anchorage (Wash Basin)  
Deformation not exceed 0.56mm Observed at a loading
- 3.4.10 Heavy Weight Anchorage (High Level Wall Cupboard)  
Test Grade of Heavy Duty (4,000N)
- 3.4.11 Effects of Door Slamming  
Test Grade of Medium and Heavy Duty
- 3.5 The content of Calcium Sulfate Dihydrate in the High Density Gypsum Block shall not be lower than 95% by weight as tested in accordance with BS 1191-1:1973
- 3.6 The content of Chloride in the High Density Gypsum Block shall be 0.1% by weight or less as tested in accordance with CSI:2010
- 3.7 The pH Value of the High Density Gypsum Block shall be within pH 5 to 9 as tested in accordance with Geospec 3:2001, C1.9.5 at the temperature of 22°C.
- 3.8 Not detected denotes result of Heavy Metal and Organic Compounds in accordance with US EPA 1311 and HKGBC Green Product Accreditation and Standards.

#### 4.0 – Performance – Environmental Issue

- 4.1 The High Density Gypsum Block shall fall within the definitions of Environmental Product Declaration ISO 14025 and Sustainability in Building Construction as per the drafts of CEN/TC 59 Building Construction SC 17
- 4.2 The High Density Gypsum Block shall fulfill the emission test in compliance with DIN EN ISO 16000-9/-11
- 4.3 The High Density Gypsum Block shall be tested and complies the life cycle assessment in accordance to DIN ISO 14040 et seq.

## 5.0 - Installation

- 5.1 Beginning of installation work shall constitute the installer's acceptance of the conditions of the substrate in which the Work to be installed or affixed to. Nothing in the material, workmanship or construction method used in the Work of this section shall invalidate any manufacture's warranties or reduce their warranty period.
- 5.2 For the installation of wet area, Water Repelling Hydro High Density Gypsum Block shall be used for the bottom course and moisture sealant shall be applied.
- 5.3 The High Density Gypsum Block wall shall be erected full height to the ceiling soffit. Opening for equipment and services installation will then be formed as marked on completed wall.
- 5.4 Cut Gypsum Block with power saws to provide, clean and sharp edges. Cut Gypsum Block to provide continuous pattern and to fit adjoining construction. All cutting process of Gypsum Block should be provided with sufficient vacuum cleaner to minimize dust generated on site. Use full-size Gypsum Block without cutting where possible.

## 6.0 - Tolerances

Materials, products and support system specified in this section shall be installed to meet the following requirements on tolerances. Tolerances are non-cumulative.

- 6.1 Plumb
- Variation from vertical lines and surfaces of column, internal corners shall not exceed +/- 8mm for 8m heights
- 6.2 Level
- Variation from level for bed joints and lines of exposed sills, parapets, horizontal grooves and other conspicuous lines shall not exceed +/- 6mm for 6m lengths  
+/- 12mm for 12m lengths or more
- 6.3 Surface Accuracy
- Surface of the finished gypsum block wall shall be to a true plane and to correct line and level. Maximum deviation permitted in surfaces shall be 3mm when measured with a 1800mm straight edge in any direction. Angles and corners shall be right angles unless otherwise required, with walls and reveals plumb and square.
- 6.4 Notwithstanding the above, the Work shall have a satisfactory visual appearance, being square, regular, true to line, level and plane with a close fit to all junctions, all to match approved trial panel. Stepping at joints between Gypsum Blocks, or other sudden irregularity is not permissible.

## 7.0 - Technical Submission

### 7.1 Calculations

Calculations shall be prepared by an Engineer and verified by a Register Structural Engineer confirming that the Gypsum Block wall systems have been designed to satisfy the specified performance requirements, in particular regard to the specified loading criteria and maximum deflection limits

### 7.2 Shop Drawing

The Contractor shall be responsible for the preparation of shop drawing with all demarcation plans, installation details and interfacing details to the Architect for Approval before placing orders.

### 7.3 Method Statement

#### I. Installation Procedure

Step1 - Set out position of the wall & opening position on the floor and intersecting walls.

*The following information shall be provided by the Main Contractor prior of gypsum block wall erection:*

- *Setting out lines for start and end of gypsum block wall erection*
- *Setting out lines for thickness of gypsum block wall erection*
- *Setting out lines for door opening with sub frame installed.*

Step 2 - Plumb bob at the beginning and end of the wall to the verticality and alignment of the new built wall.

Step 3 - For connection adjacent to existing floor slab/ ceiling soffit, 8mm diameter dowel bars shall be installed at a spacing of 500mm for walls. Dowel bars shall be 8mm diameter Grade 43. Refer to shop drawings for detail arrangement.

*(Paint Brush will be used to clean the surface prior of drilling of re bar)*

Step 4 - Prior to the erection of the MultiGips High Density Gypsum Block, use electrical stirrer to mix the Gypsum Block Adhesive with water at a ratio of (2 : 1). Opening time of mixed Gypsum Block adhesive will be approximately 90 minutes

*(In order to ensure the adhesive is used up within the opening time, the site supervisor will record the time for the Gypsum Block Adhesive mixed and ensure only the adhesive is used within the time frame recommended)*

### 7.3 Method Statement (Cont'd)

Step 5 - Once the Gypsum Block Adhesive is ready mixed, apply Adhesive by using a broad knife or trowel to all leading edges of the block. Set the first block in place with the groove edges facing down and adjacent to the intersecting wall.

Step 6 - Tap each block into position by hand to ensure a tight joint with joint width 2mm to 5mm. Also, line string is also used to ensure the alignment. Excessive compound squeezed out shall trowel cut to provide a smooth joint.  
*(Bonding agent shall be applied for the whole length of block joint)*

Step 7 - Once the first row is erected, start alternative courses with half block (Please refer to attached shop drawing for detail arrangement). Apply Adhesive into the horizontal edge of the bedding plane and position the second course of blocks, again working from the intersecting wall. Check each block for correct alignment in all directions.

Step 8 - For connection adjacent to existing wall & column/ block wall, applying adhesive to the edge of gypsum block and tap each block into position by hand.

Step 9 - For the location in which required half blocks and short modules, all those blocks shall be sawn before bonding into place.  
*(In order to minimize the dust spreading around, vacuum cleaner will be used during the sawn cut of the gypsum block)*

Step 10 - For the last piece in which is reaching the ceiling soffit, MultiGips Gypsum Block must be accurately cut to height with ceiling gap of (20mm +/- 5mm) for the application of Gypsum Block Adhesive.

Step 11 - Once the MultiGips Gypsum Block wall is erected, E & M services/ openings could be marked on gypsum block wall. The erected block wall could be chased on the following day.  
*(In order to maintain the accuracy for the depth of the grooved formed, imported machine with special cutting disk will be used to achieve the designated width and depth of the recess groove)*

Step 12 - For openings formed for the building services as required, other contractors should be responsible for filling the gaps after the installation of services. For openings custom reserved for installation of sleeves for building services, Gypsum Block adhesive will be used to fill around the gap between the opening and the sleeves. Gaps between the sleeve and the services will be filled up by other contractors

### 7.3 Method Statement (Cont'd)

Step 13 - For chasing of E & M services, the following method is recommended to use:

- Firstly, mark the routing and location of all concealed conduit and junction box on the erected block wall.
- Secondly, use electrical sawing machine sawn a groove lines on the concealed conduit location and all sides for junction box location.
- Thirdly, form the routing of concealed conduit and junction boxes by hammer and spade with due care.
- E & M services will then be installed.
- Lastly, after the installation of E & M services, the installed conduit shall be cover by a minimum thickness of 10mm Gypsum Block adhesive for having the best result at the MultiGips Gypsum Block wall surface.  
(In order to minimize the dust spreading around, vacuum cleaner connecting to the groove forming machine will be used during the forming of E & M recess groove prior of conduit laying)

Step 14 - After the installation of all E & M services, Gypsum Block adhesive as prepared in accordance to Step 4 should be used to fill the access and socket. Adhesive shall be flushed with the base of junction box.

## II. Application Method for Finishing Material

### a MultiGips High Density Gypsum Block with Paint Finish

Step 1 - Apply skim coat to the completed MultiGips High Density Gypsum Block Wall as per the recommendation of skim coating manufacturer.

Step 2 - Apply painting material on to the skimmed surface

### b MultiGips High Density Gypsum Block with Wall Paper Finish

Step 1 - Apply skim coat to the completed MultiGips High Density Gypsum Block Wall as per the recommendation of skim coating manufacturer.

Step 2 - Install the wallpaper as per the recommendation of Wall Paper Manufacturer.

### c MultiGips High Density Gypsum Block with Tile Finish

Step 1 - Mix and apply the tile adhesive as per the recommendation of Tile Adhesive Manufacturer

Step 2 - Install the tiles as per the recommendation of Tile's supplier.

### 7.3 Method Statement (Cont'd)

#### III. Mounting of Fixtures onto MultiGips High Density Gypsum Block

- a Dowels – Dowels and anchors to Architect's approval to be used for mounting fixtures in gypsum blocks. To be taken into account in each case are the values given by the manufacturer of the dowel for the depth of the drilling and recommended working load.
- b Drillings – The drilling should be carried out using HSS drills without impact and in accordance with the manufacturer's recommendations.
- c Edge Separations – To prevent spalling, there is to be sufficient separation (50mm min.) between the drilling hole and the edges of the wall.
- d Screws and Plastic Plugs – Screws and plastic plugs to Architect's approval shall be used for the mounting of fixtures on MultiGips High Density Gypsum Blockwall.
- e The recommended working loads given in the table below is an example for reference only. The figures are provided by the manufacturer of the anchor system. Details of the anchor system shall be obtained from the manufacturer.

Hilti Anchor System <i>or equivalent approved</i>	Recommended Tension Capacity (kg)	Recommended Shear Capacity (kg)
Universal plastic anchor HUD-1 6x30	12	12
Universal plastic anchor HUD-1 8x40	102	102
Universal plastic anchor HUD-1 10x50	100	100
Door frame plastic anchor & screw HRD-UGT 10	134	134
Screw anchor HUS-H 6x45	35	35
Screw anchor HUS-H 10x75	148	148

## 8.0 – Quality Control

- 8.1 Mock-up Panel or agreed size shall be prepared to demonstrate the installation procedures of gypsum block wall systems. The approved panels shall be used and set as the control reference quality for the work.
- 8.2 The manufacturer shall provide training and guidelines to the Main Contractor for the installation of gypsum block work. Regular site inspections shall be carried out by the manufacturer/ material supplier to ensure that the gypsum block work is carried out in full accordance with the Specification.
- 8.3 The Main Contractor shall in conjunction with the Architect's representative, carry out periodic random sampling check and regular surveillance weighting test of products for matching the surface-mass tolerance and density of gypsum block.
- 8.4 When deemed necessary, the Main Contractor shall also engage the help of an independent laboratory accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) to carry out on site compressive strength test to CSI : 2010 selected by the Architect.

## **SECTION 21**

### **FINISH CARPENTRY**

#### **21.1      GENERALLY**

- A. Section Includes: The Work of this Section includes, but is not limited to the furnishing and installing of the following:
1. Casework and cabinetry
  2. Shelving and ancillary supports
  3. Plastic Laminate Materials
  4. Flooring
  5. Finish Carpentry Hardware, Adhesives and Joinery Fixings

#### **21.2      REFERENCES**

- A. British Standards
1. BS 1186: Part 1: 1991 - Specification for Timber
  2. BS 1186: Part 2: 1988 - Specification for Joinery Workmanship
  3. BS 1202: Part 1: 1974 - Steel Nails
  4. BS 1203: 1979 (1991) - Specification for Synthetic Resin Adhesives (Phenolic and Aminoplastio) for Plywood
  5. BS 1204: 1993 - Specification for Type MR Phenolic and Aminoplastic Synthetic Resin Adhesives for Wood
  6. BS 1210: 1963 - Specification for Wood Screws
  7. BS 5669: Part 1: 1989 - Particleboards: Methods of Sampling, Conditioning and Test
  8. BS 5669: Part 5: 1989 - Code of Practice for the Selection and Application of Particleboards for Specific Purposes
  9. BS EN 438: Part 1: 1991 - Decorative High Pressure Laminates (HPL) Sheets Based on Thermosetting Resins: Specifications
  10. BS EN 438: Part 2: 1991 - HPL: Determination of Properties



### 21.3 QUALITY ASSURANCE

- A. Qualification of Joinery Specialist Sub-Contractor: Company specializing in high-quality, commercial grade, finish carpentry work, with minimum of five years documented experience.
- B. Qualification of Wood Veneer and Joinery Wood Specialist Supplier: Company Specializing in the supply and exporting of tropical hardwood and exotic wood veneer with minimum of fifteen years of documented experience. The Wood Specialist Supplier shall have a thorough knowledge of tropical hardwood and exotic wood and their manufacturing and quality.
- C. Finish Carpentry Wood Qualities
  - 1. All wood veneer, wood casework, joinery, paneling, built-in furniture and other finish carpentry work shall conform to the American Woodwork Institute AWI Quality Standards for "Premium Grade" Construction Woodwork.
  - 2. All timber, wood veneer and other exposed wood items shall be equal in appearance and quality to the approved veneer and wood range samples selected by the Architect. No finish carpentry wood shall be installed until Finish Carpentry Shop drawings and range samples have been approved by the Architect.
- D. Finish Carpentry Environmental Control
  - 1. All Joinery items, casework, paneling, built-in furniture and other finish carpentry pieces shall be allowed adequate time for conditioning and acclimatizing prior to final installation. Enclose Project Building and maintain uniform indoor psychometric conditions as much as possible prior to Finish Carpentry Work.
  - 2. The Main Contractor and the Joinery Specialist Sub-Contractor shall ensure that the moisture content of the various items of joinery are appropriate to each different indoor psychometric condition encountered; and to further ensure that the arrangements, jointing and fixing of all joinery be such that shrinkage in any part or in any direction shall be accommodated in the joints, and shall not impair the strength and/or appearance of any finished articles. Should any shrinkage or warping of joinery take place so as to impair the strength and/or appearance of finished work during the of Defect Liability Period, the Main Contract and Joinery Specialist Sub-Contractor shall make good all defects to the satisfaction of the Architect. Defective joinery work shall be taken down, refitted, redecorated and/or replaced. Any Work disturbed shall be made good at the Joinery Specialist Sub-Contractor's expense.
  - 3. By executing the Work of this Section, the Joinery Specialist Sub-Contractor will assume to warrant all materials, joinery work, case work, built-in furniture and other finish carpentry items are suitable, compatible and free of workmanship and material defects in the various indoor psychometric and environmental conditions.

### 21.3 QUALITY ASSURANCE (CONT'D)

#### E. Indoor Air Quality Control

1. The Joinery Specialist Sub-Contractor, the Mechanical Sub-Contractor, and the Main Contractor are cautioned that the Work of this Section will result in the release of formaldehyde, volatile organic compounds and other toxics which may be attributable to the "Sick Building Syndrome (SBD)". The Main Contractor and the Mechanical Sub-Contractor shall ensure that the Project Building is entirely purged of formaldehyde, volatile organic compounds (VOC) and other toxics which may be attributable to SBD prior to occupancy of Project Building.

### 21.4 PRE-INSTALLATION CONFERENCE

1. Convene a Pre-Installation Conference at the Project Site, one week prior to commencing Work of this Section. Require attendance of parties directly affecting Work of this Section, including, but not limited to, the Architect, the Main Contractor, the Joinery Specialist Sub-Contractor, job foreman, and all affected trade representatives.
2. Contact the Architect, two weeks prior to Pre-Installation Conference to confirm schedule.
3. Review preparation and installation procedures and coordinating and scheduling required with related Work.
4. Record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending, and to the Architect, for review. Review foreseeable methods and procedure related to Finish Carpentry Work, including the following:
  - (a) Tour, inspect and discuss condition of substrate, fixing methods and other preparatory Work performed by other trades.
  - (b) Review all finish carpentry requirements (Drawings, Specifications and other Contract Documents).
  - (c) Review required submittals, both completed and yet to be completed.
  - (d) Review and finalize Construction Programme of Work related to all Carpentry Work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - (e) Review procedure and measures for protection of workmen from the release of formaldehyde, Volatile Organic Compounds (VOC) and other toxics during Work of this Section.
  - (f) Review with the Consulting Mechanical Engineers requirements for Indoor Air Quality Monitoring and testing procedure for formaldehyde, Volatile Organic Compounds (VOC) and other toxics which may be attributable to "Sick Building Syndrome". Review method of Purging Project Building.

## 21.5 SUBMITTALS

### A. Shop Drawings:

1. Shop drawing plans and elevations shall be shown at 1:20 scale. Detail drawings shall be shown at 1:1 scale.
  2. Shop drawings to indicate the layout and matching of veneers.
  3. Indicate on the shop drawings, layout, pertinent dimensions, anchorages, joint connection details, reveals, movement accommodation joints, joinery trim and skirting profiles, edge constructions and all special decorative features. No shop fabrication shall be started until the shop drawings for that part of the Work have been approved by the Architect.
- B. Provide product data on adhesives, wood products, reinforcements, cabinetry ironmongery and hardware, anchors and fixings. Submit for approval.
- C. Submit chip sample of each type, finish, and colour of plastic laminate. Plastic laminate colours, shall be selected by the Architect.
- D. Submit flitch samples of veneer for Architect selection, in both the finished and unfinished state prior to the ordering of the veneer.
- E. Submit 300 x 300 range samples of the finished veneer. The range is to constitute of five number samples, and is to represent the maximum range in finished approve of the timber veneers.
- F. Samples of curved pieces; scarf and interlocking finger jointing; bullnose, reveal, and edge treatments and fixing hardware shall be submitted in 300mm x 300mm size or length to the Architect for review and approval.

## 21.6 MOCK-UPS

- A. Mock-ups of all other parts of this section are to be produced at the job site, for the Architect/CIC to review and approval. The size of each of these mock-ups to be agreed with the Architect/CIC.
- B. All mock-ups shall be completed prior to the Pre-Installation Conference.
- C. The use of the mock-ups as part of the final Work is at the sole discretion of the Architect/CIC.
- D. The specimens shall be full size and represent, as closely as possible, conditions which will exist in the Completed Project building with respect to the structural arrangement of the members and their anchorages.
- E. Construct the mock-up in strict accordance with endorsed shop drawings. Any deviations from, or additions to, details shown on the shop drawings are subject to endorsement by the Architect/CIC.

#### 21.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store on Project Site all wood and joinery materials and fabricated items only when the Project Building is completely enclosed, moisture-laden materials such as concrete, plaster, etc. are generally dry, and heating or cooling system are functioning to maintain uniform indoor psychometric conditions.
- B. Store all materials and items away from windows or doors. They shall not be exposed to sunlight or subjected to wetting.
- C. Protect all materials and items from damage, staining, traffic and Work of other trades.
- D. Wood shall sit at least 150 mm off unfinished or finished floors.
- E. Check all deliveries and consignments for proper quantity, wood species, and grading. Ensure mill certificates, preservative and fire-retardant treatment certificates accompany all deliveries and consignments. Submit certificate for country of origin of all timber items.
- F. Never stand panels on end against a wall for any length of time. If it is not convenient to lay them flat, they shall stand on their sides with care taken not to chip the sides and edges. Protect all edges and corners from damage.

#### 21.8 STANDING AND RUNNING TRIMS

- A. All trims shall be relief back routed to prevent trims displacement from substrate if trim or skirting cupping occurs.
- B. All trims shall be surfaced smooth on all sides.

#### 21.9 SHELVING

- A. Plywood, 19 mm thick minimum with PVC/ exposed solid wood edge lippings (profile ref. dwgs.) with Perstorp plastic laminate or equivalent as facing (1.5 mm thick minimum) as indicated on the Drawings (colour subjected to Architect/CIC's approval).
- B. Shelving Fixings & Accessories shall be provided as drawings requirements or as Architect/CIC's instruction.

#### 21.10 CASEWORK AND CABINETRY

- 1. Door Hinges, magnetic catches to be fully recessed.
- 2. Cabinet and Drawer Cylinder Rim Locks: 22mm diameter and provided with master key lockset. Stainless steel No. 4 Hairline finish, U.N.O.
- 3. Drawer Slides: Heavy-duty, telescopic extension arm drawer slider, one pair per drawer. Sugatsume Lamp, Häfele, or equal.
- 4. Other accessories as indicated on the Drawings and for proper function.

## 21.11 PLASTIC LAMINATE MATERIALS

- A. High Pressure Laminates: Class D3, Fire Rating F1 and Performance Rating HD-Heavy Duty conforming to BS 4965 : 1991.: Color, pattern, and finish selected by Architect/CIC from Manufacturer's standard products.
1. Exposed Horizontal Surface: HD grade per BS EN 438 : Part 1
  2. Exposed Vertical Surfaces: HG grade per BS EN 438 : Part 1
  3. Adhesive: Thermosetting Resorcinol formaldehyde Type WBP adhesive recommended by Manufacturer for D3 and D4 class plastic laminates, complying with BS4965 and BS EN 204.
  4. Minimum 1.5 mm thickness. Use D4 class plastic laminate for application with frequent prolonged exposure to running or condensed water.
  5. Adhesion of laminate to backing board material shall not exhibit any failure of glue line such that any area of either the laminate or the backing board greater than 40mm<sup>2</sup> is free from adherent matter derived from either backing board or laminate. It is essential that the surface of the substrate should be sufficiently smooth to prevent the transfer of defects through to the decorative laminate surface.
  6. The pattern matching of leaves to be book matched. The panel matching is to be blueprint so that the book matching is continuous across adjacent panels in both directions.

## 21.12 COUNTERTOP

1. Product: To refer drawings and finishing schedule for detail.
2. Sample of minimum size 200 x 200 should be submitted for approval
3. One piece delivery to be ensured to suit the counter top design, without division line, unless otherwise stated.

## 21.13 WOOD VENEER MATERIALS

- A. Wood Veneer, Curly Maple Veneer to American Woodwork Institute (AWI) "Architectural Woodwork Quality Standards, Premium Grade." To match samples provided by Architect. All veneer to be rift sliced. The veneer matching of leaves to be book matched. The veneer matching in panel face to be centre. The panel matching is to be blueprint so that the book matching is continuous across adjacent panels in both directions. A premium grade acid catalysed transparent lacquer finish, stain as required, to match Architects sample with rubbed medium gloss sheen all as required to match Architects sample. Quarter sawn solid stock maple to be use as edge lipping, finish to match veneer.

#### 21.14 FLOORING

Boarded or strip flooring to be oak white tinted and heavy brushed engineered flooring or other approved hardwood, as specified. Surface finishes shall refer to drawings and finishing schedule for details. Boarded or strip flooring shall be free from cracks or sharp edges and uniform in colour and texture.

#### 21.15 FABRICATION

- A. All casework, furniture, built-in items and other custom-made finish carpentry shall be tongue and groove mitred jointed, glued and reinforced with wood splines. They shall be rigidly built with no distortions, opened joints, and other apparent or defective workmanship, materials and connections.
- B. The Joinery Specialist Sub-Contractor shall ensure that the arrangements, jointing and fixing of all casework, furniture, built-in items, etc. are such that shrinkage in any part, or in any direction, shall be accommodated in the joints, and shall not impair the strength and/or appearance of the finished articles. Should any shrinkage or warping of casework, furniture, built-in items, etc. take place so as to impair the strength and/or appearance of the finished work during the Defect Liability Period, the Joinery Specialist Sub-Contractor shall make good such to the satisfaction of the Architect/CIC.
- C. Fabricate finish carpentry in largest practical length.
- D. All ironmongery and hardware shall be fully rebated.

## 21.16 PREPARATION

- A. Preparation for Finishing: Sand work smooth and set exposed nails and screws. Apply wood filler in all exposed nail and screw indentations.
- B. Verify mechanical, electrical, and building items affecting this Section are in place, tested, approved, and ready to receive the Work of this Section.
- C. Prime paint surfaces of items and assemblies in contact with cementitious materials.
- D. All finish carpentry materials and items are properly conditioned and acclimatized so as to prevent later shrinkage, warping or opened joints.

## 21.17 INSTALLATION

- A. Install woodwork plumb, level, and straight without distortion; use concealed shims. Scribe and cut woodwork to fit adjoining work. Anchor woodwork items to anchors or blocking or directly to substrate using concealed fasteners.
- B. Standing and Running Trims : Install with minimum joints, using maximum lumber lengths possible. Cope at returns; mitre at corner. Use scarf joints where necessary for base skirting. Butt joints are not permitted.
- C. Casework: Provide well-fitting and smooth operating doors and drawers. All cabinet door and drawers shall have nylon stoppers. Provide run on drawer slides.
- D. The Joinery Specialist Sub-Contractor shall verify the dimensions shown on the Drawing at the Project Site and shall allow necessary tolerances so that furniture fits neatly between walls with minimum gaps in between. The Finish Carpentry Specialist Sub-Contractor shall take all measurements for joinery works at the Project Site and not from the drawings. Tolerances for cabinet door swing and drawer clearances shall also be verified prior to fabrication, installation or ordering of cabinets.
- E. All arises shall be slightly rounded, 1.5mm radius.
- F. All timber that is to be exposed in the finished surfaces of joinery works shall be dressed on the appropriate faces, unless otherwise stated. Exposed end grain shall be finished smooth to a degree equal to the overall finish. Joiner's work shall generally be finished to a fine glass papered surface unless otherwise stated.
- G. All panel trim to have 45 degree mitre corners, all edges and corners to be slightly eased or rounded to minimum 2mm radius. All joints in skirting, cornices, trim must be cut and overlapped 45 degree (scarf joint), no butt joints permitted. All panel trim shall be of a single length of timber without joints. In no case shall trim lengths be pieced together of short (under 3500mm) lengths.

## 21.17 INSTALLATION (CONT'D)

### H. Plastic Laminates:

1. Cut, fit and bond sheets to the surfaces specified, or as shown on the Drawings, with a specified type WBP adhesive recommended by the Manufacturer of the laminate, and neatly trim as required. Butt chamfer where returned around salient edges. Perform bullnoses where indicated in strict accordance with the limitations of the material as recommended by the Manufacturer. Where radius corners and bullnosed edges are detailed, these shall be formed in post formed quality laminates.
  2. All inside faces of laminated cupboards, built-in furniture etc. shall be fully laminated internally with matte white laminate, or as otherwise indicated on the Drawings.
- I. Provide adequate fresh air, exhausting and other measures to ensure that specified indoor air quality during and after Work of this Section is met. All formaldehyde, volatile organic compounds and other toxics released during the Work of this Section shall be purged in strict accordance with the Consulting Mechanical Engineer's Contract Documents.
- J. Protect all finished carpentry, casework, furniture, and built-in items from damages, staining and adverse indoor psychometric conditions until Project Handover. The Joinery Specialist Sub-Contractor and the Main Contractor shall be liable for all repair, replacement and expenses for their failure in adhering to this requirement.

## 21.18 CLEANING & POLISHING

- A. Remove dirt, stain, finger prints, etc. upon completion of Finish Carpentry Work.
- B. Clean soiled surfaces with cleaning solution compatible and approved by the Manufacturer of the finish coating.
- C. Use non-metallic tools in cleaning operations.
- D. Wax and repolish all wood joinery as recommended by Manufacturer, prior to final handover.

## 21.19 PROTECTION

- A. During and after Finish Carpentry construction, all work subject to staining or damage shall be protected by heavy-duty boards. The protection shall be kept in position, and maintain in good condition, by the Main Contractor until Project Handover.
- B. Protect all exposed corners and edges from foot and wheel traffic and impacts.
- C. Replace all damaged finish carpentry to the Architect/CIC's Satisfaction.



## **SECTION 22**

### **STRUCTURAL STEEL**

#### 22.1 **GENERAL**

##### 22.1.1 **Scope**

This section specifies the general requirements for all structural steelwork to be incorporated in the works. Non-structural metalwork is not covered by this section.

##### 22.1.2 **Authoritative Standards and Codes of Practice**

(a) The following authoritative documents are referred to hereinafter:

- (i) British Standard Specifications as published by the British Standards Institution, 2 Park St., London W1 (abbreviated in the text to BS).
- (ii) British Standard Codes of Practice published by the British Standards Institution, London (abbreviated in the text to CP).

<b><u>CP</u></b>	<b><u>Date</u></b>	<b><u>Title</u></b>
3 Chapter V. Pt. 2	1972	Wind loads

- (iii) Codes of Practice under the Buildings Ordinance published by the Buildings Department of the HKSAR Government:-

<b><u>Date</u></b>	<b><u>Title</u></b>
2004	Code of Practice on Wind Effects
2005	Code of Practice for Structural Use of Steel

- (b) Should the Contractor wish to substitute any other standard or code of practice either in its entirety or in part, for any of those listed above he should submit details of such together with two complete copies to the Architect/Engineer for his approval. Generally, approval will only be given where the Architect/Engineer considers the proposals to give at least an equivalent standard of the finished work.
- (c) Materials and workmanship for all structural steelwork shall be in accordance with "The Structural Use of Steel 1987" by the Buildings Department of the HKSAR Government for building and general work, and shall be in accordance with BS 5400 for bridge works, except where superseded by this specification.

## 22.1 GENERAL (CONT'D)

### 22.1.3 Approvals

Before construction commences the Contractor shall supply to the Architect/Engineer a fabrication and erection method statement for his approval such details as he may require of the welding plant, techniques and procedures, jigs, workshop facilities and construction devices e.g. cranes, scaffolding etc., which the Contractor proposes using for the fabrication and erection of the steelwork. The information shall be in sufficient detail to enable the Architect/Engineer to approve or otherwise.

### 22.1.4 Safety

Safety precautions to be observed throughout the fabrication, transport, handling and erection of structural steelwork shall comply with the safety recommendations give in BS 5135 and with the local safety regulations.

## 22.2 MATERIAL

### 22.2.1 Steelwork for Hot Rolled Sections

- a) Mild steel for hot rolled sections shall be to grade 43C of BS 4360 unless otherwise stated.
- b) The finished dimensions, forms, weights and tolerances of all sections shall comply with BS 4 Pt. 1 or BS 4848 as appropriate for solid or hollow sections.
- c) The Contractor shall obtain a manufacturer's certificate of test in accordance with the appropriate standard for each steel batch relating to steel to be used in the works.
- d) Notwithstanding the manufacturer's certificate, the Architect/Engineer will require that any steel to be used in the Works be sampled and tested in accordance with BS 4360 or BS EN10 at the rate of one sample per 40T or part thereof. Any batch of steel so tested which fails to comply with this specification will be rejected.
- e) All steel for use in the Works shall be stored whether on the site or in fabrication works in clean and dry conditions, in clearly identified batches and protected from damage and heavy rusting.
- f) High yield steel shall be to grade 50B of BS 4360 unless otherwise stated.
- g) Structural steel hollow sections, and equal and unequal angles, shall comply with the dimensions and dimensional tolerances given in BS 4848.
- h) The correction of surface defects in rolled steel sections shall be limited to that covered by Clause 9.2.2 of BS 4360 unless otherwise approved by the Architect/Engineer.

## 23.2 MATERIAL (Cont'd)

- i) The dimensional tolerances of plates, flat bars and wide flats shall be in accordance with Section 2 of BS 4360 except that the tolerance on thickness shall be wholly over the thickness shown on the drawings unless otherwise specified.
- j) Steel to be used in built-up welded assemblies or at welded connections shall have a carbon equivalent value not exceeding that appropriate to the grade of steel given in table 2 of BS 5135 where this may be required for the avoidance of hydrogen cracking in welds unless the Contractor's proposed welding procedures are such as to make this requirement unnecessary.
- k) Steel plates and flats which may, as a result of welding, be subject to lamellar tearing shall be quality graded by ultrasonic testing using equipment as described in Section 2 of BS 5996 and, unless otherwise specified or agreed, be of quality grade LC3 as defined in section 3 of that document.

### 22.2.2 Bolts, Nuts and Washers

- a) Bolts shall be hexagon headed bolts to grade 8.8 of BS 3692 unless otherwise stated.
- b) Nuts shall be hexagon headed in accordance with BS 3692 unless otherwise stated.
- c) Washers shall be normal black metal washers to BS 4320 unless otherwise stated.
- d) Where necessary washer shall be tapered D-shaped washers of steel or malleable cast iron.
- e) The Architect/Engineer will require that any bolts to be used in the Works be sampled and tested at the rate of 2% of bolts. Any batch of bolts so tested which fails to comply with this specification will be rejected.

### 22.2.3 Welding Electrodes

- a) Welding electrodes shall be grade A to BS 639 of the best heavy coated type.
- b) Electrodes shall be of a type appropriate to the grade of steel being welded.
- c) The Contractor shall obtain the manufacturer's certificate to show that each consignment complies with the specification.
- d) Electrodes shall be kept in unbroken packets in a dry store to which the Architect/Engineer shall have reasonable access at all times to inspect and to reject any electrodes that he considers unsuitable.
- e) Electrode classification shall be to BS 639.

## 22.3 WORKMANSHIP

### 22.3.1 Fabrication – General

- a) The Architect/Engineer shall have access at all reasonable times to all places where work is being carried out, and shall be provided, by the Contractor, with all necessary facilities for inspection during fabrication and off-site assembly.
- b) All material, before and after fabrication, shall be straight unless required to be of curvilinear form, and shall be free from twists.
- c) At all stages of fabrication, structural steel shall be positively identified by grade, either by colour marking or by other approved marking system.

### 22.3.2 Fabrication Tolerances

- a) The Contractor shall fabricate all steelwork to give a finished product that is true to size and out of winding. Particular care shall be taken when welding to avoid distortion of hollow steel sections, plates and angles.
- b) Where repetition or interchangeability of units is required the fabrication shall be carried out so that the critical dimensions of the unit when measured by a tape calibrated at 20°C comply with the tolerances given in table A.
- c) The use of jigs is required for repetitive, interchangeable or complicated work.
- d) All measurements shall be marked by a steel tape or bands calibrated at 20°C and used at the correct tension.
- e) Allowance in setting out continuous structures shall be made for dimensional variations due to temperature variations.

**TABLE A Fabrication Tolerances for Repetitive or Interchangeable Units**

<b>Dimension Measured</b>	<b>Tolerance for Single Element</b>	<b>Tolerance on overall dimension of assembled system of more than one element</b>
Not exceeding 2.500m	±1 mm	±1 mm
Exceeding 2.500m but not Exceeding 5.000m	±1.5 mm	±1.5 mm
Exceeding 5.000 but not Exceeding 10.000m	±2.0 mm	±2.5 mm
Exceeding 10.000m but not Exceeding 15.000m	±2.0 mm	±4.0 mm
Exceeding 15.000m	±5.0 mm	±5.0 mm

## 22.3 WORKMANSHIP (CONT'D)

### 22.3.3 Straightening Bending and Cambering of Steel Sections

Where steel sections are required to be straightened, bent to a specified radius or pre-cambered the methods to be adopted to perform these operations shall be proposed to the Architect/Engineer for his approval in each case. Such methods shall neither weaken nor deface the material.

### 22.3.4 Prefabrication priming

Where fabrication of steelwork is to be carried out after surface preparation the protection required shall be provided by means of an approved prefabrication primer which will not give off toxic fumes whilst welding is in progress.

### 22.3.5 Cutting, Drilling and Forming

- a) All steelwork shall be cold sawn or machine gas cut and no manual gas cutting shall be used without approval.
- b) Where machine gas cutting is used or any manual gas cutting is permitted notches or heat affected metal shall be ground off. Where gas cutting is applied to BS 4360 grade 43 steel over 25mm thick or to BS 4360 grade 50 steel of all thickness, any gas cut edge which is to be stressed along its length but not subsequently incorporated in a weld shall be machined so as to remove not less than 3 mm of the flame cut profile.
- c) All projecting corners of cleats, plates, etc. shall be neatly splayed and all burs and rough edges shall be removed. The edges and ends of all flanges and end plates of girders or other members shall be machined except where Universal beams or flats with reasonable square edges are used. The edges of all web and flange plates of welded girders shall be machined square unless specified otherwise. Where plates are specified to be planed off all edges. The edges of floor plates, gutter plates, and trough flooring may be sheared.
- d) All butt ends of compression members shall be machined square and in close contact throughout so that applied loads are evenly transmitted over the entire area of the section.
- e) All holes for fasteners shall be drilled and no punching nor gas cutting will be permitted.
- f) All holes shall be accurately marked from templates and shall be drilled through the solid metal to give smooth edges.

## 22.3 WORKMANSHIP (CONT'D)

### 22.3.5 Cutting, Drilling and Forming (Cont'd)

- g) Holes for the assembly of built-up sections shall normally be drilled after the members have been assembled and lightly clamped together. Where this is not practicable, holes shall be drilled to a diameter at least 2 mm less than the required size and reamed after assembly except that, where holes are drilled in one operation through parts which would not otherwise be separated after drilling, the parts need not be separated to remove the burrs provided that the holes are for black bolts only.
- h) Finished holes for black bolts shall not be more than 2 mm in diameter larger than the diameter of the bolt passing through them for bolt diameters up to 24mm, and not more than 3 mm larger than the diameter of the bolt for bolt diameters over 24 mm, unless other specified by the Architect/Engineer or required by the design.
- i) Where slotted holes are required they shall be formed by first drilling and then reaming out smooth to the size required.
- j) Provision shall be made to prevent the ingress of moisture to the interior of sealed hollow members where these are holed for bolts.

### 22.3.6 Clearances

Care shall be taken to ensure that the clearances specified are worked to. The erection clearance for cleated ends of members connection steel to steel shall not be greater than 2 mm at each end. The erection clearance at ends of beams without web cleats shall not be more than 3 mm at each end, but where, for practical reasons, this clearance has to be increased, the seating shall be suitably designed.

### 22.3.7 Welding

- a) Welding shall be carried out generally in accordance with BS 5135.
- b) The Contractor shall submit in writing, for the Architect/Engineer's approval, details of his proposed welding procedure for each type of welded connection providing information in respect of the relevant item (a) to (h) of clause 23 of BS 5135 and particulars of the preparation of the fusion faces. Approval testing of each welding procedure shall be carried out in accordance with BS 4870 unless acceptable authentic documentation, relating to experience gained with the welding of similar connections, is available.
- c) Before welding commences the Contractor shall satisfy the Architect/Engineer that all his proposed welders are able to deposit the appropriate weld type to the required standard. The qualifying tests shall be to BS 4872 unless special welding procedures to BS 4870 are required when welder testing shall be to BS 4871.

## 22.3 WORKMANSHIP (CONT'D)

- d) Approval testing of welders working to each welding procedure shall be carried out unless not more than six months has elapsed since the welder was last tested on the approved or similar procedure and has continued to produce satisfactory welds as verified by non-destructive testing.
- e) Welding plant, equipment and accessories shall comply with the requirements of BS 638.
- f) Individual transformers or motor generators shall be fitted with a current density control and shall be situated as close as possible to the welder so that he may have at hand the means to adjust the current.
- g) In order to show that current values are within the ranges specified by the manufacturer of the electrodes the transformers or motor generators shall be calibrated regularly by means of an ammeter.
- h) Electrodes shall not be used in a damp condition and where necessary they shall be kept in heated quivers while in use.
- i) The surfaces to be welded shall be free from all scale, grease, paint and rust and other matter. After every run of weld, slag shall be chipped out and surfaces shall be thoroughly wire brushed. All parts to be welded shall be accurately prepared so that they will fit closely together. In the case of fillet welding the contact surfaces shall be held in contact throughout. Tack welds shall be kept to the minimum.

### 22.3.7 Welding (Cont'd)

- j) Location or tack welds where required shall be of the same quality and size as the first run of the main weld when completed shall fuse completely with the ends of the location weld and form a reasonably regular finished profile.
- k) Weld metal shall be properly fused to the parent metal without serious undercutting or overlap at the toe of the weld and shall be free from any type of crack. Welded joints shall be rejected if any of these defects are present and if the examination of the weld reveals lack of penetration, lack of inter-run fusion, slag inclusions, worm holes or porosity such that would impair the strength of the weld and the service performance of the structural member.
- l) Unless shown otherwise on the Drawings, all butt welds shall be complete penetration welds made between prepared fusion faces. In the fabrication of built-up assemblies, all butt welds in each compartment shall be completed, whenever possible, before the final assembly.
- m) Welding shall not be carried out under adverse weather conditions.

## 22.3 WORKMANSHIP (CONT'D)

### 22.3.8 Weld Examination and Testing

- a) Notwithstanding any approval of welders or welding procedures, welds produced for the permanent works shall be examined and tested as detailed before or as further specified.
- b) All welds shall be visually examined with the aid of optical instruments if necessary, to give 100% visual inspection.
- c) All full strength butt welds shall be examined by radiographic methods to BS 2600 or BS 2910 as appropriate to give 100% inspection.
- d) 30% of fillet weld as noted on the Drawings or as directed, shall be examined by radiographic ultrasonic or other non-destructive methods to BS 2600, 2910, 3923 or ASME Code Section 8 as suitable for the type of weld and its location.
- e) Any weld examined or tested and found to have slag inclusions or other unacceptable defects shall be cut out and the weld remade at the Contractor's expense.
- f) Defective weld metal including any damaged parent metal shall be removed and the weld re-made using a method approved by the Architect/Engineer. The repaired weld shall then be examined by an agreed non-destructive method.

### 22.3.9 Black or Precision Bolted Connections

- a) All bolts, nuts and washers shall be Zinc-plated to have minimum coating thickness of 25 micron conforming to BS 1706.
- b) Each bolt shall be provided with one steel washer and one spring washer which shall be placed under the nut or bolt head. All bolt heads and nuts shall be tightened against surfaces normal to the bolt axes and the washers shall therefore be tapered as necessary to meet this requirement.
- c) All bolts shall be tightened securely in the finished work and the length of each bolts shall be such that after tightening at least two thread project beyond the outer face of the secured nut.
- d) Undue force shall not be used to align the holes for bolting and holes shall not be enlarged without prior approval.
- e) Temporary bolts used for the initial or trial assembly of any part of the steelwork shall have the same hole clearances as the permanent bolts.



## 22.3 WORKMANSHIP (CONT'D)

- f) All drifts that may be used during the fabrication or erection of the steelwork shall be of such shape and dimensions as to locate the work accurately. Drifts where used shall not cause any damage to or deformation of the component parts and shall not alter in any way the sizes of the holes provided for the permanent bolts.

### 22.3.10 Galvanization

- a) All steelworks to be hot dip galvanized to BS 5493 : 1977 (system reference SB 2) of minimum coating thickness of 140 micron.
- b) All damaged area of galvanized coating due to transportation, storage and erection shall be renovated by the following procedures:

Mechanical cleaning shall be carried out by power driven tools, such as carborundum grinding discs, chipping hammers and needle guns, followed by steel brushing and dusting to resume all loosened material. All the affected area shall be cleaned to bare metal.

Apply minimum 150 micron Zinc-spray coating on the cleaned area according to BS 2569.

### 22.3.11 Cast-in Items

- a) Where steelwork forms a sub-contract under a main contract the Sub-Contractor shall supply any items required to be cast into concrete. The casting in of such items will be carried out by the Main Contractor but using templates provided by the Sub-Contractor where these are necessary.
- b) Grouting up of holding down bolts shall be carried out after the Architect/Engineer has approved the line and level of all the steelwork. Where the steelwork forms a sub-contract under the main contract this grouting up will be carried out by the Main Contractor.

## 22.3 WORKMANSHIP (CONT'D)

### 22.3.12 Transport and Erection

- a) The Contractor shall make whatever arrangements are necessary for the transport of the steelwork from the fabrication yard to the site. All steelwork shall be carefully loaded stacked and unloaded to avoid damage of any description. Any damaged items shall be replaced unless the Architect/Engineer permits the rectification of the damage. Such replacement or rectification shall be at the Contractor's expense.
- b) The Contractor shall not employ any plant or equipment which in the Architect/Engineer's opinion may be unsuitable, unsafe, or likely to cause damage to the structure during erection or damage to existing buildings, etc.
- c) The materials shall be handled, stored and erected on the site so that the structural steelwork is not subject to stress in excess of those for which it was designed.
- d) Before erection commences the Contractor shall prepare a complete scheme of erection and submit this to the Architect/Engineer for approval. The scheme shall be submitted with sufficient drawings, calculations and written descriptions to enable an adequate assessment of its soundness to be made. Such approval if given shall not in any way relieve the Contractor of his responsibilities for the safety or adequacy of such temporary work.
- e) The Contractor shall supply and erect all necessary false work and staging and shall supply all labour, tools, erection plant, lifts, services, nuts and washers and other necessary materials. Temporary bracings and guys shall be provided to ensure adequate resistance to wind and stability against collapse during construction.
- f) The Contractor shall be responsible for checking all the work prepared by others that may be incorporated into his work or the dimensions of any structure affecting his erection. If as a result of this check the Contractor finds any discrepancies or shortfalls he shall report the situation to the Architect/Engineer immediately.
- g) All setting out shall be carried out with steel tapes or bands calibrated at 20°C and used at the correct tension.
- h) All steelwork shall be leveled to a datum point and aligned to a base line during erection. Both datum point and setting out lines shall be agreed before commencement.
- i) All steelwork shall be accurately and securely located to the correct profile and camber, if any, before assembly.

## 22.3 WORKMANSHIP (CONT'D)

### 22.3.12 Transport and Erection (Cont'd)

- j) All columns and bases shall be accurately to the required lines and levels. Approved means shall be provided to maintain the stanchions in their correct positions until completion of the bolting and grouting. Girders shall be lowered slowly onto their seating cleans at each end and initially secured by at least one bolt and nut. No member of the structure shall be finally bolted or welded until the whole or a major section is approved by the Architect/Engineer for line, levels and verticality. Connections shall be completed as soon as possible after receipt of the Architect/Engineer's written approval.
- k) After transit and erection all damaged coating shall be repaired to the Architect/Engineer's satisfaction.

### 22.3.13 Erection Tolerances

The completed steelwork shall be dimensionally accurate to within the following tolerances :-

- (a) Between the centre lines of principal members :  
+/- 6mm up to 10 metre c/c.  
+/- 10mm over to 10 metre c/c.  
The +/- 10mm tolerance shall not be accumulative.
- (b) In storey height : +/- 5mm floor to floor.
- (c) In plumbness of columns : +/- 10mm on any storey or overall the structure.
- (d) In bow of any member : +/- 3mm in any 5.0mm unless specifically pre-cambered or radiuses.
- (e) In twist of any member : +/- 10mm in any 1.0m.

## 22.4 DESIGNS BY CONTRACTOR

- i) The Contractor shall design all steelwork to comply with the information given on the Drawings and the following information. In general member sizes on the Drawings will be given as serial sizes and loads will be indicated under dead and superimposed live loads only. Wind loading, seismic loading and thermal loading will not generally be shown.
- ii) The design shall comply with the requirements of Code of Practices Structural Use of Steel 2005.
- iii) Wind loading in Hong Kong shall be calculated in accordance with the Code of Practice on Wind Effects Hong Kong. Elsewhere wind loading shall be calculated in accordance with CP3 Chapter V Pt2 using basic wind speeds further specified of instructed.
- iv) Seismic loading, where this needs to be considered, shall comply with the appropriate national standard for the design of structures in relation to earthquakes.

## 22.5 FABRICATION DRAWINGS / SHOP DRAWINGS

- i) The Contractor shall prepare such fabrication drawings that are complete in such detail as may be necessary to enable the Temporary Works & Permanent Works to be fabricated and subsequently erected on site and to enable the Architect/Engineer to approve the Contractor's proposals and details for the execution of the Works.
- ii) Drawings shall be prepared on standard A1 size sheets correctly titled, referenced and with the Contractor's name. Alternative size sheets may only be used with the approval of the Architect/Engineer.
- iii) Welding shall be shown on drawings using welding symbols to BS 499.
- iv) All fabrication drawings must be submitted to the Architect/Engineer for approval and if not so submitted the Contractor shall bear the cost of any rejected work that he has commenced or prepared. It is recommended in view of the following clause, that the Contractor allow at least three weeks plus delivery time and preferably eight weeks for submission before commencement.
- v) The Architect/Engineer requires three copies of all fabrication drawings to be submitted for approval. Usually one copy of these drawings will be returned to the Contractor within two weeks of receipt marked either:
  - (a) Examined and Returned for Correction
  - or
  - (b) Approved with Corrections Indicated
- vi) Such approved fabrication drawings shall not be departed from without the approval of the Architect/Engineer.
- vii) Approval by the Architect/Engineer of fabrication drawings shall not relieve the Contractor or any of his obligations under the Contract nor relieve him of any responsibility for subsequent errors found in the fabrication drawings or in the work on site or elsewhere.

## 22.6 RECORD DRAWINGS

On completion of the erection the Contractor shall revise or redraw his fabrication drawings to show any agreed modifications made during the course of the Contract and shall submit one copy negative or velograph or CDRom of each drawing to the Architect/Engineer for record purposes. Each drawing shall be of standard A1 size and marked revision Z.

## **SECTION 23**

### **CEMENT BOARD AND DRY WALL SYSTEM**

#### **23.1 SCOPE OF WORKS**

Cement Board fixed on the dry wall system as shown in the drawings & schedules shall be supplied and installed by the Contractor.

#### **23.2 GENERALLY**

Unless otherwise specified or counter proposal approved by the Architect, the cement board system shall be the following:

Hofmann Fiber Cement Board

#### **23.3 SAMPLES SUBMISSIONS**

Material Samples to be submitted for Architect and the Employer's approval.

#### **23.4 SPECIFICATION / APPLICATION**

Application refer to the follow attached specification / method statement

## Particular Specification for Cement Board

under normal conditions of handling and storage. Particular attention shall be given to the protection of edges, projecting features, corners and other vulnerable areas.

### 1. Factory Inspections

The Sub-Contractor shall allow for up to eight (8) persons to the place of fabrication (and assembly if different) once every three (3) months or as needed.

The Sub-Contractor shall allow for four (4) persons to the proprietary cladding manufacturer's manufacturing facility.

Should, in the professional judgement of the Supervising Officer and in the opinion of the Employer, any area or facet of the Sub-Contractor's work being performed be considered deficient, substandard or cause for concern for any reason whatsoever, the Sub-Contractor will be notified and periodic or full time supervision over the works will be implemented by the Supervising Officer or his Consultant Team.

### 2. Fibre Cement Board

All cutting finishing and edge labours shall be carried out by personnel skilled according to the manufacturer's recommendation, using modern and well maintained equipment

Exposed surface and edges shall be thoroughly cleaned off all rust stains, accurate, sharp and smooth. Gently sand the edges of panels after cutting to soften the edges. A block of wood, approximately 400x100mm in size with a piece of sandpaper (80-grit) affixed to it shall be used to sand the edges.

Drilling and cutting shall be undertaken without the use of percussive tools. Carbide-tipped twist drill shall be used with in a dry environment and appropriate drill/ cut speeds. All drillings and cutting materials must be removed immediately from the panel with a micro-fibre towel. Any drillings and cuttings causing the permanent stains on the surface of panel shall not be allowed. All drillings and cutting shall be carried out indoors or under a covered area.

The Sub-Contractor shall use a specialist cutting blade, recommended by the supplier of the fibre cement board. The blade shall be unique with its minimal diamond tipped teeth which are shaped to give a tear-free edge, and its vibration damping composite body construction. The specification of the blade shall be as follow:-

Blade Diameter	Blade thickness	Borehole	No. of teeth	Saw Speed rpm
160mm	3.2mm	20mm	4	4,000-6,000

The Sub-Contractor shall design, supply and maintain all equipment, fit for its intended purpose and capable of achieving the tolerances prescribed.

Tolerances shall refer to Tolerance (BS EN 12467:2004 clause 5.3).

## **SECTION 24**

### **DISCLAIMER AND SAFETY SIGNAGE**

#### 24.1 GENERAL

This section applies to all disclaimers and signage. The contractor shall provide the content of the disclaimer in the notice board per advised by the safety expertise / Architect / CIC.

Mock up samples shall be prepared on site for approval of safety expertise/Architect/CIC prior to material ordering.

#### 24.2 HEALTH CONDITION DISCLAIMER

24.2.1 The disclaimer shall include English, Traditional and Simplified Chinese versions.

24.2.2 Any translation of the disclaimer is prepared for convenience or any other purpose, the provisions of the English version shall prevail.

24.2.3 The disclaimer content and format shall be approval before production, a sample of English, Traditional and Simplified Chinese versions disclaimer as follows:



**Construction Industry Council  
Kwai Chung Campus (KCC)  
Safety Experience Training Centre (SETC)**

**Health Condition Disclaimer**

Safety Experience and Training Center's exercise can be strenuous and potentially hazardous. The participant shall rely upon his/ her own judgement in participating in any exercise or manoeuvres. Provided the participant has experienced health situation (e.g. suffer from a heart condition/ wearing a pacemaker/ suffer from any allergies/ history of asthma, epilepsy or blood disorders/ pregnant, breastfeeding or given birth in the last 8 weeks/ on any medication/ any injuries, broken or strained bones, muscle or ligaments), however the participant still decided to attend the exercise or manoeuvres, Construction Industry Council shall not be liable for any pre-existing injuries or medical condition which may be exacerbated.

This release extends to all claims of any kind what so ever, foreseen or unforeseen, known or unknown.

建造業議會  
香港建造學院葵涌院校  
安全體驗訓練中心

## 健康狀況聲明

安全體驗訓練活動屬於劇烈活動以及有潛在危險性，參加者需要自行承擔所參加活動之風險。如果參加者有身體健康狀況 (例如: 患有心臟疾病/ 戴著心臟起搏器/ 過敏/ 哮喘，癲癇或血液疾病/ 懷孕，哺乳或在過去 8 週內分娩過/ 正在接受藥物治療/ 現在或在過去有任何骨折或扭傷或韌帶斷裂)，但參加者仍然決定參加活動，建造業議會不會對原有的傷病或醫療情況承擔責任。

本聲明稿涵蓋所有預見或未預見的，已知或未知的任何形式的索賠，參加者並不會向建造業議會及相關人士作出任何法律索償。

# 建造业议会 香港建造学院葵涌院校 安全体验训练中心

## 健康状况声明

安全体验训练活动属于剧烈活动以及有潜在危险性，参加者需要自行承担所参加活动之风险。如果参加者有身体健康状况(例如: 患有心脏疾病/ 戴着心脏起搏器/ 过敏/ 哮喘，癫痫或血液疾病/ 怀孕，哺乳或在过去 8 周内分娩过/ 正在接受药物治疗/ 现在或在过去有任何骨折或扭伤或韧带断裂)，但参加者仍然决定参加活动，建造业议会不会对原有的伤病或医疗情况承担责任。

本声明稿涵盖所有预见或未预见的，已知或未知的任何形式的索赔，参加者并不会向建造业议会及相关人士作出任何法律索偿。

## 24.3 SAFETY SIGNAGE

24.3.1 Safety signage and instructions to remind personnel of potential hazards in the operation and maintenance of the equipment shall be provided at appropriate locations. Such items shall include the followings (but not limited to):

- Safe Working Load;
- Wear Safety Harness / Belt;
- Magnets May Interface with Pacemakers;
- Wear Eye Protection;
- Wear Protective Gloves;
- Lifting In Progress; and
- Wear Safety Mask.

24.3.2 The signage shall include English, and Traditional and Simplified Chinese versions.

24.3.3 The signage content and format shall be approved before production.

24.3.4 Below is a matrix table to illustrate the safety signage with related equipment. The exact safety signage quantity and location shall be subject to final approval.

	Equipment (Training working height)	B for at	Equipment C (Training for working at height)	Equipment D (Training for working at height)	Equipment E (Training for slinging operation)	Equipment F (Training for chemical & electrical safety)	Equipment G (Training for chemical & electrical safety)	Equipment H (Training for machinery and trapping hazard)	Equipment J (Training for machinery and trapping hazard)	Equipment K (Training for machinery and trapping hazard)
Safe Working Load	✓		✓	✓	✓					
Wear Safety Harness / Belt	✓		✓	✓						
Magnets May Interface with Pacemakers						✓				
Wear Eye Protection							✓	✓	✓	
Wear Protective Gloves							✓		✓	✓
Lifting In Progress	✓				✓					

Wear Safety Mask						✓			
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24.3.4 Black and yellow diagonal safety stripes shall be applied as appropriate to all moveable parts to warn operating personnel of potential danger.

## **SECTION 25**

### **HEALTH & SAFETY**

**(Section 25 content for reference only. Should there be any different between the Section 25 and CIC Contractor's Safety Requirements. The CIC Contractor's Safety Requirements shall prevail.)**

#### General

- 25.1.1 The health, safety and welfare of all personnel working on Site, the safety of the general public and the avoidance of damage to property are of highest importance to the Employer.
- 25.1.2 The Main Contractor shall treat health and safety measures throughout the Project as the top priority in all activities and shall ensure that all operations are conducted in such a manner, as to eliminate or reduce to an acceptable level, the risks to person, property and equipment.
- 25.1.3 The Main Contractor shall be responsible for health and safety during the execution of the works, This responsibility shall extend to the Main Contractor's personnel, the Engineer's personnel the public and all persons directly or indirectly associated with the Works.
- 25.1.4 The Main Contractor shall comply with all current Government Enactments, Code of Practice and safety guidelines relating to the Works.
- 25.1.5 The Main Contractor shall be responsible to apply specific certificates for the equipment of Safety Experience Training Centre, include but not limited to:
  - CAP. 56 Boilers and Pressure Vessels Ordinance; and
  - WR1/ WR1(A) Certificate.

#### Breach of Health and Safety Obligations

- 25.2 Serious or repeated breaches of requirements in the Employer's safety documentation, contract requirements, statutory regulations, or disregard for the safety and health of any person shall be reasons for the Employer to require the removal of any employee of the Main Contractor from Site.

#### Safety supervision and Inspection

- 25.3.1 The Main Contractor shall provide adequate supervision to ensure all works on Site are carried out safely.
- 25.3.2 Supervisor, shall have sufficient experience and trade knowledge for the trade in which they are engaged in.
- 25.3.3 The Main Contractor shall conduct appoint a Registered Safety Officer (RSO) to dedicated site safety inspection at least once a week. The Employer and representatives from Labor Department may attend shall on a regular basis.

- 25.3.4 Where an area with substandard practices or substandard conditions is observed, the Main Contractor shall take immediate action to rectify the problems raised and a further inspection shall be conducted to assess the conditions.

#### Reporting if Accidents, Incidents and Dangerous Occurrences

- 25.4.1 The Main Contractor shall notify the Employer immediately if any incident, fire, dangerous occurrence, near miss or injury that occurs to any person on Site or member of the public.
- 25.4.2 The Main Contractor shall submit to the Employer, upon request, a copy of any LD reporting Form 2 or 2a, or any other statutory reports as required.

#### Safety Training

- 25.5 Persons involved in high risk activities (as a minimum those identified as high risk by the LD listed below) shall attend CICTA trade specific training courses applicable to their trade, prior to starting to work.
- Painters and decorators working at height;
  - Carpenters working at height;
  - Demolition workers;
  - Plumbers working at height;
  - Bar benders and fixers;
  - Plasters, tilers and external wall installation workers;
  - Curtain wall installers;
  - Bamboo scaffolders and metal scaffolders; and
  - Construction material riggers.

#### Personal Protective Equipment

- 25.6.1 Adequate safety equipment including safety helmets, safety boots, safety shoes, eye protection, safety harness, fall arrestors, independent lifeline, respiratory protection, safety equipment for working in sewers, drains and enclosed spaces, fire extinguishers, first aid equipment and any other necessary safety equipment, shall be made available on Site and maintained in an acceptable condition at all time.
- 25.6.2 Safety harness, lanyards and fall arrestors, shall be inspected monthly by a competent person and prior to use by wearer.

## Ladders

- 25.7.1 Only ladders that have been purchased as proprietary products shall be used on Site. Self-made ladders shall not be used.
- 25.7.2 Ladders shall not be used as working platforms.

## Dangerous Goods and Substances

- 25.8 The Main Contractor shall ensure that explosives, compressed gases, paint, thinners, petrol and other dangerous substances described in the Dangerous Goods Ordinance, are stored and handled in accordance with the relevant Ordinance.

## Alcohol and Drugs

- 25.9.1 The Main Contractor shall ensure that no alcoholic drinks, drugs or other substances which may impair judgment, are brought on site.
- 25.9.2 The Main Contractor shall ensure that persons entering the Site are not under the influence of alcohol or any substance, which may impair their judgment.
- 25.9.3 The Main Contractor shall immediately remove from Site, any person who is found suspected to be under the influence of alcohol, drugs or any other substances which may impair their judgment.



## **SECTION 26**

### **DIGITAL SIGNAGE SYSTEM**

#### **26.1 SCOPE OF WORKS**

The Digital signage System as shown in the drawings & schedules shall be supplied and installed by the Contractor.

#### **26.2 GENERALLY**

Unless otherwise specified or counter proposal approved by the CIC / Architect / Engineer, the digital signage system shall be the following:

Brightsign XT model XT 1143

Supplier: Pacific Datacom (HK) Ltd.

Contact No.: Eddie Choy 2303 0018

The above supplier information is for reference only. The tenderer can quote from other suppliers with this specific model.

#### **26.3 SPECIFICATION / APPLICATION**

Specification refer to the follow attached

General Specification requirement of the system

H.265 Get more efficient, stellar quality playback using H.265

Signage players support H.265 decoding

- ✧ Play both 4K and Full HD content encoded with H.265
- ✧ Get half the file size and double the bandwidth and memory savings
- ✧ Achieve better video quality with H.265 vs. H.264 at the same bit rate
- ✧ Only H.265 supports 10-bit color and high dynamic range of color

4K HDR Video Engine

- ✧ Showcase stellar native 4K CEA HDR10 video at 60fps  
Supports High Dynamic Range (HDR) offers vibrant colors in highlights and detail in shadows which uses 10 bit color
- ✧ Utilizes the efficient and high quality H.265 decoding
- ✧ Requires a 4K HDR screen that supports HDMI 2.0a

Dual video decoding:

- ✧ one 4K (3840x2160p60) video & one Full HD (1080p60) video simultaneously  
Superior scaling technology delivering pristine video quality for any screen or zone size including upscaling of Full HD video to 4K  
Simultaneous playback of content from local, streaming and live content sources  
Accelerated JPEG decompression for instant image display and high-speed transition

IP Streaming Full HD video and audio IP streaming available on all signage players  
Supports Full HD video, Mjpeg and audio streaming, including these formats:

- ✧ HLS (the standard for public internet streaming: i.e. YouTube, etc.)
- ✧ UDP/RTP/RTSP streaming from head-end real-time encoders

### 26.3 SPECIFICATION / APPLICATION (CONT'D)

- ✧ HTTP including SHOUT cast

Customize buffering and latency to improve media streaming performance.

Play streaming media in HTML5 assets or audio or MJPEG stream states.

Stream, buffer and play content from IP cameras supporting the

RTSP unicast streaming protocol.

Play multiple video streams simultaneously

IP Streaming Server

- ✧ transcodes files on local storage and encodes video from the HDMI Input to stream to a number of end-points

Features:

- ✧ Securely distribute video to a set of devices without locally storing the content on the end-point device.
- ✧ Serve IP video streams from a CMS player's local storage to distribute video to a network of devices:
- ✧ Supports MPEG transport stream (\*.ts) video files.
- ✧ Clients can be networked signage players, PCs, Macs, mobile devices, etc.
- ✧ Supports RTP, UDP, HLS in unicast or multicast.
- ✧ Stream multiple video files simultaneously

Mosaic Mode

- ✧ Turn on Mosaic mode to enable more simultaneous video zones in CMS
- ✧ Display an increased number of video zones with total resolutions adding up to the maximum resolution output of the video decoder (1920x1080 or 4K).
- ✧ The lower the resolution of the video files used, the higher the number that can be simultaneously displayed in each zone.
- ✧ User must scale down the video files prior to adding them to the video zone.

IPhone App

- ✧ Easily update messaging and interact with locally networked signage using your iPad or iPhone
- ✧ The App offers a simple and secure interface on your iPad or iPhone:
- ✧ Select any signage player connected to a local network.
- ✧ Update on-screen text and user variables immediately within the running presentation.
- ✧ Trigger presentation events and change presentation content via UDP commands.
- ✧ Customize the user interface to match your presentation.
- ✧ Access the diagnostic tools for each unit.
- ✧ Secure your displays with a password.

Mobile digital signage that plays content based on your current location

- ✧ Play specific audio and/or video content when located within a defined geographical radius (requires a USB GPS device).
- ✧ Applications:
- ✧ Shuttles, taxis, public transportation and moving billboards: Advertise and promote local businesses.
- ✧ Tour buses and boats: Inform and educate riders with video and audio relevant to the area.

### 26.3 SPECIFICATION / APPLICATION (CONT'D)

Power over Ethernet

- ✧ Power your digital signage with PoE+
- ✧ Use PoE+ (Type 2) to power your signage players with just an Ethernet connection.
- ✧ Eliminates the power cord with support for up to 25 watts of power:
- ✧ Signage players will not exceed 25 watts when running a standard presentation. Players can power an HDMI cable and 1-2 other outputs at most.
- ✧ When Signage players are powered by PoE+, there is approximately 1A available for all other connectors.

Remote Snapshot

- ✧ Get a glimpse of what your signage playback looks like.
- ✧ See a snapshot image of all zones in your currently running presentation.
- ✧ View snapshots using any of the following:
- ✧ Over the local network via the iPhone App or CMS.
- ✧ On the cloud Network via CMS or the WebUI

Wall function

- ✧ drag-and-drop CMS tool that makes building video walls simple in any size and layout.
- ✧ Supports separate videos per display or stretches a single video across all the displays.
- ✧ Build video walls by simply choosing the number of displays, specifying the layout of the displays, and dragging the video(s) into CMS.
- ✧ Utilizes the signage Ethernet port and a common clock to achieve frame-accurate synchronization

Between 0° and 70° C at 90% maximum relative humidity, non-condensing

M.2 Interface

- ✧ M.2 interface to support a Wireless/Bluetooth module
- ✧ M.2 SSD interface connector for added internal storage

UDP Control

Remotely control and interact with your digital signs via Ethernet or WiFi

- ✧ Users can interact with signage via mobile devices to download coupons or learn more about products.
- ✧ Deliver emergency messaging by controlling digital signage remotely.
- ✧ Integrate with databases to view inventory, statistics, pricing or any array of information.

- ✧ Show controlling is made easy with UDP and serial controls: power and manage media playback, control AV devices such as projectors, lighting, etc. and integrate with other show controllers.
- ✧ UDP controls can be sent via Ethernet or wireless.

### 26.3 SPECIFICATION / APPLICATION (CONT'D)

#### Preview

Get a sneak peek at how your signage will display

- ✧ Preview presentation playback in CMS before publishing.
- ✧ Speed up presentation authoring by reviewing the final look of your digital signage.

#### Interactivity

- ✧ Engage your audience with interactive devices and controls
- ✧ Trigger playback from virtually any type of interactive device you can dream up!
- ✧ Supported peripherals include touch screens, barcode scanners, motion sensors, RFID, GPIO and USB button controls, IR remote controls, serial devices, keyboards, mice and more.
- ✧ Easily create Interactive Playlists using the Free CMS PC software.

**BrightSign®**

# BRIGHTSIGN XT

## STATE-OF-THE-ART TECHNOLOGY. ENTERPRISE PERFORMANCE.

BrightSign XT delivers unsurpassed performance for enterprise applications with a powerful 4K video engine, our fastest HTML and graphics engine and our most powerful CPU. This state-of-the-art technology for leading-edge digital signage installations supports H.265 decoding, True 4K HDR and Full HD video playback including Mosaic Mode. It offers a hardware-accelerated HTML5 rendering engine that enables flawless playback of multiple modular HTML5 assets including Javascript, CSS animations, WebGL and even swipe/gesture interactivity. All XT models offer Gigabit Ethernet, and XT is the only product line offering PoE+ as well as HDMI In for Live TV playback.



### BrightSign XT1143

#### Expanded I/O Player

Includes all the features BrightSign XT243, plus serial, dual USB (type A and C) and Live TV playback via the HDMI 2.0a input to play content from any broadcast channel – even protected HDCP content.

Price: \$650

### Features



BrightSign, LLC. 16795 Lark Ave., Suite 200 Los Gatos, CA 95032 | USA 408-852-9263 | International +44 1223 298500 | [www.brightsign.biz](http://www.brightsign.biz)

**BrightSign®**

## SPECIFICATIONS

MODEL	XT243	XT1143
VIDEO ENGINE DECODER		
Single 1080p60 video decoding	X	X
Dual 1080@60p decoding	X	X
Native 4K@60p CEA HDR10 video decoding	X	X
Dual video decoding of one 4K & one 1080p60 video	X	
MEDIA FORMATS		
Video Codecs for 4K content: H.265	X	X
Video Containers for 4K H.265 content: .ts, .mov, .mp4, .mkv	X	X
Video Codecs for Full HD: H.265, H.264(MPEG-4, Part 10), MPEG-2, MPEG-1		X
Video Containers for Full HD content: .ts, .mpg, .vob, .mov, .mp4, .m2ts, .wmv	X	X
Images: BMP, JPEG, PNG	X	X
Audio: MP2, MP3, AAC, FLAC, OGG, and WAV (AC3 is passed through)	X	X
HTML5	X (Enterprise)	
DISPLAY RESOLUTIONS*		
4K resolutions: 3840x2160, 4096x2160, 3840x600	X	X
Upscaling to: 3840x2160x24/25/29.97/30p	X	X
1920x1080x24/25/29.92/30/50/59.94/60p, 1920x1080x50/59.94/60i, 1600x1200x60p, 1440x1050x60/75p, 1440x900x60/75p, 1360x768x60p, 1280x1024x60/75p, 1280x960x60p, 1280x800x60p/75p, 1280x768x60p, 1280x720x50/59.94/60p, 1024x768x60p, 800x600x60/75p, 720x576x50p/50i, 720x480x59.94/60p/60i, 640x480x60p	X	X
HARDWARE INTERFACES		
Locking Power Connector	X	X
External micro SD Slot (SDHC and SDXC); SDHC storage up to 32GB SDXC storage up to 2TB	X	X
M.2 SSD Interface	X	X
USB High Speed Host Port (also supports content updates)		X (2 ports: Type A&C)
Phoenix GPIO Port (12-pin bi-directional)	X	X
3.5mm RS-232 Serial Port		X
3.5mm IR In/Out	X	X
3.5mm Audio Out (analog -or- SPDIF digital, non-simultaneous)	X	X
HDMI 2.0a Out	X	X
HDMI 2.0a Input		X
Ethernet	X (Gigabit)	
Power over Ethernet (PoE+)	X	X
M.2 (E) Keyed Wi-Fi/Bluetooth Connector	X	X
Wi-Fi External Antenna Connector (optional)	X	X
Status LEDs	Power, Error, Busy, Update	
Reset Button	X	X
Real Time Clock	X	X
FEATURES		
H.265 Decoding: smaller file sizes and higher quality content than H.264	X	X
Powerful 4K Video Engine: True 4K CEA HDR10, 4K upscaling, dual video decoding and superior scaling	X	X

MODEL	XT243	XT1143
Live TV: brings Live TV, even HDCP-protected content, to your signage via HDMI 2.0a Input		X
HTML5: hardware-accelerated engine that plays modular HTML assets flawlessly alongside high-bandwidth video	X (Enterprise)	
BrightBeacon™: 2-way Bluetooth/Beacon communication between mobile devices & signage (requires: wireless/Bluetooth module)	X	X
BrightWall™: synchronized playback across multiple displays	X	X
Autowall™: embraces the power of HTML5 to create unique multimedia video walls	X	X
Zones: playback multiple content types on a single screen	X	X
Mosaic Mode: play a multitude of smaller resolution videos simultaneously that add up to the maximum video resolution of the player	X	X
IP Streaming: play streaming media	X	X
IP Streaming Server: serve IP streams from local storage	X	X
Encoding Server: transcode or composite/encode IP streams	X	X
Interactivity: connect virtually any type of interactive device to a multitude of interactive ports	X (GPIO, IR, UDP)	X (GPIO, dual USB, serial, IR, UDP)
Live Feeds: Live Data, Live Text, MRSS, Twitter, Flickr, etc.	X	X
Tagging: BrightSign Network users can assign media and player tags for highly targeted content distribution	X	X
BrightSign App: update signs with an iOS device	X	X
Geo-Fencing: trigger playback based on location (requires USB dongle)		X
Sign Preview: preview presentation playback in BrightAuthor	X	X
Remote Snapshot: remotely view a snapshot image of the display's playback	X	X
BrightPlates™: easy template-based sign creation service	X	X
Networking: update, manage and schedule your signage	X	X
B-deploy: A setup feature to deploy many players at once	X	X
Extended Thermal: Supports ambient temperatures between 0° & 70° C at 90% max relative humidity, non-condensing	X	X
<b>SOFTWARE</b>		
Free BrightAuthor Software	X	X
BrightSign Networking Options	X	X
<b>ACCESSORIES</b>		
USB Button Pads		X
Wireless/Bluetooth Module	X	X
MicroSD Class 10 Cards (various capacities)	X	X
<b>MISCELLANEOUS</b>		
Dimensions (W x H x D)	179.9 x 21.9 x 204.8mm or 7.1 x 0.86 x 8.1in	
Weight	20.0kg	
Power	12V / 3A (36 Watts)	
Multi-Country Power & Regulatory Approvals	X	X
Built-in Wall Mounting Brackets	X	X
1 year warranty, parts and labor	X	X

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## PROFESSIONAL SERVICES

The Main Contractor shall include a tentative schedule for the hardware and service delivery with consideration of the following tasks:

<b>Task</b>	<b>Description of Deliverables</b>	<b>Estimated Completion Date (in week)</b>
1.	<b><u>Planning and User Requirement Collection</u></b> Submission of the following document to the satisfaction of CIC (including but not limited to): <ul style="list-style-type: none"> <li>• Detailed Project Plan</li> <li>• Record of Initiation Meeting</li> <li>• User Requirement Verification</li> </ul>	End of Week 1 upon Contract Award
2	<b><u>System setup and configuration</u></b> Completion of hardware installation, system setup and configuration and submission of the following document to the satisfaction of CIC (including but not limited to): <ul style="list-style-type: none"> <li>• System / Hardware / Software Configuration</li> <li>• Administrator/User account list</li> </ul>	End of Week 9 upon Contract Award
3	<b><u>System Testing</u></b> Include first Post-Implementation checking, Site Integration Test (SIT), User Acceptance Test (UAT), System Training and submission of the following document to the satisfaction of CIC (including but not limited to): <ul style="list-style-type: none"> <li>• UAT Plan, Scenarios, Briefing sessions</li> <li>• Problems Logs</li> <li>• User Training Manual</li> <li>• System Configuration Manual</li> </ul>	End of Week 11 upon Contract Award
4	<b><u>System Nursing</u></b> Provision of software patches for problems and incidents. Submission of the following document to the satisfaction of CIC (including but not limited to): <ul style="list-style-type: none"> <li>• Problems and Incident Logs</li> </ul>	End of Week 13 upon Contract Award

Training Service Scope:-

The Main Contractor shall provide 2 training classes with materials for the CIC.

APPENDIX A :  
PART - E - FIRE PROPERTIES OF  
BUILDING ELEMENTS AND  
COMPONENTS OF CODE OF  
PRACTICE FOR FIRE SAFETY IN  
BUILDINGS 2011





## **Part E -**

---

### **Fire Properties of Building Elements and Components**

**This Part contains six Sections:**

- **Section 1 – General**
- **Section 2 – Loadbearing Elements**
- **Section 3 – Non-loadbearing Elements**
- **Section 4 – Protection of Openings in Fire Barriers**
- **Section 5 – Non-combustibility**
- **Section 6 – Fire Testing Authorities**
- **Reference – List of Tables**

## **Section 1 – General**

### **Subsection E1 – Use of this Part**

#### **Clause E1.1**

---

This Part provides the Deemed-to-Comply provisions for the fire properties of building elements and components and should be read in conjunction with all other Parts in this Code.

#### **Clause E1.2**

---

The Building (Construction) Regulation 90 stipulates the requirements for the design and construction of buildings to inhibit and resist the spread of fire and Regulations 39 and 43 stipulate the combustibility requirements for cladding and curtain walls. This Part provides guidance on how the fire properties of building elements and components may comply with these Regulations.

#### **Clause E1.3**

---

Relevant parts of the International standard of ISO and the national standards stipulated in this Part are considered acceptable to the Building Authority for demonstrating the fire properties of the building elements and components. Where it is intended to use other standards, authorized persons should demonstrate complying with Clause E16.2 that such standards are equivalent or not inferior to the international or the national standards stipulated in this Part.

### **Subsection E2 – Scope**

#### **Clause E2.1**

---

Part E is applicable to all Use Classifications in Table A1 of Part A.

#### **Commentary**

There are two principal groups of fire tests for building elements, materials and components:

- (a) Reaction to fire – the extent to which a product burns and contributes to the development of a fire. Products include walls, floors and ceiling linings, etc.
- (b) Resistance to fire – the ability of a product to prevent the spread of flame and/or smoke from a fully developed (post-flashover) fire, and where relevant, to maintain stability, integrity and insulation characteristics.

## Section 2 – Loadbearing Elements

### Subsection E3 – Fire Tests for Loadbearing Elements

#### Clause E3.1

---

Loadbearing elements should be tested in accordance with the following applicable standards to demonstrate the required FRR (structural stability, integrity and insulation as appropriate):

- (a) BS EN 1363-1:1999, *Fire resistance tests. General requirements*;
- (b) BS EN 1365-1:1999, *Fire resistance tests for loadbearing elements. Walls*;
- (c) BS EN 1365-2:2000, *Fire resistance tests for loadbearing elements. Floors and roofs*;
- (d) BS EN 1365-3:2000, *Fire resistance tests for loadbearing elements. Beams*;
- (e) BS EN 1365-4:1999, *Fire resistance tests for loadbearing elements. Columns*;
- (f) BS EN 1365-5:2004, *Fire resistance tests for loadbearing elements. Balconies and walkways*;
- (g) BS EN 1365-6:2004, *Fire resistance tests for loadbearing elements. Stairs*.

#### Commentary

FRR of loadbearing elements is classified in accordance with BS EN 13501-2:2007, *Fire Classification of Construction Products and Building Elements – Classification using data from fire resistance tests, excluding ventilation services*.

#### Clause E3.2

---

The following British Standards will still be applicable until they are obsolete:

- (a) BS 476: Part 20:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles)*;
- (b) BS 476: Part 21:1987, *Fire tests on building materials and structures. Methods for determination of the fire resistance of load bearing elements of construction*.



## Section 3 – Non-loadbearing Elements

### Subsection E4 – Fire Tests for Non-loadbearing Elements

#### Clause E4.1

---

Composite walls involving plasterboard systems should be constructed in accordance with the manufacturer's specifications. The assembled products should be tested in accordance with BS EN 1364-1:1999, *Fire resistance tests for non-loadbearing elements. Walls* to demonstrate the required FRR.

#### Clause E4.2

---

Other materials used as fire barriers should be installed in accordance with the manufacturer's specifications and tested in accordance with an appropriate testing regime, such as BS EN 1364-1:1999, *Fire resistance tests for non-loadbearing elements. Walls*.

#### Clause E4.3

---

Materials forming a ceiling that requires an FRR should be tested in accordance with BS EN 1364-2, *Fire resistance tests for non-loadbearing elements. Ceilings*.

#### Clause E4.4

---

False ceilings and elevated floors that require an FRR should be tested in accordance with the following applicable standards:

- (a) BS EN 1366-6:2004, *Fire resistance tests for service installations. Raised access and hollow core floors*;
- (b) BS EN 1364-2:1999, *Fire resistance tests for non-loadbearing elements. Ceilings*.

#### Clause E4.5

---

The following British Standards will still be applicable until they are obsolete:

BS 476 Part 22:1987, *Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction*.

#### Commentary

False ceilings and elevated floors forming part of an air plenum should be non-combustible – see Subsection E10.

## Section 4 - Protection of Openings in Fire Barriers

### Subsection E5 - Openings in Fire Barriers (Doors, Windows, Shutters and associated Penetrations)

#### Clause E5.1

---

Elements that protect openings, such as doors, windows and fire shutters in fire barriers should be tested in accordance with the following applicable standards to demonstrate the required FRR (integrity and insulation as appropriate):

- (a) BS EN 1634-1:2008, *Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware. Fire resistance test for doors, shutters and openable windows;*
- (b) BS EN 1634-2:2008, *Fire resistance tests for door, shutter and openable window assemblies and elements of building hardware. Fire resistance characterisation test for elements of building hardware;*
- (c) BS EN 1634-3:2004, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter assemblies;*
- (d) BS EN 14600:2005, *Doorsets and openable windows with fire resisting and/or smoke control characteristics. Requirements and classification.*

#### Commentary

The FRR of fire rated doors, fire shutters and openable windows designed for installation within openings in vertical separating elements should be tested in accordance with BS EN 1634-1:2008. BS EN 1634-1:2008 sets out two options of maximum temperature rise criteria for insulation. These options are based on the classification of thermal insulation (Classification I1 or I2) and the classification shall be in accordance with BS EN 13501-2:2007. The thermal criterion of Classification I1 is recommended for consistency with BS 476.

#### Clause E5.2

---

The following British Standards will still be applicable until they are obsolete:

- (a) BS 476: Part 20:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles);*
- (b) BS 476: Part 22:1987, *Fire tests on building materials and structures. Methods for determination of the fire resistance of non-load bearing elements of construction.*

#### Clause E5.3

---

All tested fire rated doors, fire shutters and fire windows should be “tagged” or otherwise labelled to ensure ease of identification.

### **Commentary**

The FRR of elements to prevent fire spread through openings in fire barriers is classified in accordance with BS EN 13501-2:2007, *Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services*.

The performance for protected openings in fire barriers includes:

- (a) Integrity – the ability of the element of construction that has a fire separating function, to withstand fire exposure on one side only, without the transmission of fire to the unexposed side as a result of the passage of flames or hot gases;
- (b) Thermal insulation – the ability of the element of construction to withstand fire exposure on one side only, without the transmission of fire as a result of significant transfer of heat from the exposed side to the unexposed side. Transmission shall be limited so that neither the unexposed surface nor any material in close proximity to the surface is ignited;
- (c) Radiation – the ability of the element of construction to withstand fire exposure on one side only, so as to reduce the probability of the transmission of fire as a result of significant radiated heat either through the element or from its unexposed surface to adjacent materials;
- (d) Self-closing – the ability of an open door to close fully into its frame and engage any latching device that may be fitted, without human intervention, by stored energy, or by mains power backed up by stored energy in case of power failure.

## **Subsection E6 - Openings in Fire Barriers (Ventilation Ducts and associated Penetrations)**

### **Clause E6.1**

---

Elements that protect openings where ventilation ducts and the like penetrations in fire barriers, such as seals, should be tested in accordance with the following applicable standards to demonstrate the required FRR (integrity and insulation as appropriate):

- (a) BS EN 1366-1:1999, *Fire resistance tests for service installations. Fire resistance tests for service installations. Ducts*;
- (b) BS EN 1366-8:2004, *Fire resistance tests for service installations. Smoke extraction ducts*;
- (c) BS EN 1366-9:2008, *Fire resistance tests for service installations. Single compartment smoke extraction ducts*.

### **Clause E6.2**

---

The following British Standards will still be applicable until they are obsolete:

- (a) BS 476: Part 20:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles)*;
- (b) BS 476: Part 24:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of ventilation ducts*.

## **Subsection E7 - Openings in Fire Barriers (General Penetrations)**

### **Clause E7.1**

---

Penetration seals for electrical cables, plumbing and other services, should be tested in accordance with the following applicable standards to demonstrate the required FRR (integrity only):

- (a) BS EN 1366-3:2009, *Fire resistance tests for service installations. Penetration seals*;
- (b) BS EN 1366-4:2006, *Fire resistance tests for service installations. Linear joint seals*.

### **Clause E7.2**

---

The following British Standards will still be applicable until they are obsolete:

- (a) BS 476: Part 20:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles)*;
- (b) BS 476: Part 23:1987, *Fire tests on building materials and structures. Methods for determination of the contribution of components to the fire resistance of a structure*.

#### **Commentary**

The same control on pipe penetrations applies to all pipes penetrating fire barriers, irrespective of they are water-borne, their diameter or material of construction.



## **Subsection E8 - Fire and Smoke Dampers**

### **Clause E8.1**

---

Fire and smoke dampers in ventilation ducts should be tested in accordance with the following applicable standards to demonstrate the required FRR (integrity only):

- (a) BS EN 1366-2:1999, *Fire resistance tests for service installations. Fire dampers*;
- (b) BS ISO 10294-1:1996, *Fire-resistance tests. Fire dampers for air distribution systems. Test method*;
- (c) BS ISO 10294 -2:1999, *Fire-resistance tests. Fire dampers for air distribution systems. Classification, criteria and field of application of test results*;
- (d) BS ISO 10294-3:1999, *Fire-resistance tests. Fire dampers for air distribution systems. Guidance on the test method*;
- (e) BS ISO 10294-5:2005, *Fire-resistance tests. Fire dampers for air distribution systems. Intumescent fire dampers*.

### **Clause E8.2**

---

The following British Standards will still be applicable until they are obsolete:

- (a) BS 476: Part 20:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles)*;
- (b) BS 476: Part 23:1987, *Fire tests on building materials and structures. Methods for determination of the contribution of components to the fire resistance of a structure*.
- (c) BS 476: Part 24:1987, *Fire tests on building materials and structures. Method for determination of the fire resistance of ventilation ducts*.

### **Clause E8.3**

---

All newly installed dampers should be inspected and certified by a registered specialist contractor in the ventilation works category that the dampers are in safe and efficient working order.

## **Subsection E9 – Smoke Leakage for Doors with Smoke Seal**

### **Clause E9.1**

---

Doors with smoke seal should be tested at ambient temperature and medium temperature and demonstrated to comply with the smoke leakage rate criteria in accordance with the following applicable standards:

- (a) BS EN 1634-3:2004, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter assemblies*;
- (b) BS EN 14600:2005, *Doorsets and openable windows with fire resisting and/or smoke control characteristics. Requirements and classification*;
- (c) ISO 5925-1:2007, *Fire tests - Smoke-control door and shutter assemblies - Part 1: Ambient- and medium-temperature leakage tests*;
- (d) UL 1784:2009, *UL Standard for safety air leakage tests of door assemblies*; or
- (e) AS 1530:Part 7:2007, *Methods for fire tests on building materials, components and structures- Smoke control assemblies. Ambient and medium*.

### **Clause E9.2**

---

[Clause deleted.]

## Section 5 – Non-combustibility

### Subsection E10 – Non-combustibility

#### Clause E10.1

---

Any product that complies with one of the following is considered to be non-combustible:

- (a) Class A1 in BS-EN 13501-1:2007, *Fire classification of construction products and building elements - Classification using data from reaction to fire tests*;
- (b) BS EN ISO 1182:2010, *Reaction to fire tests for products. Non-combustibility test* and BS EN ISO 1716:2010 *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)*;
- (c) BS 476-4:1970, *Fire tests on building materials and structures. Part 4: Non-combustibility test for materials*.

#### Commentary

Other appropriate non-combustibility tests include:

- (a) AS 1530.1:1994, *Methods for fire tests on building materials, components and structures Part 1: Combustibility test for materials*;
- (b) ASTM E136–11, *Standard test method for behavior of materials in a vertical tube furnace at 750°C*.

### Subsection E11- Limited Combustibility

#### Clause E11.1

---

Materials of limited combustibility are classified as Class A2-s3, d2 or better in accordance with:

- (a) BS EN 13501-1:2007, *Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests* to BS EN ISO 1182:2002, *Reaction to fire tests for building products – Non-combustibility test*;
- (b) BS EN ISO 1716:2010, *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)* and BS EN 13823:2010, *Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item*.

### Commentary

The European classifications are developed through a suite of fire tests. Building elements except flooring, are classified as A1, A2, B, C, D, E or F (with A1 being the highest performance and F being the lowest) in accordance with BS EN 13501-1:2007, *Fire classification of construction products and building elements, Classification using data from reaction to fire tests*.

The relevant fire tests are:

- (a) BS EN ISO 1182:2010, *Reaction to fire tests for products. Non-combustibility test*;
- (b) BS EN ISO 1716:2010, *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)*;
- (c) BS EN 13823:2010, *Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item*;
- (d) BS EN ISO 11925-2:2010, *Reaction to fire tests. Ignitability of building products subjected to direct impingement of flame. Single-flame source test*;
- (e) BS EN 13238:2010, *Reaction to fire tests for building products. Conditioning procedures and general rules for selection of substrates*.

The European test methods are based on performance in the ISO 9705, *Room Corner Test*. Products tested in accordance with the room corner test (ISO 9705), in tandem with the Cone Calorimeter (ISO 5660-1) are acceptable.

Table E1 is the comparison of classification of fire performance of materials tested in accordance with BS EN 13501-1:2007 and BS 476: Parts 4 and 7.

**Table E1 - European Classes on Reaction to Fire Performance**

European Classification	British Standard Equivalent
A1	Non-combustible
A2	Limited combustibility
B	0
C	1
D	3
E	4
F	Unclassifiable or no performance determined

## Subsection E12 - External Facades

### Clause E12.1

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External facades should be tested in accordance with the following applicable standards:

- (a) BS EN 1364-3:2006, *Fire resistance tests for non-loadbearing elements. Curtain walling. Full configuration (complete assembly)*;
- (b) BS EN 1364-4:2007, *Fire resistance tests for non-loadbearing elements. Curtain walling. Part configuration*.

#### Commentary

There are other options for testing of facades, including:

- (a) Large scale testing:
  - (i) NFPA285:2006, *Standard fire test method for evaluation of fire propagation characteristics of exterior non-loadbearing wall assemblies containing combustible components*;
  - (ii) ULC-S134-92, *Fire test of exterior wall assemblies (Vertical channel test)*.
- (b) Small scale testing:
  - (i) ULC-S134-92, *Fire test of exterior wall assemblies (Vertical channel test)*;
  - (ii) AS 1530.1:1994, *Methods for fire tests on building materials, components and structures Part 1: combustibility test for materials*.

## Subsection E13 – Linings of Internal Wall and Ceiling and Decorative Finishes

### Clause E13.1

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Linings of internal wall and ceiling and decorative finishes in the following Use Classifications, where the combustibility is required to be controlled, should comply with the following when tested in accordance with BS EN 13501-1:2007:

- (a) All Use Classifications – within protected exits, Classification C of Table E1;
- (b) Use Classification 3 – general accommodations (including corridors, circulation spaces and rooms) that are not forming the protected exit, Classification B or above of Table E1;
- (c) Use Classification 5a – within cinemas, auditoria and theatres, Classification C or above of Table E1;

When tested in accordance with the British Standards, the performance should meet the equivalent European classification in Table E1.

### Clause E13.2

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For compliance with Clause E13.1, the linings and finishes should be tested in accordance with the following applicable standards:

- (a) BS EN ISO 1182:2010, *Reaction to fire tests for products. Non-combustibility test*;
- (b) BS EN ISO 1716:2010, *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)*;
- (c) BS EN 13823:2010, *Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item*;
- (d) BS EN ISO 11925-2:2010, *Reaction to fire tests. Ignitability of building products subjected to direct impingement of flame. Single-flame source test*.

### Clause E13.3

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The following British Standards will still be applicable until they are obsolete:

- (a) BS 476-4:1970, *Fire tests on building materials and structures. Part 4: Non-combustibility test for materials*.
- (b) BS 476 Part 6:1989, *Fire tests on building materials and structures - Method of test for fire propagation for products*;
- (c) BS 476 Part 7:1997, *Fire tests on building materials and structures - Method of test to determine the classification of the surface spread of flame of products*.

#### Commentary

Decorative finishes are materials that are fixed to walls and ceilings. For cinemas and theatres only, decorative finishes also include seat linings.

There is another option for testing of linings: NFPA 265: 2011, *Standard methods of fire tests for evaluating room fire growth contribution of textile coverings on full height panels and walls*.

## Subsection E14 - Linings and Coverings of Floors

### Clause E14.1

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Linings and coverings of floors, where the combustibility is required to be controlled, should comply with the following when tested in accordance with BS EN 13501-1:2007:

- (a) All Use Classifications – within protected exits, Classification C of Table E1;
- (b) Use Classification 3 – general accommodation (including corridors, circulation spaces and rooms) that are not forming the protected exit, Classification B or above of Table E1;
- (c) Use Classification 5a – within cinemas, auditoria and theatres, Classification C or above of Table E1.

When tested in accordance with the British Standards, the performance should meet the equivalent European classification in Table E1.

### Clause E14.2

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For compliance with Clause E14.1, the linings and coverings of floors should be tested in accordance with the following applicable standards:

- (a) BS EN ISO 1182:2010, *Reaction to fire tests for products. Non-combustibility test*;
- (b) BS EN ISO 1716:2010, *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)*;
- (c) BS EN ISO 9239-1:2010, *Reaction to fire tests for floorings. Determination of the burning behaviour using a radiant heat source*;
- (d) BS EN ISO 11925-2:2010, *Reaction to fire tests. Ignitability of building products subjected to direct impingement of flame. Single-flame source test*.

### Clause E14.3

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Other small scale tests may also be applicable:

- (a) BS 4790:1987, *Determination of the effects of a small source of ignition on textile floor coverings (hot metal nut method)*;
- (b) BS 6307:1982, ISO 6925-1982, *Method for determination of the effects of a small source of ignition on textile floor coverings (methenamine tablet test)*.

#### Commentary

Whilst a floor is not usually the prime vehicle for fire spread, the contribution of floor coverings such as carpets to fire spread can be significant. The Flooring Radiant Panel represents the exposure of a carpet or other floor covering to a nearby fire, and measures the propensity of the floor covering to be an agent of flame spread over flat floors (in the absence of significant air flow). The Hot Nut Test (BS 4790) and the Methenamine Pill Test (BS 6307, ISO 6925) represent small ignition sources falling on a carpet in the absence of any external radiation.

## **Subsection E15 - Acoustic and Thermal Insulation**

### **Clause E15.1**

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Acoustic and thermal insulation in ductings and concealed locations should be tested in accordance with the following applicable standards:

- (a) BS EN ISO 1182:2010, *Reaction to fire tests for products. Non-combustibility test*;
- (b) BS EN ISO 1716:2010, *Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)*;
- (c) BS EN 13823:2010, *Reaction to fire tests for building products. Building products excluding flooring exposed to the thermal attack by a single burning item*;
- (d) EN ISO 11925-2:2010, *Reaction to fire tests. Ignitability of building products subjected to direct impingement of flame. Single-flame source test*;
- (e) BS EN 13501-1:2007, *Fire classification of construction products and building elements. Classification using data from reaction to fire tests*.

### **Clause E15.2**

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The following British Standards will still be applicable until they are obsolete:

- (a) BS 476-4:1970, *Fire tests on building materials and structures. Part 4: Non-combustibility test for materials*;
- (b) BS 476 Part 6:1989, *Fire tests on building materials and structures. Method of test for fire propagation for products*;
- (c) BS 476 Part 7:1997, *Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products*.



## **Section 6 – Fire Testing Authorities**

### **Subsection E16 - Criteria for Choosing Testing Authorities**

#### **Clause E16.1**

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The Building Authority will recognize the laboratories accredited by the Hong Kong Accreditation Services (HKAS) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or other laboratory accreditation bodies which have reached mutual recognition agreements with HOKLAS. The Building Authority will also recognize the certification bodies accredited by HKAS under the Hong Kong Certification Body Accreditation Scheme (HKCAS) or other accredited certification bodies which have reached multilateral recognition arrangements with HKCAS.

#### **Clause E16.2**

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The fire properties of materials, products or construction components should be tested in accordance with or assessed against the standards stipulated in this Part and certified as being capable of achieving such fire properties to the satisfaction of the Building Authority. Such certification should be established by:

- (a) a test report prepared by a recognized laboratory. The test should be within the accredited scope for testing of the laboratory; or
- (b) an assessment report prepared by a recognized laboratory or certification body. The subject category or type of the materials, products or components of the assessment should be within the accredited scope for testing or certification by the laboratory or the certification body.

## **Reference – List of Tables**

1. The FRR of the standard of construction and building materials are set out in the following Tables for reference.
2. In this List :
  - “gypsum plaster” means gypsum building plaster complying with BS EN 13279;
  - “gypsum plaster board” means gypsum plaster board complying with BS EN 520.
3. The List contains:
  - Table E2 on Walls Constructed Wholly of Non-combustible Materials
  - Table E3 on Walls not Constructed Wholly of Non-combustible Materials
  - Table E4 on Floors and Landings
  - Table E5 on Steel Columns and Beams
  - Table E6 on Reinforced Concrete Columns and Beams
  - Table E7 on Stairs

**TABLE E2****WALLS CONSTRUCTED WHOLLY OF NON-COMBUSTIBLE MATERIALS**

Construction and Materials	Minimum thickness in mm (excluding plaster) for FRR of		
	240 mins	120 mins	60 mins
<b>SOLID CONSTRUCTION</b>			
Solid bricks of clay, concrete or sand lime without plaster	225	225*	100
Reinforced concrete -			
(a) containing not less than 1 per cent of vertical reinforcement	180	100	75
Concrete cover to main reinforcement	25	25	15
(b) containing less than 1 per cent of vertical reinforcement	240	160	120
Concrete cover to main reinforcement	25	25	25
<b>HOLLOW BLOCK CONSTRUCTION</b>			
Clay blocks (outer web not less than 13mm thick) of 2 cells not less than 50 per cent solid finished with 13mm gypsum plaster on each side		100	100
Concrete blocks of one cell in wall thickness not less than 50 per cent solid finished with 13mm gypsum plaster on each side			190

\* Where finished with 13mm gypsum plaster on each side, the thickness may be reduced to 100mm.

**TABLE E3****WALLS NOT CONSTRUCTED WHOLLY  
OF NON-COMBUSTIBLE MATERIALS**

Construction and Materials	Minimum thickness of finish in mm on each face for FRR of	
	120 mins	60 mins
<b>SOLID CONSTRUCTION</b>		
Wood wool slabs – complying with BS EN 13168 -		
(a) 50mm minimum thickness with gypsum plaster finish		13
(b) 75mm minimum thickness with gypsum plaster finish	13	6
Gypsum plaster board in cores not less than 19mm thick in section not more than 1.2m wide supported top, bottom and sides in steel channels or a timber framework, with gypsum plaster finish		10
<b>HOLLOW CONSTRUCTION</b>		
Steel or timber framing with facings on each side of -		
(a) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing		19
(b) 2 layers of 10mm thick gypsum plaster board with gypsum plaster finish		Nil
(c) 13mm thick gypsum plaster board with gypsum plaster finish		6
(d) 19mm thick gypsum plaster board with gypsum plaster finish		Nil

**TABLE E4**  
**FLOORS AND LANDINGS**

Construction and Materials	Minimum thickness in mm for FRR of		
	240 mins	120 mins	60 mins
<b>SOLID REINFORCED CONCRETE CONSTRUCTION</b>			
Thickness of concrete	170	125	100
Concrete cover to all reinforcement -			
simply supported	55*	35	20
continuous	45*	25	20
<b>SOLID PRESTRESSED CONCRETE CONSTRUCTION</b>			
Depth including screed	170	125	100
Concrete cover to all reinforcement -			
simply supported	65*	40	25
continuous	55*	35	20

\* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5kg/m<sup>2</sup> with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.

**TABLE E5**  
**STEEL COLUMNS AND BEAMS**

Construction and Materials	Minimum thickness of protection in mm for FRR of		
	240 mins	120 mins	60 mins
<b>SOLID PROTECTION</b>			
Columns and hangers (mass per metre not less than 45kg)			
(a) Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
(b) Solid bricks of clay, concrete or sand lime	75	50	50
Beams (mass per metre not less than 30 kg)			
Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
<b>HOLLOW PROTECTION</b>			
Columns and hangers (mass per metre not less than 45kg)			
(a) Solid bricks of clay, concrete or sand lime reinforced in every horizontal joint with steel binding wire not less than 2.5mm in thickness or steel mesh weighing not less than 0.5kg/m <sup>2</sup> .	115	50	50
(b) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing.			19
(c) Gypsum plaster on 10mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch			13
(d) Gypsum plaster on 19mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch		13	7
Beams (mass per metre not less than 30kg)			
(a) Portland cement plaster or Portland cement-lime plaster on metal lathing			19
(b) Gypsum plaster on metal lathing		22	16
(c) Gypsum plaster on 10mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch			13
(d) Gypsum plaster on 19mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch		13	7

In this Table –

“hollow protection” means there is a void between the protective material and the web of the steel section, such hollow protection to columns should be effectively sealed at each floor level.

“solid protection” means casing which is bedded close to the steel without any intervening cavities and with all joints in that casing made full and solid.

**TABLE E6****REINFORCED CONCRETE COLUMNS AND BEAMS**

Construction and Materials	Minimum overall size of column in mm for FRR of		
	240 mins	120 mins	60 mins
<b>REINFORCED CONCRETE COLUMNS AND HANGERS</b>			
(a) Fully exposed columns and hangers	450	300	200
Concrete cover to main reinforcement	35	35	25
(b) 50 per cent exposed of columns and hangers	350	200	160
Concrete cover to main reinforcement	35	25	25
(c) One face exposed of columns and hangers	240	160	120
Concrete cover to main reinforcement	25	25	25
<b>REINFORCED CONCRETE BEAMS</b>			
Width of beam	280	200	200
Concrete cover to main reinforcement -			
simply supported	80*	50*	30
continuous	60*	40	30
<b>PRESTRESSED CONCRETE BEAMS</b>			
Width of beam	280	200	200
Concrete cover to tendons -			
simply supported	90*	70*	30

\* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5kg/m<sup>2</sup> with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.

**TABLE E7****STAIRS**

<b>Construction and Materials</b>	<b>Minimum thickness in mm for FRR of</b>		
	<b>240 mins</b>	<b>120 mins</b>	<b>60 mins</b>
Reinforced concrete construction -			
Thickness at waist of slab	170	125	95
Concrete cover to all reinforcement	55*	35	20

\* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than  $0.5\text{kg/m}^2$  with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.



**Assignment Brief**

**for**

**Supply and Delivery of Simulation Equipment for the**

**Safety Experience Training Centre (SETC)**

**at**

**Kwai Chung Campus (KCC)**

**of**

**the Construction Industry Council (CIC)**

**January 2018**

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**Assignment Brief**  
**Supply and Delivery of Simulation Equipment for the**  
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## **1. Background**

- 1.1 The Construction Industry Council (CIC) has been providing construction training for various construction-related trades in Hong Kong, and would like to provide a new mode of safety training in a designated area at its Kwai Chung Campus (KCC) (the Site).
- 1.2 The project site is called Safety Experience Training Centre (SETC) with a floor area of around 330m<sup>2</sup>.
- 1.3 Renovation works would be carried out by the Main Contractor (to be engaged by the CIC) for the establishment of SETC in Year 2018. The CIC has decided to engage a supplier (the Supplier) to supply the suitable equipment (the Equipment) as specified in the contract to provide simulation experience safety training in SETC.

## 2. Objectives

- 2.1 The Supplier is required to supply the equipment as listed below at the Site (the Works). The Supplier shall supervise the Main Contractor engaged by the CIC during installation of the Equipment.
- 2.2 The Supplier shall ensure quality and to achieve the required performance, relevant forms / information as required by this Contract, completion inspection and verification, preparing relevant Training Manual, Operation and Maintenance Manual, work jointly with the Main Contractor and handover the Equipment to the CIC / Architect (engaged by the CIC), obtaining feedback and making the necessary rectification, etc.

<u>Type of Equipment</u> (Refer to Section 9 - Technical Specifications)	<u>Quantity</u>
Equipment A	1 set.
Equipment B	1 set.
Equipment C	2 sets.
Equipment D	2 sets.
Equipment E	1 set.
Equipment F	1 set.
Equipment G	1 set.
Equipment H	1 set.
Equipment J	1 set.
Equipment K	1 set.

- 2.3 The Supplier must supply all Equipment in accordance with the requirements stated in the Technical Specifications in the Contract. No alternative proposal would be adopted in this Contract unless otherwise specified by the CIC / Architect after the contract award.

### **3. Scope of Supply and Delivery Contract**

3.1 The description of the scope of the Works given below is not exhaustive. The tenderer is deemed to have read other tender documentation to fully aware of the extent of the Works.

3.2 The scope of Supply and Delivery Contract are proposed as follows:

(a) Submit Shop Drawing for the CIC / Architect's Approval:

3.3 To prepare and submit all necessary shop drawings, calculations, reports, certificates, technical information, supporting documents and other documents as required for the CIC / Architect for review and approval, within 14 days upon the contract award. No ordering of any Equipment shall be made until the approval from the CIC / Architect is attained.

(b) Painting on Equipment:

3.4 To allow for painting of all Equipment including (but not by way of limitation) motors, hangers, brackets and supports, etc., provided under this Contract. In particular, all Equipment, steelwork, etc., shall be painted inside the factory before delivery.

3.5 The CIC / Architect shall has the right to design the Equipment colour and coating after the contract is awarded. Colour sample, the specifications of the painting materials and the painting method shall be submitted to the CIC / Architect for approval prior to comment of the painting works. The Supplier shall take adequate precautions and make good all damage, so that at the time of handover to the Employer, all paint surfaces are free of imperfections of any kind.

### **3. Scope of Supply and Delivery Contract (Cont'd)**

(c) Delivery of Equipment:

3.6 To deliver all confirmed Equipment to the Site by air / shipping or another media within 75 days after the confirmation of ordering. In addition, if the Supplier considers to separate the delivery in batches, the first batch and final batch of the Equipment delivery shall not be more than 14 days as it would affect the site operation.

3.7 The routing for delivering all Equipment shall be proposed by the Supplier. The Equipment which need to be disassembled and re-assembled for delivery due to restriction of the building structure (if any) shall be included in the Contract.

3.8 No wall opening would be made from the Employer to facilitate the delivery to the Site. The Supplier shall also provide protection on the delivery to make sure no damages to the Site would be made during the delivery.

3.9 Upon delivery to the Site, protections of the Equipment after positioning shall be provided to satisfaction to the CIC / Architect;

(d) Supervision for Installation and Coordination with the Main Contractor:

3.10 Unless otherwise specified by the CIC / Architect, the tentative delivery and installation schedule shall be around Q3-Q4 2018. Upon the delivery of the Equipment on the Site / Designated area within KCC (to be advised by the CIC), the Supplier shall arrange supervisor to carry out supervision to the Equipment, which shall be procured and installed by the Main Contractor within 14 days from the last batch of Equipment delivery. In addition, the Supplier shall provide 14 days of site supervision (as a minimum) without additional cost, or unless specified by the CIC / Architect.

### **3. Scope of Supply and Delivery Contract (Cont'd)**

3.11 The Supplier shall carry out supervision on all Equipment during the installation and coordinate with the Main Contractor until the completion of the installation. It is estimated that the supervision and installation period shall be 7 days (maximum) unless otherwise specified.

(e) Supervision of the Supplier:

3.12 The Supplier shall be supervised by the CIC and its Consultant of the SETC Project (i.e. David S K Au & Associates Ltd) who also serve as the Architect of the project.

(f) Training Manual and Training Classes:

3.13 The Supplier shall provide Training Manual for all the Equipment installed in SETC with protection of users from any potential hazard in using the Equipment. The Supplier shall conduct two training classes with materials to the CIC for all the SETC installed Equipment (including but not limited to safety precautions, usage, operation and maintenance requirement and how to conduct in training).

(g) Operation & Maintenance (O&M) Manual:

3.14 The Supplier shall provide O&M Manual for all of the above-mentioned experimental Equipment to be installed in SETC.

3.15 The O&M Manual shall include, but not limited to, equipment overview, equipment drawings, operation procedure of equipment, maintenance procedure of equipment, O&M safeguards for potential hazards and personal protective equipment proposal for safe operation and maintenance of equipment, proprietary information, spare part information, required documentations and certifications.

### **3. Scope of Supply and Delivery Contract (Cont'd)**

- (h)        Testing and Commissioning:
- 3.16        The Supplier shall join with the Main Contractor to perform 14 days of Testing and Commissioning (as a minimum) of all the Equipment upon completion of installation without additional cost, or unless specified by the CIC / Architect.
- (i)        Certification of Completion:
- 3.17        To certify the Completion for Installation of all Equipment upon Testing and Commissioning to the satisfaction of the CIC;
- (j)        Developing Disclaimers:
- 3.18        To assist the CIC / Architect to develop and advise disclaimers required before participants use the SETC;
- (k)        Issuance of Warranty:
- 3.19        To repair the Equipment at no charge for any defects of the Equipment within 2-year from the date of handover of the Equipment to the CIC or Practical Completion of the Main Contract whichever is the later, provided the Equipment is operated in normal conditions and the defects are caused by the manufacturer's responsibility.
- 3.20        The scope of works mentioned above must not be read as complete description of work forming this Contract but only as an indication of extent of works. The tenderer is requested to visit the Site to make clear of the works involved and to ensure that all installation described above should comply with all relevant local regulations.
- (l)        Liaison works with the Main Contractor to facilitate all necessary statutory submission/ licensing requirements:
- 3.21        Any Equipment provided by the Supplier may be required to fulfill any



### **3. Scope of Supply and Delivery Contract (Cont'd)**

statutory / licensing requirements in Hong Kong. The Supplier shall coordinate with the Main Contractor who would carry out the renovation works of the SETC and install the Equipment as specified this Contract, to apply for any licensing application / fulfilling the statutory requirements in Hong Kong. The Supplier shall modify the profile of the Equipment to comply with the relevant licensing requirements and until the relevant license is obtained.

### **4. Presentations**

- 4.1 To attend meetings with the Architect and the CIC for any modifications of the Equipment as necessary.

### **5. Deliverables**

- 5.1 All Deliverables shall comply with the Contract requirements to the satisfaction of the CIC and the Architect. Should there be different interpretations between the CIC and the Supplier against any requirements in the Contract, the CIC shall have the final jurisdiction on the explanation and approach of the implementation for the requirements. The Supplier shall follow the explanation of the requirements and the instructions given by the CIC to implement the solution to the satisfaction of the CIC.
- 5.2 To prepare and submit all necessary shop drawings, calculations, reports, certificates, technical information, supporting documents and other documents as required for the CIC / Architect for review and approval, within 14 days of the contract is being awarded.
- 5.3 The Shop Drawings of the Equipment A to K produced by the Supplier shall be subject to the acceptance by the CIC / Architect. The CIC will endeavour to respond to and comment on the shop drawing submitted by the Supplier within 2 weeks of submission as practical as possible. The Supplier shall rectify and supplement the submissions within 2 weeks upon receiving comments from the CIC and/or stakeholders.

## **5. Deliverables (Cont'd)**

- 5.4 To deliver all approved Equipment by the CIC / Architect to the Site by air / shipping or another media, all equipment shall be sent to the site within 75 days after the confirmation of ordering.
- 5.5 To arrange the appropriate supervisor on site to carry out supervision to the installation works to be carried out by the Main Contractor engaged by the CIC. The equipment shall be ready for supervision within 14 days after all equipment delivered on site or unless otherwise specified by the CIC / Architect.
- 5.6 The Supplier shall join with the Main Contractor to perform 14 days of Testing and Commissioning (as a minimum) of all the Equipment upon completion of installation without additional cost, or unless specified by the CIC / Architect.
- 5.7 To prepare Training Manual and conduct two training classes with materials to the CIC for all the experimental Equipment installed in SETC with protection of users from any potential hazard in using the Equipment.
- 5.8 Certification of the completion for Installation of all Equipment upon Testing and Commissioning.
- 5.9 All documents shall be submitted electronically in MS Word format, MS Excel format (for data) and in pdf file format or any other formats as applicable which are readily printable.
- 5.10 All shop drawings and documents must be submitted in English to the satisfaction of the CIC / Architect.
- 5.11 To submit warranty of all Equipment with the number of years as specified in the contract and to provide the Operation and Maintenance Manual.

## 6. Brief Programme

- 6.1 The Supplier undertakes to submit Deliverables as stipulated in the Assignment Brief (in particular Section 9 - Technical Specifications) to the CIC in accordance with the tentative programme specified in Paragraph 6.3 below or as directed / agreed by the CIC from time to time.
- 6.2 Supplementary information or reports other than the Deliverables stated below shall be prepared and delivered at such time upon request by the CIC.
- 6.3 The following activities shall be taken into consideration in the preparation of the programme:

Task	Description of Deliverables	Deadline
(1)	To submit Shop Drawings of all Equipment as specified in Paragraph 5.2	Within 14 days upon contract award
(2)	To deliver all approved Equipment by the CIC / Architect to the Site by air / shipping or another media as specified in Paragraph 5.4	All batches are within 75 days after the confirmation of ordering. In addition, if the Supplier considers separating the delivery in batches, the first batch and final batch of the Equipment delivery shall not be more than 14 days.
(3)	To arrange the appropriate supervisor on site to carry out supervision to the installation works to be carried out by the Main Contractor engaged by the CIC as specified in Paragraph 5.5	Within 14 days from all equipment delivered on site or unless otherwise specified by the CIC / Architect.
(4)	To join with the Main Contractor engaged by the CIC to perform Testing and Commissioning of all the Equipment upon completion of installation as specified in Paragraph 5.6	Within 14 days from all equipment installed on site or unless otherwise specified by the CIC / Architect.
(3)	To submit Training Manual and conducted Training Classes as specified in Paragraph 5.7	Within 28 days from completion of equipment installation

(4)	To issue Certificate of Completion as specified in Paragraph 5.8	Within 28 days from completion of Testing and Commissioning
(5)	To issue all warranties of the equipment Operation and Maintenance Manual and other certificates as specified in Paragraph 5.11	Within 28 days from completion of Testing and Commissioning

## **7. Management of the Supplier**

- 7.1 The Supplier shall be directed and supervised by the CIC and the Architect as delegated. (See also Paragraph 3.12 above)
- 7.2 References to the CIC in this Assignment Brief and its Annex 1 shall include the committees and/or task forces and/or task groups set up under the CIC. The CIC Secretariat will facilitate the CIC in supervising the Supplier.
- 7.3 The Supplier shall obtain the approval of the CIC and the Architect as delegated (where appropriate) before commencement of each stage of the Assignment.
- 7.4 The Supplier shall attend all meetings held by the CIC and the Architect as required and necessary.

## **8. General Specifications**

### **8.1 General**

- 8.1.1 The scope of work should include Supply, Delivery and Supervision of Simulation Equipment for Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC), 7-11 Kwai Hop Street, Kwai Chung New Territories, Hong Kong K.T.C.L. 381 (The Site).
- 8.1.2 The Supplier shall deliver the approved Equipment to the Site tentatively from May 2018 to August 2018 subject to the master programme prepared by the Main Contractor responsible for the renovation works.
- 8.1.3 The contract period of the Main Contract for SETC renovation works is approximately 180 calendar days unless otherwise specified. The tentative commencement date of abovementioned renovation contract shall be in March 2018.
- 8.1.4 The Supplier shall provide a cargo insurance, which shall cover all risks of loss of or damage to the equipment in transit from Supplier's manufacturer to the Contract Site or Designated area within KCC (to be advised by the CIC) in Hong Kong Special Administrative Region. The insurance shall cover general average and salvage charges, adjusted or determined according to the contract of affreightment and / or the governing law and practice, incurred to avoid or in connection with the avoidance of loss from any cause. The duration of the cargo insurance shall attach from the time the equipment leave the Supplier's manufacturer for the commencement of the transit, continues during the ordinary course of transit and terminates upon the delivery to the Contract Site in Hong Kong Special Administrative Region.
- 8.1.5 The Supplier shall provide all means of appropriate protection at its own cost to fully protect the Equipment in order to avoid damages when the renovation works are carried out at the Site.
- 8.1.6 The information provided in the tender documents only indicates the design intent and minimum performance requirements. The quantities, capacities and sizing contained should not be assumed to be the exact extent of the works. The Supplier

should be responsible for the full design and developing a complete system fit for the intended purpose and in accordance with the design intent.

8.1.7 Relevant standards, codes, guidelines, regulations and other documents issued by international / local statutory authorities shall be followed.

8.1.8 All powered equipment shall be installed with Emergency Stop to stop the machine during emergency case.

8.1.9 The Works shall include, but not limited to, the following:-

- a) Submission of the proposed materials, detail sketches etc. to the CIC / Architect for comment and approval before commencement of the Works.
- b) Resume of any other trade works / fire sealant / insulation etc. before / after the Works.
- c) Liaise with any contractor(s) employed by the Employer to achieve timely completion of the Works if required.
- d) The Supplier shall liaise closely with the Employer and its representative(s) for detail planning / execution of the Works.
- e) Provide all necessary warning notices, signages, labels, protection and temporary lighting facilities to pedestrian when needed in order to cope with all relevant statutory requirements.
- f) Submit method statement / testing procedures to the Employer for approval and carry out all necessary testings for the Works according to the latest version of procedures approved by the Employer or its representative(s).
- g) Provide THREE (3) sets of catalogues and approved equipment drawings and details for the alternated and addition system as installed in both hard copy and electronic files stored CD-ROM / DVD-ROM.

- h) Provide quotation for subsequent operation & maintenance work (if applicable) and unit rate for major components that may incur for additional / alternation works with validity for at least one years' time after DLP.

8.1.10 All materials and workmanship shall comply with all relevant sections of the latest edition of the following and all current amendments thereto issued, unless otherwise instructed by the Employer:

- a) CAP 56A (Boilers and Pressure Vessels Regulations)

8.1.11 All inspection, checking, adjusting, servicing, modifying, testing, maintenance and repairing services for those installations not exempted from such Regulations shall be carried out by competent persons provided by the Supplier in a safe, prompt and workmanlike manner to the satisfaction of the Employer.

## 8.2 Supplier's Management Organization

8.2.1 The Supplier shall provide an adequately qualified and experienced supervision team(s) for the purpose of this Contract. The team members shall be required to attend regular meetings with the Employer and its representative(s) to review the progress, work performance, complaints etc. The team shall comprise of, at least, the following team members:

### (a) Project Manager

The project manager shall have minimum of 5 years of experience in the field of equipment production monitoring.

### (b) Competent Supervisor(s)

The Competent Supervisor shall have minimum of 5 years of experience in the field of similar equipment / simulators' supervision.

8.2.2 The Supplier shall provide an adequate number of Competent Supervisor(s), serving for monitor the installation and safety measures carried out by the Main Contractor.

### 8.3 Equipment and Appliances Offered

- 8.3.1 The equipment and appliances offered shall be rated at 380 volts, 3 phase 4-wire/220 volts single phase two wire  $\pm 6\%$  at 50Hz.

### 8.4 Inspection, Measurement and Test Equipment

- 8.4.1 The Supplier shall use calibrated equipment for the Supply of Calibrated Inspection, Measurement and Test Equipment. All equipment and ancillaries shall be checked, calibrated and maintained in good working order and available for use at all times.

### 8.5 Spare Parts

- 8.5.1 The Supplier shall include in his tender all required spare parts and the tenderer shall also offer warranty that all the spare parts can be available on the market for THREE (3) consecutive years after the expiry of the original 2-years warranty period.

### 8.6 Advice of Orders Placed

- 8.6.1 The tenderer is required to forward copies of all orders placed for major items and equipment which are necessary to be imported from overseas to Employer for reference within two weeks after approval of the corresponding equipment by the Employer. Copies of all orders placed shall be forwarded to the Employer for information & record.

### 8.7 Addition and Deletion of Installation

- 8.7.1 The Employer shall have the right during the Contract period to instruct additional installation works into this Contract and the Supplier shall execute such additional works in accordance with the Conditions of this Contract.
- 8.7.2 The Employer shall have the right during the Contract period to instruct for omission of installation works from the Contract.



## 8.8 Information to be Submitted to the Employer

8.8.1 In addition to the requirements of staff organization, Supplier's facilities, working programme, company's brochures, etc. that stipulated in this specifications, the Supplier shall also submit the followings :

- a) Method Statement;
- b) Warranty;
- c) Support, Maintenance and Spares;
- d) Proposed System Design Description, Schematics and Drawings;
- e) Project Methodology and Deliverables;
- f) Technical Expertise;
- g) Information on Relevant Projects
- h) Schedule of Current Projects

## 8.9 Remedy on Supplier's failure to Perform

8.9.1 If the Supplier fails to carry out any work required under the Contract or refuses to comply with any instruction or order given by the Employer in accordance with the Contract within a reasonable time, the Employer may give the Supplier 7 days' notice in writing to carry out such work or comply with such instruction.

8.9.2 If the Supplier fails to comply with such notice, the Employer shall be entitled to carry out such work by itself or by his own workmen or by other contractors. Without prejudice to any other remedy, all additional expenditure properly incurred by the Employer in having such work or instruction carried out shall be recoverable by the Employer from the Supplier by deduction from money due to the Supplier under this Contract or under any other contract between the Employer and the Supplier.

## 8.10 Industrial Training and Pneumoconiosis Levies

8.10.1 The Supplier's attention is drawn to his obligations under the Industrial Training (Construction Industry) Ordinance (Cap. 317) and the Pneumoconiosis (Compensation) Ordinance (Cap. 360) and the Contract Sum shall include the amounts payable in respect of these levies with regard to all works included in this Contract.

## 9. Technical Specifications

### 9.1 Equipment A (Training for personal protection equipment)

#### General Description:

This Equipment shall have a steel post with lifting device to lift up a heavy weight. A testing object such as dummy helmet or dummy shoes would be placed under the heavy item to receive a dropping impact. There should be a control to activate the dropping test.

#### Objective:

This Equipment would facilitate dropping a heavy item on a dummy with or without protected by safety helmet or safety shoes, the trainee would see the condition of the dummy from test.

The dropping impact could be varied from different lifting weight.

Trainee is expected to learn the effectiveness of wearing safety shoe compare to regular shoes and the important of wearing safety helmet in the construction site.

This Equipment shall allow one person in operation at a time.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 1000mm
	Length : not more than 1000mm
	Height : not more than 2100mm
Material	Steel with painting coat.

## 9. Technical Specifications (Cont'd)

### 9.1 Equipment A (Training for personal protection equipment) (Cont'd)

#### Equipment's Specification Requirement:

Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Dropping weight	Around 10kg
Dropping impact	Around 20kn
Weight	Not more than 300kg

## 9. Technical Specifications (Cont'd)

### 9.2 Equipment B (Training for working at height)

#### General Description :

This Equipment shall consist of a rectangular metal frame with 4 posts, connected with diagonal bracing on all post for lateral stability. A lifting hoist crane would be mounted on top and center of the rigid frame for lifting up a person off the ground. There should be a power control device for the lift up operation.

#### Objective:

This Equipment shall allow the trainee experience the falling under protection by safety equipment. The trainee shall wear safety harness, lift upward by the winch of the equipment and experience the lift up in the air.

Trainee is expected to learn how the types of the safety belts and safety harness works to the body when they are fallen.

This Equipment shall allow one person in operation at a time.

#### Equipment's Specification Requirement:

Allowable size :	Width : not more than 2000mm
	Length : not more than 1500mm
	Height : not more than 3000mm
Material :	Aluminium with painting coat.
Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.

## **9. Technical Specifications (Cont'd)**

### **9.2 Equipment B (Training for working at height) (Cont'd)**

#### Equipment's Specification Requirement:

Weight	not more than 300kg
Component	1 set of hoist winch lifted by power
Electrical power supply	220 V- single phase
Maximum lifting weight	150kg for a person

#### **Specification in Safety Aspects (for Equipment B)**

##### Equipment Potential Hazards

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Fall from height
- Overturning of equipment

##### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Certificate that the equipment can support the safe working load
- (2) Calculations to demonstrate the equipment system safety. (i.e. equipment cannot be overturned.)
- (3) Safe Working Load labels shall be presented on equipment

## 9. Technical Specifications (Cont'd)

### 9.3 Equipment C (Training for working at height)

#### General Description :

This Equipment shall have an “A” shape step ladder sit on a based platform. Both side of ladder could be shifted slightly by a control. The movement operation is triggered by an air compression and there are two ways of movement operation.

It is expected that one air compress air tank would serve two set of Equipment.

#### Objective:

In order to learn the safety matter from working at height, this Equipment shall be in safety training on an unsteady step ladder form, which allows trainee to experience the potential dangers if they operate the step ladder in an unsafe manner.

Trainee is expected to experience the unbalance in their body in a sudden. The movement of the step ladder could be in backward or collapse either powered by electric or compress air mechanism.

This Equipment shall allow one person in operation at a time.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 2000mm
	Length : not more than 1000mm
	Height : not more than 2500mm
Material	Aluminium and steel with painting coat.
Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.

## 9. Technical Specifications (Cont'd)

### 9.3 Equipment C (Training for working at height) (Cont'd)

#### Equipment's Specification Requirement:

Weight	not more than 300kg
Component:	-Compress air tank unit (in compliance with CAP 56A Boilers and Pressure Vessels Regulations) : motor and air receiver with chamber for air collection.
Electrical power supply	220 V- single phase
Maximum lifting weight	150kg for a person
Accessories:	A fall protection system shall be proposed by the supplier in case the user is falling during operation
Ladder shall comply with BS EN 131-1:2015 or equivalent international standards	

#### Specification in Safety Aspects (for Equipment C)

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Collapse of ladder
- Fall from height
- Tripping
- Explosion hazard of air tank

## **9. Technical Specifications (Cont'd)**

### **9.3 Equipment C (Training for working at height) (Cont'd)**

#### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Certificate that the equipment can support the safe working load
- (2) Compliance Certificate to BS EN 131-1 or equivalent international standards
- (3) Safe Working Load labels shall be presented on equipment
- (4) O&M procedure for safe operation of the equipment while trainee is on the equipment
- (5) Either one of the below documentations regarding equipment's air tank:
  - (A) one copy of the maker's certificate and one copy of the certificate of inspection during construction issued in respect of the boiler or pressure vessel by a recognized inspection body; or
  - (B) documentary evidence, to the satisfaction of the Hong Kong's Boilers and Pressure Vessels Authority, that the boiler or pressure vessel complies with a recognized engineering standard or code in respect of:
    - (i) the welders employed and welding procedures used in the construction, erection, and repairs of the boiler or pressure vessel;
    - (ii) heat treatment before and after welding;
    - (iii) tests and inspections carried out on the boiler or pressure vessel; and
    - (iv) any other relevant technical details that the Authority may specify, e.g. the kind and grade of material used in the pressure parts of the boiler or pressure vessel; or
  - (C) details of the design and methods of construction, inspection, and testing of the boiler or pressure vessel and its auxiliary equipment.



## **9. Technical Specifications (Cont'd)**

### **9.4 Equipment D (Training for working at height)**

#### General Description:

This Equipment shall have an elevated metal platform protected by railings on all sides.

Ladders would be attached for people to climb up. The ladder shall have protective guard provided.

An unstable plank shall be provided with railing for safety handling.

#### Objective:

This Equipment shall allows trainee to climb up and conduct different mode of safety training regarding working at height.

Not meant to be exhaustive but trainee is expected to learn the following from the Equipment:

- 1) how to use safety belt hook and safety harness on the elevation platform;
- 2) walk on the elevation platform and experience the sudden gap of plank ;
- 3) a correct angle to use a portable ladder to climb up the high level;
- 4) a correct body position to use a fixed vertical ladder and see how climbing a vertical ladder affects the trainee's balance;
- 5) Experience the unsecured planks which could affect the trainee's steadiness.

This Equipment shall allow one person in operation at a time.

Allowable size	Width : not more than 2600mm
	Length : not more than 2100mm
	Height : not more than 4000mm
Material	steel with painting coat

## 9. Technical Specifications (Cont'd)

### 9.4 Equipment D (Training for working at height) (Cont'd)

#### Equipment's Specification Requirement:

Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 700kg
Component	-Fixed ladder able to be mounted on the Equipment -Portable ladder able to be mounted on the Equipment -Walkway unit with anchor point(s) able to attach the safety hook and safety harness.
Maximum lifting weight	150kg for a person

#### Specification in Safety Aspects (for Equipment D)

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Collapse of platform
- Fall from height

##### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Certificate that the equipment can support the safe working load
- (2) Safe Working Load labels shall be presented on equipment

## **9. Technical Specifications (Cont'd)**

### **9.5 Equipment E (Training for slinging operation)**

#### General Description :

This Equipment shall consist of a hoist crane with motor mounted on a horizontal steel beam, supported by two H-steel post on both side. The hoist crane in the middle shall have a hook to allow different kind of lifting rope to mount on. This Equipment is able to be controlled by a remote control panel.

#### Objective:

This Equipment shall allow trainee to know how to use the hoisting crane and slinging wire, and experience the danger in simulation from the operation.

Trainee shall learn

- the right operation of hoist crane,
- a right angle of the slinging wire
- How to select the different size of the wire rope for the different type of slinging experience
- experience the stimulation of accident by using wrong method of slinging operation in a safe environment.

This Equipment shall allow one person in operation at a time.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 2600mm
	Length : not more than 1600mm
	Height : not more than 2800mm
Material	steel with painting coat
Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.

## 9. Technical Specifications (Cont'd)

### 9.5 Equipment E (Training for slinging operation) (Cont'd)

#### Equipment's Specification Requirement:

Weight	not more than 1000kg
Component:	-Hoist Crane lifting power : at least 1000 kg lifting weight lifting motor power: 4.3kw in minimum lifting speed : at least 10m / min. Traversing speed : at least 20m / min.
Accessories:	- Provision of sticks to handle sling wire
Electrical power supply	220 V- single phase and modified to fit Hong Kong standard of power socket.

#### **Specification in Safety Aspects (for Equipment E)**

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Collapse of framework
- Overturning of equipment
- Hands trapped between pinch points
- Hands abrasion

## **9. Technical Specifications (Cont'd)**

### **9.5 Equipment E (Training for slinging operation) (Cont'd)**

#### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Certificate that the equipment can support the safe working load
- (2) Calculations to demonstrate the equipment system safety. (i.e. equipment cannot be overturned.)
- (3) Safe Working Load labels shall be presented on equipment
- (4) LA and LG certificate, according to CAP 59J Factories And Industrial Undertakings (Lifting Appliance and Lifting Gear) Regulation
- (5) Visual and Audible warning signal during lifting operation

## 9. Technical Specifications (Cont'd)

### 9.6 Equipment F (Training for Chemical & Electrical Safety)

#### General Description :

This Equipment shall consist of

- 1) A touch panel for operator to experience the current flow with indication
- 2) A viewing chamber to demonstrate the electrical cable under over current flow.
- 3) Demonstration of testing power socket in an abnormal condition.

#### Objective:

This Equipment is expected to allow trainee to experience the electrical shock in low voltage and understand the characteristic of electrical current flow. The voltage shall be varies in different level to suit for the different experience.

Trainee shall learn the potential danger of using electrical appliance and understand the risk of overloading from the power connection.

This Equipment shall allow the electrical shock experience in dry and wet condition both.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 1100mm
	Length : not more than 900mm
	Height : not more than 1700mm
Material	-Steel with painting coat - Electrical wires for electrical shock experience shall be Low Smoke Zero Halogen (LSOH) type

## 9. Technical Specifications (Cont'd)

### 9.6 Equipment F (Training for Chemical & Electrical Safety) (Cont'd)

Equipment's Specification Requirement:

Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 300kg
Component	-A touch panel for current flow stimulation Power indication of current value , max 3.0mA -A view chamber for demonstration of testing electrical cable and power socket under an over current flow
Electrical power supply	220 V- single phase and modified to fit Hong Kong standard of power socket.

## **9. Technical Specifications (Cont'd)**

### **9.6 Equipment F (Training for Chemical & Electrical Safety) (Cont'd)**

#### **Specification in Safety Aspects (for Equipment F)**

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Electrocution
- Inhalation of harmful gas from burning wire

##### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Certification and detail of design safeguards to guarantee the electric shock demonstration current is under 3 mA.
- (2) Justification that current under 3mA is harmless to human being.
- (3) LSOH wires specification and standard
- (4) Justification or proof that emission of gas is harmless to human being



## 9. Technical Specifications (Cont'd)

### 9.7 Equipment G (Training for Chemical & Electrical Safety)

#### General Description :

This Equipment shall consist of a viewing chamber as a well protected transparent cylinder. An organic solvent testing material shall be injected into the cylinder by syringe for ignition. It is expected that an explosion would be occurred after the ignition of a testing object under a safety control environment.

No generation of any toxic substance or gas shall be occurred from the whole process.

#### Objective:

Trainee shall experience from a sparking to an explosion shock from the reaction of igniting organic solvent in the viewing chamber. This process shall be under a safe protection, facilitate by this Equipment.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 500mm
	Length : not more than 500mm
	Height : not more than 1200mm
Material	steel with painting coat
Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 50kg

## 9. Technical Specifications (Cont'd)

### 9.7 Equipment G (Training for Chemical & Electrical Safety) (Cont'd)

#### Equipment's Specification Requirement:

Component	-A sturdily constructed viewing chamber to place the substance for testing
	-An ignition device
Electrical power supply	220 V- single phase and modified to fit Hong Kong standard of power socket.

#### **Specification in Safety Aspects (for Equipment G)**

#### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Explosion
- Inhalation of harmful gas

#### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Relevant standards of sturdily constructed viewing chamber's material
- (2) Design justification that the sturdily constructed viewing chamber can withstand the explosion without inducing potential harms
- (3) Safety procedure and Material Safety Data Sheet (MSDS) for handling, storage and disposal of the solvent
- (4) O&M procedure to inspect and maintain the glass tube
- (5) Justification or proof that emission of gas is harmless to human being

## **9. Technical Specifications (Cont'd)**

### **9.8 Equipment H (Training for machinery and trapping hazard)**

#### General Description :

This Equipment shall consist of a movable roller blade attached on the rail track. A dummy object would be placed at a point that the blade would reach in action.

#### Objective:

This Equipment shall facilitate a cutting blade experience on a dummy object for demonstration to trainee: Operator shall place a dummy hand on a designated position in the machine whereas the blade would be in contact. This Equipment shall be conducted by one person at a time.

Trainee shall be aware of the importance of wearing Cut Resistant Glove when they are handling objects with sharp edges or during any cutting operation.

## 9. Technical Specifications (Cont'd)

### 9.8 Equipment H (Training for machinery and trapping hazard) (Cont'd)

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 1000mm
	Length : not more than 500mm
	Height : not more than 500mm
Material	steel with painting coat
Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 50kg
Accessories:	Transparent shield to enclose the equipment/ cutting blade during operation. The equipment shall installed with interlocking switch (to stop the operation of equipment during open the enclosure ie. removal of dummy object)
Electrical power supply	220 V- single phase and modified to fit Hong Kong standard of power socket.

#### Specification in Safety Aspects

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Laceration

## 9. Technical Specifications (Cont'd)

### 9.9 Equipment J (Training for machinery and trapping hazard)

#### General Description :

This Equipment shall consist of powered grinder machine and covered by a well protected transparent box as a viewing chamber. The viewing chamber is operable and the testing material shall be placed into the chamber to receive grinding experiment.

#### Objective:

This Equipment shall facilitate a grinding experience on a test object in full power for demonstration to trainee: A grinder is served to grind stone / dummy under a well protected environment. This Equipment shall be conducted by one person at a time.

Trainee shall learn the following:

- 1) experience the power of grinding stone process
- 2) learn point of potential danger in the grind stone operation.
- 3) aware the importance on safety handling before any grinding stone process
- 4) check grind stone condition see any crack and fragment before the grinding operation to mitigate the risk of accident.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 1000mm
	Length : not more than 600mm
	Height : not more than 1600mm
Material	steel with painting coat

## 9. Technical Specifications (Cont'd)

### 9.9 Equipment J (Training for machinery and trapping hazard) (Cont'd)

Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 50kg
Component	A motor for power the grinder Power at 1.2kw min.
Electrical power supply	220 V- single phase

#### **Specification in Safety Aspects (for Equipment J)**

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Flying debris hazard
- Trapping hazards during removal of trapped object or maintenance of equipment

##### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Specification and requirement of test object
- (2) Transparent enclosure with interlocking switch (to stop the operation of equipment during open the enclosure ie. Removal of dummy object)
- (3) Equipment enclosure with interlocking switch (to stop the operation of equipment during open the enclosure ie. Removal of trapped objective)

## 9. Technical Specifications (Cont'd)

### 9.10 Equipment K (Training for machinery and trapping hazard)

#### General Description:

This Equipment shall consist two rotating wheels mounted with a conveying belt, this whole set is to be covered by a well protected machine frame with transparent panel in front for reviewing the experiment. To operate, simply put testing object (e.g. wooden sticks) into the conveying belt to experience the effect.

#### Objective:

This Equipment shall allow trainee to experience the jamming shock by inserting a testing object would be deteriorated (e.g. wooden chop sticks) in between the Vee belt and pulley in action. This action simulate if a worker's operation near vee belt with bare hand. This Equipment shall be conducted by one person at a time.

Trainee shall learn the following:

- 1) Experience the shock of jamming as the testing object reflects the trainee 's hand;
- 2) aware the importance on safety handing (e.g. wearing groove) before the operation;
- 3) Immediate follow up action if the hand got caught from jamming.

#### Equipment's Specification Requirement:

Allowable size	Width : not more than 800mm
	Length : not more than 500mm
	Height : not more than 1500mm
Material	steel with painting coat

## 9. Technical Specifications (Cont'd)

### 9.10 Equipment K (Training for machinery and trapping hazard) (Cont'd)

Painting Coat	Baking finish type with 2 layers 1 <sup>st</sup> layer : 15mμ Primer coating 2 <sup>nd</sup> layer: 15mμ Baking finish coating.
Weight	not more than 300kg
Component	A double row V-Belt Drive motor power at 1.2kw min. Draw for chop sticks
Electrical power supply	220 V- single phase and modified to fit Hong Kong standard of power socket.

#### **Specification in Safety Aspects (for Equipment K)**

##### Equipment Potential Hazards:

Subject to the equipment design, following are potential hazards associated with the equipment that shall be addressed in O&M manuals with O&M safeguards:

- Flying debris hazard

##### Equipment's Documentation Requirement:

In addition to deliverables mentioned in Particular Preliminaries for Equipment, following shall be provided:

- (1) Specification and requirement of test object
- (2) Safety procedure for removing jammed objects



## **Annex 1 – Drawing List**

<u>Drg. No.</u>	<u>Drawing Title</u>	<u>Revision</u>
NS-01	Equipment and Power Socket Layout Plan at G/F	

## **PARTICULAR SPECIFICATION**

### **SPECIFICATION FOR MVAC INSTALLATION**

#### **Content**

Section 1	-	Details for Extent of the Works
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Section 13	-	Paint, Labelling and Finishing
Section 14	-	Commissioning, Testing, Maintenance & Services

## Section 1 – Details for Extent of the Works

### 1.1 Location of Works

This Specification covers the MVAC Installation for the Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of The Construction Industry Council (CIC).

### 1.2 Statutory Requirement

All equipment and installation works shall comply with the rules and regulations established by the following Authorities and Utilities:-

- a) Building Authority
- b) Fire Services Department (FSD)
- c) Food and Environmental Hygiene Department (FEHD)
- d) Labour Department
- e) Water Authority
- f) Local Power Company
- g) Electrical & Mechanical Services Department (EMSD)
- h) Environmental Protection Department (EPD)
- i) Architectural Services Department (ASD)
- j) Any other Authorities having jurisdiction over the installation.

The Contractor shall bear the costs of all fees, permits, testing, stamping of samples, etc., required by any of the above authorities.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.3 Standards, Guides and Codes of Practice

The installation, materials and equipment shall comply with the requirements of the Standard Codes, Guides and other documents issued by the Authorities, Institutions and Organizations referred to in various sections of the Specifications, including the following:

- a) BSI British Standards Institution
- b) CIBSE Chartered Institution of Building Services Engineer. U.K.
- c) LPC Loss Prevention Council
- d) HVCA Heating and Ventilation Contractors' Association, U.K.
- e) IEE Institution of Electrical Engineers, U.K.
- f) ISO International Standards Organization
- g) ARI Air-conditioning and Refrigeration Institute
- h) ASHRAE American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
- i) ASME American Society of Mechanical Engineer
- j) ASTM American Society of Testing and Materials
- k) NBS National Bureau of Standards
- l) NEMA National Electrical Manufacturers' Association
- m) NFPA National Fire Protection Association
- n) SMACNA Sheet Metal and Air Conditioning Contractors' National Association
- o) TEMA Tubular Exchange Manufacturers Association
- p) UL Underwriters' Laboratories, Inc.
- q) DIN Deutsche Industries – Normen

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.4 Building Energy Code

All installations shall comply with the latest edition of Code of Practice for Energy Efficiency of Building Services Installation issued by the Electrical and Mechanical Services Department of the Hong Kong Special Administrative Region. In case there are discrepancies between the Building Energy Code and this Technical Specification, the more stringent requirement shall be adopted.

### 1.5 General Specifications

The latest edition of the following specification issued by the Architectural Services Department of the Hong Kong Special Administrative Region shall form as the General Specifications of this Technical Specification. In case there are discrepancies between the General Specifications and this Technical Specification, this Technical Specification shall take precedence.

- General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Hong Kong Special Administrative Region (AC\_GS)
- General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region (EE\_GS)
- General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region (FS\_GS)
- General Specification for Plumbing and Drainage Installation in Government Buildings of the Hong Kong Special Administrative Region (PD\_GS)
- General Specification for Building (B\_GS)

### 1.6 Technical Information to be Submitted

- a) All equipment and materials shall be approved by the Architect in writing before installation. The Contractor shall be fully responsible for delays and problems arising from his late submission of required information and from his failure to provide adequate information or acceptable equipment.
- b) Wherever equipment do not appear to conform to the space allocation shown on tender drawings, or the Services arrangements, shown, the Contractor shall submit at time of tender, and in any event at the earliest opportunity, sufficient information/Drawings to enable adequate checking prior to installation.
- c) Before ordering of equipment, the Contractor shall submit to the Architect full details of the operating weights of the equipment for purposes of determining floor loading and structural accommodation.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.6 Technical Information to be Submitted (Cont'd)

- d) Technical information shall be submitted in sufficient time to allow for comments and approval by the Architect, including resubmittal and amendments, the whole process of submittal and approval shall comply with the overall programme. At least four copies of approved documents shall be required for distribution by the Contractor.

### 1.7 Building Provisions and Equipment Access

- a) Before proceeding with the works, the Contractor shall confirm in writing that all the provisions of space, structural openings, plinths etc., as shown on architectural and other relevant Drawings are satisfactory. Wherever necessary, the Contractor shall furnish additional information for Builder's works required.
- b) The Contractor shall be deemed to have allowed in his tender sum all costs for hoisting and maneuvering items of equipment, accessories, etc., into the areas or spaces of final positions. The Contractor shall acquaint himself with loading and space limitations for the above purposes. Exact final positions of equipment shall be determined on site by the Contractor and shall be referred to the latest architectural and structural Drawing, as well as requirements of other services.

### 1.8 Samples

- a) Each sample shall be labelled and submitted with detachable parts left loose so that they can be taken apart for internal examination.
- b) The samples to be submitted shall be at the decision of the Architect.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.9 Drawings

- a) When tendering, Tenderer shall bring to Architect's attention any omissions and discrepancies between tender Drawings and Specifications. In general, all works called for by Drawing even if not by the Specifications, and vice versa, shall be fully executed.
- b) Tender Drawings are intended primarily to enable tenderers to prepare his estimate and submit tender. Layout of piping, cables, ducting, etc. as shown do not necessarily indicate exact positions.
- c) The Contractor's working and builder's work drawings shall indicate in detail of all works proposed. Two weeks after the award of the Sub-contract, the Contractor shall submit a proposed submission programme indicating the timing of submission of the various shop drawings for the approval of the architect. The timing as stipulated in the proposed submission programme shall cope with the building programme and shall be subject to the approval by the architect.

Initial submission to be commented by Architect/Engineer 3 weeks

Subsequent resubmission to be commented by Architect/Engineer 2 weeks

Distribution of drawings by the Contractor after approval of submission 1 week

For initial submission and subsequent resubmission by the Contractor, 5 copies are required to be submitted by the Contractor.

After approval by the Architect / Engineer, the Contractor shall make 5 copies of the drawings to distribute to all other parties. Additional copies shall be provided upon the instruction of the Architect at no additional cost.

- d) The drawings shall be based on tender drawings, but amended to account for any modifications to building or installation which may have taken place, and for any adjustments due to the actual equipment offered. The working drawings shall be to suitable scales relative to their purposes, and shall include adequate plans, elevations, sections and views as necessary to show all dimensions, levels and installation details. All such drawings shall be approved by the Architect in writing before any work is put in hand.
- e) The Contractor shall submit all necessary shop drawings showing the details in accordance with architect's / engineer's verbal instructions and submit alternative proposals in order to suit site condition prior to commencement of installation work.

Section 1 – Details for Extent of the Works (Cont'd)

1.9 Drawings (Cont'd)

- f) Additional copies of shop drawings may be tabled at site meetings for discussion purposes but they shall not be regarded as a formal submission.
- g) Prior to any approval being given by the Architect / Engineer, the Contractor shall allow ten days from the date of receipt for the Employer / Project Manager / Architect / Engineer to make any comments.
- h) The Contractor shall carefully keep in his site office a full set of prints showing progress of work. Such prints shall be kept up-to-date at all times and shall serve as a progressive site record of the actual installation.
- i) As soon as possible after completion of the Works, and in any event within fourteen (14) calendar days thereafter, the Contractor shall prepare and submit to the Architect for forwarding to the Employer the following document:
  - i) Four prints of each of all approved 'as-fitted' drawings.
  - ii) Four sets of CD-Rom disk presenting as-fitted drawings.
  - iii) Four copies of approved O/M manual.
- j) Scale of drawings to be submitted by Contractor shall be:-

<u>Type of Drawing</u>	<u>Scale Required</u>
Layouts	1:100
Congested Area	1:50
Details and Sections	1:20

- k) All Contractor's Drawing shall be on standard drawing sheets to sizes in accordance with the International A Series.
- l) All submission drawings, shop drawings or as fitted drawings shall be prepared by 'AutoCAD 2000'.



## Section 1 – Details for Extent of the Works (Cont'd)

### 1.10 Operation and Maintenance Manuals

- a) Prior to delivery of equipment to site the Contractor shall submit two sets of comprehensive draft Operation and Maintenance Manuals and Instruction to the Architect for approval.
- b) The Operation and Maintenance Manual shall contain, as a minimum, the following (properly ordered and indexed) in a form completed and agreed with the Architect:
  - Description of the systems and equipment installed;
  - Details and frequency of maintenance recommended;
  - List of spares and their local agent's names, addresses and telephone numbers;
  - Method of operation of all systems;
  - Equipment Schedules;
  - Catalogues and performance data of all items of equipment;
  - Correct settings of protection devices.
- c) Original operation manual from manufacturer shall be provided.
- d) Upon approval of the Operation and Maintenance Manuals, four sets of Operation and Maintenance Manual shall be distributed. At least one master copy shall be submitted and all catalogues contained in this copy shall be original printings and not photocopies of catalogues.
- e) Operation and Maintenance Manual shall be bound in good quality hard cover binders which can allow adequate access for removal/insertion of data for updated purpose.
- f) Manuals shall be adequately indexed and plastic section divider sheet shall be incorporated to facilitate the use of the manual.
- g) Manuals shall give complete contact address and contact telephone numbers for equipment manufacturers and their local agents.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.11 Services Co-ordination

- a) The Contractor shall obtain the latest technical information, details and layout of other services and latest architectural and structural Drawings and shall complete co-ordination of his works with other trades for a neat, workmanlike installation. The co-ordination shall be reflected in his working Drawings and actual installation.
- b) The Contractor shall provide technical information, details and layout of his installation to the other Contractors and shall co-operate and co-ordinate with the other Contractors for smooth execution of works on site.
- c) The Contractor shall be responsible for costs of taking down installed works, re-fixing etc., as a result of his lack of and/or improper co-ordination and co-operation with the other Contractors.
- d) The Contractor shall allow for working, at certain times, in areas with separate contractors other than his Sub-contractors. In this case, he shall note the full list of works under this Contract and the other Contracts.
- e) All works with respect to the delivery of equipment and installation on site shall be proceeded with all speed and in such order as to conform strictly to the Master Construction Programme.

### 1.12 Contractor's Site Staff

- a) The Contractor shall provide a suitable qualified Site Engineer for the whole duration of the Contract. The Site Engineer shall be full time resident on site.
- b) The Site Engineer shall be qualified, fluent in English and shall adequately represent the Contractor at site meetings and other meetings as required.
- c) The Site Engineer shall be authorized to receive and execute efficiently instructions issued by the Architect.
- d) In addition to the Site Engineer, foreman and supervisors shall be provided by the Contractor as required, to the satisfaction of the Architect.
- e) C.V. of the Site Engineer shall be submitted to the Architect for approval. The Architect reserves the right to move, or cause to remove, from site the Contractor's Site Engineer and/or his sub-ordinates who, in the opinion of the Architect, fails to perform satisfactorily his duties in the best interest of the Project. Such drastic action may be taken even after details of the Site Engineer have been approved by the Architect.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.13 Storage, Protection and Care of Site

- a) The Contractor shall be fully acquainted with space and storage facilities available on site, and shall arrange for delivery his equipment and materials carefully so that they are in phase with overall programme
- b) Off-site storage of equipment and materials by the Contractor shall be entirely at the expense of the Contractor unless such off-site storage has been authorized by the Architect by written Architect's Instruction.
- c) The Contractor shall adequately protect his equipment, materials and unfinished work on site against unauthorized interference, inclement weather, and other causes of damage.
- d) The Contractor shall at all times keep his installation reasonably clean and tidy, and shall remove from site at his expense all surplus materials and temporary works as soon as they are not required.
- e) On completion of the works, the Contractor shall removal all stains, blemishes, markings, etc., to the state ready for handing over.

### 1.14 Training and emergency Repair Service

- a) The Contractor shall provide adequate training of the Employer's staff until they are fully familiar with the operation and maintenance of the complete installation.
- b) The Contractor shall provide emergency repair service to the work carried out under this Sub-contract without charge to the Employer for a period of twelve (12) months commencing from the date of practical completion.

The emergency repair service shall include systematic checking, adjustment and testing of all equipment, all necessary scaffolding and platform for easy access of equipment. The Contractor shall supply and install all consumable parts for replacement as when necessary, repair or replace parts of equipment whenever this is required as instructed by the Employer and shall only use genuine standard parts provided by the manufacturer of the equipment concerned. The emergency repair services shall be carried out within 24 hours upon notification of compliance from the Employer.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.14 Training and Emergency Repair Service (Cont'd)

#### c) Replacement of Faulty Materials

During a period of twelve (12) months from and after the acceptance date, the Contractor shall supply and install without charge, replacement for all and any equipment or parts thereof or liquids or gases which may be in the opinion of the Engineer become unserviceable where such unserviceability is due to faulty materials, workmanship, design or installation or inadequate performance, rating or size. The liability of the Contractor shall cover the replacement of all liquids and gases, oils and refrigerants which may be lost by leakage or otherwise or become contaminated or in other ways unserviceable due to faulty materials, workmanship or installation or inadequate capacity, rating or size.

### 1.15 Warranty Certificate

The Contractor shall furnish with the Employer warranty certificates of all equipment. Unless otherwise specified, the warranty period of the equipment shall be one year commencing from the date of practical completion.

### 1.16 Tools and Spares

- a) Unless otherwise specified, the Contractor shall provide two complete sets of recommended and required tools for maintenance and service of equipment within his Sub-contract.
- b) The Contractor shall submit with his tender price list for recommended items of spares and consumable pertaining to all the equipment offered, per manufacturer's recommendations.
- c) The price list shall be fixed and open for acceptance up to the end of Defects Liability Period.

## Section 2 – Design Criteria

### 2.1 Temperature and Humidity

<b>Area</b>	<b>Summer Design Conditions</b>	<b>Winter Design Conditions</b>
Outdoor	35°C db, 29°C wb 63.8%	7°C db
Reception Area, Briefing Area, Training Area, Office, CCTV server room	24 ± 1 °C db	No winter heating provided

### 2.2 Ventilation Rate

<b>Area</b>	<b>Ventilation Rate</b>	<b>Occupation</b>
Reception, Briefing and Training Area	10 l/s/person	27
Office	10 l/s/person	3

### 2.3 Noise Criteria

<b>Area</b>	<b>NC Level</b>
Reception, Briefing and Training Area	NC45
Office	NC40
Outside Area	Comply with Noise Control Ordinance, EPD's requirement and "Noise and Vibration Control" Section of this Specification

The specified interior noise level limits apply to every position within a room at a height of 1.5m from the floor and not closer than 1.5m from any air technical advice or mechanical equipment.

### Section 3 – Scope of Work

The work embraced by this Specification covers the supply, installation, testing, commissioning and maintenance of the mechanical ventilating and air conditioning (MVAC) installation, in accordance with this Specification and associated drawings, and without abrogating the more extensive details described elsewhere in the Specification and Drawings, includes the following (but not be limited to):

- i) Supply and installation of air handling and ventilation equipment consisting of ventilation fans, VRV air-conditioning units, Split air-conditioning units, all associated filters, valves and control equipment and the like.
- ii) Complete condensate drainage piping system including pipework, thermal insulations, water sealed traps, fittings and all necessary accessories.
- iii) Complete air distribution and filtration system including ductwork, filters, air registers, air terminals, volume control dampers, fire and/or smoke dampers associated with the air conditioning and ventilation system.
- iv) Complete refrigerant piping system including thermal insulations, fittings, charging of refrigerant and all necessary accessories.
- v) All thermal insulations associated with the MVAC installation.
- vi) Aluminum claddings for all insulated pipeworks and ductworks exposed to view, in plant rooms and outdoor.
- vii) Complete electrical works associated with the MVAC installation including motor control panels, starters, switches, protective devices, cable trays, trunkings, conduits, conduit boxes, wirings and all necessary accessories.
- viii) Complete control system including all necessary control devices, sensors, dry contacts, relays, contactors, trunkings, conduits, conduit boxes, wirings and accessories.
- ix) Method “C” ventilation and air-conditioning (V/AC) control system complying with the FSD’s requirements.
- x) All acoustic and vibration isolation work related. The Contractor shall design, supply and install acoustic and vibration treatment in full compliance with the Specification.
- xi) Provision of painting and labelling of ductwork, pipework, VRV indoor units, split type indoor units, ventilation fans and other equipment etc. All ductwork, pipework and equipment exposed to view and not enclosed with cladding shall be painted accordingly to the relevant section of the Specification.

Section 3 – Scope of Work (Cont'd)

- xii) Balancing, testing and commissioning of the entire MVAC system and equipment.
- xiii) Provision of all holding down bolts, spigots, sleeves, etc., where required to be built in during construction including detailed drawings showing accurate locations of holding down bolts, spigots, sleeves, and heights and shapes of plinths, etc.
- xiv) Supply and put the pipe sleeves to appropriate location for all Builder's Work including openings, holes through the building structure, slabs, partition walls and the like required for the MVAC system.
- xv) Plinth, concrete supports and steel framework / platform for outdoor units of VRV air conditioning system shall be provided by the contractor. This contractor shall be responsible for design and construction of additional supports and steel framework / platform where required.  
  
Any additional steel beams, supports and platforms shall be certified by a Registered Structural Engineer (RSE) appointed by the contractor and the calculation and layout of the additional steel beams and supports shall be submitted to the Project Structural Engineer for approval prior to installation.
- xvi) Provision of twelve (12) months maintenance and breakdown services after the date of Practical Completion.
- xvii) Provision of as-fitted drawings, operating instructions and maintenance manuals.
- xviii) Liaison with, and submission to, all Statutory Authorities to obtain all necessary certificates and approvals including the completion of all forms, preparation of all shop drawings and other document for necessary submission purpose and the payment of any fees.

The submission shall include but not be limited to the following:

- Fire Services Department (Form 314 & Form 501 and Form 314A & Form 251).
  - Work completion Certificate (Form WR1 and Form WR1 A) (**ALL** parts of the form) in accordance with the Electrical Ordinance for MVAC Installation associated with electrical installation.
  - Minor Works submission for all installation works fallen into such categories in accordance with Building (Minor Works) Regulation.
- xix) On-site performance and functional testing for rehearsal of Fire Services Inspection including interrelated operations with other M&E installation such as Fire Services and etc.
  - xx) The contractor shall include the cost of the annual certificate for the MVAC Services, and the relevant charges shall be counted until at the end of defects liability period.

Section 3 – Scope of Work (Cont'd)

- xxi) Training of employer's staff for proper operation of the entire MVAC systems.
- xxii) The entire MVAC installation shall fully comply with the Building Energy Code (BEC).
- xxiii) Submit the photos & report showing before and after completion of the Works within Seven (7) calendar days after completion of the Works.
- xxiv) Submit a CD-ROM copy of the full set of "as-fit" drawings (AutoCAD version) showing the routing of conduit and trunking installations within Fourteen (14) calendar days after Practical Completion of the Works. (The AutoCAD template of floor layout plans shall be provided by the CIC.)  
\*The actual routing of the Conduit and Trunking should be determined by the Contractor and approved by the Architect / CIC subject to the actual Site condition.\*



#### Section 4 – Air Cooled Unitary Air Conditioner

##### 4.1 General

- a) Air cooled unitary air conditioners shall include split type unit.
- b) The units shall be designed for quiet operation with all moving parts mounted on anti-vibration mountings and carefully balanced to ensure minimum vibration.

Each unit shall be of standard design and construction, having refrigerant of an approved non-toxic, non-flammable and shall incorporate accessory items set out below. Allowance shall be made for the provision of all these items if these are not provided in the manufacturer's standard equipment.

- c) Cooling capacities shall be as stipulated in the Equipment Schedule.

##### 4.2 Split Type Unit

- a) Air conditioning units shall be of the air cooled split type and shall be standard products of manufacturers who carry in stock locally all possible items for repair or replacement and who are reputable in providing prompt service.
- b) The indoor units shall consist of fans, cooling coils, associated pipework (stainless steel drain trays and controls equipment if necessary). The outdoor air-cooled condensing units shall consist of compressors, condenser coils and fans, associated pipework and control equipment.

Each unit shall have compressor(s) quantity as indicated in the Equipment Schedule and each compressor shall have its independent refrigerant and electrical circuit.

##### 4.3 Casing

- a) Casing shall be constructed or folded and reinforced zincanneal sheet or structural steel frame clad in zincanneal sheet to support all items of equipment, and shall be treated for prevention of corrosion. Casings for outdoor installation shall be of weather proof finish with galvanised or special coating finish with zinc chromate and a finish coat.
- b) Casing for housing coils and supply air fan shall be internally lined with 25mm thick fibreglass or mineral wool insulation in rigid form faced with scrim.
- c) Casing for housing compressors shall be acoustically treated to achieve the specified acoustic level.
- d) Removal panels shall be provided for access to all internal components to facilitate convenient installation and maintenance.

#### Section 4 – Air Cooled Unitary Air Conditioner (Cont'd)

##### 4.4 Compressors / Controls

Compressors of hermetic or accessible hermetic type with suction gas cooled motor shall be complete with all necessary accessories and controls for safe and efficient operation and shall include:

- a) Starters complying with the requirements of power supply authorities.
- b) High refrigerant pressure (manually set) safety cutout.
- c) Low refrigerant pressure (automatically reset) safety cutout.
- d) Oil pressure (manually reset) safety cut out.
- e) Thermal overload, single phasing protection and external overload relays on all motors (this requirements shall also be applicable for all fan motors).
- f) Positive lubrication.
- g) Service valves at suction and discharge of each compressor.
- h) Liquid moisture indicator sight glass
- i) Compressor crankcase heaters
- j) Pumpdown control
- k) Individual compressor fault indication
- l) Return air thermostat (2 steps):
- m) Limit start timer for compressor

The control shall be via micro processor control unit.

In addition to the above, split unit of up to 15kW cooling capacity shall have following control.

- 24 hours programmable timer with day time and nighttime mode setting.
- auto movement of supply air diffusers via remote control unit.
- start-stop via. a remote control unit.
- 3-fan speed control via. a remote control unit.
- Temperature resetting via. a remote control unit.

#### Section 4 – Air Cooled Unitary Air Conditioner (Cont'd)

##### 4.5 Evaporation Coils

- a) Coil shall be constructed of seamless copper tube complete with mechanically bonded aluminium fins.
- b) Each compressor shall have its independent coil and each coil shall consist of two refrigerant circuits with its own expansion valve and solenoid valve.
- c) Heavy gauge insulated galvanised drip trays shall be provided under each evaporator coil.

##### 4.6 Supply Air Fans

- a) Supply air fan shall be of centrifugal type and shall be adequately rated to provide the air quantities specified.
- b) Supply air fans shall be full double width, double inlet, forward curved, multi-blades fans statically and dynamically balanced. And wheels shall be mounted on an adequately size shafts with 200,000 hours bearing.
- c) Fans shall be direct drive type with field adjustable speed tap or driven by a vee belt drive correctly aligned with pulleys capable for replacement as necessary to achieve the air quantities specified.
- d) The exact fan speed and fan motor size shall be determined having regard to the resistance of all elements of the air conditioning systems to be provided and installed, including ductwork and fittings.

##### 4.7 Air Cooled Condensers

- a) Air cooled condensers shall be constructed with copper tubes and aluminium fins. Fans shall be of propeller type. In case where the condenser fan is connecting to a duct which requires a high static pressure fan, fan shall be of axial type.
- b) Each compressor shall be connected to its independent condenser coil amply sized to dispose the heat rejection.
- c) Condensers shall be provided with spring loaded pressure relief valve and line valves.
- d) Condensers shall be designed for suitable refrigerant working pressure.

#### Section 4 – Air Cooled Unitary Air Conditioner (Cont'd)

##### 4.8 Execution

- a) All units shall be complete with washable type aluminium filters and thermostats controls.
- b) The equipment shall be resiliently mounted on anti-vibration mounting, as specified in the 'Noise and Vibration Control' Section of this Sub-contract Specification. All equipment based shall be machine finished and accurately aligned.
- c) All equipment, instrument and accessories shall be painted, labelled and fitted with manufacture's nameplate as specified in "Painting, Labelling and Finishing" Section of this Sub-contract Specification.
- d) Split Type Units
  - The Contractor shall supply and install the complete refrigerant pipes with liquid line solenoid valves, replaceable core filter drier, moisture indication sight glass, thermostatic expansion valves, refrigerant shut-off and bypass valves.
  - The liquid and suction refrigerant lines shall be insulated with 25mm flexible closed-cell insulating materials of elastomeric expanded nitrile rubber and it shall achieve Class O rating. The outer surface shall be of smooth finish. The inherent vapour barrier shall be maintained at all joints.

Properties shall be:

BulkDensity(nominal)	50-120 kg/m <sup>3</sup>
Thermal conductivity (maximum)	0.041 W/mK (20°C mean temperature)

The elastomeric insulation when exposed to sunlight should be protected by UA protective painting as recommended by the insulation manufacturer.

- The refrigerant piping shall be adequately sized by the Contractor according to the recommendation of ASHRAS/CIBSE for refrigerant and oil conveyed through the circuit.

## Section 5 – VRV Air Conditioner

### 5.1 General

- a) The VRV air conditioner shall employ environmental friendly refrigerant such as R410a as refrigerant and shall be 'Inverter' type to allow variable refrigerant volume for energy saving capabilities.
- b) Compressor shall be equipped with frequency inverter controller, and capable of changing the rotating speed to follow variations in cooling load.
- c) Outdoor unit shall be suitable for one type or even mix-match connection of different type of indoor units.
- d) For cooling only model, heat is absorbed from the building at the cooling coil of indoor units and rejected to atmosphere at the ambient air.
- e) Mounting of indoor units shall be with mild steel with primer brackets. The channels, bolts and nuts for outdoor unit mounting shall all be stainless steel when installed outdoor.

### 5.2 Outdoor Unit

- a) The outdoor unit shall be factory assembled unit housed in a sturdy weatherproof casing.
- b) Casings of condensing units shall be constructed of sheet steel and suitably reinforced with channels and sections to form a robust cabinet. Casing for outdoor installation shall be of proof finish & painted. Removable panels shall be provided to give access to all working components, parts, and connection for installation and service. The compartment having the compressor shall be treated for effective sound insulation to ensure that the noise emitted is within the limits specified.
- c) The Contractor is responsible to collect the condensate from the outdoor unit with a stainless steel drain pan underneath and connect it to the condensate drain pipe system provided by the Contractor.
- d) The outdoor unit shall be modular in design and should be allowed for side by side installation. The noise level shall not be more than 50 dB(A) at normal operation measured horizontally 1m away and 1.5m below the indoor unit.
- e) The outdoor unit shall be capable to be connected up to 8 numbers of indoor unit in one refrigerant circuit having a total capacity up to 130 percent of nominal capacity of the outdoor unit.
- f) The outdoor unit shall be capable to be connected up to 20 numbers of indoor unit and outdoor air processing unit in one refrigerant circuit having a total capacity up to 100 percent of nominal capacity of the outdoor unit.

## Section 5 – VRV Air Conditioner

### 5.2 Outdoor Unit (Cont'd)

- g) Each outdoor unit has a min. standard external static pressure at 50 Pa.
- h) The outdoor unit shall be suitable for operation on 380 volt, three phase, 50 Hz power supply.
- i) Each outdoor unit shall be provided with a weatherproof type emergency stop installed adjacent to the unit and in conspicuous location.

### 5.3 Compressor

The compressor shall be of hermetically sealed scroll type and equipped with inverter control capable of changing the speed in accordance to the cooling load requirement. The inverter shall be efficient and quiet. The outdoor unit shall have several steps of capacity control to meet load fluctuation and indoor unit individual control.

### 5.4 Refrigerant Circuit and Cooling Coil

- a) Cooling coil shall be of the direct expansion type and constructed with copper tubes and aluminium fins to give high heat transfer performance with sufficient number of rows & tubes. An adequate collecting tray for run off and removal of the condensate shall be provided. Each coil or circuit shall be controlled by a separate thermal electronic expansion valve.
- b) The refrigerant circuit shall include all necessary solenoid valves, shut-off valves, etc. for operation of unit in each of the operating modes and shall be provided with shut-off valves, charging connection, replaceable filter drier, thermostatic expansion valves, pressure gauges showing suction and discharge pressure of compressors, etc.

### 5.5 Condensing Fans

- a) Fans shall be of propeller type arranged for vertical discharge unless otherwise approved. High static pressure fan shall be provided for plant room installation.
- b) In selecting the VRV outdoor units, the Contractor shall allow for the actual resistance imposed on the air flow of the units due to ducts and grilles etc. This added resistance is to be applied to all outdoor units and is to be taken as a minimum external static pressure of 50 Pa.

## Section 5 – VRV Air Conditioner

### 5.6 VRV Indoor Unit

- a) VRV indoor unit shall be resiliently suspended as described in the ‘Noise and Vibration Control’ section.
- b) The Contractor shall supply noise level emissions of the indoor units in terms of dB re 10 to the minus 12 watts (dB PWL) from 125 Hz to 4000 Hz inclusive for all available fan speeds.
- c) The VRV indoor units shall be of ceiling mounted duct type and wall mounted type as shown on the drawings, comprising cooling coil, direct electric motor driven centrifugal fans and condensate drain pan unless otherwise specified.
- d) The VRV indoor unit shall be equipped with an electronic expansion valve and a microprocessor thermostat to control the refrigerant flow individually.
- e) The unit shall be suitably sized to meet the duty required, matching well with the corresponding condensing unit. The fan speed shall be in the lower range of selection to ensure quiet operation and vibration free.
- f) Drain-up pump shall be of built-in type capable to raise the condensate to 50cm high.
- g) Each cooling unit shall be completely fabricated and assembled in factory as the corresponding condensing unit. All of its components and accessories shall be designed and selected to match in characteristic, function and duty as the respective condensing unit so as to overall optimum system performance under all operation conditions.
- h) Temperature sensor of A/C units installed at the return air grille of each indoor unit to measure the actual room temperature.
- i) Each indoor unit shall have a temperature control unit via hard wiring to control the A/C unit individually. The temperature control units shall be located at the designated location as specified by Architect/Engineer at the same level.
- j) Self-contained indoor units serving only the protected area and are wholly situated within the structural FRP can be installed provided that:-
  - The indoor unit volute casing, fan blades, fan coil enclosure, etc shall be all constructed from non-combustible materials (i.e. in compliance with BS 476 : Part 4)
  - All electrical wirings shall be run inside metal conduits and/or enclosure.
  - Insulating materials for the fan coil and the associated pipework shall meet the FSD requirements.

## Section 5 – VRV Air Conditioner

### 5.7 Coils

For dry expansion type cooling coil, aluminium plate fins shall be coolers drawn, belled and firmly bonded to copper tubes by mechanical expansion of tubes. No soldering or tinning shall be used in bonding process. Coil shall have galvanized steel casings and be mounted pitched in the unit. Cooling coils shall be enclosed in an insulated unit coil section. Coil headers and U-bends shall not be exposed. Refrigerant distributors shall be provided and connections to the tubes shall be so designed to ensure an equal flow of refrigerant to each tube.

### 5.8 Fans

Each indoor unit shall be provided with one or more statically and dynamically balanced aluminium or equivalent or factory standard blade forward curved centrifugal supply air fans, which shall be direct driven by a permanent split capacitor motor suitable for operation on 220 volt, single phase, 50 Hz power supply. Motor shall be at least two speed, ball bearing types, with accessible extended oil tubes and oil reservoirs.

### 5.9 Motor

- a) Indoor unit fan motors shall be of the ‘split-capacitor’ type suitable for single phase electrical supply. The motor shall be resiliently mounted to the fan tray or scrolls. The motor/fan tray assembly itself shall be also resiliently mounted to the casing structure. The tray shall be easily withdrawable for inspection and cleaning after disconnecting from the mains supply and ancillaries with the plugs and sockets provided.
- b) The motor shall be capable of providing at least two fan speeds (plus on/off) and shall be of adequate capacity to prevent overloading at any speed and duty of the fans.

### 5.10 VRV Refrigerant System Control

- a) The VRV system shall incorporate all necessary safety devices such as high pressure switch, compressor safety thermostat & overcurrent relay, fan motor safety thermostat, inverter overload detector, fusible plugs, etc.
- b) The VRV system shall be equipped with computerized PID control and a self-diagnosis circuit to accurately maintain individual room temperature and facilitate inspection of function mode and maintenance service.
- c) Each indoor unit shall be equipped with a micro-processor thermostat and an electronic expansion valve to control the temperature.



## Section 5 – VRV Air Conditioner

### 5.10 VRV Refrigerant System Control (Cont'd)

- d) The remote controller for each group of indoor units shall be of liquid crystal display (LCD) type with an on-off switch, operational features such as fan speed selection, timer setting, temperature setting, self-diagnosis function and auto restart function.
- e) The controller shall have wide screen liquid crystal display and can be wired by a non-polar 3 wire transmission cable to a distance of max 1 km away from the indoor unit.
- f) Control wirings between the outdoor unit and each indoor unit shall be of a wire multi-plexed signal system, such that a single wiring link is to be connected to the first indoor unit from the outdoor unit, then each additional indoor unit is to be connected only to the one before it; this address setting to distinguish between indoor units in the same system to be automatically.
- g) Control wiring shall be of twin-core sheathed vinyl cord as approved by the Engineer.
- h) Interunit control wiring shall be kept away from power cables to prevent electrical noise.
- i) The VRV system shall be equipped with an effective oil recovery system to automatically control the return of refrigerant oil due to the significance of long refrigerant piping and plural indoor units.
- j) An oil equalized system shall be equipped with the outdoor unit to avoid any unbalance between the two compressors.

## Section 6 – Fan

### 6.1 General

- a) The fans shall have capacities as scheduled in the Equipment Schedule (subject to (f) below).
- b) Fans shall be performance tested to BS 848:Part 1:1997 and B.S. 848:Part 2:1985 and quality assured to BS EN ISO 9001:1994.
- c) Materials shall comply with the various British Standards or other approved international standards.
- d) All fans shall be statically and dynamically balanced by the manufacturers. Limit of vibration severity shall be in accordance with BS 4675 Part I.
- e) The Contractor shall select all fans suitable for the scheduled duties. Fans shall be capable of at least 5% head increase or 10% increase in air flow rate (whichever is more stringent) at rated conditions by alteration of blade angle or impeller.
- f) The Fan static pressures given in the Schedules are given for guidance only, and the Contractor shall be responsible for checking the total final resistance of each system, based on the actual duct runs and equipment offered, prior to ordering. The Contractor shall be responsible for any modifications to the system or any component, i.e. fans, ductwork, motors, cables, switchgear, and the like, which may be required to meet the required performance.

Notwithstanding the above no modifications to any system shall be carried out where such modification may result in a reduction in system performance or efficiency, without the prior approval of the Architect.

- g) Fan characteristic shall be plotted over the entire range from shut-off to free delivery as static pressure in Pa, total efficiency in percentages and operating kW, against the air flow in m<sup>3</sup>/s at the specified speed and shall clearly indicate the operating point for each fan operating separately and, additionally, in the case of parallel operation fans, the parallel operation characteristics and operating points.
- h) Fans shall have non-overloading characteristics over their entire operating range and the characteristic curves must be such that the fan operating point falls below the point of no flow static pressure, to the right of the point corresponding to that of maximum mechanical efficiency, and a 15% increase in static pressure over that specified results in not more than a 15% reduction in air volume and does not affect the stability of fan operation. If necessary, this shall be accomplished by modifying the width of the fan wheel and/or by providing inlet vanes to change the characteristic curve.

## Section 6 – Fan (Cont'd)

### 6.1 General (Cont'd)

- i) For fans with variable speed drives, the Contractor shall provide sound power rating curves and characteristic curves showing the operating points for the complete range of speeds from the minimum speed to the maximum speeds at intervals of 200 r.p.m. of shaft speed.

The Contractor shall make appropriate allowances for the effects on fan performance of all installation conditions including coils, eliminators, attenuators, plenum enclosures and inlet and discharge arrangement so that actual installed fan performance equals that specified.

All characteristic curves shall be certified accurate by the manufacturer for the complete fan and drive assemblies.

- j) Fans shall be selected with speeds and outlet velocities (maximum 13m/sec.) in order to keep the noise level to a minimum.

All fans and motors offered shall be of minimum vibration and noise level during operation, all as detailed in the "Noise and Vibration Control" Section of this Specification herein.

- k) All fans with nominal rating above 7.5kW shall have a minimum efficiency of 75%.

- l) All fans shall be equipped with lifting devices.

- m) Fans having dimensions over 1,000mm in any direction shall have split casings for easy removal and repair.

- n) All fans shall be constructed to a fully developed design and shall be capable of withstanding the pressures and stresses developed during continuous operation at the selected duty. Additionally, all belt driven fans shall be capable of running continuously at ten per cent in excess of the selected duty speed.

- o) Fan bearings shall be of a type suitable for the installed altitude of the fan. They shall be grease/oil ball and/or roller type or alternatively oil lubricated sleeve type. All bearing housings shall be precision located in position and arranged so that bearings may be replaced without the need for realignment. Bearing housings shall be protected against the ingress of dust and, where fitted with greasing points, they shall be designed to prevent damage from over-greasing. For grease lubricated systems the bearing shall be provided with grease in amount and quality recommended by the bearing manufacturer. For oil lubricated systems the housings shall provide an adequate reservoir of oil and shall include a filling plug and be oil tight and dust proof. Systems other than total loss types shall include an accessible drain plug. All bearing lubricators shall be located to facilitate maintenance.

The bearings shall have a minimum operational life of 200,000 hours.

## Section 6 – Fan (Cont'd)

### 6.1 General (Cont'd)

- p) Where the radiated sound power level of the proposed fans exceeded the noise criteria specified for areas by more than 15dB, an approved acoustic jacket or enclosure shall be provided to satisfy the noise criteria. The acoustic jacket shall be supplied by the same manufacturer of the fan or fabricated locally to the manufacturer's recommendation which can allow 100% adequate access for routine maintenance.

### 6.2 Centrifugal Fans

- a) Fans shall be of single width, single inlet or double width, double inlet type with non-overloading fan impellers as specified in the Equipment Schedule. Type of fan blade shall also be as specified in the Equipment Schedule.
- b) The fan casings shall be of a true volute form and shall have inlet cores aerodynamically shaped to give an even distribution of air over the full width of the impeller.

All surfaces of fan casings shall be galvanised after manufacture and all fans with an inlet eye diameter exceeding 300mm or with a scroll 450mm or more in width shall have a bolted access door on the scroll for access purposes. The doors shall be located near the scroll bottom and of the pan type set in a raised frame so that the inner surface is flushed with the scroll. The doors and frames shall be arranged for insulation if applicable. The doors shall be secured to the frames by hand-grip bolts and shall be provided with lift handles.

The fan casings shall be provided with drain sockets or holes with copper drain-pipes brought out to an accessible point, valve and plugged.

The fan casings shall be fitted with flanges on the outlet connection suitable for connection of discharge ductwork and flexible connections, as shown on the Drawings.

All casings and components exceeding 2000mm in any direction shall be of the split type.

- c) Where the suction side of the fan is connected to ductwork, then matching flanges shall also be provided.

## Section 6 – Fan (Cont'd)

### 6.2 Centrifugal Fans (Cont'd)

- d) Suitable terminal boxes welded to the casing shall be provided for electrical connection to fan motors.
- e) Inspection doors or sight ports to enable direction of rotation to be established shall be provided.
- f) Impellers shall be fabricated from mild steel sheet, hot dip galvanized after fabrication.

Impellers shall be rigidly fixed to solid bright steel shafts, statically and dynamically balanced to G2.5 of BS5625 Part 1 (1979), adequately sized and proportioned to ensure that the maximum operating speed is not more than 60% of the first critical speed.

- g) The shafts shall be carried in ring lubricated self-aligning sleeve bearings for shafts of 150mm diameter and larger. Each bearing shall have large oil capacity to ensure efficient lubrication. On shafts of sizes smaller than 150mm diameter, grease lubricated self-aligning ball bearings resiliently mounted to reduce noise transmission shall be used.

Except for sealed ball/roller bearings, all lubrication shall have sight-glasses and oil pipes shall be provided so as to bring the lubricators to an easily accessible position.

- h) The shafts shall be extended beyond the drive-side bearing and keyed for overhung pulleys in all cases.

All fan and motor shaft ends shall be countersunk at the shaft centres to take a tachometer.

- i) All centrifugal fans shall be driven by totally enclosed fan cooled squirrel cage induction motors (minimum I.P.44 for indoor or I.P.54 for outdoor applications unless otherwise indicated in the Equipment Schedule). All motors shall be continuously rated to BS 5000:Part 99:1973 or an approved equivalent standard.

All motors shall be fully tropicalized and vermin proof and suitable for operation in a high humidity environment.

Motor bearings shall be precision grade anti-friction type, packed at the factory with special lubricant designed for maximum radial and thrust loads.

The fans and motors shall be mounted on rigid hot dipped galvanised mild steel channel bases.

## Section 6 – Fan (Cont'd)

### 6.2 Centrifugal Fans (Cont'd)

- j) All fans shall be driven by means of multiple 'Vee' belts driving on overhanging pulleys keyed to the shafts and accurately balanced. Motor pulleys shall be of adjustable type to enable operating speed to be varied within limits after installation. No space saver drives are acceptable.

All belt drives shall have taper lock pulleys on both the driver and driven side and belt sets shall be matched.

Belt sections shall be selected according to the fan manufacturer's recommendations with the overriding condition that belt speeds shall not exceed 23.0m/sec.

Nominal motor nameplate ratings shall be at least 15% higher than the motor operating input at the most arduous design conditions.

- k) Fans shall be anti-vibration mounted as stipulated in the "Noise and Vibration" Section of this Specification herein.
- l) Where centrifugal fans are specified for VAV application and using inlet guide vanes, vanes shall be constructed from heavy gauge aluminium with zinc plated steel interlocking and operating mechanism. The drives shall be located outside the casings and accessible for maintenance.

## Section 6 – Fan (Cont'd)

### 6.3 In-line Fans

- a) In-line acoustic fans shall be of centrifugal / mixed flow type.
- b) Fan cabinets shall be fabricated from heavy gauge steel frame finished with a special coating fitted with galvanised panels.
- c) Panels shall be of 1mm thick galvanised steel sheet with.
- d) Impellers shall be of galvanised steel sheet with integral inlets.
- e) Motors shall be of external rotor motors designed to IP44 minimum protection using class B insulation unless otherwise indicated in the Equipment Schedule.
- f) Motors shall be capable of being removed from the fan assembly via a swing out arrangement.
- g) A fan-speed regulator shall be provided for flow adjustment.
- h) Fans shall be anti-vibration mounted as stipulated in the "Noise and Vibration" Section of the Specification herein.

### 6.4 Execution

- a) All equipment supplied shall be in accordance with this Contract Specification and the relevant drawings and to the approval of the Architect.
- b) The Contractor shall be required to demonstrate at site that the duties required of the equipment are obtainable as integral part of the system.
- c) Physical sizes of all plant and equipment shall be suitable for the space allocated for the accommodation of such plant and equipment, taking into account the requirement of access for maintenance purposes.
- d) The equipment shall be resiliently mounted on anti-vibration mounting as specified in the 'Noise and Vibration Control' Section of this Sub-contract Specification. All equipment bases shall be machine finished and accurately aligned.
- e) All equipment, instruments and accessories shall be painted, labelled and fitted with manufacturer's nameplate as specified in 'Painting, Colour Coding and Labelling' Section of this Sub-contract Specification.

## Section 6 – Fan (Cont'd)

### 6.4 Execution (Cont'd)

- f) Fans with inlets or discharges not connected to ducts shall be fitted with a propriety bell mouth and wire guard.
- g) All centrifugal fans units shall be equipped with lifting devices suitable for their size weight and all fans heavier than 50 kg shall be provided with eyebolts or their purpose made lifting devices.
- h) Fans having dimensions over 1,000mm in any direction shall have split casings for easy removal and repair.
- i) Where the suction side of the fan is connected to ductwork, then matching flanges shall also be provided.
- j) Suitable terminal boxes welded to the casing shall be provided for electrical connection to fan motors.
- k) Inspection doors or sight ports to enable direction of rotation to be established shall be provided.
- l) For belt driven fans, all fans shall be driven by means of multiple 'Vee' belts to BS3790) driving on overhanging pulleys keyed to the shafts and accurately balanced. Motor pulleys shall be of adjustable type to enable operating speed to be varied by 20% with the design fan duty setting at approximately the mid point of the adjustment. No space saver drives are acceptable. The drive shall be rated at 150% of the operating motor power input.

All belt drives shall have taper lock pulleys on both the driver and driven side and belt sets shall be matched.

Belt sections shall be selected according to the fan manufacturer's recommendations with the overriding condition that belt speeds shall not exceed 23.0m/sec.

Nominal motor nameplate ratings shall be at least 20% higher than the motor operating input at design conditions.



## Section 6 – Fan (Cont'd)

### 6.4 Execution (Cont'd)

- m) All exposed shafts, couplings and moving parts shall be provided with suitable galvanised angle iron wire mesh guards which shall be stoutly constructed, easily removable and provided with lifting handles. Care shall be taken that these guards shall not cause 'ring' and/or create vibration noise. Guards shall be independently supported and mounting on fan casings shall not be permitted.
- n) Fans shall be installed using bolts, nuts and washers with all 'as cast' bearing surfaces for bolt heads and washers counterfaced. Holding-down bolts for fans and motors shall be provided with means to prevent the bolts turning when the nuts are tightened.
- o) For fans connected to frequency inverters, a bypass switch and a starter shall be installed in parallel to the frequency inverter so that the fan can be operated even if the frequency inverter is under repair. The cables connection from frequency inverters shall be properly screened against interference to manufacturer's recommendation.

## Section 7 – Motor

### 7.1 General

- a) All motors shall be of a type constructed to BS 4999, BS 2048 and relevant parts of BS 5000 or approved equivalent standard.
- b) Motors shall be selected to obtain the most suitable drive for the specified equipment, as recommended by the equipment manufacturers. Motor shall be tropic-proof Squirrel cage induction TEFC motors unless noted otherwise in the Equipment Schedule.
- c) Ratings shall be based on continuous duty in the prescribed environment or an ambient temperature of 40 degree C whichever is the greater.
- d) Motors in all cases shall be entirely suitable for the duty. A margin of not less than 15% shall be provided between the continuous rating of the motors (without overloading) and the maximum power absorbed by the item of equipment (as installed) under its most arduous operating condition, taking account of the characteristics of the driving machine. All motors up to 30kW shall have full load efficiency of not less than 85% and power factor of not less than .85. Motors of rating greater than 30 kW shall have full load efficiency of not less than 90% and power factor of not less than 0.85.

### 7.2 Products

- a) Winding insulation and general construction of the motor casing, terminal block and the like shall be to Class B in accordance to BS 2757. Allowing 80°C temperature rise above ambient unless otherwise specified in the Sub-contract Specification.
- b) For fans associated with fire and smoke control, the motors shall have totally enclosed fan cooled enclosures with Class H insulation, strictly in accordance with BS 2757 and FSD requirements for 1 hour continuous operation in an ambient of 250°C.

For fan motors for air cooled condensers they shall have Class F temperature rise.

Such motors shall be provided with high temperature leads and terminals and the bearings shall be packed with high temperature grease and guaranteed for operation at the specified duty.

## Section 7 – Motor (Cont'd)

### 7.2 Products (Cont'd)

- c) All motors shall be dynamic and electrically balanced and free from vibration during starting and running.

The vibration and noise level generated by the motors shall not exceed the recommended limits stipulated in BS 4999 Part 142 respectively. The motors shall be of low noise design to limit 1 dB(A) sound pressure level at 1m on no load.

- d) The torque characteristic shall be entirely suitable for the load characteristic.

The design synchronous speed shall not exceed 25 rps unless otherwise specified and the power output ratings shall not be less than those shown in the 'Schedule of Equipment'. The locked rotor torque shall be adequate to provide satisfactory starting of the load being driven considering the load inertia and all other relevant factors but in any case it shall not be less than 150% fully load torque.

In particular, motors driving high inertia loads such as centrifugal fans shall be carefully matched to the load, bearing in mind the starting method, in order to accelerate the load to fully speed well within the maximum start time specified by the motor manufacturer, without overheating of the motor or its associated starting equipment.

- e) The starting current conditions shall conform to the requirements stipulated in the latest edition of the supply rules of the local power companies.

- f) Bearings shall be end shield mounted wherever possible and shall have a minimum average services life of 200,000 hours continuous operation at the installed duty.

Small motors up to and including 15kW shall incorporate permanently lubricated 'sealed for life' bearings.

Lubrication for large motors above 15kW shall be by means of readily accessible lubrication points and shall be capable of greasing with the motor in operation. Pressure relief devisees shall be fitted such that grease cannot enter the motor. Captive dust caps shall be provided on lubrication points.

Motors up to and including 3.7kW shall be fitted with ball bearings at both ends. Larger motors shall be fitted with roller or deep groove ball bearings designed to counted balance end thrust.

## Section 7 – Motor (Cont'd)

### 7.2 Products (Cont'd)

- g) Terminal blocks enclosed in cast iron or aluminium boxes shall be provided for all wiring connections to motors. The blocks shall be arranged so as to enable easy access for maintenance.

Terminal boxes shall be of such dimensions as will ensure access to the terminals and allow room for the supply leads.

Each terminal box shall be fitted for normal bottom or top cable entry. With the exception of motors with ratings less than 1KW, all boxes shall be capable of being turned to a further 3 positions, 90 degrees apart without affecting the terminal base or terminals. Motors above 7.5kW shall be provided with suitably sized tinned brass cable sockets to BS 91.

- h) All motors rated at 15kW or more shall be fitted with thermistors or other sealed temperature sensing devices embedded in the windings and suitable for connection to motor protection control and circuits.
- i) Motors of a particular type or application shall be of the same manufacturer.
- j) Three phase motors shall be fitted with separate earthing terminals.
- k) On all motors over 25kg in weight, lifting eyes or lugs shall be supplied.
- l) All motors shall be provided with name plates.
- m) Motor fan shall be of aluminium alloy. Motor fan cover shall be of pressed steel material. Motor casings shall be fabricated of aluminium alloy, cast iron or steel as appropriate for the frame size.

Motors in the sea water pump house or plantroom or plantroom located underground shall be protected with anti-corrosive finish for dust and high humidity and saline condition.

- n) Motor enclosures shall be in accordance with BS 4999:Part 20 and the Degree of Protection shall be appropriate to the location in which the motors are operating and the environment indicated. Unless otherwise stated, the minimum standard shall be as follows.

Outdoor: TEFC(IP54)  
Indoor: TEFC(IP44)

All pump motors in the sea water pump houses or basement plant rooms shall be waterproof to IP55.

## Section 7 – Motor (Cont'd)

### 7.2 Products (Cont'd)

- o) Unless otherwise specified in the Equipment Schedule, motors rated in excess of 50kW and for all fan and pump motors within the sea water pump houses or basement plant rooms located underground shall be supplied with anticondensation heaters, and controlled such that the heater is only 'ON' when the motor is 'OFF'.
- p) Application point for a tachometer for speed checking shall be provided.
- q) 2-speed motors shall have speed ratio as specified and effected by pole-changing of the stator winding or dual-winding.  
  
They shall comply with all the relevant requirements as specified in this section.
- r) All motor components shall be completed and fully tested to comply with BS 5000: Part 99 including sound pressure level tested 1m from the machine surface at 'no load' condition to BS4196.

### 7.3 Execution

- a) Each individual drive shall be aligned with a straight edge and be provided with a heavy duty belt guard adequately bracketed to the driven equipment and provided with a mesh front plate and holes at shaft positions for use of tachometer.

The drive selected for any machine shall be the type recommended by the manufacturer of the driven machine and subject to Approval. All drives shall be fitted with galvanised iron safety guards.

In general all drives, belts and pulleys shall be products of one manufacturer.

Allowance for drive losses and service factors shall be strictly in accordance with the manufacturer's recommendations.

Details of all drives, belts and pulleys proposed together with manufacturers written guarantee as to their complete suitability for each application shall be submitted for approval prior to installation.

The Contractor shall ensure that all belts and pulleys are selected from the manufacturer's metric range of products.

Belt drives shall comply with BS 3790: 1981 and be capable of transmitting at least the rated power output of the driving motor with one belt removed. Unless otherwise indicated, not less than two belts per drive shall be used and all multi-belt drives shall use matched sets. Pulleys shall be correctly aligned and the Contractor shall ensure that any holding down bolts or fixing to be provided are positioned so as to ensure correct alignment. Provision shall be made for adjustment of the tension in belt drives and also for their alignment.

## Section 7 – Motor (Cont'd)

### 7.3 Execution (Cont'd)

Belt driven fans shall be fitted with pulleys suitable for the belt drive used. Pulleys may use split taper bushes of an approved type for drives up to 30kW. Alternatively, and in any case above 30kW output, pulleys shall be secured to the fan and motor shafts by keys fitted into machined keyways. Pulleys shall be keyed to the fan shaft in the overhung position. Keys shall be easily accessible so that they can be withdrawn or tightened and they shall be accurately fitted. Where gib head keys are used they shall not protrude beyond the end of the shaft. When keys without gib heads are used they shall be drilled and tapped to accept extractor bolts.

Guards shall comply with the recommendations contained in BS 5304. Guards shall be provided at all open intakes and exhausts from fans, all forms of open power transmission systems including belt drives and drive couplings.

Fixed guards shall be used and they shall be installed to prevent access to dangerous parts of machinery. Construction and installation of guards shall ensure strength and rigidity and it shall not be possible to remove any guard or access panel without the aid of a tool.

For fans, the guards shall be manufactured by the fan manufacturer or be to the fan manufacturer's approval and they shall be constructed from galvanised steel wire.

For belt drives, the guards shall be of galvanised steel wire not less than 2.5mm diameter attached to a rigid galvanised steel rod or angle framework. The mesh size and/or the location of the guard shall prevent finger contact with any enclosed danger point. Alternative construction may be from galvanised sheet steel not less than 0.8mm thick stiffened as necessary to ensure a rigid enclosure. Removable access panels shall be provided in guards to allow tachometer readings to be taken on both driving and driven shafts and also belt tension to be tested. The sizes of guards including the dimensions and locations of access panels shall allow for the limits of motor position.

Slid rails shall be provided for all motors driving through V-belts. Purpose-made adjusting devices shall be provided to enable belt tension to be altered and motors to be secured.

- b) For multi-winding motors there shall be no way that the motor isolating switch can be operated whereby any winding may be energised whilst another winding is isolated.
- c) The electrical and mechanical arrangements of all motors must be such that the necessary periodic testing, cleaning and maintenance can be carried out in a minimum of time with economy of labour. No motor must be installed in a position where surrounding plant or building work would obstruct such requirements.

Section 7 – Motor (Cont'd)

7.3 Execution (Cont'd)

- d) The cable connection to motor shall have an approved provision for movement of the motor and the terminal boxes shall be suitably arranged to make a heat cable joint.
- e) All motors shall have an isolating switch adjacent to and within sight of the motor. The switch shall be such that all conductors to the motor are isolated in one location. A lockout emergency push button interlocking with the starter shall be accepted as a means of isolation. Fan coil units and damper actuators shall have a fused spur unit.
- f) The motors and the driven equipment shall be mounted on an approved frame which shall resiliently mounted, accurately set and labelled as specified in 'Noise and Vibration Control' section of this Specification.
- g) Cable connection from a frequency inverter to motor (for variable speed application) shall be properly screened to manufacturer's recommendation.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.1 General (Cont'd)

- h) The Drawings indicate the clear internal air passage dimensions of the ductwork and the manner in which the ductwork systems shall be installed. Due allowance shall be made for the thickness of internal or external linings when dimensioning ductwork and selecting fittings and accessories. The actual work involved in respect of transitions, offsets, etc, shall be ascertained by the Contractor, who shall co-ordinate the ductwork installation with the work of other trades and services.

Reasonable provisions shall be made by the Contractor for future removal and dismantling of sections of ductwork by means of bolted, flanged joints and shall in all cases be approved by the Architect prior to fabrication.

### 8.2 Sheet Metal Duct Materials

- a) Generally, all ductwork shall be of hot dipped galvanized steel sheet to BS EN10142:1991, Grade DX51D+Z, coating type 'Z275' as specified in DW/144.

Galvanized steel ductwork shall be fabricated from new, best quality, full sized galvanized flat steel sheets.

Oval ducts shall be of spirally-wound construction.

- b) The pressure class and air leakage limit shall be as defined in DW/143 and DW/144. The Contractor shall indicate duct static pressure on his working drawings.

### 8.3 Flexible Ducts

- a) For insulated ductwork, the insulation shall be pre-factory insulated and of vapour-proof type of 25mm thick having a density of 24 kg/m<sup>3</sup> and wrapped with aluminum foil.
- b) Flexible ducts shall comply with the requirements of DW/144, CP 413:1973, BS476 Part 6 or UL181 Class 2 and shall be the Fire Services Department approved type.
- c) All flexible ductwork shall be of the patent preinsulated aluminium spiral wound type constructed of a tough multi-ply aluminium laminate, supported by a reinforced steel helix suitable for an operating temperature of -5°C to 90°C as approved by the Architect and shall be suitable for the duties and pressures as required for the particular system.



## Section 8 – Ductwork & Fittings (Cont'd)

### 8.3 Flexible Ducts (Cont'd)

- d) Flexible metal ductwork shall be installed in all locations indicated on the Drawings of and/or wherever else necessary to eliminate transmission of vibration.
- e) All bends made in flexible ducting shall be formed to manufacturer's recommendations and shall have a centre-line radius of not less than 1.5 times the diameter of the ducts. Bends shall remain at full diameter throughout the length of the bend and all bends deformed or damaged in any way during installation shall be replaced with new bends.
- f) All fittings such as tee-pieces, Y-pieces and reducers shall be of galvanized sheet metal exactly as specified for circular sheet metal ductwork.
- g) All joints between lengths of flexible ductwork shall be made with short spigots of galvanized sheet metal circular duct to form a slip joint. Similarly all connections to fittings and terminal boxes and the like shall be of the spigotted slip joint type.
- h) All joints shall be sealed with shrink-on type duct bands similar to "Thermofit" or approved equivalent except that continuous screw type metal bands hose clips or equivalent as approved by the Architect may be used for low pressure applications only. Self tapping metal screws and rivets shall not be used.
- i) All flexible ducts shall be adequately supported with hanger straps located, at a minimum of 2000 centres, to prevent undue sagging and strictly in accordance with the manufacturer's recommendations. Under no circumstances, should the flexible ductwork rest on the ceiling file or suspension system.
- j) All flexible ductwork shall be air tight and leak tested in accordance with the requirements of this Specification.
- k) Flexible ducts shall not exceed 4m in length as required by F.S.D.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings

#### a) Joints and Fittings

All cross joints, longitudinal joints, take-offs, bends, transitions and other fittings shall be in accordance with DW/144:1998.

All flanges and steel works for jointing and supporting members shall be hot-dipped galvanized to BS729:1971, Part 1 or BS2989 G275 whichever is applicable.

All joints for flat oval ducts for the medium and high pressure applications shall be sealed with shrink-on type duct bands similar to 'Thermofit' or approved equivalent.

#### b) Ductwork Jointing Sealants

Jointing for flanged cross joints shall be formed from a gasket of 'Prestick' lead or other approved material to thickness not less than 4mm.

Sealant for longitudinal and slip joints shall be type EC/750C sealing compound.

#### c) Vanes and Deflectors

Vanes or deflectors shall be provided inside ducts where required. In particular, such vanes or deflectors shall be provided at all bends having an internal radius less than the width of the duct and also where the included angle exceeds 30° at changes of section. Vanes and deflectors shall be of aerofoil profile i.e. double-skin vanes to ensure complete change of direction of flow at the point, with extended leading and trailing edges, and with radii and spacing selected to achieve uniform velocity at the bend.

#### d) Flexible Connections

- Flexible connections shall be provided at the suction and delivery connections of all fans and air handling units and elsewhere as shown on the Drawings or as may be required to eliminate vibration.

- All flexible connections for use at temperatures up to a maximum of 90°C shall be of neoprene coated glass fabric having a density of not less than 1 Kg/m<sup>2</sup>.

All flexible connections for use with temperatures in excess of 90°C shall be of non-combustible woven glass fabric capable of withstanding 250°C under continuous operation. All materials shall be approved by FSD.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### d) Flexible Connections (Cont'd)

- All flexible connections exposed to the weather shall be covered with prime quality galvanized sheet steel or fibreglass weather shields arranged to form a complete weatherproof jacket.
- All flexible connections shall be fixed over mild steel angle flanges at both ends and secured to same with not less than 2.5mm thick x 25mm wide mild steel bands. For circular ducts flexible connections shall be of the split semi-circular type drawn up tight with bolts at the split points. Flat bars for rectangular ducts shall be fixed with bolts or screws at not more than 150mm centres. The flanges to take the connections shall be not less than that specified for the ducts and the "free" space between flanges shall not be less than 50mm. The flexible connections shall be installed with not less than 25mm additional slack length between the flanges to prevent transmission of vibration.
- Flexible connections shall not be used to correct misalignment of fan and duct.
- Where flexible connections are used to connect fans to insulated ductwork, then flexible fibreglass of equal thickness as for ductwork insulation shall be fitted over the cloth and enclosed in an insulation 450 aluminium foil vapour barrier.
- Where silencers are fitted to fans either on the suction or discharge side then flexible connections shall be of lead impregnated vinyl or other suitable material providing an acoustic barrier and approved by the Fire Services Department.

#### e) Fire Dampers

- Fire dampers shall comply fully with the latest requirements of BS 476 Part 20, UL555, DW/144 and the Fire Services Department requirements regarding rating, construction, installation and testing.

The Contractor shall obtain FSD's approval for the fire damper to be used.

- Fire dampers shall be manufactured by reputable makers subject to FSD's approval and with test certificates conforming to BS476/UL555/UL555S.
- The fire dampers shall be constructed generally to the same standards of air-tightness as the rest of the system.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### e) Fire Dampers (Cont'd)

- Fire dampers shall be provided where ducts enter shafts, pass through masonry or concrete walls, floors, fire partitions, partitions between tenants, and wherever required by authorities having jurisdiction over the installations. All fire dampers shall be constructed to provide a fire rating the same as the wall or floor penetrated.

Test results and certificates issued by air independent Testing Institution shall be submitted for approval to verify the fire resistance ratings.

- Fire dampers shall be of curtain type or multi-leaf type suitable for horizontal and vertical installations and constructed from heavy duty galvanised steel with stainless steel bearings pressed into the frames and achieve the maximum free area. Fire dampers for kitchen exhaust ducts shall be fabricated by stainless steel materials to Grade 304.

Fire dampers shall be gravity operated with fusible links. Electro-thermal links shall be used where fire dampers are operated by smoke detectors. Electro-thermal links shall be the reusable type similar to McCabe or approved equal.

- The fire, smoke and combination of fire and smoke dampers shall be of the UL approved type and comply with the requirements of the BS 476 Part 22 F.S.D. and shall give a positive closure at high velocity.

Motorized fire/smoke dampers shall be actuated by pneumatic or electric actuators as specified and to FSD's requirements.

The whole damper assembly including actuators, linkage, cabling, pneumatic pipe, cable seal, all accessories and control shall withstand 250°C for one hour without distortion, buckling, damage to seals or bearings or any detrimental effect to the operation of the dampers. For large dampers which are fabricated from modules and sealed by gaskets between the module frames, the gasket material shall withstand 250°C within 1 hour.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### e) Fire Dampers (Cont'd)

The dampers shall provide positive fire and smoke control with the absolute maximum impedance to the leakage of smoke and other products of combustion from either flow direction by the twin trailing edges of the interlocking blade. The leakage rate shall comply with the limits for UL555S Class II.

The fire resistance and leakage requirements shall be certified by an Independent Testing Institution and test certificates shall be submitted to the Architect for approval.

The dampers shall also be capable of withstanding a differential pressure of 1.5 kPa or the test pressure in accordance with DW/143 (whichever is the higher) when the dampers are in the fully closed position. The support of the dampers shall be designed and installed to the manufacture's recommendation to satisfy this requirement.

- The actuators shall be fitted with a fail safe spring return mechanism to be normally closed or open as required.

Fire damper assemblies shall incorporate provision to permit free expansion in case of fire, and the integrity of the fire damper shall be maintained by fire resistant packing around the casing and duct through the fire partition. Access panels shall be provided adjacent to fire dampers to permit access to and replacement of fusible links.

The damper leaf shall be retained out of the air stream.

#### f) Access Panels

- Access panels shall be provided at the following locations for ductwork cleaning:
  - Within 600mm of every elbow
  - At the end of each run
  - Every 15 metres of straight run when there is no air grille.
- Access panels shall be provided at every point in the ductwork systems where access for checking, servicing and cleaning of equipment is required. Such equipment shall include all fire dampers, plenums, motorized dampers, fan chambers, air chambers, and the like. Where additional access panels are required for checking, servicing and cleaning of equipment not mentioned above, these shall also be provided by the Contractor.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### g) Volume Control Dampers

- The Contractor shall supply and install access panels in ductwork, casings, or sheet metal partitions of G.I. double construction with insulation of the same general character as adjacent sections of ductwork and of not less than 0.8 mm sheet metal and shall have gaskets around their entire perimeter to ensure possible seal conforming to DW/144 leakage class specification as required by the system. Access panels for kitchen exhaust ducts shall be of grade 304 stainless steel. Minimum size shall be 450 mm x 450 mm or 50 mm narrower than the duct whichever is smaller.
- The Contractor shall submit required location and sizes of any access panel in finished building surfaces and exposed areas for Architect's approval in time to enable them to be incorporated into the construction. Access panels in building surfaces shall be supplied by the Architect. The exact location shall be shown on the Contractor's shop drawings.
- The Contractor shall supply and install hand operated dampers where required for the proper regulation of the ventilating and air conditioning systems. In general, dampers shall be provided as follows:
  - i) In all main supply and exhaust air ducts, branches, supply air connections to fan coil units and all fresh air supply outlets.
  - ii) Behind all supply and exhaust air diffusers/grilles.
  - iii) At the point of connecting flexible ducts to main ducts where flexible ducts are used for connection to air outlets.
  - iv) All other locations as shown on the Drawings.
- All volume dampers shall comply with DW/144 and shall be provided in separate purpose-made flanged casings of rigid construction conforming to the same standards of air-tightness.
- Materials for dampers in all cases shall be galvanized mild steel.
- The damper spindles shall be provided with suitable seals when passing through the casing and penetrations shall be limited by the use of internal linkage.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### g) Volume Control Dampers (Cont'd)

- Air leakage around dampers shall be less than 5% of the maximum design air flow when in the fully closed position.
- Dampers up to width of 300mm in the plane of rotation shall be of butterfly type or single leaf having blades of double construction fitted round a square spindle and the edges of blades shall be smooth and no sharp edges. The spindles shall be turned down at each end and be carried in substantial bronze bosses fixed to the sides of duct, with substantial cast quadrant pieces in an accessible position and with means of clamping after adjustment.
- Dampers on ducts larger than 300mm shall be of multi-leaf opposed blade type, mounted in built-in frames inserted in the ductwork and bolted thereto. Individual blades shall be as specified for butterfly (or single-leaf) dampers, each shall be carried on solid spindle with ends housed in bronze or nylon bushes. The group of blades forming the damper shall be linked to a hand-operated mechanism, which shall be controlled by a quadrant in cases where the damper is accessible from ordinary working level and in all other cases, shall be provided with screw-operated remote-control gear with the winder at an accessible point.
- After final testing and adjustment, all dampers shall be clamped in their correct positions which shall be marked on the quadrant in a permanent manner and stops-fitted.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.4 Fittings (Cont'd)

#### h) Duct Flanges

- Flanges for duct work shall comply with latest standard DW144. Certificates of test complying to such standard shall be submitted for the Architect's approval.
- Air leakage rates and deflection of the flanges shall be certified to meet DW144. Flange sizes shall be selected to comply with DW144 table 2 to table 4.
- The flange shall be a proprietary roll formed type from hot dipped galvanised sheet metal to BS EN 1042 Grade DX 51DtZ, coating type Z275. Sealant shall be integral provided by the flange manufacturer.
- The flanges shall be applied on site as per manufacturer's recommendations. The flanges shall be clamped together with screw lock clamps and using screw type wedge local clamp for positions which are hard to access.

### 8.5 Duct Supports, Hangers and Bracing

- a) The Contractor shall be responsible for building in all supports and the like and all fixing details must be submitted for the Architect's approval.

No vibration whatsoever shall be transmitted from the ductwork of plant to the structure, and the Contractor shall provide where necessary resilient mounting to achieve this.

- b) The construction of hangers shall be in accordance with DW/144. All such hangers shall be provided with screw lengths or turnbuckles for adjustment of ducting runs to level. Welding of hangers to bearers shall not be permitted. All nuts shall be provided with washers and lock-nuts. Projecting ends of bolts shall be cut-off.
- c) On no account shall supports be riveted or bolted to the air ducts.



## Section 8 – Ductwork & Fittings (Cont'd)

### 8.5 Duct Supports, Hangers and Bracing (Cont'd)

- d) All vertical ductwork shall be supported by angle iron bearers under flange joints.
- e) All ductwork hangers shall be as follows:

<u>Location</u>	<u>Brackets, Supports and Hangers</u>
External locations	Stainless steel
Internal locations	Hot-dipped galvanized mild steel construction to BS729 with a minimum coating of 85µm appropriate primed and painted.

Painting shall be executed as stipulated in "Painting, Labelling and Finishing" Section of this Specification herein. All brackets shall be fixed by means of bolts and nuts or screws electroplated with zinc or cadmium to BS3382. Part 1 and 2 of 25µm minimum plating thickness.

All bolts and nuts shall be electroplated with zinc or cadmium to BS3382:Parts 1 and 2 with min. plating thickness of 25 microns.

- f) The ducts shall be tightened to underside of slabs/beams and after the projecting ends of bolts are cut off, no other part of the support shall project below the bottom bearers, thus maintaining maximum height throughout.
- g) Lengths of steel angles and the like used in fabrication of the brackets, flanges and bracing shall be cut from full length sections. Short lengths of sections butt welded together to form a longer length shall not be used.
- h) All hanger supports shall be placed as close as possible to transverse joints or bracings.
- i) All ducts shall be carefully designed and provided with all necessary anchoring and flexible connections to prevent damage to either the ducts or the building structure due to expansion and/or Sub-contraction of the ducts or building.
- j) All anchor points and flexible connections shall be shown on the shop drawings and specific approval shall be obtained from the Architect before proceeding with the installation of any anchors or fixings to the building structure.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.6 Air Outlets

#### a) General

- All diffusers, registers, grilles, linear diffusers and other air terminal fittings shall be an approved types as specified in the following clauses and as shown on the Drawings for the MVAC systems. The Contractor shall submit certified performance figures for each size and type of supply air terminal including the following information to the Architect.
  - i) Face velocity
  - ii) Static pressure drop
  - iii) Throw in metres for terminal velocity of 0.25m/s and 0.75 m/s.
  - iv) Sound power level data taken in a reverberate room and based on ASHRAE standard 36-72.
- The ceiling arrangement and type of tiles and suspension system, including type of air terminal fittings shall be checked before fittings are ordered.
- Volume control dampers of opposed blade type shall be provided behind all supply, return, exhaust and transfer air diffusers, registers and grilles to control the air flow rates. Where flexible air ducts to be used for the connection to the air outlets, they shall be dampered by butterfly dampers at the point of connections of the flexible ducts to the main ducts.
- Samples of each type of outlet to be provided shall be submitted for approval. The samples shall be supplied with the specified finishes and in the colours nominated and shall be retained until the completion of the project. All outlets installed shall match the samples provided in quality of finish and in colour.
- The internal parts of all air outlets which are visible, including volume controls where mounted behind grilles, registers and diffusers shall be finished in matt black paint.
- Opposite blade dampers shall have blades linked together in sections for ganged operation from adjusting screws. Where opposite bladed dampers are mounted on the back of outlets or grilles, the screws shall be accessible through the blades of the outlet. Where the opposed blade dampers are mounted in the duct spigots back from the outlets, then the screws adjustment shall be accessible by removing the registers or grilles.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.6 Air Outlets (Cont'd)

#### a) General (Cont'd)

- Outlets shall be fixed using concealed screws. Exposed fixing shall be rejected.

The Contractor shall liaise with the Architect regarding details of the air outlets with respect to constructional, fixing and dimensional details for the correct fitment and performance.

Shop drawings showing the construction and interface details shall be submitted to the Architect for approval.

Upon first approval by the Architect on the samples, the Contractor shall provide a mock up installation on site for further examination.

The Contractor in liaison with the Architect and other Contractors shall fit and secure air outlets.

Upon approval by the Architect on the mock up installation, units shall be manufactured and delivered to site.

The Contractor shall install ceiling tiles.

The Contractor shall advise the Architect in a timely manner the access requirements to the false ceiling for proper installation.

Adjustment of air flowrate shall be carried out from the front by key without any projecting device.

Neck sizes shall be selected based on the actual air flowrate, maintaining proper air distribution and acceptable noise levels.

Non-combustible gaskets shall be provided to obviate air leaks and prevent the formation of condensation.

All internal surfaces that are visible from below shall be painted matt black.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.6 Air Outlets (Cont'd)

#### b) Rectangular Ceiling Supply Air Diffusers

- Rectangular ceiling air diffusers shall be of the adjustable multi-blade removable louver face type with core designed to provide adequate air mixing without draught for either one, two, three or four way discharge pattern. Each side of the diffuser shall supply the correct air volume for the space it serves. Ceiling outlets shall be suitable for mounting in place of ceiling tiles on ceilings suspended by exposed T-bars, and shall otherwise be suitable for surface mounting on the particular type of ceiling involved.
- Diffusers shall be of aluminium construction finished in colour anodized according to the Architect's instruction and approval.

#### c) Side Blow Supply Air Grilles

- Side blow supply air grilles shall be of the flange mounting type with horizontal adjustable louver blades in front of vertical louver blades, unless otherwise shown on the Drawings.
- Frames and deflecting vanes shall be constructed from extruded aluminium finished in colour anodized according to the Architect's instruction and approval.
- Grille sizes specified on the Drawings are the neck sizes of the core or element, and openings for grilles shall be subject to Architect's approval.

#### d) Linear Supply Air Diffusers

- Diffusers shall be constructed of extruded aluminium with fully adjustable air pattern controlling vanes for active sections and blanking panels for inactive sections. Diffusers shall be flange type.
- Each length of diffuser shall be installed without any visible means of fastening and shall incorporate an aligning device to permit long lengths to be aligned neatly.
- Diffusers shall be multi-slots (20mm per slot) as specified on the Drawings.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.6 Air Outlets (Cont'd)

#### d) Linear Supply Air Diffusers (Cont'd)

- Air shall be supplied to the active lengths of each diffuser via plug in diffuser boots or plenum with spigots for round flexible duct connections. Boots or plenums shall be externally insulated. Each boot or plenum shall be fitted with butterfly dampers. Dimensions of boots or plenums shall be as shown on the Drawings.
- The linear diffusers shall be extruded aluminium with anodized finish to the Architect's instruction and approval unless otherwise indicated on the Drawings.
- All internal surfaces that the visible from below shall be painted matt black.

#### e) Ceiling Supply Linear Bar Grilles

- Ceiling supply linear bar grilles shall be of the flange mounting type with horizontal fixed blades inclined at 15°.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.6 Air Outlets (Cont'd)

#### f) Ceiling Supply Linear Bar Grilles (Cont'd)

- Frames and blades shall be of aluminum construction finished in colour anodized according to the Architect's instruction and approval.
- Grille sizes specified on Drawings are the neck sizes of the core or element, and openings for grilles shall be subject to Architect's approval.

#### g) Return Air, Exhaust Air and Transfer Air Grilles

- Grilles shall consist of extruded aluminium horizontal louvres fixed securely in an aluminium frame with flanged surround. They shall be of the single louvre type and shall fit tightly into the frames and unsupported blade lengths shall not exceed 300mm.
- Grilles shall be completely free from rattles and vibration when the system is operating. Grilles shall be anodized finish to Architect's instruction and approval.
- Where egg crate grilles are specified on the drawings, they shall be constructed of extruded aluminium of 20mm apart at each direction and fixed to the aluminium frames. Grilles shall be anodized finish to Architect's instruction and approval.
- Where wire mesh grilles are specified on the Drawings, they shall be constructed of mild steel wire at 12mm apart at each direction and welded to each other and fixed to the mild steel frames. The grilles shall be galvanised after fabrication and painted to the Architect's instruction and approval.

### 8.7 Thermal and Acoustic Insulation

#### a) External Thermal Insulation

- All insulation shall comply with the requirements of Hong Kong Fire Services Department and shall be tested to comply with the following :

All insulating materials shall be tested to comply with the following :

- i) BS476: Part 12: Class P: not easily ignitable.
- ii) BS476: Part 6: Fire propagation "T" less than 12, "i" less than 6.
- iii) BS476: Part 7 Clause 1: surface spread of flame.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.7 Thermal and Acoustic Insulation (Cont'd)

#### a) External Thermal Insulation (Cont'd)

- Thermal insulation shall be of semi rigid fibreglass unless specified otherwise of  $48\text{kg/m}^3$  with thermal conductivity of not greater than  $0.034\text{ W/mK}$  at  $25^\circ\text{C}$  mean temperature.

The insulation shall be with fibre reinforced double sided aluminium foil vapour barrier. The fibre reinforcing grid shall not be greater than  $10\text{mm} \times 10\text{mm}$  and water vapour permeance less than  $0.3\text{ng/Ns}$  and puncture resistance not less than 2 Joules.

- Ductwork shall be insulated from hangers and supports generally as indicated in DW/144:1998 (MVAC).
- Fibreglass shall be adhered to duct with fire resistant adhesive. Adhesive shall be applied so that insulation conforms to duct surfaces uniformly and firmly.
- For ducts up to  $450\text{mm}$  wide, the insulation shall be wrapped around the duct. For horizontal ducts over  $450\text{mm}$ , metal pins shall be fixed on the bottom surface at  $400\text{mm}$  maximum centres. The insulation shall be wrapped around vertical ducts over  $450\text{mm}$ , the pins shall be located on all sides of the duct at approximately  $300\text{mm}$  centres. Protruding ends of pins shall be cut off after clips have been applied. The vapour barrier facing shall be thoroughly sealed with a vapour-barrier mastic or tape where the pins have pierced through.
- All joints shall be sealed with at least  $75\text{mm}$  wide vapour barrier tape to provide a continuous external vapour seal. Prior to the application of tape all contact surfaces of vapour barrier foil shall be wiped clean of dust and grease using cloth and suitable solvent all in accordance with the manufacturer's recommendation.
- All ductwork insulation shall extend over external flanges and stiffening.
- Insulation shall be applied so as to form a continuous heat and vapour barrier without gaps, cavities and openings. Care shall be exercised to ensure that the minimum thickness specified is maintained at corners, protrusions, and the like.
- At the point of supports, specially prepared blocks of hardwood or Styrofoam material shall be positioned to ensure integrity of vapour barrier by bonding the supports to the insulation.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.7 Thermal and Acoustic Insulation (Cont'd)

#### a) External Thermal Insulation (Cont'd)

- All externally insulated ductwork exposed in plant rooms and outdoor locations, and exposed to sight in any area, shall be protected externally by means of aluminium cladding unless otherwise shown on the Drawings with all joints lapped and secured by sheath screws at 100mm centres without any damaged to vapour barrier of the fibreglass insulation. The cladding shall be made water tight with gaskets and sealants in outdoor locations.
- All externally insulated ductwork exposed in outdoor locations, shall be insulated by 25mm 32kg/m<sup>3</sup> self-extinguishing type polystyrene board held in place with hot bitumen. The maximum thermal conductivity shall be 0.036W/mK at 25°C mean temperature. 15mm cement plaster finish on chicken-wire mesh with additional finish of 0.8mm polyiso butylene sheeting with solvent weld joints shall be applied to outdoor type insulation. The whole shall be then provided with a completely weatherproof external enclosure to the insulation. Corrosion proof bands and clips shall hold the sheeting tight against the insulation such that ballooning will not occur.

#### b) Duct Insulation Application

- Unless specified on the Drawings, all ductwork shall be insulated as external thermal insulation. Thickness of insulation shall follow latest version of Building Energy Code



Section 8 – Ductwork & Fittings (Cont'd)

8.7 Thermal and Acoustic Insulation (Cont'd)

- c) No insulation shall be applied until the duct and plant have been pressure tested as specified.
- d) All insulation shall be applied so as to give a smooth, homogeneous and lineable surface. All rigid sections shall be concentric, and accurately matched for thickness. Steps and undulations in the surfaces shall not be acceptable. Any sections or slabs having damaged ends or edges shall be rejected.
- e) All insulation shall fit tight to surfaces to be covered, and all slabs and sections shall be built up close, butting edges being mitred, chamfered or shaped as necessary. Any minor interstices left in insulation shall be filled and sealed.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.7 Thermal and Acoustic Insulation (Cont'd)

- f) Insulation shall be applied to clean and dry surfaces, free of foreign material such as oil, grease, rust, scale or dirt.

All surfaces to be insulated, which show any signs of rusting or damage to galvanizing shall be thoroughly scraped and wire brushed as necessary to remove all rust, scale, and the like prior to insulation.

- g) Only clean and dry insulation shall be used. Insulation shall generally be applied in accordance with the manufacturers' recommendations.
- h) The vapour barrier shall be sealed around all hangers or other projections through the insulation.
- i) Continuous insulation shall be provided through all sleeves and insulation joints shall be staggered with respect to joints on the associated ductwork system.
- j) Where ducts pass through walls and slabs, suitable fire stops insulation shall be provided for the ducts including the fire dampers. The continuity of the insulation shall be maintained throughout.

### 8.8 Sealing and Flashing

- a) Where ducts pass through walls, floor, and the like the Contractor shall provide sleeves of 18 gauge steel. Where sleeve are fitted through floors, they shall extend to at least 12 mm clear of finished floor.
- b) Sleeves shall be of sufficient size to allow free movement of pipes and furthermore where ducts are insulated the sleeves shall be oversized to allow the insulation to be carried through the sleeves.
- c) Penetrations through roofs shall also be provided with a weatherproof apron and up stand curb.
- d) Where ducts pass through fire walls and floors slabs, a metal fire stop shall be provided around the ducts.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.8 Sealing and Flashing (Cont'd)

- e) Where ductwork penetrates the building fabric the penetration shall be detailed as follows:
- An oversize sleeve shall be built into the construction leaving a consistent clearance of 12-15mm all round the ducts when installed. This gap shall be packed carefully with 80 kg/m<sup>3</sup> mineral wool and the ends of this packing shall be caulked using a non-setting waterproof mastic compound giving an air tight and water tight seal.
  - Where the ducts shall be thermally insulated the insulation shall terminate at both ends of the sleeve and a seal between the surface of the thermal insulation and the end of the sleeve shall be provided by the use of a single bellows arrangement using a flexible material having a minimum surface weight of 5 kg/m<sup>2</sup>.

### 8.9 Test Points

- a) Pitot tube openings for measuring static velocity, and total pressure for air flow shall be provided at the following locations:
- At all fans (in the straightest section of duct near to the outlet).
  - At main branches after regulating dampers.
  - At cooling coils (both before and after the coil).
- b) The setting-out of these holes on MVAC equipment shall follow the manufacturer's recommendation.
- c) The location of these holes shall be approved by the Architect before fabrication.
- d) On insulated ductwork, these holes shall be boxed out for the thickness of the insulation.
- e) Test holes shall be 25mm diameter and fitted with an effective removable seal and the seals shall be properly insulated.
- f) Pitot openings required within medium and high pressure ductwork system shall use proprietary fittings.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.9 Test Points (Cont'd)

- g) All pitot tube openings shall be located in the sides of straight lengths of ducts and not less than two duct diagonal dimensions (for rectangular ducts) or two duct diameters (for circular ducts) downstream and not less than one duct diagonal dimension or one duct diameter upstream of all bends, tees, transitions, and the like. The number and position of the pitot tube openings to be provided at each location shall be as follows :

- Circular Ducts

- i) For ducts up to 1200mm dia. provide two openings as perpendicular centrelines.
- ii) For ducts above 1200mm dia. provide four openings as two sets of perpendicular centrelines. The two sets of perpendicular centrelines shall be at 45 degrees to the other.

- Rectangular Ducts

- i) For ducts having diagonal dimensions up to 450mm provide six openings, located on two perpendicular sides, three per side. Openings to be located at 1/6, 1/2 and 5/6 locations on both duct faces.
- ii) For ducts having diagonal dimensions up to 900mm provide eight openings located on two perpendicular sides, four per side. Openings to be located at 1/8, 3/8, 5/8 and 7/8 locations on both duct faces.
- iii) For ducts having diagonal dimensions up to 2300mm provide ten openings, located on two perpendicular sides, five per side. Openings to be located at 1/10, 3/10, 5/10, 7/10 and 9/10 locations on both duct faces.
- iv) For ducts having diagonal dimensions exceeding 2300mm provide twelve (12) openings, located on two perpendicular sides, six per side. Openings to be located 1/12, 1/14, 5/12, 7/12, 3/4 and 11/12 locations on both duct faces.

### 8.10 Cleaning and Protection During Construction

- a) All ductwork shall be fabricated undercover, delivered to site and stored in a weatherproof and dry area and covered with a plastic sheet or tarpaulin until required for installation.
- b) Prior to and during installation ducts shall be thoroughly cleaned out and shall have all ends covered in an approved manner to prevent ingress of dust and general building debris.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.10 Cleaning and Protection During Construction (Cont'd)

- c) Ductwork shall not be installed unless adequate cover and protection is available to protect it from possible construction damage and the elements.
- d) Air ducts running at low levels shall have proper heavy duty metal protection to the Architect's approval.

### 8.11 Leak Testing

- a) Leak testing shall be carried out by the Contractor in accordance with the requirements stipulated in the "Commissioning, Testing, Maintenance and Services" Section of this Specification herein.

### 8.12 Fire Rated Ducts, Fire Rated Enclosure

- a) The materials shall be approved by the FSD and Building Department to suit the fire resistance and insulation required.
- b) The materials for fire rated enclosure shall be of composite fibre cement with metal facing sheets. The facing sheets shall be forced under pressure into a fibre-cement core before curing to form a permanent mechanical bond between facing sheets and cores. The facing materials shall be generally 0.5mm thick hot dip galvanised mild steel and otherwise specified on the Contract Drawings to be stainless steel or nickel copper alloy to suit the corrosion resistance required.
- c) The material shall be non combustible to B.S. 476 Part 4 1970 and have appropriate thickness to suit the 2 hours or 4 hours fire stability and integrity as specified on the Contract Drawings to B.S. 476 Part 8 1972 as well as to B.S. 476 Part 11 1989 and to suit the compartmentation requirements.
- d) The materials shall have a class 1 surface spread of flame to B.S. 476 Part 7 1971 and Class O to the Building Regulations.
- e) The material shall be impact strength tested to B.S. 5669 and as required by FSD and shall withstand the required impact for the drop height of at least 1 metre to a dry or saturated sample.
- f) The material shall have a minimum flexural strength of 180N/mm<sup>2</sup>.

Section 8 – Ductwork & Fittings (Cont'd)

8.12 Fire Rated Ducts, Fire Rated Enclosure (Cont'd)

- g) The maximum moisture content of the materials shall be as follows.
  - i) Natural moisture content 7 – 8% by weight.
  - ii) Absorption from bare dry after 24 hours soak 13 – 14% weight.
  - iii) Absorption from natural after 24 hours soak 6% by weight.
- h) The thermal characteristics shall be as follows.
  - i) 0.55 W/mK thermal conductivity
  - ii) 4.0 W/m<sup>2</sup>K thermal transmittance
  - iii) 350°C maximum working temperature
- i) The average sound reduction index over 100 - 3150Hz shall be as follows.
  - i) 9.5mm thick - 29.7 dB
  - ii) Double skin sandwich construction with 40 dB
- j) Where fire rated ducts are specified on the Contract Drawings. They shall be formed as double skins with sheet metal ducts enclosed in fire rated boards of appropriate fire resistance. The sheet metal ducts shall be galvanised steel sheet as specified in DW/144 and insulated as necessary according to Clause for Duct Insulation Application in this section. The fire rated ducts, fire rated enclosure and fixed smoke barrier shall be constructed and supported according to the manufactures recommendation and as approved by FSD to maintain the specified fire rating when tested to B.S. 476 Part 20 22 and 24.
- k) For fire rated duct, the materials shall be protected against fire both inside and outside.

## Section 8 – Ductwork & Fittings (Cont'd)

### 8.12 Fire Rated Ducts, Fire Rated Enclosure (Cont'd)

- l) The air leakage for fire rated duct shall be constructed to achieve DW143 specification for Class D duct at 2500 Pa.

The composite sandwich material which forms the sides of the duct, shall be fixed to internal longitudinal rolled steel angles.

Duct units in a system of duct work shall be prefabricated in sections. The duct units shall be jointed together by flanged connections.

The flange connections shall be constructed from galvanised rolled steel angles and angle flanges shall be fastened together by bolts and nuts.

All connections between sheets and angles as well as between angles themselves shall be sealed by gas-tight sealant to FSD approval.

The duct shall be suspended by hangers with maximum spacing of the hangers to be 1200mm and the duct shall be placed on top of the angles in this "cradle" support system.

- m) Access panels shall be provided as for other ductwork.

The construction and fixing of access panel shall allow frequent panel removal for regular inspection.

## Section 9 – Pipework and Fittings

### 9.1 General

- a) This section of the Specification covers the general requirements for pipework, valves and fittings and pipe insulation for the ventilating and air-conditioning system unless the general requirements are abrogated by specific requirements elsewhere in the Specification or Drawings.

The Contractor shall supply and install all pipework, valves and fittings necessary for the correct and satisfactory completion, working, isolation and regulations of the piping systems covered by this Specification.

- b) All pipes materials and valves shall be fully imported from reputable manufacturers from Japan or Europe.
- c) Exposed pipework shall not be permitted in occupied areas without prior approval from the Architect/Engineer.
- d) Sizes indicated for copper and plastic pipes are nominal outside diameters, and for all other pipes are nominal inside diameters.
- e) All pipework delivered to site shall be new and shall be colour banded to identify different grades.
- f) Pipework shall be installed with correct falls to ensure adequate venting and draining.
- g) All pipework shall be free from burrs, rust and scale and shall be cleaned before installation.
- h) All open ends shall be plugged or capped to prevent ingress of dirt. On completion each system shall be flushed out with clean water.
- i) The Drawings indicate the sizes of pipes and the manner in which the various systems are to be installed. They do not purport to show all minor pipework or bends and offsets etc. which must be co-ordinated with other trades, measured on site or ascertained from architectural drawings showing structural, plumbing and drainage, lighting and other features normally encountered in this type of project.
- j) Connections to equipment shall be to the recommendations of the equipment manufacturer's and to approval.



## Section 9 – Pipework and Fittings (Cont'd)

### 9.1 General (Cont'd)

- k) All pipework shall be installed in an approved manner to meet structural and architectural constraints and to achieve a neat and workmanlike appearance and shall be laid out with adequate provision for concrete shrinkage, expansion, contraction, grading, alignment and access for maintenance with not less than 50mm clearance between the external surfaces of pipes (including insulation where applicable) and all adjacent services and building structures. Provision shall be made for replacement of each piped service without disturbing other services.
- l) Where two or more pipe runs follow the same route all shall be parallel to each other and to the building structure, except for the required allowance for draining and venting.
- m) The Contractor shall be entirely responsible for ensuring compliance with any Government requirements for the stamping of valves and for the payment of any fees levied.
- n) All pipework shall be provided with hangers, supports, guides, anchors and the like in accordance with BS 3974.
- o) Grooved pipe couplings for pipework larger than 50mm diameter and screwed joint for pipework 50 diameter and smaller shall be used for jointing as far as practical in all plant rooms, to minimize site fabrication. The contractor shall only use welded joints with the prior approval of the Architect/Engineer.

## Section 9 – Pipework and Fittings (Cont'd)

### 9.2 Pipework Materials

- a) Pipework for the various services shall be according to the Table 1 as follow :-

Pipework Class as

Service referred to in Tables 1

- |    |                      |    |
|----|----------------------|----|
| 1. | Condensate drain     | I  |
| 2. | Refrigerant pipework | II |

b) TABLE 1 - PIPEWORK MATERIAL DETAILS

<u>Pipework Class</u>	<u>Nominal Bore (mm)</u>	<u>Specification</u>
I	25-150	Galvanized steel tube to BS 1387, medium grade
II	15-200	Copper pipe of refrigeration quality to BSEN 1057 Internally degreased and cleaned, fully. hard drawn copper

- c) All refrigerant pipes and fittings shall meet with requirements of high pressure refrigerant R410A air-conditioning. The minimum allowable copper tube wall thickness for use with R410A shall be 0.8mm.
- d) Factory tests shall be carried out to enable the quality of pipes and fittings to be controlled during manufacture. Records of these tests shall be available for inspection by the Architect/Engineer who shall have access for checking the same at any reasonable time during production and testing of the pipes. The manufacturer shall supply a certificate that the pipes comply with the requirements of the relevant British Standards or other approved equivalent such as ANSI Standards.
- e) All pipes shall be tested for straightness, uniformity of thickness and diameter.
- f) All refrigerant pipes shall be undergone the following procedures before charging the refrigerant.
- Nitrogen replacement during soldering
  - Flushing
  - Air-tight test
  - Vacuum drying

## Section 9 – Pipework and Fittings (Cont'd)

### 9.2 Pipework Materials (Cont'd)

- g) Soldering work shall be carried out with dry nitrogen gas passing through the pipes which are being soldered to avoid the formation of oxidation bubbles on the inside surface of the pipes.
- h) Split air-conditioning unit shall have a strength and leakage pressure test after manufacture.

Refrigerant piping circuit shall be pressure tested to 3800 kPa for R410A refrigerant for 24 hours, using dry nitrogen or anhydrous carbon dioxide. Pressure test shall be carried out with compressor discharge and suction services valves closed.

The pressure test shall be immediately followed by evacuation simultaneously from both sides of the systems to an absolute pressure of 3-mm of mercury (i.e. the boiling point of water in the system is below 0 deg C) with compressor service valves open and vacuum pump running. The compressor service valves shall then be closed, and the vacuum pump isolated from the system. The evacuation test shall be deemed satisfactory if the absolute pressure rise over twelve hours does not exceed 4mm of mercury measured on an approved mercury monuments or electronic vacuum indication. On completion of the vacuum test, the vacuum shall be broken and the system charged with refrigerant. The method and procedures of the test shall be to manufacturer's recommendation and submitted for approval.

- i) The Contractor shall submit the test method and arrangement of the pressure test and leakage test to the Architect/Engineer for approval before the testing is carried out.

## Section 9 – Pipework and Fittings (Cont'd)

### 9.3 Pipe Joints, Union and Flanges

- a) The following methods of joining straight pipework shall be employed.

<u>Class of Pipework</u>	<u>Joint</u>
I	<p>Screw sockets for pipework up to 50mm diameter with jointing compounds to BS 5292 or welded joints.</p> <p>Butt welded joints for pipework 65 mm diameter and over.</p> <p>Steam pipework shall have welded joints for all sizes.</p>
II	<p>Brazed joints to BS 1723</p> <p>Flanged, flared (up to 20mm O.D. only) or brazed with or without capillary fittings. Brazing shall be according to HVCA Code of Practice. "Brazing and bronze welding of Copper Pipe and Sheet".</p>

- b) Sufficient joints shall be provided to ensure that access to equipment for maintenance, removal and replacement can be effected without dismantling large sections of pipework or adjacent plant.
- c) No pipe joint shall be permitted within the thickness of wall or floors and the like.

### 9.4 Pipe Fittings

- a) Pipe fittings shall be as specified hereunder for the various tube materials.
- b) Changes in direction of pipes shall be made with elbows and under no circumstance shall pipes be bent without the use of fittings.
- Long sweep bends shall be used in preference to round elbows wherever practicable. Square elbows shall not be used. Tees shall be of the easy sweep or twin elbow pattern except where square tees are required for venting or draining and the like.
- c) Bushes are not preferable and where a reduction in pipe size is required reducing sockets shall be preferred.
- d) Proprietary branch joints from VRV supplier shall be provided for VRV A/C system

## Section 9 – Pipework and Fittings (Cont'd)

### 9.4 Pipe Fittings (Cont'd)

- e) The fittings shall conform to the following standards:

<u>Pipework</u>	<u>Class of Fittings</u>
I	Galvanized malleable iron screwed fittings to BS 143 and BS 1256 for pipes of 15 - 150mm.
II	Silver brazed high duty copper capillary fittings to BS 864 Part 2 for pipes to 54mm dia.  Silver brazed gunmetal fittings for pipes of 67mm dia. and above.

### 9.5 Welded Joints on Copper Pipework

- a) Brazed joints shall be to BS 1723.
- b) Welding rods shall be suitable for the piping materials and atmospheric conditions to BS 1845.

### 9.6 Pipe Supports

- a) Pipe supports shall be provided as required for the stable and sufficient support of the pipework. These supports shall allow free movement for expansion and contraction and shall be graded to required levels for air elimination and drainage. Spacing of supports both vertical and horizontal shall not exceed the centres given in the following table.

<u>Service</u>	<u>Nominal Bore (mm)</u>	<u>Centres for Horizontal Supports (m)</u>	<u>Centres for Vertical Supports (m)</u>
Condensate	20	2.7	3.0
	25-32	2.7	3.0
	40	3.0	3.6
	50	3.4	3.6
Refrigerant Pipework	15-22	1.4	2.0
	28-32	1.7	2.4
	42-67	2.0	3.0
	76	2.4	3.6
	108 cover	2.7	3.6

## Section 9 – Pipework and Fittings (Cont'd)

### 9.6 Pipe Supports (Cont'd)

- b) The material of pipe supports shall be as follows.

<u>Locations</u>	<u>Materials</u>
Exposed to weather	Stainless steel c/w stainless steel washer, bolt & nut.
Indoor with A/C	Galvanized mild steel c/w stainless steel washer, bolt & nut.
Indoor without A/C	Hot-dipped galvanized mild steel with stainless steel washer, bolt and nut

All bolt and nut and wash shall be of stainless steel of 316.

### 9.7 Drain Points

- a) Adequately sized key operated drain cocks shall be provided at all low points on pipes or as shown on Drawings to enable the pipework to be completely drained. Drain cocks shall be as manufactured by Hattersley or an equivalent as approved by the Architect/Engineer.
- b) Drain cocks shall be at least 20mm for pipes to 50mm and 32mm for larger pipes, all complete with hose unions.
- c) All drip trays under equipment in which water may collect during normal operation, shall be drained to waste via piping of at least 25mm or larger to suit particular systems. Water shall not be permitted to fall or lie on the structure of the building.
- d) All items of equipment and ancillary items and fittings such as expansion tanks, strainers, dirt legs, and similar equipment shall be provided with draining facilities which shall run to nearest floor waste or draining position and shall be provided with screwed unions or screwed capped tees to facilitate cleaning.
- e) All size dirt legs fitted with gate valves and hose nipples shall be installed in all water systems. Valves shall be not less than 32mm for pipe lines above 50mm and not less than 20mm for pipes less than 50mm. Dirt legs shall be located at the lowest point of all vertical runs and on coil connections to permit drainage and cleaning.
- f) All drains and vent outlets running to waste shall be visible and run into a copper tundish so that leakage can be observed.
- g) Gradients in all lines shall not be less than 1:500 and condensate drain pipe not be less than 1:100 and shall be arranged to drain to a minimum of low points.

## Section 9 – Pipework and Fittings (Cont'd)

### 9.8 Pipe Sleeves

- a) Where pipes pass through walls, floor, etc (including floors in ducts) the Contractor shall provide pipe sleeves. Where sleeve are fitted through floors, they shall extend to at least 12 mm clear of finished floor.
- b) The Contractor shall supply the detailed information to the Builder and in compliance with the Builder's programme. Where holes have to be cut through structure after concrete has been poured as a result of the Contractor's failure to provide timely information to the Builder, then all costs for this shall be to the Contractor's account.
- c) Sleeves shall be of sufficient size to allow free movement of pipes and furthermore where pipes are insulated the sleeves shall be oversized to allow the insulation to be carried through the sleeves.
- d) Penetrations through roof shall also be provided with a weatherproof apron and up stand curb.
- e) Where pipes pass through fire walls and floors slabs, a metal fire stop shall be welded or bolted around the pipe. This shall be in the form of a 6mm (min.) thick flange located so as to occur in the centers of the slab/wall thickness and welded/screwed to the pipe, the flange being of the same diameter as the internal bore of the pipe sleeve.
- f) Where pipework penetrates the building fabric, an oversized sleeve shall be built into the construction leaving a consistent clearance of 12-15mm all round the pipe or insulation when installed. This gap shall be packed carefully with 80 kg/m<sup>3</sup> mineral wool and the ends of this packing shall be caulked using a non-setting waterproof mastic sealant giving a water tight-seal.

### 9.9 Pipe Cleaning

- a) All pipes shall be stored with closed ends, which shall not be opened until erection.
- b) Every precaution shall be taken to clean out all piping before, during and after erection, and to prevent foreign material being left in the pipe. The Contractor shall be responsible for any damage caused by debris in pipes.
- c) On satisfactory completion of all pipe testing, drain, the Contractor shall clean and fill all piping systems to Architect's /Engineer's approval.

## Section 9 – Pipework and Fittings (Cont'd)

### 9.10 Pipework Insulation

- a) All refrigerant pipes shall be insulated with minimum 25mm or thickness as stated in the BEC (whichever is larger) thick flexible elastomeric insulation. The liquid line and vapour line of refrigerant pipework shall be insulated separately for split type A/C units. Condensate drain pipes shall be insulated with minimum of 25mm thick elastomeric insulation. The insulating material shall consist of CFC free, fire-retardant, flexible, closed-cell elastomeric thermal insulation class 'O' in continuous length with factory applied talc coating on inner surface. Thermal conductivity of the insulation shall not be greater than  $0.04\text{W/m}^{\circ}\text{K}$  at a mean temperature of  $40^{\circ}\text{C}$ . Application of the insulation shall follow manufacturer's recommendations. Flexible elastomeric insulation shall comply with latest FSD's requirements.
- b) Where the insulated pipework are installed in outdoor shall be painted with two coats of hypalon based paint with colour to match the external wall/finish having resistance to U.V. radiation and ozone as approved by the Architect/Engineer.
- c) Continuous insulation shall be provided through all sleeves and insulation joints shall be staggered with respect to joints on the associated pipework systems.
- d) Insulation shall be provided for the whole length of circuit of refrigerant including valve at outdoor units.
- e) External refrigerant pipe shall be cladded with aluminium cladding or enclosed in metal trunking. All exposed refrigerant pipe in indoor shall be painted with two coats of hypalon based paint color to match the wall as approved by the Architect/Engineer.
- f) No insulation shall be applied until pipes and plant have been pressed tested as specified.
- g) All insulation shall be applied so as to give a smooth, homogeneous and lineable surface. All rigid sections shall be concentric, and accurately matched for thickness. Steps and undulations in the surfaces shall not be acceptable. Any sections or slabs having damaged ends or edges shall be rejected.
- h) All insulation shall fit tight to surfaces to be covered, and all slabs and sections shall be built up close, butting edges being mitred, chamfered or shaped as necessary. Any minor interstices left in insulation shall be filled and sealed.
- i) Insulation shall be applied to clean and dry surfaces, free of foreign materials such as oil, grease, rust, scale or dirt.



Section 9 – Pipework and Fittings (Cont'd)

9.10 Pipework Insulation (Cont'd)

- j) Any surface to be insulated, which shows any signs of rusting or damage to galvanizing shall, prior to insulating, be thoroughly scraped and wire brushed as necessary to remove all rust, scale, and the like Surfaces shall then be solvent cleaned to remove all oil, grease and dirt prior to the application of a coat of primer.
- k) Only clean and dry insulation shall be used. Insulation shall generally be applied in accordance with the manufacturers' recommendation.
- l) The vapour barrier shall be sealed around all hangers or other projections through the insulation.

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## Section 10 – Noise and Vibration Control

### 10.1 Application

- (a) This Specification shall apply to all mechanical services for which specific values/requirements are not indicated on the drawings, Schedules or Data Sheets.
- (b) The Contractor shall be responsible for providing all noise and vibration control equipment necessary to achieve the required noise levels.

### 10.2 External Noise Criteria

Acoustic treatment shall be applied to all ductwork/equipment by means such that the resultant noise level at all Noise Sensitive Receivers (NSR) shall not exceed 60dB(A) during 0700 to 2300 hours and 50 dB(A) during 2300 to 0700 hours. In addition, the noise at 3m from any external louvres shall not exceed 70dB(A) at daytime and 60dB(A) at night time.

In all cases, the noise level in areas where people might be standing shall not exceed 70dB(A).

Notwithstanding the above, the installation shall comply with the requirements of the Hong Kong Environmental Protection Department.

### 10.3 Fan and Duct Construction

- (a) Noise breakout from fan assemblies and air handling units shall be controlled by the selection of the appropriate sound-insulating enclosures and/or duct wall construction to limit noise to the targets specified. Such enclosures shall be, as a minimum requirement, of double metal skin construction with the void containing an appropriate absorbent. Access to such enclosures shall be via acoustically sealed hatches or covers.
- (b) All flexible duct connections to air handling units, centrifugal and axial fans shall be formed from resilient sound barrier mat of minimum of 25mm slack across a 100mm gap to ensure effective isolation, installed in such a way to avoid impeding air flow.
- (c) External flexible connections shall be provided for all AHUs irrespective of the provision of internal flexible connectors.
- (d) All air ductwork, associated fittings and components shall be well sealed to avoid noise from air leakage and internally free from raw edges and projections.
- (e) All mitre bends shall be provided with double skin short chord turning vanes constructed and installed according to DW/144.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.3 Fan and Duct Construction (Cont'd)

- (f) Alignment of ductwork shall be such as to avoid unnecessary excitation of adjacent constructions. Ceiling hangers and other support systems shall be kept clear of ductwork and any ductwork insulation.
- (g) All control dampers are to be selected to maintain smooth airflow and minimum regenerated noise. Where multi-blade dampers are not used prior approval of alternatives must be obtained from the Architect. No additional volume control dampers shall be introduced without the approval of the Architect. In balancing the systems, pressure drops across dampers integral with terminals serving areas at NC35 or less will only be permitted where indicated on the drawings or with prior approval of the Architect.

### 10.4 Acoustic Duct Lining

- (a) Acoustic duct internal lining shall be provided where shown on the drawings and where **required to meet the criteria listed** in this specification. The material used for acoustic duct lining shall be incombustible, non-hygroscopic, vermin proof and moisture proof. The material shall not impart any odour to the airstream. The absorbent media shall be faced with a permeable covering such that no fibre erosion occurs at the rated air velocities, and shall have a density between 48 and 72 kg/m<sup>3</sup>.
- (b) The lining shall be protected with a perforated metal facing of 25-30% open area.
- (c) The lining shall comply with Fire Services Department regulations and also with CP413 (with current amendments) as published by British Standards Institution.
- (d) Where duct lining is provided, the lining shall be applied at all internal surfaces of the ductwork. The duct lining shall be fixed to the duct with 100% coverage of fire-resist adhesive. The liner shall also be additionally secured with mechanical fasteners on maximum 400mm centres on all sides. Mechanical fasteners which pierce the ductwork are unacceptable.
- (e) The leading edge of the lining exposed to the airstream shall be sufficiently protected to prevent erosion. All other ends of the duct lining shall be coated before assembly with a cementing material that will prevent de-lamination, leakage or erosion.
- (f) The external thermal insulation to internally lined ductwork may be omitted, provided that the seams and joints of the internally lined duct are all sealed with a fire-resistant sealant, and the thermal insulation effect of the lining is equal to or exceeds the insulation effect specified for external thermal insulation.

Section 10 – Noise and Vibration Control (Cont'd)

10.4 Acoustic Duct Lining (Cont'd)

- (g) No damaged materials shall be used.

10.5 Duct Acoustic Lagging

- (a) External duct acoustic lagging shall be provided where identified on the drawings or if it is necessary to avoid break-out or break-back of noise through ductwork. The lagging shall take the form of either:

- A construction using a minimum of 40mm (density 80 kg/m<sup>3</sup>) mineral wool covered by a sound barrier material of adequate surface weight to resist the level of break-through envisaged (using dry construction techniques only).

**OR**

- Construction of a separate enclosure whereby a support is taken from the ductwork and the surface weight is again adequate to resist the expected break-through.
- (b) The duct lagging shall be fixed to the duct wall using 100% coverage of the fire retardant adhesive. The lagging shall additionally be fixed using GI steel bands at not less than 600mm centres. No pin type fasteners linking the external layer of the lagging to the duct wall shall be used. No fixings which pierce the duct wall shall be used.
- (c) The fire rating of the lagging shall comply with BS5588 and BS8313, or the equivalent. The lagging inside A/C plant rooms and that exposed indoors shall have BS476 class 1 surface spread of flame rating, or the equivalent.

The Contractor shall include all costs associated with issuing to the selected acoustic specialist manufacturer full certified details of air handling plant, sound power spectra and copies of installation drawings giving final routing for ductwork and grille schedules sufficient to permit the specialist manufacturer to confirm the compatibility of attenuator and acoustic louvre performance with the design noise criteria.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.6 Duct Attenuators and Acoustic Louvres

#### (a) Selection

The Contractor shall provide attenuators as shown on the Drawings and as required to meet the requirements detailed in Clause R2 of this Specification.

The Contractor shall be responsible for establishing the number, location and detail design of the attenuators and shall submit detailed calculation in support of this.

The Contractor shall provide and install even they are not shown on the Drawings and specifications where necessary duct attenuators and acoustic louvres to obtain, over the full range of system operation and within the space allocated, dynamic insertion losses sufficient to ensure that the noise criteria specified are not exceeded, without detriment to the system performance and with due attention to the contribution from other services noise.

Evidence of performance of attenuators intended for use for the project must be submitted based on test work carried out to BS4718. Acoustic data shall include dynamic insertion loss and self-noise levels at a relevant range of face velocities. Suppliers will be required to identify and report to the Architect in advance and in writing any limiting effect of the intended location and system conditions on performance and make adequate compensation to ensure that specified performance will be achieved in practice.

The Contractor shall ensure that the attenuators and louvres selected are suitably matched to the system and add as little as possible to system resistance. Attenuators with pressure drops, at normal system duty, exceeding 75Pa may be included only with the prior approval of the Architect and shall be identified and reported at the time of tender. The geometry of selected attenuators shall not result in requirements for sharp transformation in adjacent ductwork, shall not interfere with adjacent services or with reasonable access to services and shall not affect adversely the aerodynamic performance of the system or encourage regeneration of noise local to the attenuator, all to the satisfaction of the Architect.

The Contractor shall include all costs associated with issuing to the selected acoustic specialist manufacturer full certified details of air handling plant, sound power spectra and copies of installation drawings giving final routing for ductwork and grille schedules sufficient to permit the specialist manufacturer to confirm the compatibility of attenuator and acoustic louvre performance with the design noise criteria.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.7 Design and Manufacture

- (a) Unless with the prior approval of the Architect, all splitter attenuators are to be designed with splitters standing vertically and forming a tight fit within the casing. The splitters shall incorporate faired leading edges.
- (b) Rectangular attenuators shall have an outer casing of not less than 1.2mm thickness galvanised sheet steel. Longitudinal joints shall be lock-formed and sealed during construction. Acoustic louvres are to be constructed and installed to form a tight fit free of by-pass routes.
- (c) Sound absorbent materials used within attenuators and acoustic louvres shall be inert, non-hygroscopic, incombustible, rot and vermin proof, and must be capable of carrying passage velocities of at least 25m/sec without surface erosion or other forms of material migration. The infill shall be of a density sufficient to obtain the specified performance and packaged under not less than 10% compression to eliminate voids due to settling. Splitters and the lower face of acoustic louver blades shall be faced with perforated post-galvanised steel sheet of not less than 0.5mm thickness.
- (d) Silencers shall not fail structurally when subjected to a differential bursting pressure of more than 2kPa.
- (e) The fire rating of the filler materials, membranes and sealants shall comply with CP412 (with current amendments), Clause A.2.3 paragraph (1) and (2) as published by British Standards Institution.
- (f) The sound absorbent materials in silencers and acoustic louvres used as part of extract systems from food preparation areas shall be bagged in an impermeable material and shall be capable of being regularly steam cleaned without damage.
- (g) Unless specified otherwise, duct attenuators shall be located such that noise break-in to ductwork on the 'quiet' side of the attenuator or duct breakout between the noise source and the attenuator is adequately controlled. Where this is not practicable, the affected ductwork shall be acoustically lagged to control noise breakout/break-in.
- (h) Attenuators are to be adequately protected during delivery, storage and installation. This shall include delivery to site with blocked ends. The direction of air flow through each attenuator shall be marked clearly, and the attenuator shall also be clearly marked with the agreed silencer reference number and suppliers type number.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.8 Alternative Plant and System Design Modification

- (a) Any modifications to the fan acoustic performance, ductwork layout or selections of supply register, fire dampers, airflow dampers etc may necessitate alteration of the attenuator performance required to meet the acoustical design targets. The Contractor shall be responsible for selecting appropriate silencers where alternative plant selections are proposed. Selections shall be submitted to the Architect for approval.
- (b) No amendments shall be made to the system which would result in the design pressure drop across dampers situated immediately behind supply or return air grilles, terminals, diffusers etc. exceeding the pressure drop in their fully open position by a factor of more than 1.5 unless approval is given by the Architect.

### 10.9 Service Penetrations through Building Fabric

#### (a) Ductwork

Where ductwork penetrates through walls, floors or ceilings/roofs, the penetration through the building element shall be detailed as follows:

- . An oversized, 18 gauge mild steel sleeve shall be built into the construction leaving 12-25mm clearance all round the duct and any insulation. The gap shall be filled with minimum 60 kg/m<sup>3</sup> mineral wool, giving slight compression curing packing. The packing is then covered with mastic.

#### (b) Pipework

Where pipework penetrates the building fabric the penetration shall be detailed as follows:

- . An oversized sleeve shall be built into the construction leaving a consistent clearance of 12-25mm all round the pipe when installed. This gap shall be packed carefully with minimum 60 kg/m<sup>3</sup> mineral wool and the ends of this packing are to be caulked using a non-setting sealant.
- . Where the piped service is to be thermally insulated the insulation shall terminate at both ends of the sleeve and a seal between the surface of the thermal insulation and the end of the sleeve shall be provided by the use of a single bellows arrangement using a flexible material having a minimum surface weight of 5 kg/m<sup>2</sup>.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.9 Service Penetrations Through Building Fabric (Cont'd)

#### (c) Trunking

Trunking penetrating sound insulating structures shall be packed internally with loose mineral wool or fibreglass.

### 10.10 Vibration Isolation System Selection

This Specification shall apply to all mechanical services for which specific values/requirements are not indicated on the drawings, Schedules or Data Sheets.

- (a) Vibration isolation systems shall reduce the vibration and structure borne noise in all occupied areas, with the exception of plant rooms and services areas, such that:
  - . resulting noise re-radiation will not exceed the Noise Criteria set out in this specification.
  - . vibration should not be perceptible to occupants, sitting, standing or lying down. An r.m.s. surface vibration velocity of 0.1mm/s shall be taken as a reference limit of perception.
- (b) Where the vibration isolator type is not specified, the method of mounting machinery and the size, type and active material of the mountings shall be agreed between machinery and isolator manufacturer, and shall comply with this and the vibration isolator specification.

### 10.11 Vibration Isolation Systems for Variable and Multispeed Machinery

- (a) Vibration isolation systems for variable or multispeed machinery shall achieve the degrees of isolation required by the specification at all the normal operation speeds. The resonant frequency of the isolation system shall be lower than any operating speed.
- (b) The resonant frequency of vibration isolation systems for machinery and electric motors with stepped speed starting arrangements (star delta, tapped resistor and transformer etc.) shall not correspond to any of the speeds at the step changes and shall allow for long 'run-up' and 'run-down' times.



## Section 10 – Noise and Vibration Control (Cont'd)

### 10.12 Unsymmetrical Loading Of Anti-Vibration Mounts In A Vibration Isolation System

- (a) The vibration isolation system shall allow each mounting to be adjusted to the design value at the operating condition of the supported equipment.
- (b) The selection of vibration isolation systems for fans and pumps shall allow for forces and movement due to pressure differences at flexible connections. Mountings shall be laid out and sized for their loadings at all operating speeds.
- (c) 'Inertia' blocks and counterweights may be used to reduce the percentage variations in mounting loads at varying speeds.

All such inertia blocks and counterweights shall be included in this sub-contract.

- (d) Isolated sway braces, buffers and similar devices may be used to limit movement during start up and run down. Such devices shall be installed so that they are not in contact with the vibrating device under normal conditions. Sway braces and buffers shall not be used to control constant thrusts created during normal operation.

### 10.13 Prevention of Overloading of Vibration Isolators or Equipment Connections

- (a) Vibration isolation systems whose mountings can be overloaded by excessive deflections, shall be provided with 'bottoming' or similar restraints. The restraints may be part of the mountings, machinery or bases.
- (b) These restraints may be omitted only from vibration isolation systems which cannot be overloaded by pipe or ductwork during erection and are unlikely to be used as hand or footholds subsequently.
- (c) Vibration isolation systems fitted beneath chillers, cooling towers or other equipment in which the weight of the liquid contents acts through the mountings and forms a significant part of the load, shall be provided with adjustable restraints which limit the movement of the equipment on draining down to amounts which do not strain service connections or adjacent runs.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.14 Pipe & Duct Supports Adjacent To Fans, Pumps And Other Equipment

- (a) All services connecting to isolated equipment shall incorporate flexible elements.
- (b) The weight of pipes, ducts, and their contents, or other services connected to the equipment shall not impose any load on the equipment.
- (c) All pipework connected to vibration isolated equipment shall be mounted on spring hangars or supports. The extent of the supports shall be as defined in Table 1 which determines the type and extent of isolation or either side of the vibration source for different categories of isolation requirement.
- (d) The category is determined by reference to the specified Noise Criteria levels of the spaces that the system passes through. All plant rooms shall have a 'nominal' category at least.
- (e) The support vibration isolators shall provide the same static deflection as the equipment supports for the length of service relating to the first type of pipe support isolation specification.
- (f) Flexible pipework connections may be used in place of pipework resilient hangars only when the connectors comply with the requirements of the section below.
- (g) Approval shall be sought from the Architect before any flexible connections are used for the vibration isolation of pipework.
- (h) Flexible connections not complying with the requirements may be used to compensate for mis-alignment etc. provided that the connections comply with the requirements of

### 10.15 Flexible Connections For Pipework

- (a) Where pipework is jointed to vibration isolated equipment with flexible connections, for effective vibration isolation and not just alignment purposes, the first three service supports next to the equipment shall include vibration isolators giving 80% efficiency at the fundamental forcing frequency of the equipment, or the efficiency required for similar service supports in the plant space if it is higher. The supports shall be designed to prevent movement of the connected pipe or duct due to static or dynamic forces due to the fluid weight or velocity.
- (b) The support vibration isolators shall provide the same static deflection as the equipment supports for the length of service relating to the first type of pipe support isolation specification.

## Section 10– Noise and Vibration Control (Cont'd)

### 10.16 Flexible Electrical Connections

Electrical connections between all vibration isolated equipment and equipment fixed to structure shall be made through flexible conduit which changes direction by at least 90° in a minimum length of 25 conduit diameters. Mineral insulated cables shall be taken through at least 360° at 75mm radius or double the permissible minimum radius, whichever is larger.

### 10.17 Air Gap Resonance

The width of air gap between the undersides of solid machine bases (supported on vibration isolation mountings) and the floor shall be selected to avoid resonance of the air gap at the major vibrational or acoustic frequencies generated by the supported plant. Similarly the distance between the panels of air handling units and floors, walls, or soffits shall be chosen to avoid resonance of the panel and air gap at the fan or motor rotational and fan blade passing frequencies. The Contractor shall take specialist advice concerning these two points.

### 10.18 Anti-Vibration Equipment

- (a) This Specification shall apply to all mechanical services systems for which specific values/requirements are not indicated on the drawings or Schedules.
- (b) Noise and vibration systems shall be selected to suit the environment in which the equipment is to be located. Components of the system located in the open air shall be weatherproof non-rusting and be resistant to or protected from rodent and insect attack by choice of materials and design of components. Any particularly corrosive environments or unusual temperatures are indicated on the drawings and schedules.

### 10.19 Vibration Isolation Equipment Performance

The equipment performance shall meet the requirements of the vibration isolation system in which it is used.

### 10.20 Levelling and Height Adjustment of Vibration Isolators

Vibration isolators shall be provided with means of adjustment of deflections to allow for unevenness in bases, etc, unless they are located between prefabricated accurately parallel frames. The amount of adjustment for floor mounted isolators shall not be less than twice the permitted tolerance in the levelling of the floor. Levelling bolts or studs shall be provided with lock nuts.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.21 Lateral Stiffness of Isolators

The lateral stiffness of vibration isolators shall be selected to suit the lateral isolation efficiency required without causing instability. For rotating machines with horizontal shafts, the horizontal stiffness perpendicular to the shaft shall not be less than the vertical, if 'floor' mounted, and vice versa if 'side' mounted.

### 10.22 Spring Type Vibration Isolators

- (a) Spring type vibration isolators shall be constructed from suitably treated and finished steel or steel alloys. They shall be manufactured with rubber, neoprene or glassfibre 'acoustic pads' to prevent transmission of high frequencies. The material of the pad shall be selected to suit the location. Holes shall be provided for fixing both to the supported machine and the supporting structure.
- (b) The ratio of 'lateral stiffness/vertical stiffness' shall be at least 1.2 times the ratio 'static deflection/working height'.
- (c) Spring type isolators with (a) static deflection more than 50mm or (b) fitted to reciprocating machinery or (c) fitted to rotating machines with long rundown times, shall have auxiliary dampers or adjustable 'snubber' type restraints which prevent excessive movement as the machine speed passes through the resonant frequency of the mounting system.

### 10.23 Rubber, Neoprene, Glass Fibre (or similar material) 'in shear' type vibration isolators

- (a) The active element of the isolator shall be bonded to mild steel or steel alloy plates, sleeves, pressings or forgings. Both element and bonding agent shall be resistant to lubricating oil and water and chemicals likely to be present in the plantroom, and suited to the operating temperatures within the plantroom or external area.
- (b) The active elements of mountings used on internal combustion or steam engines, pumps, compressors or chillers, shall be protected from spillage from above by an integral cover.
- (c) Holes shall be provided for fixing both to the supported machine and to the supporting structure. The holes shall be located and formed in such a way that making the fixing does not stress the active element.
- (d) The dynamic stiffness and damping coefficients of the active material, at the operating speed of the supported equipment, shall be used in calculation of isolation efficiencies. Alternatively, certified isolation efficiency charts may be used.
- (e) Mountings whose stiffness varies with direction of deflection shall be mounted with orientation marks for use during maintenance and installation.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.24 'Pad' or 'Mat' Type Mountings

- (a) The material used for 'pad' or 'mat' type mounting may be cellular, ribbed, or studded. Pads and mats shall normally be bonded both to supported and to supporting surfaces.

Material and bonding agent shall be resistant to lubricating oil and water, and chemicals likely to be present in the plantroom, and suited to the operating temperatures within the plantroom or external area.

- (b) 'Pads' or 'mats' of vibration isolation material, used to obtain acoustic isolation in installations which do not require vibration isolators, shall be selected and loaded to avoid resonance. The resonant frequency of the assembly shall not lie between  $2/3$  and  $4/3$  of the disturbing frequencies of the supported equipment.
- (c) Pads or mats of vibration isolation material used in 'cast-in-situ' concrete sandwich construction machine bases, shall be separated from the concrete, to ensure exclusion of grout and fines from internal voids, with materials recommended by the manufacturer.
- (d) Cork pads or mats shall not be used.

### 10.25 Pipe and Duct Hangers

- (a) Hangers used for vibration control shall consist of a mild steel welded cage containing a helical spring, or neoprene /rubber /glass fibre isolator, (or both) and be suitable for suspension from drop rods. Where both types of isolating elements are used together, the spring shall be at the pipe or duct end of the hanger. The spring or active materials shall be used in compression.
- (b) Steel springs shall be stable at all loadings up to full compression and full compression shall not occur before 150% of the rated maximum loading. No permanent deformation shall be caused by full compression. The load shall be transmitted to the spring through a neoprene washer bushed into the moving end to prevent metal to metal contact.
- (c) Neoprene/rubber/glass fibre isolators shall be protected from overloading by metal to metal restraints or lateral containment.
- (d) The hanger cage shall be capable of carrying five times the maximum rated normal service load without permanent distortion. The drop rod arrangement shall allow  $30^\circ$  movement without metal to metal contact.
- (e) Stainless steel (minimum grade SS316) shall be used for spring mounts for external use and for all isolators supporting condenser water pipework.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.26 Inertia Bases

- (a) Inertia bases shall be constructed from reinforced concrete and shall be designed for the stressing due to the supported machine, the vibration isolation equipment and its own weight. The surface shall be steel float finished or equivalent and levelled to the machine manufacturers requirements. Machinery shall be fixed to the base with 'grouted in' holding down bolts located in reverse tapered cast sockets.
- (b) Where the inertia base will be supported on spring or rubber in shear mountings, the base shall be formed with a prefabricated mild steel continuous edge frame, to which the necessary cross members and reinforcing shall be fixed. The mountings shall be fixed to brackets which are welded to the sides of the edge frame.
- (c) The design of the brackets and mountings shall allow the base to be raised from (or lowered onto) the floor by adjustment of the levelling bolts between mountings and brackets. The design shall also allow the insertion (or removal) of the mountings when the base is resting on the floor.
- (d) Where the base is cast in-situ on the plant room floor, the bottom shuttering shall be separated from the concrete pour by a continuous polythene sheet not less than 0.25mm thick.
- (e) The weight of the inertia base for pump shall be 2 times the operating weight.

### 10.27 Reinforced Flexible Pipe Connectors Used For Vibration Isolation

Flexible pipe connectors shall only be considered suitable for use as vibration breaks in pipework when they comply with the following stipulations.

They shall be:

- (a) Made from corrugated metal, rubber, neoprene or other flexible liner with braided metal or other similar internal or external reinforcing.
- (b) Intended for use without tie rods.
- (c) Installed without the rods.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.27 Reinforced Flexible Pipe Connectors Used For Vibration Isolation

- (d) Have the following minimum live lengths:

Pipe Nominal Bore	Live Length
0-28mm	230mm
32-80mm	340mm
90-133mm	455mm
150-200mm	570mm
250-300mm	690mm

The minimum internal bore shall not be less than the actual pipe internal diameter.

The axis of the connectors shall be perpendicular to the direction of vibration. Alternatively, where the design allows, the connectors may be formed into 90 bends.

Connectors with threaded ends shall be provided with flats or raised bends for standard spanners or wrenches to allow fixing without stressing the active elements.

### 10.28 Expansion Joints Used For Vibration Isolation In Pipework

The tie rod systems on expansion joints used for vibration isolation shall be designed to achieve the isolation required across the joint. The tie rod fixings shall use rubber or neoprene bushed washers to prevent metal to metal contact throughout the normal range of movement of the joint.

### 10.29 AHU Internal Vibration Isolation Devices

- (a) The AHU shall have internal spring mounts fitted below the fan frame having a static deflection of 50mm.
- (b) The selection of vibration isolation systems shall allow for forces and movement due to pressure differences at flexible connections. Mountings shall be laid out and sized for their loading at all operating speeds.

## Section 10 – Noise and Vibration Control (Cont'd)

### 10.29 AHU Internal Vibration Isolation Devices

- (c) Spring type vibration isolators shall be constructed from suitable treated and finished steel or steel alloys. They shall be manufactured with rubber, neoprene or fibreglass acoustic pads' to prevent transmission of high frequencies. The material of the pad shall be selected to suit the location. Holes shall be provided for fixing both to the supported machine and the supporting structure.
- (d) The ratio of 'lateral stiffness / vertical stiffness' shall be at least 1.2 times the ratio 'static deflection / working height'.

### 10.30 AHU External Vibration Isolation Devices

- (a) The AHU casing shall be mounted on ribbed neoprene pad having a static deflection of 2 to 3mm. The pads shall be Mason 'Type Super W' or approved equivalent.
- (b) The material used for 'pad' or 'mat' type mounting may be cellular, ribbed, or studded. Pads and mats shall normally be bonded both to supported and to supporting surfaces. Material and bonding agent shall be resistant to lubricating oil and water.
- (c) The pad materials shall comply with all relevant Hong Kong fire regulations.
- (d) AHU plantroom doors shall be under the Contractor. The Contractor shall supply information to the Contractor such that the doors shall be selected so that the overall design noise limits can be achieved outside the plantroom.

### 10.31 Acoustic Commissioning

Balancing/commissioning of the services systems shall be carried out such as to result in the specified noise criteria being achieved, but shall be compatible with the non-acoustic performance requirements of the systems.

The Contractor shall allow adequate time before occupation for commissioning of noise/vibration levels and shall co-operate with, and attend, the Architect during noise measurement work necessary to confirm that acoustic criteria have been met.

Noise measurements shall be conducted with the system operating at normal design conditions, and preferably with the suspended ceilings (and carpets, where appropriate) installed.

Noise measurements shall be made using a meter complying with 'Type 1' requirements of IEC 651 standard. The meter shall be calibrated using an acoustic calibrator, before and after all sets of measurements.



Section 10 – Noise and Vibration Control (Cont'd)

**TABLE 1 – PIPE SUPPORT ISOLATION**

Dia (mm)	Criteria* (NC or NR)	Length of pipework (m) either side of vibration source supported with:		
		Spring Hanger	Pad Type Hanger	Resilient Insert
15	25 – 35	-	-	10m
	35 – 45	-	-	-
25	25 – 35	-	-	15m
	35 – 45	-	-	7m
	>45	-	-	-
50	25 – 35	-	30m	-
	35 – 45	-	10m	-
	>45	-	-	-
100	25 – 35	20m	10m	-
	35 – 45	10m	10m	-
	>45	-	10m	-
150	25 – 35	30m	10m	-
	35 – 45	15m	10m	-
	>45	15m	-	-
200	25 – 35	50m	10m	-
	35 – 45	25m	10m	-
	>45	-	10m	-
300	25 – 35	75m	15m	-
	35 – 45	35m	15m	-
	>45	35m	-	-
>300	25 – 35	100m	20m	-
<500	35 – 45	50m	20m	-
	>45	50m	-	-
>500	All	As specified by Equipment Supplier		

\* Refers to the lowest noise criteria of all areas within 10m of the plantroom in any direction.

Section 10 – Noise and Vibration Control (Cont'd)

**TABLE 2 – VIBRATION ISOLATION REQUIREMENTS**

<b>Description</b>	<b>Location</b>	<b>Vibration Isolation Requirements</b>	<b>Static</b>
Pipework	Plant rooms	Spring isolators	25mm
A/C units	Flats	20mm ribbed rubber pad at suspension point	N/A
Fans	Plantroom	Spring isolators	25mm
Small In-line Duct Fans	Toilets	Neoprene in shear hangers for small fan units only	10mm

## Section 11 – Electrical Equipment and Installation

### 11.1 General

- (a) This section covers the general requirements for electrical work to be installed under this Specification.

The Contractor shall supply and install all electric wiring, switchgear and the like, necessary for the complete, safe and satisfactory operation of the plant covered by the Specification.

Cable and switchgear arrangement shown on the Drawings are only for indicative purpose, the Contractor shall design the capacity, supply and install wiring and switchgears to match with the equipment actually offered in compliance with IEE Regulation and power supply rules and to the Architect's approval.

- (b) In case the permanent supply is not available, the Contractor shall be responsible for the supply and installation of all temporary power required for the operation of all units during inspection period by Buildings Department and the Fire Services Department.
- (c) All equipment provided shall be selected of 'tropicalized' designed for use in conditions up to 40°C ambient air temperature and 100% relative humidity.
- (d) The entire electrical installation shall be in accordance with the regulation and requirement of the Electricity Ordinance (Law of Hong Kong Chapter 406), the Electricity (Wiring) Regulation and the Code of Practice published by EMSD and all relevant authorities having jurisdiction over the installation and the Power Company's Supply Rules.

The requirements of I.E.E. wiring Regulations (Latest Edition) shall be taken as the minimum standard for this installation.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.2 Electrical Equipment

#### (a) Wall Mounted Panels

- Wall mounted panels with appropriate rating and number of circuits shall be provided to supply power to plant located throughout the building.
- Panel enclosures shall be fabricated from galvanised sheet metal and finished in enamel of a colour to the approval of the Architect. Inside the enclosure door, a circuit chart indicating the number of ways, location of equipment, loading and protection rating shall be fixed.
- All wiring terminations, busbars, and live parts within the panel boards shall be adequately shrouded and an insulating front shield of minimum 1.6mm thickness shall be provided to completely screen the unit's interior. Only the operating dolly and insulated surround shall project through the shield.
- The units shall be provided with sufficient wiring ways for outgoing circuits at both the top and bottom of the board. Space for future ways shall be provided.

#### (b) Isolating Switches

Switches mounted outdoors, or in positions where they may be exposed to rain or water, shall have watertight enclosures with IP54 in accordance with BS5490.

#### (c) Fuses

- HRC cartridge fuses to BS 88:Part 2, Class Q1 shall be supplied, ASTA certified.
- The voltage rating shall be 380V 50Hz. The rated breaking capacity of fuses shall be 80 kA at 380V 50Hz.

#### (d) Control Relays

- "Volt-free" contacts shall be provided as required for the use of other trades for external control, alarm or indication circuits.
- Volt-free contacts shall generally be provided to effect the remote indication.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.2 Electrical Equipment (Cont'd)

#### (e) Control Wiring

- All instruments and equipment shall be securely mounted and all internal wiring runs shall be secured and so positioned as to ensure complete accessibility for servicing purposes.
- All internal wiring shall be PVC insulated, neatly bunched, run on supporting cleats or insulators and shall be coloured and adequately labelled or sleeved for identification. All control wiring shall be 1.5mm<sup>2</sup> min. copper cable and shall terminate on the "Klippon" or similar approved terminal blocks by the Architect and shall incorporate loops to permit the opening of doors and removal of components for inspection without disconnecting the cables.
- Where control necessitates the use of a battery supply, DC wiring shall be totally segregated in a separate enclosure from the mains system.
- All terminals shall be shrouded and adequately labelled with cautionary signs. All circuits shall be provided with removable links/fuses to facilitate isolation, checking and maintenance.

#### (f) Labelling

- All items of equipment on the switchboards shall be labelled to indicate function with black Traffolyte labels and white engraved lettering securely fixed with chrome plated screws. Lettering shall be at least 10mm high. Labels to all switches, isolators and the like shall indicate the supply and cable details. All labels shall be approved prior to engraving.
- The use of adhesive labels shall not be permitted. All electrical equipment not mounted on the switchboard shall also be labelled as specified above.

#### (g) Control Circuit Transformers

Transformers supplying extra low voltage for control interlocks and other equipment shall be double wound, and adequately rated for their duty.

The primary and secondary terminals shall be physically separated and clearly marked. HRC fuse protections shall be provided in the secondary circuits. Where the transformers rating exceeds 300 VA a separate primary fuse shall be provided. For transformers rated at 300 VA or less, the primary may be connected to the common control circuit fuses where applicable. Transformer primary shall be rated for 230 volts, and secondary for 24 volts. Cabling from the secondary windings to the control circuit fuses shall be rated for full secondary current.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.2 Electrical Equipment (Cont'd)

#### (h) Relays and Time Delay Relays

Relays and time delay relays shall be interlocked to give fail safe operation. Time delays shall be provided to properly time the starting and stopping sequences, and to limit the number of starts per hour to within the capacity of the motor starters. Start limit timers shall be of the 'stop to start' delay type.

Time delay relays shall be of the plug in rail mounted type similar to the relays and suitable for continuous energization. Timing mechanism shall be pneumatic, electronic or of the synchronous motor driven type with does not depend on a stalled motor condition to maintain contact positions. Timing ranges and time settings shall be clearly marked on the face of the timers and delay timers shall be readily adjustable throughout the range to suit the application.

Plant sequence start timers shall be of the synchronous motor drive cam type with spring return to zero prior to plant start up or equal approved recycle feature, incorporating adjustable timing cams and electrically operated gear train engagement.

#### (i) Time switches

Time switches shall be provided for control of the plant.

An electronic 4 channels digital time switch incorporating LCD display and one week advance programming shall be provided for control of the plant.

The time switches shall include a minimum of 120 switching addresses with a minimum of 860 switching possibilities per week. Programming shall be by day of week (or by date, with switching priority given to the date) thus enabling programming of holidays. Switching times shall be in 1 minute increments.

#### (j) Control Switches

All control switches shall be of the rotary type of Santon, Kraus and Naimer or other approved manufacture.

Each switch shall be panel mounted and engraved to clearly indicate the equipment controlled or function of the switch.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.2 Electrical Equipment (Cont'd)

#### (k) Indicating Lamps

Indicating lamps shall be individual flush mounted units. Lamps shall have chromium plated and polished solid brass body and ring with metallic threaded section and shall be circular in shape of approximately 20mm diameter.

Indicating lamps shall be of 24V and rated to withstand not less than 20% continuous over-voltage.

Lamps shall be well ventilated and the design shall permit removal of lamp glasses and bulbs from the front of the unit without the need of any special tool.

Indicating lamps shall be colour coded as follows:

- Green - Motor running, circuit breaker ON
- Amber - Supply available
- White - Valve open, trip circuit breaker
- Red - Motor tripped, circuit breaker OFF
- Blue - Valve closed

Control circuits shall be of 24V supply.

#### (k) Indicating Lamps (Cont'd)

A lamp testing circuit shall be provided incorporating a common push button and relay contact (switchboard).

#### (l) Push Button Switches

- Push button switches shall comply with and be tested and certified to BS 9564. Electrical ratings shall be 500V A.C. or 250V D.C. as appropriate. Push buttons for alarm duty shall be minimum of 2amp. rated and that for control duty 10 amp. rated.
- Push buttons shall be individual flush mounted units with metallic chromium plated and polished solid brass body and ring, circular in shape and approximately 20mm diameter.

#### (m) Earth System

- All metal work associated with the switchboard installation not forming part of a phase or neutral circuit shall be bonded together and shall be solidly and effectively earthed through the supply provided by others.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.2 Electrical Equipment (Cont'd)

#### (n) Terminal Blocks

- Terminal blocks for control wiring shall be rated not less than 20 amp. and shall clamp the wire securely between two plates secured by a captive screw.
- Terminal blocks shall have easily removable copper links to short circuit adjacent terminals or shall be fitted with suitable fuse/fuse holders where required. Pinch screw type terminal blocks shall not be acceptable.

### 11.3 Cables

#### (a) General Requirement

- Cables being proposed by the Contractor shall either be of BASEC approved types with valid BASEC Certificates or be type tested according to the relevant British Standards with type test certificates issued by recognized authorities. In either case, the certificates shall be submitted to the Architect for approval together with specific catalogues of the cables.
- All the main power cables to be used in this Contract are shown on the drawings and the Contractor shall provide all the necessary conduits and supports, glands, shrouds, end boxes, clamps, compounds, specialist tools, and the like, necessary to install, terminate and connect the cables with good engineering practice and in accordance with the Specification and Drawings.
- Where multi-core cables are used for indication, protection and control applications, each core shall have an identification number and the Contractor shall in addition to the cable identification labels provide engraved ferrules over the cable tails. The ferrules shall be numbered according to a wiring diagram approved by the Architect. All wires shall be terminated with clamp connector to the approval of the Architect.
- Notwithstanding the above the Contractor shall install the cables in accordance with the I.E.E. Wiring Regulation.
- All cables shall be of copper conductor type.



## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.3 Cables (Cont'd)

#### (b) General Requirement (Cont'd)

- The voltage drop and current carrying capacity of each circuit shall be in accordance with those indicated in I.E.E. Regulations and its latest amendments and shall be limited to the specified voltage drop (maximum 3% of 380V/220V with respect to the main switchboard).
- When cables pass through walls or floor slabs, pieces of G.I. sleeves of adequate sizes shall be supplied by the Contractor to the Builder of this Contract for casting-into the walls or floors and the cables shall be drawn therein. Fireproof material in accordance with the FSD requirements and to the approval of the Architect shall be provided to seal up the gap between the sleeves and the cables by the Contractor.
- The minimum bending radius of all PVC/SWA/PVC, XLPE/SWA/PVC, PVC/PVC, MICC and fire resistant cables shall not be less than eight times the overall diameters of the cable.
- Minimum conductor size shall be as follows:-

–	Control	1.5mm <sup>2</sup>
–	Power	2.5mm <sup>2</sup>
- All cables shall be carried out on the loop-in system. For conduit wiring systems, cables shall be drawn into the conduits after the whole of the conduit installation has been completed. No joints or connectors shall be allowed in any such cables, except that connectors may be used in accessible positions within lighting fittings or device outlet boxes.
- All cables shall be colour coded consistently over their entire length. Red, yellow and blue shall be used for phase conductors and black and green for neutral and earth respectively.

#### (b) PVC Copper Cables

- The cables shall consist of copper conductors insulated with PVC complying with B.S. 6004:1984 for conductor sizes at 35mm<sup>2</sup> or below and BS6346:1989 for conductor sizes above 35mm<sup>2</sup>. Cables for both three phase and single phase circuits shall be minimum 450V/750V grade.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.3 Cables (Cont'd)

#### (b) PVC Copper Cables

- All wiring shall be installed using the loop-in method and the wiring shall be enclosed in conduits or in metal trunking. The maximum number of cables that may be accommodated in a given size of conduits or trunking shall not exceed the limits given in the 16th Edition of the I.E.E. Regulations.
- For copper cables sizes  $4\text{mm}^2$  and above, compression type cable connectors/lugs shall be used for all cable terminations. Where apparatus is fitted with tunnel type terminals, stranded cable conductors shall be tinned solid for direct connection to such terminal. If for any practical reason a different termination method is used, prior approval shall be obtained from the Architect.
- Connections to electric fixed equipment shall be by means of PVC cables in conduits, with the final connection being made by PVC covered pliable conduit, and suitable adaptor. Separate earth continuity copper earth in accordance with I.E.E. Regulations and B.S. 6004 of not less than  $2.5\text{mm}^2$  shall be provided outside the flexible tube and solidly connected at each tube termination.

### 11.4 Earthing

All metalwork associated with the electrical installation but not forming part of a phase or neutral circuit shall be bonded together and solidly and effectively earthed.

The electrical resistance of metallic enclosures or framework to earth shall be low enough to permit the passage of current necessary to operate the device protecting the associated circuit.

The size of all earth continuity and bonding conductors shall be in accordance with the IEE Wiring Regulations.

All earth conductors fixed or run outside the building shall be protected against corrosion and mechanical damage.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.5 Conduits

- (a) All conduits shall be heavy gauge galvanized welded steel complying with BS 4568: Part I & II Class 4. No conduits shall be less than 20mm nominal diameter.
- (b) Conduit shall be concealed in concrete as construction proceeds, and so arranged as to drain naturally to outlet boxes. Sealing caps shall be placed on all conduits before concrete pouring commences to ensure no water enters the conduit. Expansion couplings shall be fitted at all building expansion joints.
- (c) Surface conduits shall in no circumstances be fixed to floor slabs.
- (d) All conduit systems shall be installed fully in accordance with the requirements of the IEE Regulations.
- (e) All conduits shall be swabbed through to clean out all dirt, burrs, and moisture.
- (f) All sets and bends in conduit runs shall be formed on site with bending machines. Distortion of conduits due to bending is not acceptable.
- (g) Runs between draw-in boxes shall not have more than two right angle bends or their equivalent and the length of such runs shall be limited to 12m to permit easy drawing-in of cables.
- (h) In concealed conduit systems all adaptable boxes for accessories and draw-in boxes shall be installed such that the outer rim of the box is flush with the finished surface of the wall.
- (i) All conduits shall be entirely separated from other piping services and no circuit connections shall be permitted between the conduits and such pipes.
- (j) Conduits and outlets fixed in areas where there is waterproofing to the building shall be installed with no damage to the waterproofing.
- (k) Where flexible metallic conduits are fixed to the rigid conduit this shall be achieved by means of either male or female adaptors terminating at an adaptor box. The adaptors shall be of brass, sweated or screwed onto the flexible conduit.
- (l) The Contractor shall make good any damage to the finish of all conduits, including threads cut at site, by painting damaged areas with two coats of aluminium primer paint.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.5 Conduits (Cont'd)

- (m) The Contractor shall supply for approval prior to installation conduit layout drawings for the entire installation. The approved shop drawings shall be kept up to date on site; and on completion, as-fitted drawings shall be provided for record purposes as specified in other Section.

### 11.6 Conduit Boxes

- (a) All conduit junction boxes shall be malleable iron of standard pattern.
- (b) Standard pattern boxes shall be used with conduits up to and including 25mm diameter. Rectangular pattern boxes shall be used for conduits of 25mm diameter and larger. For the drawing-in of cables, standard pattern through boxes shall be used. All conduit boxes shall be galvanized finish.
- (c) Adaptor boxes shall be of galvanized mild steel not less than 3mm thick. Boxes shall be not less than 50mm deep and of such dimensions as shall enable the largest size cable for which the conduit run is suitable to be drawn in without excessive bending of the cables. Covers of approved material with fixing screws shall be provided. All boxes shall be drilled for holes according to the conduit entries required.
- (d) All conduit entries to adaptor boxes, outlet boxes and switchgear shall be made with couplings and hexagonal male bushes.
- (e) The protective coating of the malleable iron boxes shall be heavy both inside and outside in accordance with B.S. 4662.

### 11.7 Flexible Conduit

- (a) Flexible conduit and fittings shall comply with B.S. 731:Part 1. The flexible conduit shall have a galvanized steel helically coiled inner core of the square locked type. The core shall be oversheathed with a contoured PVC jacket so that the flexibility of the steel inner core is not restricted.
- (b) The adaptors shall be of nickel plated brass made in two parts. The inner core shall screw into the bore of the conduit together with a ferrule which caps off the end of the conduit. The core shall lock against the outer ferrule which provides a smooth edge for threading of cables.
- (c) Where the conduits are installed exposed in weather or subject to water intrusion, the PVC oversheathed jacket and all conduit fittings shall provide waterproofing to IP54 (BS5490:1977).
- (d) Flexible conduits shall be used for final connections to equipment subject to vibration.

## Section 11 – Electrical Equipment and Installation (Cont'd)

### 11.8 Motor Starters

(a) Generally, reduced voltage starters of the following type shall be selected:-

- |   |                             |                                              |
|---|-----------------------------|----------------------------------------------|
| - | Motors up to 0.37kW         | On/Off switch or<br>direct-on-line           |
| - | Motors over<br>0.37kW-7.5kW | Direct-on-line or<br>open circuit star-delta |

(b) Contactors

- Contactors used in starters shall be of Class AC3 type provided with silver alloy contacts. Auxiliary contacts shall be provided to facilitate the connection of interlocks, status indication and auxiliary controls. Unless explicitly described, a minimum of one normally open and one normally closed contact shall be provided.
- Each starter shall be complete with protection incorporating the following features:-
  - overload protection in each supply phase adjustable from 80 to 120% of full rated load
  - manual reset
  - phase failure protection
  - ambient temperature compensation
  - an auxiliary contact to signal an overload condition.
- Contactors or complete starters not mounted in switchboard shall be contained in metal or approved plastic enclosures with conduit entries, shrouded "stop" and "start" push buttons and a manual "reset" button, which may be combined with the "stop" button.

Section 11 – Electrical Equipment and Installation (Cont'd)

11.9 Motor Control Circuits

The Contractor shall provide the following for each motor:-

- (a) Auto-off-manual switch
- (b) Start-stop-push button
- (c) Blue power on light
- (d) Green pilot light
- (e) Red fault light
- (f) Auxiliary contacts for remote stop-start
- (g) Auxiliary contacts for remote status indication.
- (h) Ammeter for motor over 0.75 kW

## Section 12 – Automatic Control and Monitoring for MVAC System

### 12.1 General

- a) The MVAC control system shall be basically electronic and shall wherever possible be of the same manufacturer. All control equipment shall be so located as to be readily accessible for maintenance.
- b) All automatic controls shall be manufactured, supplied and installed by an approved supplier.
- c) The design of control systems are diagrammatically shown on Drawings. However, the Contractor is to, prior to installation of any work, submit to the Architect and Engineer for approval complete diagrams and drawings to show the arrangement and sequencing of all controls and details of equipment actually offered. Wiring diagrams are to be included.
- d) All automatic control equipment shall be of the highest commercial standard and shall be rated and tested in accordance with an approved testing authority.
- e) The Contractor shall supply and install all sensing elements and field equipment, and all control wirings from DDC outstations to all sensing elements and field equipment. The Contractor shall provide all necessary software and programming to achieve the automatic operation of the installation as specified herein and to maintain the desired levels of temperature and humidity with the limits specified.

## Section 12 – Automatic Control and Monitoring for MVAC System (Cont'd)

### 12.2 Mechanical Ventilation Fan

- a) A sheet metal local panel shall be provided by the Contractor for each fan to house all controller relay and control switches. The following minimum indication and control shall be provided.
  - Remote/off/local selection
  - On/off control
  - Status indication of fan motor
  - Spare contacts for unit remote ON/OFF control and status indication.
  - Trip status of probe type smoke detector, if any
- b) Window fans/propeller fans shall have local control and the electrical on/off switches shall be provided by the Contractor unless otherwise specified on drawings.
- c) Fans for refuse storage rooms, carpark etc. shall consists of programmable 24 hour timer to turn on and off the fans. Fans for plant rooms including potable water, flushing water and fire services shall be controlled by room type thermostat.

### 12.3 Air Conditioning Split Type

- a) All split type A/C system shall be equipped with duct-mounted/wall mounted controller for temperature and fan control.

The thermostat shall have the following functions:

  - Fan speed control
  - Temperature control (cool-fan selector)
  - On/off button
- b) The split type A/C unit serving the plant room such as and public area shall be automatically restarted after power failure.



Section 12 – Automatic Control and Monitoring for MVAC System (Cont'd)

12.4 Installation

- a) The Contractor shall provide all DDC outstations, labour and materials to form the complete automatic control systems and shall leave the installation properly adjusted and calibrated.

## Section 13 – Paint, Labelling and Finishing

### 13.1 Materials

- a) All parts of the work installed under this Specification shall be painted with approved first quality enamel paints of quality, colours, and brands as approved by the Architect, except those items specified as being painted by others or otherwise exempted from painting in this section of the Specification.
- b) The requirement for painting of all pipework and ductwork is in addition to the colour coding or banding specified in this Specification.
- c) Paint shall be selected to withstand the temperature on the surface which it is applied, and shall be suitable in all respects for the environmental conditions in which it shall be located.
- d) All paint used shall be of one manufacture as approved by the Architect, and finishes shall be full gloss unless otherwise instructed by the Architect.
- e) All painting for outdoor installation which are subject to corrosion effects shall be epoxy paint equivalent to Amerlock 400.
- f) Before ordering any primer, undercoat and finishing paint, The Contractor shall propose the colour scheme to the satisfaction of the Architect.

### 13.2 Plant, Machinery & Equipment

All items of plant, machinery and equipment supplied painted ex factory shall be given one finishing coat of full gloss enamel using colour and brand as approved by the Architect, except where the manufacturer's standard finish has been approved by the Architect.

### 13.3 Exposed Metalwork

- a) All exposed metalwork shall be wire-brushed and cleaned from rust, scale, dirt and grease, and shall then be given one priming coat, one undercoat and one finishing coat of full gloss enamel to colour as approved by the Architect.
- b) The priming coat for exposed galvanised iron shall be an approved galvanized iron primer as approved by the Architect.
- c) The priming coat for exposed non-ferrous metalwork shall be suitable for the metal to which it shall be applied and shall be to the approval of the Architect.

### Section 13 – Paint, Labelling and Finishing (Cont'd)

#### 13.4 Concealed Metalwork

- a) All galvanized iron surface concealed in roof spaces, false ceilings, building ducts and the like shall not be painted.
- b) All black iron and steel surface shall be wire brushed and given one coat of approved primer.

#### 13.5 Plastered Finish Insulation

Plastered finish insulation surfaces shall be given one coat of size, one undercoat consisting of two parts of ordinary undercoat to one part of sealer, and one finishing coat of full gloss enamel.

#### 13.6 Pipework and Metal Sheathing

- a) Pipework and metal sheathing shall be painted as for exposed or concealed metalwork as applicable.
- b) Turned parts of valves, controls and the like shall be cleaned and polished to the approval of the Architect.

#### 13.7 Pipework Identification

- a) All pipes and the like shall be identified in accordance with B.S. 1710:1984.
- b) Circumferential bands of standard ground colours shall be not less than 100mm wide on pipes up to 50mm nominal diameter, and not less than 150mm wide on pipes greater than 50mm nominal diameter.
- c) Supplementary colours shall be displayed as bands not less than 25mm wide in the centre of the ground colour bands.
- d) Where lettering is required it shall be painted in contrasting colours in accordance with the standard, in block letters not less than 15mm high for pipes up to 50mm nominal diameter, and in block letter not less than 40mm high for larger pipes.
- e) Identification bands shall be located where they are clearly visible in each room or compartment through which the pipe runs, and shall be placed at centres not exceeding 6m all to details as approved by the Architect.
- f) Direction of flow shall be indicated by an arrow painted on the pipe adjacent to each colour band. Arrows shall be 75mm long on pipes up to 50mm nominal diameter, and 150mm long on larger pipes.

### Section 13 – Paint, Labelling and Finishing (Cont'd)

#### 13.8 Ductwork Identification

- a) All air ducts, and the like shall be indicated by colour panels of not less than 100mm wide on air ducts of all sizes.
- |                          |       |
|--------------------------|-------|
| Supply air duct          | Blue  |
| Return air duct          | Green |
| Fresh air duct           | Red   |
| General exhaust air duct | Grey  |
| Toilet exhaust air duct  | Brown |
- b) Where lettering is required it shall be painted in Sub-contracting colours, in block letters not less than 80mm high.
- c) Identification bands shall be located where they are clearly visible in each room or compartment through which the pipe runs, and shall be placed at centre not exceeding 6m.
- d) Direction of flow shall be indicated by an arrow painted on the air duct adjacent to each colour band. Arrows shall be 150mm long.

#### 13.9 Colour Schemes

- a) The whole of the installation shall be painted in accordance with the following schedule:

##### Pipeworks:

Identification - B.S.1710

Colour coding - B.S.4800

- b) Equipment shall be painted and colour coded to BS 381C:1980 as follows:

	<u>Colour</u>	<u>No.</u>
Switchboards and Control Panels	Grey	-
Electrical Motors	Primrose	310
Electrical Conduits	Light Orange	557
Pumps and Tanks	As for respective piping services	-
Air Duct	White	-
All Other Equipment	As instructed by the Architect	-

### Section13 – Paint, Labelling and Finishing (Cont'd)

#### 13.10 Labelling

- a) All plant and equipment provided under this Specification shall be labelled in English and local language as to duty or services, all such labelling to correspond to schedules, diagrams, and the like to be provided as part of the as-fitted Drawings. Labels shall be of white Traffolyte with black engraved lettering not less than 20mm high or as otherwise required and approved. Labelling shall also be required at the Mimic Diagram.
- b) Manufacturers' nameplate shall generally be provided for all plant and equipment and shall show serial and model numbers and date of manufacture.
- c) The following refers to specific items (but not by way of limitation) requiring labelling:
  - All valves, motor starters, fans, distribution boards, gauges, contactors, cable terminals in switchboards, circuit breakers.
  - Labels to be attached to valves (or pipe adjacent thereto) with a light gauge metal band or alternatively to be screwed to the insulated valve box where provided. These labels shall state the valve number.
  - Distribution boards, starters and the like shall be labelled to indicate the circuit number, phase and item controlled.
- d) Labels shall be screwed or riveted to sheet metal. Adhesive fixing is not acceptable.
- e) Details of exact lettering shall be agreed with the Architect prior to manufacture.

#### 13.11 Application of Painting

- a) All paints shall be prepared and applied in accordance with the manufacturer's recommendations.
- b) All galvanized metal surfaces shall be properly etch-primed to ensure correct adhesion of the paint to the surface. Material shall be as recommended by the paint manufacturers. Subsequent painting of galvanized surfaces shall comply with this Specification.
- c) Prior to painting, all metallic surfaces except galvanized surfaces shall be thoroughly scraped and wire brushed as necessary to remove scale, rust and scarf. Surfaces shall then be solvent cleaned to remove all oil, grease and dirt.

Section 13 – Paint, Labelling and Finishing (Cont'd)

13.11 Application of Painting (Cont'd)

- d) When the surfaces to be painted are clean and dry, one coat of an approved primer shall be evenly applied over the entire area. After surfaces have been primed, the Contractor shall notify the Architect so that an inspection of the primed surfaces can be made prior to the application of the undercoat and the finishing coats.
- e) When the priming coat has been approved, one coat of undercoat shall be applied as approved by the Architect. Before applying the finishing coats, the Contractor shall ensure that the undercoated surface is rubbed flat and smooth. Finally, an two coats of high gloss finishing paint shall be applied when all dust has been removed as approved by the Architect.
- f) Each successive coating shall be completely dry prior to the application of the next coat. The minimum thickness of each layer of paint shall be 50 um.

## Section 14 – Commissioning, Testing, Maintenance & Services

### 14.1 General

- a) Prior to delivery from the factory and shipment to Hong Kong, the Contractor shall submit test certificates issued by the manufacturer for the MVAC equipment to be used for this project (including type test certificates). On completion of the works, the Contractor shall commission the MVAC Installation and put them into operation in accordance with the Specification.
- b) After commissioning and prior to Practical Completion, the Contractor shall provide all necessary facilities and instruments to carry out all tests as defined within the Specification to satisfy the Architect that the installation meets the requirements of the Specification.

The Contractor shall ensure that there are sufficient facilities included in the air and refrigerant piping systems to carry out an effective and comprehensive testing and commissioning exercise.

- c) During the Defects Liability Period, the Contractor shall carry out maintenance service specified later in this section of the Specification.
- d) In addition, the Contractor shall liaise with the other Contractors for the installation work and to carry out all adjustment necessary for the safe, reliable and satisfactory operation of all the equipment supplied under this Sub-contract. Such adjustment shall be carried out after all control systems have been installed and tested.
- e) The Contractor's commissioning personnel shall be experienced and trained. Qualifications of the commissioning personnel shall be submitted to the Architect for approval.

### 14.2 Supervision by Engineer From the Manufacturer

The following shall be tested and commissioned in the presence of Commissioning Engineers from the manufacturers.

- Control system installation
- Water treatment installation
- Chiller installation
- Cooling tower installations

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.3 Acceptance Procedure

- a) At least three months before the Date of Completion of the Sub-contract works, the Contractor shall notify the Architect in writing of the name of the Contractor's Commissioning Engineer, who shall co-ordinate all testing, inspections and final works to the approval of the Architect. The Contractor shall also submit in writing all the testing and commissioning procedures for the Architect's approval. Testing shall be executed according to requirements stipulated in other sections of this Specification.
- b) Unless otherwise approved in writing by the Architect, a period not exceeding two weeks shall be allowed for all commissioning adjustments which must be completed prior to the Date of Completion of the Sub-contract works.
- c) The Contractor shall within one month after the Date of Completion of the Sub-contract works, carry out all outstanding items and rectify minor defects as instructed by the Architect.
- d) The Contractor shall within the three months before the Date of Completion of the Sub-contract works, submit the recommended spare parts list for the approval of the Architect.

### 14.4 Operating and Maintenance Manuals and As-constructed Drawings

- a) Drawing Production and Documentation Requirements
  - All drawings shall be prepared in AutoCAD 2000 format or latest version.
  - All submissions including drawings and documents should incorporate the electronic file together with hard copies as requested by the Employer. The electronic files should not be compressed.



## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

#### b) As Constructed Records and Operation & Maintenance Manuals

##### - As constructed records and drawings

As constructed drawings should be prepared by the Contractor during the progress of works and should be completed as stipulated in the previous section. All drawings should be listed in a cross reference index for ease of interpretation which should form part of the operation & maintenance manuals.

The drawing should be presented in A0, A1, A2, A3 or A4 sizes as appropriate. Every drawing should have a title block, and unique reference numbering system and CADD file reference consistence these with.

As constructed drawings should show all plant and equipment and include all cable/conduit/duct runs, as appropriate. All relevant information which may be useful in the operation, maintenance or subsequent modification or extension of the installation should be indicated. Reference numbers or letters for controls, equipment items or any parts thereof, corresponding to the lettering, numbering or any other identification fixed to the plant and equipment should be shown and quoted.

Hardcopy drawings and CADD disks as requested by the Employer should be provided.

##### - Operation & Maintenance Manuals

Draft maintenance and operation manuals (referred as 'manuals' hereinafter) complete with provisions of record drawings, software listings (if any), operating and maintenance procedures, should be made available at least two month before the programmed date for on site testing to enable the Employer's staff to familiarize themselves with the installation. These draft manuals should be of the same format as the final manuals but with temporary insertion for items which cannot be finalized until the works are completed, tested and accepted.

Finalized and approved manuals should be provided as stipulated in the previous section. All manuals and instruction should be printed in English.

One separate volume should be allocated for each system to minimize the number of pages for each volume and give a clear indication to, and provide easy reference for, the user.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

b) As Constructed Records and Operation & Maintenance Manuals (Cont'd)

- Operation & Maintenance Manuals (Cont'd)

The manual should be written in English, and should consist of the following sections:

(i) General

This section should include the purpose of the manual and a brief description of the directory of the manual.

(ii) System description

This section should include the following as a minimum:

- (a) Each individual system should be described separately indicating the detail of how the system normally operated and how the system can be adjusted, controlled, monitored and regulated.
- (b) Size and capacity of all the major equipment and components of the system.
- (c) The proposed initial setting of protective, control and measurement devices and the other adjustable components of the system. Space should be reserved for the insertion of final, commissioned and approved settings.
- (d) Normal sequence of equipment and plant operation and alternative sequence to maintain operation of part of the total facilities during abnormal circumstances.
- (e) A full description of all electrical control.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

b) As Constructed Records and Operation & Maintenance Manuals (Cont'd)

- Operation & Maintenance Manuals (Cont'd)

(iii) Technical specification

This section should include the technical description and function of all equipment and components including the following:

- (a) Technical description of all systems and equipment.
- (b) Wiring diagrams.
- (c) Manufacturer's drawings on all proprietary equipment.
- (d) Equipment list, stating the make, model, serial number, approved settings (after commissioning).
- (e) Catalogues, certificates and performance data sheets on all items of equipment.

(iv) Maintenance

This section should include the required operating and maintenance procedures for all the equipment. This should include the following as a minimum:

- (a) Inspection manual for all systems.
- (b) Operation manual for all systems.
- (c) Procedures for changing components of equipment requiring regular replacement.
- (d) Maintenance instruction, calibration procedures and fault finding instructions for all systems.
- (e) Precautions when carrying out operation and maintenance procedures.
- (f) Procedures for system fault finding.
- (g) Proposed maintenance schedule during Defects Liability Period.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

b) As Constructed Records and Operation & Maintenance Manuals (Cont'd)

- Operation & Maintenance Manuals (Cont'd)

(v) Safety

This section should include the following as a minimum:

- (a) Proper procedure of equipment operation.
- (b) General description of plant hazards, where appropriate.
- (c) Safety inspection requirements for mechanical hoist and lifting appliance under the Factories and Industrial Undertakings Regulations.

(vi) Directory of suppliers

This section should list the name of suppliers and agents of each type of equipment, materials and accessories. Correspondence addresses and telephone numbers should be included.

(vii) Software Manual

For any installation or control system using software, a dedicated manual should be provided to include the following:

- (a) Printout of the listing.
- (b) Flow chart, data flow diagrams and program descriptions.
- (c) Instruction on the use of diagnostic software and tools.
- (d) Programming and system user manual.
- (e) Application source software, special tools and utility software to enable the Employer to modify or further develop the software.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

#### b) As Constructed Records and Operation & Maintenance Manuals (Cont'd)

##### - Operation & Maintenance Manuals (Cont'd)

The manuals should be prepared on A4 size paper of good quality and adequate thickness for frequent handling, with clear reproduction of text, sketches, etc., and should have stiff covers and a spine suitable protected by plastic or other material to prevent undue deterioration by frequent handling in dirty situations. The binding arrangement should be such as to permit the book to be laid flat when open at a page.

Diagrams should be drawn on paper having vertical and horizontal grid margins (actual grid lines being omitted). Any inter-relation of separate diagram sheets should be shown on all relevant sheets.

Control diagrams should be clearly drawn showing the operation of the equipment in simple functional form on 'schematic' type diagrams and separately on 'connection' type diagrams, the latter showing the location and connection of components and cable forms in their relative positions within the enclosures.

Diagrams showing connections between equipment, i.e. transferred from one sheet to another, or identifying interconnection cables, should clearly show the reference of the associated diagrams and the identity and size of cores of interconnecting cables.

Drawings of equipment layouts should carry the same identification keys as the diagrams.

The set of manuals should also include a similarly bound list of all 'as constructed' drawings, listed under headings of type of plant. Drawings which are common to more than one part of the plant should be listed under each appropriate section of plant.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.4 Operating and Maintenance Manuals and As-constructed Drawings (Cont'd)

- c) The Architect shall require four weeks for checking the draft sets of operation/maintenance manual and as-constructed drawings. After the Architect has approved these documents, the Contractor shall submit the following to the Architect within two weeks:

- . Four copies of the approved operation and maintenance manuals.
- . Four prints each of all approved as-constructed drawings.
- . One set of CADD CD-Rom's for all approved as-constructed drawings. The CADD drawings shall be in AutoCAD (Version 2000) format or later.

The above document shall be prepared, checked and certified to be a comprehensive record of the installation by a qualified Engineer to the approval of the Architect.

### 14.5 Equipment for Testing and Commissioning

- a) All equipment required for the commissioning and testing of the Works shall be provided by the Contractor.
- b) This equipment shall include:
- Octave band sound meter;
  - vibration meter;
  - sling psychrometer;
  - tachometer;
  - mercury in glass thermometers;
  - pitot tube and inclined gauge manometer;
  - water flow test set for flow meter and double regulation valves;
  - electronic rotating vane anemometer;
  - velometer;
  - insulation megger;
  - ammeter;
  - voltmeter;
  - cable test kit;
  - thermo-hygrograph;
  - a discharge funnel or hood for measurement of air flow for light troffer or linear diffusers
  - water treatment test kit
- c) All instruments shall have been recalibrated within six months of the start of commissioning or testing.
- d) Calibration of all instruments shall be certified by the instrument manufacturer or a calibration agency approved by the Architect.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.6 Testing During Erection

- (a) Where specified in the relevant section, plant shall be pressure tested at the manufacturer's works to a minimum of 1-1/2 times the working pressure (or as specified in the schedule) for a period of not less than two hours. Test certificates in triplicate shall be forwarded to the Architect.
- (b) Prior to application of insulation and painting all water pipework shall be hydraulically pressure tested to 1-1/2 times the maximum working pressure in the system for not less than 24 hours without leakage or loss of pressure. The maximum working pressure shall be deemed to be the static head plus the total pump head. The minimum test pressure for water pipes is 16 bar.

The pressure test shall be carried out in different sections of the hydraulic systems in such zoning approved by the Architect. The test of the whole system shall be considered as final.

Where any plant shall not accept the maximum pipework test pressure it shall be isolated during the pipework tests, then that section of pipework and plant shall be retested at the equipment test pressure.

In sections of pipework with expansion joints, care shall be taken not to exceed the design anchor load. The joints shall either be rigidly tied or removed for the hydraulic test and replaced by a spacer piece. When the expansion joint is reintroduced, that section of pipework shall be retested at the system working pressure.

- (c) No pressure tests are required for low velocity or low pressure ductwork (unless otherwise indicated) but all such systems shall be visually inspected for air tightness in the presence of the Architect.

All ductwork shall be tested by handfeel and audio checking of all joints and the Contractor shall seal all leaks with a sealing compound approved by the Architect.

- (d) High and medium velocity systems shall be pressure tested for air leakage as recommended by the Heating and Ventilating Contractors' Association Ductwork Specification DW/143.
- (e) Compressed air systems if required shall be tested after erection by raising the air pressure in the system to the working pressure and leaving it for six hours to cool. After which readings shall be taken to ascertain the pressure drop. The pressure drop shall not exceed 5% over a period of two hours. Before readings are taken the mains shall be isolated from the compressor plant and air receivers, and low pressure mains shall be isolated from high pressure sections.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.6 Testing During Erection (Cont'd)

- (f) Air receivers if required shall be hydraulically tested at works in accordance with the relevant British Standards for pressure vessels. After installation, the receivers shall be isolated from the system and hydraulically tested to 1,000 kPa. The safety valve shall be removed during this test. Subsequently, the pressure in the vessel shall be reduced, the valve reinstated and the pressure raised to 830 kPa to demonstrate that the valve operates correctly.
- (g) All open top cisterns, including cold water storage tanks, shall be subjected to a standing leak test for twenty four hours.
- (h) Refrigerant piping circuit shall be pressure tested to 3000 kPa for 24 hours, using dry nitrogen or anhydrous carbon dioxide. Pressure test shall be carried out with compressors discharge and suction services valves closed. The pressure test shall be immediately followed by evacuation simultaneously from both sides of the systems to an absolute pressure of 3mm of mercury (i.e. the boiling point of water in the system is below 0°C) with compressors service valves open and vacuum pump running. The compressor service valves shall then be closed, and the vacuum pump isolated from the system. The evacuation test shall be deemed satisfactory if the absolute pressure rise over twelve hours does not exceed 4mm of mercury electronic vacuum indicator. On completion of the vacuum test the vacuum shall be broken and the system shall be pressure tested with nitrogen gas to test pressure as indicated below :-

Refrigerant	High side test <u>Pressure (kPa)</u>	Low side test <u>Pressure (kPa)</u>
R134a (air cooled)	2080	1190
R134a (water cooled)	1270	880

In performing pressure tests for refrigerant systems and circuits containing blend refrigerants, e.g. R407C, manufacturer's recommended procedures and test pressures shall be followed.

### 14.7 Preliminary Commissioning and Pretreatment

- (a) The Contractor shall ensure that all equipment included under this Sub-contract is thoroughly cleaned, lubricated and checked for serviceability immediately before setting to work.

Particular attention is drawn to the removal of building debris from the air systems, motors, fan bearings and pipework and subsequent cleaning to the satisfaction of the Architect.



## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.7 Preliminary Commissioning and Pretreatment (Cont'd)

- (b) Prior to start-up and after satisfactory hydraulic testing, The Contractor shall clean out the entire installation and keep them in a new condition. All piping systems shall be flushed and drained at least once through to draw off contaminating materials. All pipes shall be rotted when necessary to ensure clearance of debris, cleaning and flushing shall be carried out in sections as the installation becomes completed.

All strainers shall be inspected and cleaned out or replaced.

When the entire systems are reasonably clean, a pre-treatment chemical shall be introduced and circulated for at least 8 hours. Warning signs shall be provided at all outlets during pre-treatment. The pre-treatment chemical shall:

- Remove oil, grease and foreign residue from the pipework and fittings.
- Pre-condition the metal surfaces to resist reaction with water or air.
- Establish an initial protective film.

- (c) During all preliminary flushing, plant shall be isolated by means of bypasses to avoid deadlegs, and the systems shall be completely isolated from any existing systems to ensure contamination cannot occur.

Further flushing and chemical treatment shall be carried out on isolated systems by connection of temporary diesel driven pump to circulate water and dosing chemical. The Contractor shall allow for cross-connection of flow and return pipework at the extremities of risers and interface points with existing installations or other Sub-contracts.

After pre-treatment, the system shall be drained and refilled with fresh water and left until the system is put into operation.

Details and procedures of the pre-treatment shall be submitted to the Architect for approval.

- (d) The air handling equipment shall be operated to remove building debris from ductwork, and the Contractor shall thoroughly clean out all air handling units, filter chambers and air chambers.

During initial testing and cleaning of air handling equipment, temporary filter media shall be provided to clean air entering fans and coils.

- (e) All automatic controls and safety devices shall be inspected and checked for serviceability before the working fluid or electricity is applied to the system.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.8 Factory Tests

The following items of equipment shall be tested at the manufacturer's works or elsewhere as appropriate. In all cases, Factory Tests Certificates and 'Type-test' certificates shall be submitted in triplicate to the Architect.

(a) Fans

'Type-Test' for fan characteristic curves, (B.S. 848 Part 1, test method as appropriate) and type test certificate for sound power levels (B.S. 848 Part 2)

(b) Electric Motors

'Type-test' in accordance with B.S. 5000. For motors of 40 kW output and above, factory test in accordance with B.S. 5000 for one of each type of motor shall be required for specified performance.

(c) Starters and Control Gear

'Type-test' (B.S. 587) for control panels as a whole, routine (individual) high voltage test in accordance with B.S. 587.

(d) Motorized Smoke and Fire Dampers

Type test for fire rating and leakage

(e) Packaged Split A/C Units

- Type test for cooling capacity, air flow, fan pressure, power consumption and acoustic data.
- Pressure test for coils at factory.

### 14.9 On-site Testing and Commissioning

(a) General

- Two months before the date of completion of the Sub-contracts Works, the Contractor shall liaise with the other Contractors and submit for the Architect's approval a detailed programme for conducting on-site acceptance tests and commissioning.
- Acceptance tests to demonstrate that the installation is in accordance with the Specification in respect to plant duties, performance and control stability.
- Acceptance Tests shall be carried out immediately when commissioning is complete.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.9 On-site Testing and Commissioning (Cont'd)

#### (a) General (Cont'd)

- The Contractor shall start up, operate, test and adjust the systems in accordance with the agreed programme. The setting up shall be supervised by the manufacturer's representative, who shall remain on site until the equipment is operating satisfactorily and accepted by the Architect. The Contractor shall advise and co-ordinate with the manufacturer's representatives so that all testing is carried out according to the agreed programme.
- The whole installation shall be given the following tests to bring the plant into running order. The Architect shall be given reasonable notice together with a copy of recorded test results, generally not less than seven days, regarding the nature of tests, the time and location. Acceptance tests shall only be witnessed by the Architect when the submitted test results are found satisfactory.
- All instruments, tools, materials and labour required to perform these tests shall be provided by the Contractor.

If the test results show that the plant and equipment is not functioning in a satisfactory manner or satisfying the requirements of this Specification, the Architect shall decide whether this is due to incorrectness of faulty work by the Contractor and if this be the case, the Contractor shall, when called upon, carry out at his own expense such alterations, replacements and adjustments as may be required, to the Architect's decision as to what constitutes a satisfactory test shall be final.

- The test report shall contain the following:
  - Title page with record for name and address of parties involved and report date.
  - Summary comments for:
    - Design versus final performance with notes to explain in detail why the final performance varies
    - Notable characteristic of system
    - System operation sequence
  - Nomenclature sheets for equipment codes and technical data.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.9 On-site Testing and Commissioning (Cont'd)

#### (a) General (Cont'd)

- Test conditions with data for:
  - Setting of dampers, fan drive, inlet vane
  - Conditions of filters and coils
  - Setting of supply air static pressure controller
  - Others which affect performance

#### (b) Fan & Ductwork

- All the commissioning procedures shall comply with that set out in the current edition of the CIBSE guide Commissioning Code Series A ASHRE Standard 111-1988 (Sections 6, 8 and 10), BSRIA Manual for Regulating Air Condition Installation. The Contractor shall allow for balancing all air diffusers and grilles by means of the regulating dampers provided.
- The following data shall be recorded on the commissioning sheets:
  - Dry and wet bulb temperatures
    - at ambient conditions
    - within each occupied space, at various locations within same space as required
    - at each main supply and return air duct
    - before and after coil
  - Water flow rate and pressure drop across each coil
  - Entering and leaving water temperature and water temperature difference across each coil
  - Total system static pressure, discharge static pressure and suction static pressure, and total air flow rate for fans or air handling unit.
  - Fresh air supply flow rate and return air flow rate to each fan, or air handling unit.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(b) Fan & Ductwork (Cont'd)

- Air flow and resistance across each main plant item, e.g. filter, cooling coil, VAV boxes.
- Air flow at each supply and exhaust duct, and at each supply, return and exhaust air grille and diffuser, and the like.
- Outside air and return air damper position.
- All fan and motor speeds.
- Starting and operating currents for each motor.

The commissioning report shall also include the following equipment data:

- Fan
  - Make/type
  - Model no./size
  - Serial no.
  - Arrangement/class
  - Discharge
  - Sheave make
  - Sheave size/bore
  - Nos. of belts/make/size
  - Nos. of filters/type/size
- Motor
  - Make/frame
  - KW/RPM
  - Volt/phase/Hz
  - Full load Amps
  - Sheave make
  - Sheave size/bore
  - Sheave centre line distance & adjustment
- Coil
  - Make/type
  - Model/size
  - Nos. rows/fins
  - Face area
  - Tube size
  - Tube/fin material
  - Circuitry

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(b) Fan & Ductwork (Cont'd)

- Air Terminal Device
  - System/unit no.
  - Location/zone
  - Test apparatus
  - Area served
  - Air terminal device make
  - Air terminal device no.
  - Type/model
  - Air terminal device size
  - Air terminal device size
  - Air Terminal Device AK/effective
- Each fan shall be tested after installation and the fan speed adjusted to given approximately the design air quantity. After the outlets have been adjusted and the various systems balanced, a final check shall be taken of the flow, static pressure and power. The final air quantity shall not be less than the specified and not more than 10% above the specified figures or any approved variation to these figures.

All outlets, diffusers and grilles shall be initially adjusted to give the air quantities shown on the Drawings with a tolerance of + or - 10%.

In addition to this initial setting, the Contractor make any further adjustments to the air distribution that may be required to ensure even temperatures, freedom from draughts throughout the conditioned areas and adequate ventilation.
- The Contractor shall forward one print of each relevant shop drawings marked up to show the measured air quantity to each of the following:
  - Outlet, return or exhaust grille, exhaust hood and the like.
  - Main duct and each major branch duct, as determined by pitot traverse.
  - Air handling unit or fan. Total air quantities for air conditioning units shall be measured with the design air quantity through the cooling coil and the outside air dampers set at their minimum position. Outside and return air dampers shall be adjusted to give the design air quantities at minimum and maximum positions and any intermediate position noted on the Drawings.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(b) Fan & Ductwork (Cont'd)

- As an alternative to marking the air quantities on shop drawings, test sheets may be used accompanied by diagrams identifying each outlet.
- Particular attention shall be given to establishing that the total air quantity for each system is within the allowable tolerance -0, +10%. This total shall be established by correlating readings for at least three methods of measurement in order of preference:
  - Pitot traverse in main supply duct in accordance with B.S. 1042 - 1943.
  - Actual pressure drop compared to manufacturers rated air pressure drop through the cooling and/or heating coils. (A.R.I. ratings).
  - Sum of air quantities measured at all outlets with appropriate correction factor applied according to the manufacturer's data for the particular method of measurement.
  - Anemometer measurement taken 25mm off face of air leaving side and averaged over the area, of the filter or coil, with an appropriate correction factor applied (factor usually in order of 0.8 x reading on anemometer to obtain actual air quantity).
  - Actual fan power consumption VS expected fan power consumption at the specified duty. (The Contractor shall check fan dimensions and clearances against manufacturer's drawings, also correct calculation for power consumption to take account of power factor and motor efficiency and belt drive efficiency. The Contractor shall also check expected actual system static resistance.)

The total air quantity shall be proven after the distribution system has been balanced.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.9 On-site Testing and Commissioning (Cont'd)

#### (b) Fan & Ductwork (Cont'd)

For the purpose of testing the air distribution to zones and outlets it is acceptable to total up all the outlets and balance proportionately throughout with an allowable tolerance of + or - 5% from the required air quantity by proportion. Direct reading voltmeters may be used for preliminary balancing and comparative adjustment of air flows at outlets. However, if different types of outlets are used (e.g. side blow registers, ceiling diffusers, linear slots, and the like) and it is not possible to use substantially the same method of measurement for each outlet then the supply to each zone branch shall be checked using pitot or Lenora velometer. Calibrated anemometers shall be used for all final air flow measurements at outlets and at coils, air filter banks, fresh air intake's and the like. Special hoods shall be used to measure air flow for linear diffusers and light troffers. If different sized hoods are used then allowance shall be made for different correction factors which may apply. If the same hood is used throughout but the air quantities and/or size of diffusers vary substantially then allowance shall be made for variation to the hood correction factor.

- Pitot tubes or direct reading voltmeters with pitot probes shall be used for measurement of air flow rates in ducts and shall be based on the average of multiple readings at not more than 300mm centres and not less than one reading per  $0.1\text{m}^2$  of cross sectional area of the duct.
- In addition air distribution from supply air outlets shall be checked and adjusted as necessary to ensure that the direction and "throw" of air is adequate for the application, free from unacceptable draughts and generally uniform over the face of each outlet.
- Air flow adjustments shall be made in such a manner that pressure drops through dampers at or near the faces of outlets are the minimum possible. Pressure drops required for restricting flow rates in low resistance branches such as short runs nearest to the fan shall be primarily achieved by means of the dampers provided at branch take-off points at the main duct. Adjustable fan drives, where provided, shall be used to obtain the correct air flow rates at the minimum possible fan speed with the minimum use of the dampers in the highest resistance run of ducting.



Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(c) Air Cooled Split Conditioners

The units shall be commissioned and tested according to ASHRAE standard 111-1988 Section 12.

The following data shall be recorded on the commissioning sheet:

- Unit Data
  - Make/Model Number
  - Type/Size
  - Serial Number
  - Type Filters/Size
  - Fan Sheave Make
  - Fan Sheave Diam./Bore
  - No. Belts/Make/Size
  - Type Heating Section\*
- Motor Data
  - Make/Frame
  - H.P./RPM (w/Rad/s)
  - Volts/Phase/Hertz
  - F.L. Amps
  - Sheave Make
  - Sheave Diam./Bore
  - Sheave Centerline Distance and Adjustment
- Condenser Test Data (List Design & Actual)
  - Refrigerant/Weight
  - Compressor Manufacturer/Number
  - Compressor Model/Serial No.
  - Low Ambient Control
  - Suction Pressure/Temperature
  - Condenser Pressure/Temperature
  - Crankcase Heater Amps
  - Compressure Volts
  - Compressure Amps
  - L.P./H.P. Cutout Setting
  - No. of Fans/Fan RPM
  - Condenser Fan HP/Airflow Rate
  - Condenser Fan Volts/Amps/Phase

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(c) Air Cooled Split Conditioners (Cont'd)

· Evaporator Test Data (List Design & Actual)

- Total Airflow rate
- Total Static Pressure
- Discharge Static Pressure
- Suction Static Pressure
- Out Airflow Rate
- Out Air DR/WB
- Return Airflow Rate
- Return Air DB/WB
- Leaving Air DB/WB
- Fan RPM
- Voltage
- Amps

(d) Electrical Test

After erection of the panel on site and prior to testing the equipment, the following test shall be performed in the presence of the Engineer.

- Inspection of control panel
- Mechanical test
- Continuity and dielectric tests
- Functional checks
- Earth test

On completion of the above tests, the Contractor shall commission the switchboard on no-load and perform the following tests:

- Voltage test for phase to phase and phase to neutral
- Phase sequence tests on every outgoing circuits

The following tests shall be carried out in full compliance with the I.E.E. Regulations by the Contractor in the presence of the Architect.

- Verification of polarity
- Insulation resistance test of all power and control cables
- Insulation resistance test of all motor windings

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(d) Electrical Test (Cont'd)

- Test of conductor continuity
- Test of effectiveness of earthing
- All thermal overload relays and starters
- Sequence of operation
- Flick test of motors

The Contractor shall carry out the following test on all electrical motors and provide test certificates in duplicate:

- Check motor nameplate voltage
- Check motor rotation and speed, prior to connecting up to the driven machine.
- Ascertain maximum kW absorbed by fan at the most demanding point of the pressure/volume characteristic curve at the specified fan speed.
- Earth continuity loop resistance for every motor starter.
- Insulation to earth resistance for every motor starter taken with 500 volt megger.
- Full load current taken by all motors on each phase.
- The tripping time of starter overloads set to 10% above the motor nameplate rating (if thermal when hot).
- Demonstration that each control works in accordance with the specification (i.e. selector switches correctly wired, high or low circuit cut-out operates, level switches correctly operate).
- Check motor temperature (in accordance with BS 4999).
- Check starting current of all motors.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.9 On-site Testing and Commissioning (Cont'd)

(e) Miscellaneous Measurement and Testing

- . Room temperatures and humidity and noise levels shall be measured to ensure design conditions are achieved. Measuring instruments shall be mounted 1.5m above floor level at points away from the influence of draughts or hot or cold surfaces. Such measurements shall not be carried out when weather or other environmental conditions are likely to cause undue influence to the results.
- . Sound and vibration testing shall be carried out to ensure that equipments are operating with satisfactory sound and vibration levels and that there is no transmission of objectionable vibration or through the building structure. Sound levels shall be measured with and without the plant in operation.
- . All measurements shall be taken at a height of 1.5m above floor level and at least 1.5m from any wall, window or ceiling surface. Measurements shall be taken in octave bands from 63Hz to 8KHz.
- . Measurement of sound pressure levels shall be taken during conditions of maximum load of equipment or part load where directed otherwise by the Architect at a time when the building is practically unoccupied. No measurement shall be taken closer than 1500mm to any outlet, and not closer than 1000mm to any ceiling, wall or floor surface.
- . Background noise levels during testing shall be below measured values by at least 6dB in all octaves.
- . Vibration test and analysis shall be carried out as in the "Noise & Vibration Control" Section and Chapter 37 of 2003 Application Handbook of ASHRAE (Testing, Adjusting and Balancing).

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.9 On-site Testing and Commissioning (Cont'd)

#### (f) Performance Tests

- In addition to the commissioning requirements to above. Performance Tests shall be carried out and any necessary final adjustments arising therefrom, be carried out at a time to be nominated during the Defects Liability. Period or, in the event of failure of the installation to meet the minimum requirements of this Specification, such extended period as may be permitted.
- The Performance Tests shall be run over a period of up to five nominated consecutive days in any two months to be selected by the Engineer. During this period necessary facilities to log hourly intervals during normal working hours shall be provided:
  - Ambient dry and wet bulb temperatures in a shaded location to be nominated.
  - Internal dry and wet bulb temperatures in not less than one location per 200m<sup>2</sup> of floor area of the conditioned space and as nominated.
  - Estimates of the number of person in each area.
  - Estimates in the total amount of lighting and heat producing appliances in use in each area.
  - Fresh air intake flow rates at each air handling unit. Fresh air quantities shall be maintained as close as possible to the specified values during performance testing.
  - Any other factors affecting the heat loads on the systems and beyond the control of the Contractor.
- With the above ambient and building heat load information obtained as a background, a minimum of three separate readings shall be obtained and subsequently averaged, for each air and water inlet and outlet temperature, humidity, pressure and flow rate, together with the speed, current draw and overload setting of each electrical drive.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.10 Training of Employer's Staff

- (a) After handover of the plant, the Contractor shall provide training to the Employer's staff in the safe and proper operation, care and maintenance of the system and shall demonstrate the operation of any special purpose plant requiring a skilled or certificated operator.
- (b) All instructions and demonstrations shall be carried out by way of special visits by competent and experienced technicians at a date to be notified by the Architect.

### 14.11 Statutory Authorities' Tests & Inspections

- (a) As and when notified in writing or instructed by the Architect, the Contractor shall attend all tests and inspections carried out by Statutory Authorities including the Water Authority, Environmental Protection Department, Fire Services Department and B.D. and shall forthwith execute free of charge any rectification work ordered by the Architect as a result of such tests and inspections which determine non-compliance with Statutory Regulation. These tests may take place after the issue of Practical Completion of the Main Contract and the Contractor shall make all allowances in this respect.
- (b) The Contractor shall be responsible for all necessary forms and shop drawings submissions to the Statutory Authorities which shall conform to the latest architectural plans submitted kept by these authorities.

The submission shall comply with the requirements set forth in the current Codes of Practice and circular letters of the statutory authorities. The documents to be submitted by the Contractor shall be forwarded to the Architect for checking before submission.

The Contractor shall ensure that his submission and subsequent approval shall not delay the subsequent inspection and test carried out by the Statutory Authorities, otherwise he shall be fully responsible for any consequence due to his delay.

The Contractor shall allow for at least two submissions to each authority of complete sets of documents to each Statutory Authority, one to be made within six months after the award of the Sub-contract and the other before the Statutory Authorities inspection. The Architect may at his discretion instruct the Contractor for additional submissions whenever necessary.

- (c) The Contractor shall notify the Architect at least seven days in advance of his application for statutory tests and inspections. On receipt from the Statutory Authorities of a confirmed date for test and inspection. The Contractor shall inform the Architect without delay.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.12 Maintenance and Service

(a) General

The Contractor shall provide a comprehensive planned maintenance program and 24 hours emergency call out service during the Defects Liability Period.

(b) During the Defects Liability Period

- The Contractor shall undertake the comprehensive maintenance and routine servicing of the MVAC Installation during the Defects Liability Period.
- The Contractor shall carry out routine maintenance as described herein. The Contractor shall also perform all additional maintenance work not listed herein which he considers necessary to ensure that all the various systems installed to operate satisfactorily and that maximum availability of the MVAC installation is maintained at all times.

(c) The Contractor shall give the Employer at least seven days' prior notice of when each operational maintenance visit is due so that the Employer can nominate a representative to be present.

The Contractor shall report to the Employer prior to commencing each service and before leaving. A comprehensive report shall be compiled by the Contractors for all the work which has been carried out during each visit, including comments on any improper functioning of various systems, and comments on any items requiring detailed examination at or before the next scheduled visit.

The service report shall also state the date when the next regular routine service visit is due to take place.

A copy of this report shall be submitted to the Employer.

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.12 Maintenance and Service (Cont'd)

(d) The minimum maintenance requirements shall be as follows:

· A/C Units, Fans and Ductwork

– Monthly

- To check and clean condensate drain pans and drain pipes to ensure no choking
- To examine air filters, record filter pressure drop and compare to design figure; report to the Employer any filter that requires replacement, renew as necessary with filter media supplied by the Employer
- To clean guides and mesh
- To test motorized, smoke / fire dampers
- To clean return air louvres and dampers
- To examine fans and drive alignment and tension, lubricate and adjust as necessary
- To check fan and motor bearings and lubricate according to manufacturer's recommendation
- To clean fan wheels, casing and enclosure
- To check control valve actuators together with the two-way valves for correct operation in conjunction with the ATC Specialist
- To check and adjust control system to ensure proper setting and calibration working order in conjunction with the ATC Specialist.
- To ensure no choking in cooling coils
- To check generally for air leakage in all flexible duct connections, inspection holes, and the like if so required - adjust and repair as necessary
- To check anti-vibration mountings and adjust as necessary
- To check and tighten all holding down bolts, clamps, brackets, and the like
- To check all pressure gauges, thermometers, flow gauges, manometers, and the like, and record their readings



## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.12 Maintenance and Service (Cont'd)

- To check at quarterly intervals, the operation of circuit breakers thermals and all other electrical controls and interlocks
- To check all electric motors for excessive noise, or excessive temperature
- To carry out all additional repair work required to ensure the correct operation of equipment
- Every Three Months
  - Spray all condensate trays for AHU/FCU with biocide treatment as approved by the Architect.
- Every Six Months
  - To inspect the cleanliness of cooling coil to remove all dirt and clogging by steam jet if so instructed by the Architect
  - To check and test safety controls including cooling and heating thermostat, high temperature cut-out, overheat cut-out, sail switch, and the like to ensure all in good working order.
  - To check and clean fire dampers and pressure relief dampers to ensure free operation and the fusible linkages in good condition; to lubricate all bushes for fire dampers
  - To check and test heating element for good working order and record meter reading and compare to design
  - To check and clean air-diffuser, air grilles and volume controls
  - To check and test temperature sensor in conjunction with the ATC Specialist
  - To carry out all necessary repair after the above checking if so instructed by the Architect

Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

14.12 Maintenance and Service (Cont'd)

- Yearly Routine
  - To check and clean exhaust fans
  - To check starter and the associated equipment for good working order and replace contact as required
  - To check visually the cleanliness of ducts and grilles and clean up accordingly
  - To overhaul fan motors and controls including removal of dust and oil or grease from motor windings and interior of motors, checking winding insulation, cable terminations and cables for damage or deterioration, replace winding, cable or cable termination as necessary
  - To examine units casing and accessories for paint chipping or corrosion, repaint as necessary
  - To check damper linkage, set-screws and blade adjustment for proper operation
  - To carry out all necessary repair after the above checking
- Miscellaneous
  - Yearly
    - To wire brush or ship-off rust, corrosion etc, and paint with approved anti-corrosive or protective coating for any portion of plant or equipment subject to determination
    - To inspect the MVAC system generally and perform necessary service work not listed above.
- (e) Annual Certificate

The Contractor shall prepare and submit an annual certificate in accordance with the Local Building (Ventilating Systems) Regulations.
- (f) All the scheduled maintenance service described above shall be properly programmed and agreed with the Employer in order not to affect operation of the MVAC system.

## Section 14 – Commissioning, Testing, Maintenance & Services (Cont'd)

### 14.12 Maintenance and Service (Cont'd)

- (g) The Contractor shall also undertake to provide a 24 hours comprehensive breakdown service whereby qualified technicians shall attend to each breakdown as soon as practicable after a breakdown is reported, and carry out immediate remedial work at a reasonable speed according to the nature of the breakdown. Any faulty equipment or components shall be quickly replaced.

In circumstance such that the Contractor fails to attend the breakdown within four normal working hours after notification of a breakdown, and where remedial work is interrupted during normal working hours for purposes other than obtaining replacement parts, the Employer reserves the right to order such action as may be necessary to expedite completion of remedial work which shall be at the Contractor's expense without abrogation of the Contractor's responsibilities.

- (h) A competent engineer shall be provided to investigate the fundamental cause of a fault. Temporary quick fix solutions shall not be accepted.
- (i) The Employer shall at his discretion, take action to recover all losses incurred arising from the failure of the Contractor to perform the duties either wholly or in part as detailed in this Section.

### 14.13 Spare Parts

- (a) A full set of spare parts shall be provided by the Contractor. The spare parts shall be provided within 2 weeks from commencement of the Defect Liability Period (DLP).

The Contractor shall provide the following spare materials and parts:-

- 2 nos. of fuselink for each rating of fuse-switches.
- 10 nos. of indicating lamp for each colour of indicator lights.
- 5% of each type of air filters.
- 5% of pulley belts.
- Additional spare and special tools for operation and maintenance of all the plant and equipment as recommended by the equipment manufacturer.
- Other materials which are not readily available in the market, quantity to be determined by the Architect.

- (b) The list of spare parts shall form part of the equipment approval process.
- (c) All spares shall be kept in purpose made lockable galvanized steel cabinets with the words “Spare Parts for .....” and the equipment name and reference number stenciled on the lid. Inside each cabinet in a clear plastic waterproof folder shall be a complete spare catalogue for the respective equipment with re-order numbers clearly defined.

## **PARTICULAR SPECIFICATION**

### **SPECIFICATION FOR ELECTRICAL INSTALLATION**

#### **Contents**

- Section 1 - Details for Extent of the Works
- Section 2 - Scope of Works
- Section 3 - Lighting and Power Final Circuits
- Section 4 - Closed Circuit Television (CCTV) System
- Section 5 - Public Address System
- Section 6 - Telecom Cabling System
- Section 7 - Dimming System
- Section 8 - Provision for Other Services

## Section 1 – Details for Extent of the Works

### 1.1 Location of Works

This Specification covers the Electrical Installation for the Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) of The Construction Industry Council (CIC).

### 1.2 Statutory Requirement

All equipment and installation works shall comply with the rules and regulations established by the following Authorities and Utilities:-

- a) Building Authority
- b) Fire Services Department (FSD)
- c) Labour Department
- d) Office of the Communications Authority (OFCA)
- e) Local Power Company
- f) Electrical & Mechanical Services Department (EMSD)
- g) Environmental Protection Department (EPD)
- h) Architectural Services Department (ASD)
- i) Any other Authorities having jurisdiction over the installation.

The Contractor shall bear the costs of all fees, permits, testing, stamping of samples, etc., required by any of the above authorities.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.3 Standards, Guides and Codes of Practice

The installation, materials and equipment shall comply with the requirements of the Standard Codes, Guides and other documents issued by the Authorities, Institutions and Organizations referred to in various sections of the Specifications, including the following:

- a) Latest edition of the Regulations for Electrical Installation issued by the I.E.T. (hereinafter referred to as "the IET Regulations").
- b) Appropriate British Standard and International Standards Organization Specification(s) ("B.S." for short) and Codes of Practice ("C.O.P." for short)
- c) Supply Rules issued by the respective supply company currently in operation in Hong Kong
- d) Code of Practice for the Electricity (Wiring) Regulations issued by the Electrical and Mechanical Services Department (Latest Edition).
- e) BSB Standard and Standard Details issued by the Building Services Branch.
- f) Code of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment, Latest Edition, issued by Fire Services Department.
- g) Requirements and Circular Letters of Fire Services Department.
- h) Current Practice Notes issued by the Environmental Protection Department.
- i) Architectural Services Department Standard Drawings as appropriate.
- j) Practice Notes of Engineers issued by the Buildings Department with respect to the or Authorized Persons and Registered Structural obligations imposed on the Contractor.
- k) Requirement and Standard of Lands and Works Branch, Labour Department, Food and Environmental Hygiene Department, Leisure and Cultural Services Department and Geotechnical Engineering Office of Civil Engineering Department.
- l) Code of Practice for Building Energy Efficiency of Building Services Installation.
- m) Any other local Government Authorities having jurisdiction.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.4 General Specifications

The latest edition of the following specification issued by the Architectural Services Department of the Hong Kong Special Administrative Region shall form as the General Specifications of this Technical Specification. In case there are discrepancies between the General Specifications and this Technical Specification, this Technical Specification shall take precedence.

- Latest edition of “General Specification for Electrical Installation in Government Buildings”

### 1.5 Technical Information to be Submitted

- a) All equipment and materials shall be approved by the Architect in writing before installation. The Contractor shall be fully responsible for delays and problems arising from his late submission of required information and from his failure to provide adequate information or acceptable equipment.
- b) Wherever equipment do not appear to conform to the space allocation shown on tender drawings, or the Services arrangements, shown, the Contractor shall submit at time of tender, and in any event at the earliest opportunity, sufficient information/Drawings to enable adequate checking prior to installation.
- c) Before ordering of equipment, the Contractor shall submit to the Architect full details of the operating weights of the equipment for purposes of determining floor loading and structural accommodation.
- d) Technical information shall be submitted in sufficient time to allow for comments and approval by the Architect, including resubmittal and amendments, the whole process of submittal and approval shall comply with the Main Contractor's programme. At least four copies of approved documents shall be required for distribution by the Contractor.

### 1.6 Building Provisions and Equipment Access

- a) Before proceeding with the works, the Contractor shall confirm in writing that all the provisions of space, structural openings, plinths etc., as shown on architectural and other relevant Drawings are satisfactory. Wherever necessary, the Contractor shall furnish additional information for Builder's works required.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.6 Building Provisions and Equipment Access (Cont'd)

- b) The Contractor shall be fully responsible for ensuring that the Main Contractor is informed of all building works, holes/openings in walls and structures etc., and that all such building works are provided and correctly located during the construction of the building. Additional holes/openings required at a later stage shall be at cost to the Contractor unless such works are covered by written Architect's Instruction.
- c) The Contractor shall be deemed to have allowed in his tender sum all costs for hoisting and maneuvering items of equipment, accessories, etc., into the areas or spaces of final positions. The Contractor shall acquaint himself with loading and space limitations for the above purposes. Exact final positions of equipment shall be determined on site by the Contractor and shall be referred to the latest architectural and structural Drawing, as well as requirements of other services.

### 1.7 Samples

- a) Before ordering, samples shall be submitted in sufficient time for approval. One set of sample board shall be submitted to the Architect for approval, after which the Contractor shall be responsible to deliver the sample board to site and display it at the Main Contractor office. The Contractor shall provide additional set(s) if requested, at no extra costs.
- b) Each sample shall be labelled and submitted with detachable parts left loose so that they can be taken apart for internal examination.
- c) The samples to be submitted shall be at the decision of the Architect.

### 1.8 Drawings

- a) When tendering, Tenderer shall bring to Architect's attention any omissions and discrepancies between tender Drawings and Specifications. In general, all works called for by Drawing even if not by the Specifications, and vice versa, shall be fully executed.
- b) Tender Drawings are intended primarily to enable tenderers to prepare his estimate and submit tender. Layout of piping, cables, ducting, etc. as shown do not necessarily indicate exact positions.



Section 1 – Details for Extent of the Works (Cont'd)

1.8 Drawings (Cont'd)

- c) The Contractor's working and builder's work drawings shall indicate in detail of all works proposed. Two weeks after the award of the Sub-contract, the Contractor shall submit a proposed submission programme indicating the timing of submission of the various shop drawings for the approval of the architect. The timing as stipulated in the proposed submission programme shall cope with the building programme and shall be subject to the approval by the architect.

Initial submission to be commented by Architect/Engineer	3 weeks
----------------------------------------------------------	---------

Subsequent resubmission to be commented by Architect/Engineer	2 weeks
---------------------------------------------------------------	---------

Distribution of drawings by the Contractor after approval of submission	1 week
-------------------------------------------------------------------------	--------

For initial submission and subsequent resubmission by the Contractor, 7 copies are required to be submitted by the Contractor. After approval by the Architect/Engineer, the Contractor shall make 13 copies of the drawings to distribute to all other parties. Additional copies shall be provided upon the instruction of the Architect at no additional cost.

- d) The drawings shall be based on tender drawings, but amended to account for any modifications to building or installation which may have taken place, and for any adjustments due to the actual equipment offered. The working drawings shall be to suitable scales relative to their purposes, and shall include adequate plans, elevations, sections and views as necessary to show all dimensions, levels and installation details. All such drawings shall be approved by the Architect in writing before any work is put in hand.
- e) The Contractor shall submit all necessary shop drawings showing the details in accordance with architect's/engineer's verbal instructions and submit alternative proposals in order to suit site condition prior to commencement of installation work.
- f) Additional copies of shop drawings may be tabled at site meetings for discussion purposes but they shall not be regarded as a formal submission.
- g) Prior to any approval being given by the Architect/Engineer, the Contractor shall allow ten days from the date of receipt for the Client/Project Manager/Architect/Engineer to make any comments.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.8 Drawings (Cont'd)

- h) The Contractor shall carefully keep in his site office a full set of prints showing progress of work. Such prints shall be kept up-to-date at all times and shall serve as a progressive site record of the actual installation.
- i) As soon as possible after completion of the Works, and in any event within fourteen (14) calendar days thereafter, the Contractor shall prepare and submit to the Architect for forwarding to the Employer the following document:
  - i) Four prints of each of all approved 'as-fitted' drawings.
  - ii) One set of CD-Rom disk presenting as-fitted drawings.
  - iii) Four copies of approved O&M manual.
- j) Scale of drawings to be submitted by Contractor shall be:-

<u>Type of Drawing</u>	<u>Scale Required</u>
Layouts	1:100
Congested Area	1:50
Details and Sections	1:20

- k) All Contractor's Drawing shall be on standard drawing sheets to sizes in accordance with the International A Series.
- l) All submission drawings, shop drawings or as fitted drawings shall be prepared by 'AutoCAD 2000'.

### 1.9 Operation and Maintenance Manuals

- a) Prior to delivery of equipment to site the Contractor shall submit two sets of comprehensive draft Operation and Maintenance Manuals and Instruction to the Architect for approval.
- b) The operation and Maintenance Manual shall contain, as a minimum, the following (properly ordered and indexed) in a form completed and agreed with the Architect:
  - Description of the systems and equipment installed;
  - Details and frequency of maintenance recommended;
  - List of spares and their local agent's names, addresses and telephone numbers;

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.9 Operation and Maintenance Manuals (Cont'd)

- Method of operation of all systems;
  - Equipment Schedules;
  - Catalogues and performance data of all items of equipment;
  - Correct settings of protection devices.
- c) Original operation manual from manufacturer shall be provided.
- d) Upon approval of the Operation and Maintenance Manuals, four sets of Operation and Maintenance Manual shall be distributed. At least one master copy shall be submitted and all catalogues contained in this copy shall be original printings and not photocopies of catalogues.
- e) Operation and Maintenance Manual shall be bound in good quality hard cover binders which can allow adequate access for removal/insertion of data for updated purpose.
- f) Manuals shall be adequately indexed and plastic section divider sheet shall be incorporated to facilitate the use of the manual.
- g) Manuals shall give complete contact address and contact telephone numbers for equipment manufacturers and their local agents.

### 1.10 Services Co-ordination

- a) The Contractor shall obtain the latest technical information, details and layout of other services and latest architectural and structural Drawings from the Main Contractor and shall complete co-ordination of his works with other trades for a neat, workmanlike installation. The co-ordination shall be reflected in his working Drawings and actual installation.
- b) The Contractor shall provide technical information, details and layout of his installation to the Main Contractor and shall co-operate and co-ordinate with the Main Contractor and other Contractors for smooth execution of works on site.
- c) The Contractor shall be responsible for costs of taking down installed works, re-fixing etc., as a result of his lack of and/or improper co-ordination and co-operation with the Main Contractor and other Contractors.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.10 Services Co-ordination (Cont'd)

- d) The Contractor shall allow for working, at certain times, in areas with separate Contractors other than Main Contractor and his Contractors. In this case, he shall note the full list of works under the Main Contract and the other Sub-contracts.
- e) All works with respect to the delivery of equipment and installation on site shall be proceeded with all speed and in such order as to conform strictly to the Main Contractor's Programme.

### 1.11 Contractor's Site Staff

- a) The Contractor shall provide a suitable qualified Site Engineer for the whole duration of the Sub-contract.
- b) The Site Engineer shall be qualified, fluent in English and shall adequately represent the Contractor at site meetings and other meetings as required.
- c) The Site Engineer shall be authorized to receive and execute efficiently instructions issued by the Architect.
- d) In addition to the Site Engineer, foreman and supervisors shall be provided by the Contractor as required, to the satisfaction of the Architect.
- e) C.V. of the Site Engineer shall be submitted to the Architect for approval. The Architect reserves the right to move, or cause to remove, from site the Contractor's Site Engineer and/or his sub-ordinates who, in the opinion of the Architect, fails to perform satisfactorily his duties in the best interest of the Project. Such drastic action may be taken even after detail of the Site Engineer have been approved by the Architect.

### 1.12 Storage, Protection and Care of Site

- a) The Contractor shall be fully acquainted with space and storage facilities available on site, and shall arrange for delivery his equipment and materials carefully so that, they are in phase with the Main Contractor's programme while at the same time, in keeping with the available space and facilities on site allocated by the Main Contractor specifically to the Contractor for his equipment and materials.
- b) Off-site storage of equipment and materials by the Contractor shall be entirely at the expense of the Contractor unless such off-site storage has been authorized by the Architect by written Architect's Instruction.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.12 Storage, Protection and Care of Site (Cont'd)

- c) The Contractor shall adequately protect his equipment, materials and unfinished work on site against unauthorized interference, inclement weather, and other causes of damage.
- d) The Contractor shall be required to protect all finished works. The Contractor shall check protection facilities provided and shall inform the Contractor immediately if such facilities are inadequate, removed or displaced by others.
- e) The Contractor shall at all times keep his installation reasonably clean and tidy, and shall remove from site at his expense all surplus materials and temporary works as soon as they are not required.
- f) On completion of the works, the Contractor shall removal all stains, blemishes, markings, etc., to the state ready for handing over.

### 1.13 Training and emergency Repair Service

- a) The Contractor shall provide adequate training of the Employer's staff until they are fully familiar with the operation and maintenance of the complete installation.
- b) The Contractor shall provide emergency repair service to the work carried out under this Sub-contract without charge to the Employer for a period of twelve (12) months commencing from the date of practical completion.

The emergency repair service shall include systematic checking, adjustment and testing of all equipment, all necessary scaffolding and platform for easy assess of equipment. The Contractor shall supply and install all consumable parts for replacement as when necessary, repair or replace parts of equipment whenever this is required as instructed by the Employer and shall only use genuine standard parts provided by the manufacturer of the equipment concerned. The emergency repair services shall be carried out within 24 hours upon notification of compliant from the Employer.

## Section 1 – Details for Extent of the Works (Cont'd)

### 1.13 Training and emergency Repair Service (Cont'd)

#### Replacement of Faulty Materials

During a period of twelve (12) months from and after the acceptance date, the Contractor shall supply and install without charge, replacement for all and any equipment or parts thereof or liquids or gases which may be in the opinion of the Engineer become unserviceable where such unserviceability is due to faulty materials, workmanship, design or installation or inadequate performance, rating or size. The liability of the Contractor shall cover the replacement of all liquids and gases, oils and refrigerants which may be lost by leakage or otherwise or become contaminated or in other ways unserviceable due to faulty materials, workmanship or installation or inadequate capacity, rating or size.

### 1.14 Warranty Certificate

The Contractor shall furnish with the Employer warranty certificates of all equipment. Unless otherwise specified, the warranty period of the equipment shall be one year commencing from the date of practical completion.

### 1.15 Tools and Spares

- a) Unless otherwise specified, the Contractor shall provide two complete sets of recommended and required tools for maintenance and service of equipment within his Sub-contract.
- b) The Contractor shall submit with his tender price list for recommended items of spares and consumable pertaining to all the equipment offered, per manufacturer's recommendations.
- c) The price list shall be fixed and open for acceptance up to the end of Defects Liability Period.

## Section 2 – Scope of Works

The work embraced by this Specification covers the supply, installation, testing, commissioning and maintenance of the Electrical installation, in accordance with this Specification and associated drawings, and without abrogating the more extensive details described elsewhere in the Specification and Drawings, includes the following (but not be limited to):

- a) Demolition and disposal of the existing lighting and power installations.
- b) Supply and installation of final circuit distribution system, comprising MCB distribution boards, MCBs, RCBOs, power cables, isolating switches and necessary accessories.
- c) Supply and installation of 32A single phase industrial type socket outlets and 13A single phase socket outlets c/w D.P. switch and pilot light for the general electrical appliances and the Client's equipment.
- d) Supply and installation of interior lighting fixtures including the lamps, drivers, fixing brackets/rod and accessories. The Contractor shall supply and install 2-hour emergency battery kits for the light fixtures denoted as emergency lighting shown on the drawings. The Contractor shall submit the catalogues of lighting fixtures with layouts and lux calculations for Architect's approval prior to ordering and installation.
- e) Supply and installation of dimming system including dimmer control panels, key pads, signal cable and all necessary accessories as per drawings and specification. The system shall be compatible with and controlled by third party software such as Building Information System (BIM). The Contractor shall also bear all the costs for the programming of the dimmer panels and key pads to suit the lighting scenes requirement as per the Client's requirement. The exact zoning of the lighting scenes shall be confirmed by the Client and coordinated on site.
- f) Provision of earthing system complying with EMSD's COP and Wiring Regulations.
- g) Supply and installation of telecom cabling system comprising Cat 6 data sockets, patch panel, network cables, server rack and necessary accessories as specified.
- h) Supply and installation of IP-based Closed Circuit Television (CCTV) System comprising colour CCTV cameras, microphone, network video recorders (NVRs), PoE Switch, UTP cables, LCD monitor and web-based access software. The system shall be able to be accessed by third party software such as Building Information System (BIM) for remote monitoring and control.
- i) Supply and installation of Public Address (PA) System as specified.

Section 2 – Scope of Work (Cont'd)

- j) Supply and installation of cable containment for the Client's card access control system and Client's CCTV system adjacent to the SETC. The conduit points as shown in the tender drawings shall be completed with an adaptable box, G.I. conduit and draw wire connected to the main ELV trunkings.
- k) Supply and installation of cable containment for the electrical and ELV cabling under this Contract. Suitable containment including trunking, surface G.I. conduit and concealed PVC conduit shall be provided according the lighting, power points and ELV layout as shown on the drawings.
- l) Supply and installation of cable containment for the Client's optical fibre connection from G/F SETC to M/F Server Room under this Contract as shown on the drawings.
- m) Testing and commissioning and provision of training to employer's staff for proper operation of the new electrical installation.
- n) Painting of all the exposed electrical containment and equipment, labelling, shop drawing submission, as-fitted drawing submission, sample board submission and O&M Manual submission.
- o) Allowance for 12-month free maintenance services as specified.
- p) Sealing / grouting of the gaps inside the pipe sleeves used for electrical wiring.
- q) Completion and issuance of a fully completed Work Completion Certificate (Form WR1) by REW for the design and installation work.
- r) The entire electrical installation shall fully comply with the Building Energy Code (BEC).
- s) Submit the photos & report showing before and after completion of the Works within Seven (7) calendar days after completion of the Works.
- t) Submit a CD-ROM copy of the full set of "as-fit" drawings (AutoCAD version) showing the routing of conduit and trunking installations within Fourteen (14) calendar days after Practical Completion of the Works. (The AutoCAD template of floor layout plans shall be provided by the CIC.)  
\*The actual routing of the Conduit and Trunking should be determined by the Contractor and approved by the Architect / CIC subject to the actual Site condition.\*



### Section 3 – Lighting and Power Final Circuits

- 3.1 The Contractor shall supply, install and connect electrical wiring for the lighting and power final circuits comprising fixed and flexible conduits, trunkings, cable tray, cables, electrical accessories and etc..

The Contractor shall also provide additional conduits, trunkings, wirings, copper tapes etc. for the electrical bonding systems in accordance with the I.E.T. Wiring Regulations, the Supply Rules of the Supply Company, the Electrical Ordinance, the Electrical General Specification and this part, although such provision may not be shown on the Drawings explicitly.

- 3.2 Only plant areas such as A/C plant rooms, lift machine rooms, electrical switch rooms and inside false ceiling, where surface conduits shall be adopted. Concealed conduits shall be used for all other areas wherever possible. All outlets and junction boxes shall be flushed with building finish, unless otherwise specified. Suitable extension ring or collar shall be provided for mounting of front plate where the plaster finish is more than 13mm thick. Only extension rings of the correct depth shall be used. Under no circumstances shall multiple extension rings be permitted.
- 3.3 The Contractor shall supply and install all wirings, busbar chambers, controlgears, switchgears, MCCB/MCB/RCCB units and boards etc. as per the Drawings for the connection of supply to the luminaires, socket outlets, air-conditioning equipment and other services. All necessary sundry components for the electrical supply system shall be provided.
- 3.4 Separate MCCB/MCB boards shall be provided for lighting final circuits, power final circuits, air-conditioning and essential power supply circuits as shown on the Drawings. Residual current circuit breakers (RCCB or RCD) complying with the Electrical General Specification and this part of Specification housed in approved galvanized sheet metal boxes shall be supplied and installed by the Contractor as indicated or as necessary. For the socket outlets final circuits, the Contractor shall supply and install MCBs with built-in RCCB protection which shall have no more than 35mm width. The RCCB units shall have the current ratings as specified and with a residual operating current of 30mA, unless otherwise specified.

A neutral assembly shall be fitted which will accept 100% phase rated incoming neutral cables, with a removable neutral link for testing purposes. The earth bar shall have a 50% phase rated incoming connection. The neutral and earth busbars shall facilitate the installation of either brass terminal blocks or crimp lug type connections. Removable steel gland plates shall be fitted top and bottom.

### Section 3 – Lighting and Power Final Circuits (Cont'd)

- 3.5 Essential lighting, non-essential lighting and emergency lighting systems shall be provided as shown on the Drawings. The Contractor shall adhere to the Drawings for details and arrangements of the final circuits after well coordination with the installation of other services, to the acceptance of the Architect. An emergency lighting system comprising self-contained battery for 2 hours operation either of the maintained or non-maintained type as shown on the drawings shall be provided throughout the shopping centre.

Wiring inside trunking/conduit system for essential lighting and all other LV electrical installation including essential power and non-essential lighting and power, shall be separated from each other in according to the I.E.T. Wiring Regulations, unless otherwise specified.

- 3.6 The positions and cable routes of all lighting and power points as shown on the Drawings are indicative only and subject to variation on site. The Contractor shall mark these positions on site after coordination with all other services installed in the same spatial zone, for the approval of the Architect prior to commencement of work. No claim due to such variation shall be entertained. For lighting installed on false ceilings, the Contractor shall refer to the actual ceiling layout and installing levels for the final locations of the luminaires. No claim for additional payment shall be entertained if the work is executed without the approval of the Architect. The Contractor shall be responsible for final adjustment of the installed luminaires to suit the actual installed ceiling so as to produce a tight and neat appearance to the satisfaction of the Architect.
- 3.7 Wiring from MCB boards to the luminaires shall be through the concealed conduit lighting wiring system. For installation above false ceiling, surface boxes shall be allowed at suitable intervals for extension with metal conduit to the various lighting points. Flexible conduits with PVC sheath to BS 731: Part 1 having length not exceeding 2 m shall be provided for the final connection from the surface conduit boxes to the individual luminaire. However, rigid conduit droppers shall be used for recessed luminaires in metal strip ceiling and the rigid conduit droppers shall terminate at an outlet box above each luminaire for final connection.
- 3.8 All luminaires installed on false ceiling shall be secured by means of rigid hangers of adjustable lengths and shall not rest on the false ceiling on their own weight.
- 3.9 Luminaires installed in plant rooms, switch rooms, pump rooms, lift machine rooms etc., shall be either wall mounted or ceiling mounted to suit the plant layouts. Notwithstanding this, the Contractor shall liaise with the B.S. coordinators and other parties on the exact locations of the lighting points so as to provide the optimum lighting effect to the rooms according to the actual layouts of the plant, machinery, equipment, ductwork, pipework and cables.

### Section 3 – Lighting and Power Final Circuits (Cont'd)

3.10 Time switches shall be of electronic type and housed in a metal enclosure. The rated voltage shall be 220V and the rated current shall be minimum 20A. Time switches, unless otherwise specified, shall incorporate the following, in addition to others as specified in the Electrical General Specification:-

- (a) Memory shall be battery maintained for a minimum period of 1 year with LCD time display maintained for 7 days during loss of electrical power
- (b) A minimum of two ON and two OFF times each day
- (c) A day-omitting device to render the switch inoperative
- (d) An ON-OFF bypass switch to enable the circuit to be controlled manually without affecting normal time switch settings.

For circuits controlled by contactors and/or time switches, the Contractor shall supply and install a painted metal box of ample space and complete with cover for housing each contactor or time switch. Suitable engraved label in English and Chinese shall be provided on the front cover to indicate the controlling circuit of the contactor and time switch.

3.11 For each self-contained maintained luminaire, the lighting and battery charging circuits shall be so arranged that the charging of the battery unit within the luminaires can be maintained automatically independent of the operating status (on/off) of the lighting circuit under normal electrical mains supply condition. When mains supply failure occurs, the luminaire shall be switched instantaneously to battery-operated mode. Upon restoration of mains supply, the luminaire shall be switched back to the mains supply operating condition and the battery shall be re-charged again. The whole operation shall be performed automatically.

3.12 All luminaires supplied and installed by the Contractor shall be completed with all necessary components, including the lamp poles and mounting brackets where applicable, supplied from the same manufacturers as the respective luminaires, unless otherwise specified. Components provided by manufacturers different from those of the respective luminaires are only acceptable subject to the approval of the Architect.

3.13 The Contractor shall be responsible and shall allow expenses for installation and adjustment of all lighting fittings within or outside normal working hours under the direction of the Architect or his representatives on site to obtain the designed illumination effects matching with the building programmes, to the full satisfaction of the Architect.

### Section 3 – Lighting and Power Final Circuits (Cont'd)

- 3.14 The lighting layout shown on the tender drawing shall be regarded as reference only. The Contractor shall re-layout the luminaries in order to meet the lux requirements specified on the CIBSE Lighting Guides.

- 3.15 All lighting fittings not controlled by local lighting switch shall be controlled by lighting switches grouped together on grid-switch panels with stainless steel plates. For surface installations, they shall be fitted with fixed grids. In flush installations, the grids shall be adjustable with matching front plates as specified having a 6mm minimum overlap. All switches on the panels shall be labelled with engraved English and equivalent Chinese characters to indicate the light fittings they are controlling.

All lighting control switches for essential lighting circuits shall have front plates engraved "ESSENTIAL", and the equivalent Chinese, in red.

- 3.16 Flush type socket outlets shall be fitted with adjustable grids and surface pattern sockets shall be supplied with cast iron as specified on the Drawings.

Socket outlets mounted externally or as indicated shall be weatherproof pattern.

- 3.17 All socket outlets, connectors, or similar power points connected to essential circuits shall be marked with engraved 'ESSENTIAL' in both English and the equivalent Chinese in red.

- 3.18 The 13A switches socket outlets to BS1363 shall be connected to 30A ring-main circuits, 20A or 30A radial circuits as shown on the Drawings and effectively earthed. The earthing terminal of each socket outlet shall be connected by a circuit protective conductor to an earthing terminal incorporated in the conduit outlet box.

- 3.19 Unless otherwise specified, 13A fused spur unit shall be fitted with D.P. switches and pilot lights and directly connected to the appliance served. Each fused connection or spur unit shall contain a fuse of the appropriate current rating for the appliance it supplies, and the front plate shall be current rating for the appliance it supplies, and the front plate shall be specified and engraved with the name in English and Chinese of the appliance served. The connection or spur units shall be of the flush pattern with all insulated white colour front plates, unless otherwise shown on the Drawings.

- 3.20 Connection between the fused connection unit and the equipment shall be by either multicore flexible cable/cord or by fixed wiring in conduit.

Every fused connection unit with fixed wiring final connection shall be provided with flush mounted outlet box at the back of the equipment served.

### Section 3 – Lighting and Power Final Circuits (Cont'd)

- 3.21 All general lighting switches, socket outlets, fused spur and connection units, cover plates etc. shall have the same sizes, configurations and colours, unless otherwise specified or accepted by the Architect for individual considerations. All these switches, socket outlets, connection units, cover plates etc. shall be constructed from material that enables engraving of letterings on them whenever required, and the screw fixing holes of them shall be complete with plugs of the same material and colour as them to seal up the fixing screws. Samples of them shall be submitted to the Architect for approval prior to order and installation.
- 3.22 Where the work involves running conduits inside or positioning of lighting points, switches or power points on or adjacent to the movable or demountable partitions and counters or tables, the Contractor shall exercise special care and attentions in carrying out such work. The Contractor shall liaise with all involved parties on the exact methods and locations of the installation and shall allow for the installation of conduits, switches and sockets etc. on such movable or demountable works.
- 3.23 All wirings and cables, whether they are for lighting points, power points or others, shall have their respective insulations be properly coloured in accordance with I.E.T. Wiring Regulations, to facilitate the ease of identification of the corresponding phases, functions or ways. Similarly, suitable permanent labels shall be provided on all light switches and power points for the phase identifications. Samples shall be submitted to the Architect for approval.
- 3.24 Double pole switches serving an adjacent equipment shall be complete with flexible outlet for cable connection except those controlling a connection unit or power outlet as shown on the Drawings.
- 3.25 Suitable identification letterings or labels of height not less than 40mm and of light blue colour paint shall be permanently marked on all cover plates of conduit junction boxes, as well as at regular intervals on the covers of trunkings, for the ease of identification of the types of circuits in the conduit/trunking system. This applies to all conduit/trunking systems to be supplied and installed by the Contractor, including the lighting and power circuits as well as other services mentioned in this part of Specification or as shown on the Drawings, such as telephone, electronic services, PA system, Data system and ELV system etc. The labelling shall be submitted to the Architect for approval.
- 3.26 Separate earthing cable serving as CPC shall be provided to each of circuits.

## Section 4 – Closed Circuit Television (CCTV) System

### 4.1 General

- 4.1.1 This Section specifies the minimum acceptable standard of quality and the minimum acceptable functions to be performed for the Close Circuit Television (CCTV) System.
- 4.1.2 The Contractor shall be responsible for the design, supply, installation, testing, and commissioning of a complete CCTV system as specified in this Specification to the satisfaction of the Architect.
- 4.1.3 All equipment, instrument, appliance, control accessories, etc. furnished shall be current model for which replacement parts shall be available for at least five years after completion of the Defects Liability Period.
- 4.1.4 All electrical cabling, signal and control wiring of the system shall be installed and terminated by the Contractor. All cables used for wiring shall be enclosed in concealed conduits or metal trunkings provided by the Contractor. The Contractor shall install separate conduit/trunking for the CCTV system.
- 4.1.5 The Contractor shall ascertain the exact quantities of CCTV cameras required for the installation as shown on the layout drawings. The figures given on the schematic drawings shall be taken as a guideline only. The final location of all cameras and control devices for the system shall be determined on site and approved by the Architect.
- 4.1.6 Although not fully shown on the drawings, the Contractor shall include the provision of necessary power supply points for all equipment supplied and installed under this Contractor.

### 4.2 System Description

- 4.2.1 The cameras shall be installed at the main entrance, corridors and the other strategic areas where local surveillance is required.
- 4.2.2 The cameras shall be wired back to NVRs located in the Server Room on G/F.
- 4.2.3 The exact location, installation detail and finishing for each camera shall match the interior design and subject to the approval from the Architect. The Contractor shall be responsible for coordination with builder and making necessary provision for mounting of the cameras.

## Section 4 – Closed Circuit Television (CCTV) System (Cont'd)

### 4.2 System Description (Cont'd)

- 4.2.4 All indoor camera mounted on ceiling shall be provided with dome shape housing. Weatherproof housing shall be provided for cameras mounted on walls or installed at outdoor or exposed to weather.

### 4.3 IP-Based System

- 4.3.1 IP-based surveillance system shall be provided with the following equipment as a minimum requirement:-

- a) IP Camera
- b) Network Video Recorder (NVR);
- c) Networking Switch with Power over Ethernet (PoE) feature

- 4.3.2 Video signals from cameras shall be transmitted via Cat 6. UTP data cables. The cables used for the outdoor cameras shall be armoured.

- 4.3.3 The video signals from the cameras shall be recorded by the NVRs, each of which shall have a storage capacity of 30 days for the recorded video in resolution 1920 x 1080.

- 4.3.4 The System shall allow User to view the picture of any cameras via internet or LAN with workstations or third party software such as Building Information System (BIM).

### 4.4 IP Camera

- 4.4.1 The IP camera shall be designed with 2 megapixel 1080p high definition images with built-in IR LEDs creating clear images even in the darkness of 0 lux.

It shall include motorized varifocal lens for easy focus control.

## Section 4 – Closed Circuit Television (CCTV) System (Cont'd)

### 4.4 IP Camera (Cont'd)

#### 4.4.2 Technical Specification of the Cameras shall be as follows :

- Max. 2M (1920 x 1080) resolution
- 16 : 9 Full HD (1080p) resolution support
- 3 ~ 8.5mm (2.8x) motorized varifocal lens
- H.264, MJPEG dual codec, Multiple streaming
- Audio / Face / Motion detection
- Simple Focus, True Day&Night (ICR)
- UPnP, Defog
- SD/SDHC/SDXC memory slot
- Multi-crop streaming, PoE
- Bi-directional audio support, IR LED (12ea)

### 4.5 Video Monitor

#### 4.5.1 The video monitors shall have the following features (minimum requirement):-

LCD panel: TFT panel  
LCD monitor size: Refer to tender drawings  
Luminance: 1000 cd/m<sup>2</sup>  
Contrast ratio: 5000:1  
Lamp life: 60,000hours  
Viewing angles: H: 170° V:170°  
Colour systems: PAL/SECAM/NTSC

### 4.6 Network Video Recorder (NVR)

#### 4.6.1 The NVRs shall be provided to process and record the IP camera signals. It shall be fully compatible with the IP cameras used.

#### 4.6.2 The NVRs shall support up to 16 network streams with a throughput of up to 64Mbps.

It features real-time recording capability at 4CIF (704 x 480) / 1.3M (1280 x 1024) / 2M (1920 x 1080) / 3M (2048 x 1536). It also offers compression in different formats such as H.264, MPEG-4 and MJPEG in dual codec, which allows selecting the proper codec to meet the users' needs.

For storage, the NVRs support up to 5/1 SATA HDDs with possible expansion and a USB and DVD writer for easy backup.



## Section 5 – Public Address System

### 5.1 General

- 5.1.1 This section of the specification details the Public Address (P.A.) System to be provided under the Contract.
- 5.1.2 The Contractor shall design, supply, install, test and commission the public address system, including labour, superintendence, materials, tools, equipment, storage, permits, certificates, drawings, testing and all accessories, auxiliaries and incidentals necessary to complete the Contract Works in a proper, safe, thorough and skilful manner to the satisfaction of the Architect.
- 5.1.3 The Public Address System shall include, but not limit to the following equipment :-
- a) Mixer pre-amplifiers,
  - b) Power amplifiers,
  - c) Speakers with matching transformers,
  - d) Zone selector,
  - e) Goose-neck microphones,
  - f) Volume control units.
  - g) CD and MP3 Players
- 5.1.4 All electrical cable, signal and control wiring of the system shall be installed and terminated by the Contractor. All cables used for wiring shall be enclosed in G.I. conduits and metal trunkings. The Contractor shall supply and install two-compartment/trunking for enclosing the audio cable and other ELV cable.
- 5.1.5 The Contractor shall ascertain the exact quantities of speakers required for the system as shown on the layout drawings. The figures given on the schematic drawings shall be taken as guideline only.
- 5.1.6 All major equipment shall be the product of one manufacturer where applicable.
- 5.1.7 Although not shown on the drawings, the Contractor shall include the provision of necessary power supply points for all equipment supplied and installed under this Contract.

## Section 5 – Public Address System (Cont'd)

### 5.1 General (Cont'd)

- 5.1.8 The Contractor shall ensure that 6 dB sound pressure difference measured at ear level can be achieved for the paging and announcement. The Contractor shall be responsible to adjust the quantities and layout of the loudspeakers in order to achieve the said SPD value without any extra cost claims.

### 5.2 System Description

- 5.2.1 The P.A. system shall be installed to provide background and announcement to the corridor area of the Development as shown on the drawings.
- 5.2.2 The areas covered by the P.A. system shall be divided into different zones according to rooms. The zone control panel shall be allowed with 20% spare capacity for future expansion.
- 5.2.3 The microphone with the headend equipments shall be housed in the ELV equipment racks located in the Management Office.

### 5.3 Mixer-Pre-amplifier

- 5.3.1 The mixer and pre-amplifier shall be solid state of modular design with sufficient channels to meet the requirement as per this specification. Each channel output shall have independent mixing volume, separate base and treble control and the following facilities :-
- Fader control for each input channel and output channel
  - Master volume, base and treble tone controls
  - Monitoring module with ON/OFF, volume control and phone jack
  - Remote control of input channel selection
  - VU-meter for output level monitoring with adjustable sensitivity
- 5.3.2 A chime signal generator module shall be incorporated to provide test tone to power amplifier for calibration purpose.
- 5.3.3 The complete pre-amp module shall be incorporated in a standard 550mm rack drawer type equipment casing. The casing shall be provided with a sturdy handle for easy draw-out and be complete with cable connectors and guide load.

## Section 5 – Public Address System (Cont'd)

### 5.3 Mixer-Pre-amplifier (Cont'd)

Technical Specification :-

Frequency response	: 20Hz to 20kHz $\pm 1$ dB
Total harmonic distortion	: Less than 0.5% between 50Hz and 15kHz
Signal to noise ratio	: 75dB below rated at 8dBm output from 20Hz to 20kHz
Tone control at base	: +14 to -19dB at 70Hz
Tone control at treble	: +16 to -19dB at 7kHz
Output impedance	: 600 ohm balanced
Volume level	: $\emptyset$ VU = 8dBm at 60 ohm
Clipping point	: $\pm 18$ dBm

### 5.4 Power Amplifier

- 5.4.1 The power amplifier shall be fully solid state, professional, monaural audio amplifier or rugged construction designed for 24 hours continuous duty at rated output and with high audio output quality.
- 5.4.2 The power amplifier shall have presettable input level and with output via transformer or direct. Output line voltage from transformer shall be selectable by voltage tapping. All controls shall be front accessible with ON/OFF switch and output level indication by VU-meter.
- 5.4.3 The power amplifier shall be suitable for standard equipment rack mounting and complete with drawer handle.
- 5.4.4 The amplifier shall be protected from misloading, short-circuiting of output or grounding by thermal protection and electronic means.
- 5.4.5 The amplifier shall withstand adverse overload conditions without major distortion. Ample thermal capacity heat sink shall be employed for heat dissipation of output stage transistor.

## Section 5 – Public Address System (Cont'd)

### 5.4 Power Amplifier (Cont'd)

Technical Specification :-

Input signal	:	70mV or 1V switchable at 7K ohm input impedance
Output voltage	:	70V/70V/50V through transformer
Frequency response	:	40 Hz to 18 kHz $\pm 2$ dB
Total harmonic distortion	:	less than 1% between 50 and 15000Hz
Output impedance	:	20% of nominal load impedance
Signal to noise ratio	:	86 dB below rated output

The Contractor shall provide sufficient no. of power amplifiers of suitable rating to drive all the connected speakers with 20% spare capacity. No. of set of amplifiers shall be depended on the output capacity of the particular power amplifier offered.

### 5.5 Microphone

#### 5.5.1 The goose-neck microphone shall be dynamic unidirectional microphone completed with press-to-talk ON/OFF switch, desk stand and chime light.

Technical Specification :-

Type	:	Dynamic cardioid type
Frequency range	:	30 - 7000Hz
Sensitivity	:	-73dbV at 700Hz
Total harmonic	:	Less than 1% at 700Hz distortion
Connector	:	5 Pin DIN type

## Section 5 – Public Address System (Cont'd)

### 5.6 Loudspeaker

- 5.6.1 All ceiling speakers shall be recess mounted in the false ceiling. Where there is no false ceiling, surface type or wall mounted type shall be provided.

The technical specification for surface ceiling/wall mount speaker shall be :-

Input	: 3W
Maximum SPL	: 95 dB (1W/1m)
Dispersion	: 90°
Frequency response	: 70 Hz to 7 kHz

- 5.6.2 All recessed speakers shall have a frequency response of 30 to 20 kHz, to provide an average sound pressure level of 80 dB output within all PA zones. Input rating shall be 3W.

- 5.6.3 The technical specification for horn speaker shall be:-

Input	: 15W/30W
Maximum SPL	: 78/113 (1W/1m)
Dispersion	: 188° Horizontal 190° Vertical
Frequency response	: 250 Hz to 16 kHz

- 5.6.4 All speakers shall be equipped with a line matching transformer with power tap settings to match with the input line voltage. Insertion loss of the transformer shall not exceed 1dB.

- 5.6.5 Enclosure housing shall be provided for all recessed ceiling speakers.

### 5.7 Zone Selector

- 5.7.1 A simple action push button keyboard shall be provided for zonal selection. Announcement to the desired areas shall be selected via the keyboard. A master override button shall be provided for announcement to all zones.

## Section 5 – Public Address System (Cont'd)

### 5.8 Volume Control Unit

5.8.1 The volume control unit shall consists of :-

- a) Auto-transformer type for power rating above 15W.
- b) Inductor type for power rating between 3W and 15W.
- c) Potentiometer type for power rating below 3W.

Appropriate type shall be selected to match system requirements.

5.8.2 All volume control shall have stainless steel face plate with stamped and filled dial scale and matching dial knob.

5.8.3 The units shall have not less than 6 positions including off position and with 3 dB attenuation per step. All switch contacts shall be silver plated for noise free operation. The unit shall be suitable for flush wall mount or surface mount in junction box.

### 5.9 Equipment Rack

5.9.1 Floor mounted 24U server rack shall be provided and located in the G/F Store Room completed with power distribution units, ventilation fans and necessary accessories for housing the PA system equipment.

5.9.2 Name plates shall be provided on the console to indicate the name of the equipment in both English and Chinese.

5.9.3 All necessary power supply points, transformers, fused line switches, circuit switches and fuses shall be installed in fully enclosed junction box. All terminal blocks shall be identified with permanent metal tags.

5.9.4 All equipment shall be mounted and arranged in a manner that can be easily accessed by the operator.

### 5.10 Microphone Cable

5.10.1 The microphone cable shall be flexible twisted pair with tinned annealed copper wire screen, and PVC outer sheath. The colour of the sheath shall be either light grey or white.

Section 5 – Public Address System (Cont'd)

5.10 Microphone Cable (Cont'd)

5.10.2 The cable shall satisfy the following minimum characteristics :-

- At least 16 strands per conductor
- Strand diameter not to be less than 0.15mm
- Nominal outer diameter not to be greater than 5.0mm
- Capacitance not to be more than 17pF/m
- Inner conductor d.c. resistance not to be more than 36 ohm/km at 20°C
- Insulation thickness not to be less than 0.25mm
- Operating temperature to be from -20°C to 60°C

5.10.3 For narrator microphone, the cable shall satisfy the above but :-

- At least 7 strands per conductor
- Strand diameter not to be less than 0.1mm
- Nominal outer diameter not to be greater than 3.4mm

5.11 Speaker Cable

5.11.1 The loudspeaker cable shall be flexible pair of tinned annealed copper conductor, PVC insulated, and white PVC outer sheath. For surface wiring, the cable shall be parallel pair; for conduit wiring, the cable shall be twisted pair.

5.11.2 The cable shall satisfy the following minimum characteristics :-

- At least 19 strands per conductor
- Strand diameter not to be less than 0.21mm
- Nominal outer diameter not to be greater than 8.0mm
- Insulation thickness not to be less than 0.55mm

## Section 5 – Public Address System (Cont'd)

### 5.11 Speaker Cable (Cont'd)

- Operating temperature to be from -20°C to 60°C
- UL listed or equivalent with working voltage to 300V
- Conductors - tinned annealed copper, stranded with minimum conductor size 1.5mm<sup>2</sup> arranged in twisted pair
- Insulation - polyvinyl chloride with polyvinyl chloride sheath
- Cables shall be colour coded and ferruled at both ends
- Designed for audio sound broadcast use

### 5.12 Terminal Box

- 5.12.1 Terminal boxes necessary for connection of speakers to the PA system shall be provided.
- 5.12.2 Terminal boxes shall be of sheet steel with hot dip galvanized finish and shall comply with BS 4662.



## Section 6 – Telecom Cabling System

### 6.1 General

6.1.1 The Contractor shall supply, install, test and commission a complete telecom cabling system as specified in the drawings and this specification hereinafter.  
The Contractor shall employ competent person qualified by Microsoft or Cisco to carry out the installation and the testing of the cabling work.

6.1.2 All offered cabling components shall comply with EIA/TIA-568A or EIA/TIA-568B.

6.1.3 The Contractor shall supply and install a 42U server rack completed with power distribution units, ventilation fans and necessary accessories in the G/F server room for housing the CCTV system, patch panels and Client's switches.

### 6.2 Performance Requirements

6.2.1 The cabling installation shall serve for the following services:-

- a) LAN Data Outlet for Client's PC and IP-Phone
- b) LAN Data Outlet for Client's Wi-Fi access points

6.2.2 The main patch panels shall be located in the Server Room on G/F. The Contractor shall supply, install and terminate the cables interconnecting between each of service outlets and the main patch panels. The contractor shall supply and install the patch cables for each patch panel port. The patch cable shall be Cat. 6 in minimum 2m.

6.2.3 No cables connecting between a patch panel and a service outlet shall be more than 90m, or 80m for PoE connection. All the cables, socket outlets and associated accessories used in the system shall comply with the specification of Cat.6 standard.

6.2.4 The cable termination module shall be compatible unique design such as "Krone", which allows patching and testing without distributing the wiring contact. The module shall meet the specification of Cat.6 standard and apply the quick connection technique. All termination cables or jumper wires shall be easily discarded from the module with proper hand tool.

6.2.5 The Contractor shall provide the demarcation line, standard colour-code painting and detailed label for all cabling works.

6.2.6 The Contractor shall be provide all relevant documentation, including the layout of the service outlets, updated demarcation line, detailed floor plans showing the routing of cables and trunking.

6.2.7 The patch panels shall be mounted on standard server racks that are equipped with ventilation fans at the top of the racks.

6.2.8 Labels and identification shall be provided to each of jumper cables and patch panels.

## Section 7 – Dimming System

### 7.1 General

A computerized lighting control system that consists of processor, dimming modules, & keypads allowing user-friendly & flexible control of electrical lights with preset scenes, zone control, partitioning function, plus automatic time scheduling.

### 7.2 Control Requirements

- 7.2.1 The system shall be able to control (switch and dim) the electrical lights according to dimming schedules and sensors.
- 7.2.2 The system shall be capable to create preset lighting scenes with adjustable fade time ranging from 1 second to 60 minutes. Also, the system shall support control of individual lighting zones.
- 7.2.3 System must contain a built-in astronomical time clock that can trigger events at specific time automatically.
- 7.2.4 Through the use of accessory keypads, the system shall allow centralized control from single location and local control per area.
- 7.2.5 The system shall have a 10-year power failure memory. If power is interrupted temporarily and restored, lights shall return to the levels prior to power outage.
- 7.2.6 Dimmer control panel (wallstation) consists of maximum 10 scene selection control push buttons with on/off.
- 7.2.7 Each button controls the dimming of lighting levels and can be pre-set at the dimmer modules.
- 7.2.8 Status LEDs show selected scene.
- 7.2.9 The pre-set scenes are connected to time clock for automatic pre-set changing.
- 7.2.10 Custom engraving on keypad buttons.
- 7.2.11 The system shall be able to be controlled by third party software / interface such as Building Modeling System (BIM).

## Section 7 – Dimming System (Cont'd)

### 7.3 Specifications

- 7.3.1 Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL)], CE, CTIC, or CCC as suitable for the purpose indicated; listed to UL 916 where applicable.
- 7.3.2 Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- 7.3.3 Design lighting control equipment for 10 year operational life while operating continually at any temperature in an ambient temperature range of 0 degrees C (32 degrees F) to 40 degrees C (104 degrees F) and 90 percent non-condensing relative humidity.
- 7.3.4 Electrostatic Discharge Tolerance: Design and test equipment to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.
- 7.3.5 Dimming and Switching (Relay) Equipment:
  - (a) Line Noise Tolerance: Provide real-time cycle-by-cycle compensation for incoming line voltage variations including changes in RMS voltage (plus or minus 2 percent change in RMS voltage per cycle), frequency shifts (plus or minus 2 Hz change in frequency per second), dynamic harmonics, and line noise.
    - i) Systems not providing integral cycle-by-cycle compensation to include external power conditioning equipment as part of dimming system.
  - (b) Incorporate electronic "soft-start" default at initial turn-on that smoothly ramps lights up to the appropriate levels within 0.5 seconds.
  - (c) Utilize air gap off to disconnect the load from line supply.
  - (d) Control all light sources in smooth and continuous manner. Dimmers with visible steps are not acceptable.
  - (e) Load Types:
    - i) Assign a load type to each dimmer that will provide a proper dimming curve for the specific light source to be controlled.

## Section 7 – Dimming System (Cont'd)

### 7.3 Specifications (Cont'd)

- ii) Provide capability of being field-configured to have loads types assigned per circuit.
- (f) Minimum and Maximum Light Levels: User adjustable on a circuit-by-circuit basis.
- (g) Line Voltage Dimmers:
  - i) Dimmers for Magnetic Low Voltage (MLV) Transformers:
    - Provide circuitry designed to control and provide a symmetrical AC waveform to input of magnetic low voltage transformers per UL 1472.
    - Dimmers using unipolar load current devices (such as FETs or SCRs) to include DC current protection in the event of a single device failure.
  - ii) Dimmers for Electronic Low Voltage (ELV) Transformers: Operate transformers via reverse phase control. Alternately, forward phase control dimming may be used if dimming equipment manufacturer has recommended specific ELV transformers being provided.
  - ii) Dimmers for Neon and Cold Cathode Transformers:
    - Magnetic Transformers: Listed for use with normal (low) power factor magnetic transformers.
    - Electronic Transformers: Must be supported by the ballast equipment manufacturer for control of specific ballasts being provided.
- (h) Low Voltage Dimming Modules:
  - i) Coordination Between Low Voltage Dimming Module and Line Voltage Relay: Capable of being electronically linked to a single zone.
  - ii) Single low voltage dimming module; capable of controlling the following light sources:
    - 0-10V analog voltage signal.

## Section 7 – Dimming System (Cont'd)

### 7.3 Specifications (Cont'd)

- - (1) Provide Class 2 isolated 0-10V output signal conforming to IEC 60929.
  - (2) Sink current according to IEC 60929.
  - (3) Source current.
- 10-0V reverse analog voltage signal.
- PWM per IEC 60929.

### 7.4 Keypads

7.4.1 Provide keypads with configuration as indicated or as required to control the loads as indicated.

7.4.2 General Requirements:

- i) Allows control of any devices part of the lighting control system.
- ii) Functionality:
  - a. Upon button press, LEDs to immediately illuminate.
  - b. LEDs to reflect the true system status. LEDs to remain illuminated if the button press was properly processed or LEDs to turn off if the button press was not processed.
  - c. Allows for easy reprogramming without replacing unit. Replacement of units does not require reprogramming.
- iii) Buttons/Engraving:
  - a. Engrave keypad buttons or provide adhesive button labels
  - b. Utilize backlighting for buttons and associated engraving to provide readability under all light conditions.
- iv) Software Configuration:
  - a. Customizable keypad button functionality:
    - (1) Buttons can be programmed to perform single defined action.
    - (2) Buttons can be programmed to perform defined action on press and defined action on release.
    - (3) Buttons can be programmed to perform automatic sequence of defined actions.
    - (4) Buttons can be programmed to perform cycle dim.
    - (5) Capable of deactivating select wall stations to prevent accidental changes to light levels.

## Section 7 – Dimming System (Cont'd)

### 7.4 Keypads (Cont'd)

- v) Keypad LEDs to support logic that defines when it is illuminated:
  - a. Scene logic (logic is true when all zones are at defined levels).
  - b. Room logic (logic is true when at least one zone is on).
  - c. Pathway (logic is true when all zones are on).
- vi) Keypad backlighting adjustable to desired brightness.

### 7.5 Other Requirements

- 7.5.1 All wires, cabling & installation shall be supplied by contractor with respect to specifications given by original manufacture.
- 7.5.2 System supplier shall provide minimum 2 times of on-site test & commissioning service, plus pre-installation site coordination and operation training to the user.
- 7.5.3 System supplier shall coordinate with lighting supplier to test the compatibility between the dimming system and the lighting drivers before installation.

## Section 8 – Provision for Other Services

### 8.1 General

- 8.1.1 The Contractor shall liaise with all the relevant parties to ensure the provisions to be appropriate at the correct location.
- 8.1.2 All trunkings and conduits shall comply with this part of Specification, the Electrical General Specification, and all other relevant standards and obligations as referred to in this part of Specification.
- 8.1.3 Cables for electrical and ELV systems shall be segregated in accordance with the IET Wiring Regulations and, where specified on the Drawings.

### 8.2 Air Conditioning Installation

- 8.2.1 The Contractor shall supply, install and terminate power cables at isolating switches for each of the A/C outdoor units.
- 8.2.2 The Contractor shall provide two conduit point connected between outdoor and indoor A/C units. One 13A switched fuse connection units with pilot light mounted adjacent to the indoor unit shall be also provided.
- 8.2.3 The Contractor shall supply and install all electrical power points comprising switch gear, fused spur or connection units, conduits, wirings and accessories etc. for all the ventilation equipment. The fused spurs/connection units isolators shall be mounted adjacent to control panels of all the ventilation equipment. The Contractor shall closely coordinate with all relevant parties to ensure that the provision are suitable and at the correct locations and to the satisfaction of the Architect. The front plate of the control switches/fused spur/connection unit shall be engraved in red, with word indicating the controlled equipment in English and Chinese characters.

### 8.3 Fire Service Installation

- 8.3.1 The Contractor shall supply, install and terminate power cables at isolating switches for each of F.S. control panels. The F.S. control panels shall be included in the Fire Service (hereinafter referred to as F.S. or F/S) work of this Contract).

### 8.4 ELV Installation and Telecom Services

- 8.4.1 The Contractor shall supply and install power supply points and conduit/trunking containment for ELV equipment.
- 8.4.2 For the telephone and data outlets, the Contractor shall provide 25mm dia. conduit with flush mounted deep pattern BS 4662 box and draw-wire.

## **PARTICULAR SPECIFICATION**

### **SPECIFICATION FOR FIRE SERVICES INSTALLATION**

#### **Contents**

Section 1	-	Details for Extent of the Works
Section 2	-	Scope of Works
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Section 6	-	Labels and Notices
Section 7	-	Electrical Installation
Section 8	-	Testing and Commissioning



Section 1 Details for Extent of the Works

1.1 General

- 1.1.1 This specification covers the Fire Services Installation for Renovation Works for Safety Experience Training Centre (SETC) at Kwai Chung Campus.
- 1.1.2 Where applicable in this Particular Specification or the Drawings, the materials, workmanship and installation as a whole shall comply with and conform to or be of a higher standard than the minima required by the latest requirement of the following statutory obligations and regulations and consistent with good practice in Hong Kong to satisfy the Architect's requirements: -
- a) The General Specification for Building Vol. 1 and Vol. 2 with Corrigendum No. GS 9304.
  - b) The General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region. (hereinafter referred to as the General Specification)
  - c) Loss Prevention Council Rules for Automatic Sprinkler Installation incorporating BS EN 12845.
  - d) Loss Prevention Council Rules, B.S. 5839 and their amendments by FSD for the Automatic Fire Detection and Alarm System.
  - e) Code of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment published by Fire Services Department, the HKSAR.
  - f) Requirements and Circular Letters of Fire Services Department, the HKSAR.
  - g) Code of Practice for the Electricity (Wiring) Regulations issued by the Electrical and Mechanical Services Department, the Government of HKSAR.
  - h) Waterworks Ordinance, Chapter 102, Laws of the Hong Kong Special Administrative Region.
  - i) Hong Kong Waterworks Standard Requirements, Latest Edition and WSD's circular letters.
  - j) BSB Standard and Standard Details issued by the Building Services Branch.
  - k) Electricity Supplier Requirements.
  - l) Current Practice Notes issued by the Environmental Protection Department.
  - m) Architectural Services Department Standard Drawings as appropriate.
  - n) Practice Notes for Authorized Persons and Registered Structural Engineers issued by the Buildings Department with respect to the obligations imposed on the Contractor.
  - o) Hong Kong Government General Specification for Civil Engineering Works.

Section 1    Details for Extent of the Works (Cont'd)

1.1    General (Cont'd)

1.1.2    (Cont'd)

- p) Architectural Services Department Technical Instructions as appropriate.
- q) Fire Service (Installations and Equipment) Regulations, Fire Services Ordinance, Chapter 95, Laws of the Hong Kong Special Administrative Region.
- r) Buildings Ordinance, Chapter 123, Laws of the Hong Kong Special Administrative Region and all subsidiary Regulations and associated Codes of Practice published by the Buildings Department, the HKSAR.
- s) Electricity Ordinance, Chapter 406, Laws of the Hong Kong Special Administrative Region and all subsidiary Regulations and associated Codes of Practice published by the Electrical and Mechanical Services Department, the HKSAR.
- t) General Specification for Electrical Installation in Government Buildings, Hong Kong, issued by the Building Services Branch, Architectural Services Department, the HKSAR.
- u) General Specification for Building, issued by Architectural Services Department, the HKSAR.
- v) Building Services Branch Testing and Commissioning Procedure for Fire Service Installation in Government Buildings, Hong Kong, issued by the Building Services Branch, Architectural Services Department, the HKSAR.
- w) Building Services Branch Testing and Commissioning Procedure for Electrical Installation in Government Buildings, Hong Kong, issued by the Building Services Branch, Architectural Services Department, the HKSAR.
- x) British Standards and Codes of Practice issued by the British Standards Institution, or internationally recognized equivalent standards acceptance to the FSD and demonstrated to be equivalent in terms of the type of construction, functions, performance, general appearance and standard of quality of manufacture and approved by the Architect.

## Section 1 Details for Extent of the Works (Cont'd)

### 1.1 General (Cont'd)

#### 1.1.2 (Cont'd)

y) Where indicated, the codes, standards and guidelines issued by the following international institutions, or internationally recognized equivalent standards acceptable to the FSD and demonstrated to be equivalent in terms of the type of construction, functions, performance, general appearance and standard of quality of manufacture and approved by the Architect: -

- National Fire Protection Association, United States
- Loss Prevention Council, United Kingdom
- International Organization for Standardization
- American National Standard Institute
- Committee for European Normalization
- Japanese International Standard
- Factory Mutual, United States
- Underwriters' Laboratory, United States

z) Requirements from relevant authorities for licensed premises.

The installation shall comply with all the current requirements in the statutory regulations and codes and to the approval of FSD as the minimum whether they are shown in this Specification and the Drawings.

1.1.3 The Works shall be carried out in a manner consistent with good practice in Hong Kong.

### 1.2 Drawings

- a) When tendering, Tenderer shall bring to Architect's attention any omissions and discrepancies between tender Drawings and Specifications. In general, all works called for by Drawing even if not by the Specifications, and vice versa, shall be fully executed.
- b) Tender Drawings are intended primarily to enable tenderers to prepare his estimate and submit tender. Layout of piping, cables, ducting, etc. as shown do not necessarily indicate exact positions.
- c) The Contractor's working and builder's work drawings shall indicate in detail of all works proposed. Two weeks after the award of the Contract, the Contractor shall submit a proposed submission programme indicating the timing of submission of the various shop drawings for the approval of the architect. The timing as stipulated in the proposed submission programme shall cope with the building programme and shall be subject to the approval by the architect.

Initial submission to be commented by Architect/Engineer	3 weeks
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Subsequent resubmission to be commented by Architect/Engineer	2 weeks
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Distribution of drawings by the Contractor after approval of submission	1 week
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Section 1 Details for Extent of the Works (Cont'd)

1.2 Drawings (Cont'd)

For initial submission and subsequent resubmission by the Contractor, 2 copies are required to be submitted by the Contractor.

After the approval/comment of the submission, the Contractor shall be responsible to make 4 copies of the approved/commented drawings for distribution.

- d) The drawings shall be based on tender drawings, but amended to account for any modifications to building or installation which may have taken place, and for any adjustments due to the actual equipment offered. The working drawings shall be to suitable scales relative to their purposes, and shall include adequate plans, elevations, sections and views as necessary to show all dimensions, levels and installation details. All such drawings shall be approved by the Architect in writing before any work is put in hand.
- e) The Contractor shall submit all necessary shop drawings showing the details in accordance with architect's/engineer's verbal instructions and submit alternative proposals in order to suit site condition prior to commencement of installation work.
- f) Additional copies of shop drawings may be tabled at site meetings for discussion purposes but they shall not be regarded as a formal submission.
- g) Prior to any approval being given by the Architect/Engineer, the Contractor shall allow ten days from the date of receipt for the Client/Project Manager/Architect/Engineer to make any comments.
- h) The Contractor shall carefully keep in his site office a full set of prints showing progress of work. Such prints shall be kept up-to-date at all times and shall serve as a progressive site record of the actual installation.
- i) As soon as possible after completion of the Works, and in any event within fourteen (14) calendar days thereafter, the Contractor shall prepare and submit to the Architect for forwarding to the Employer the following document:
  - Four prints of each of all approved 'as-fitted' drawings.
  - One set of CD-Rom disk presenting as-fitted drawings.
  - Four copies of approved O/M manual.
- j) Scale of drawings to be submitted by Contractor shall be:-

<u>Type of Drawing</u>	<u>Scale Required</u>
Layouts	1:100
Congested Area	1:50
Details and Sections	1:20

- k) All Contractor's Drawing shall be on standard drawing sheets to sizes in accordance with the International A Series.
- l) All submission drawings, shop drawings or as fitted drawings shall be prepared by 'AutoCAD 2000'.

Section 1 Details for Extent of the Works (Cont'd)

1.3 Operation and Maintenance Manuals

- a) Prior to delivery of equipment to site the Contractor shall submit two sets of comprehensive draft Operation and Maintenance Manuals and Instruction to the Architect for approval.
- b) The Operation and Maintenance Manual shall contain, as a minimum, the following (properly ordered and indexed in a form completed and agreed with the Architect:
  - Description of the systems and equipment installed;
  - Details and frequency of maintenance recommended;
  - List of spares and their local agent's names, addresses and telephone numbers;
  - Method of operation of all systems;
  - Equipment Schedules;
  - Catalogues and performance data of all items of equipment;
  - Correct settings of protection devices.
- c) Original operation manual from manufacturer shall be provided.
- d) Upon approval of the Operation and Maintenance Manuals, four sets of Operation and Maintenance Manual shall be distributed. At least one master copy shall be submitted and all catalogues contained in this copy shall be original printings and not photocopies of catalogues.
- e) Operation and Maintenance Manual shall be bound in good quality hard cover binders which can allow adequate access for removal/insertion of data for updated purpose.
- f) Manuals shall be adequately indexed and plastic section divider sheet shall be incorporated to facilitate the use of the manual.
- g) Manuals shall give complete contact address and contact telephone numbers for equipment manufacturers and their local agents.

1.4 Contractor's Site Staff

- a) The Contractor shall provide a suitable qualified Site Engineer for the whole duration of the Contract.
- b) The Site Engineer shall be qualified, fluent in English and shall adequately represent the Contractor at site meeting and other meetings as required.
  - (i) The Site Engineer shall be authorized to receive and execute efficiently instructions issued by the Architect.
  - (ii) In addition to the Site Engineer, foreman and supervisors shall be provided by the Contractor as required, to the satisfaction of the Architect.

Section 1    Details for Extent of the Works (Cont'd)

1.4    Contractor's Site Staff (Cont'd)

- (iii)    C.V. of the Site Engineer shall be submitted to the Architect for approval. The Architect reserves the right to move, or cause to remove, from site the Contractor's Site Engineer and/or his sub-ordinates who, in the opinion of the Architect, fails to perform satisfactorily his duties in the best interest of the Project. Such drastic action may be taken even after detail of the Site Engineer have been approved by the Architect.

Section 2      Scope of Works

- 2.1 The extent of the works generally included in the following list shall not be read as complete descriptions of the works forming this Contract but only as an indication of works. The Contractor shall carry out the following works for the purpose of FSD/WSD/BD's inspection.

The work embraced by this Specification covers the design, supply, installation, testing, commissioning and maintenance of fire service installations and equipment of the Development in accordance with this Specification and associated Drawings.

- a) Supply and installation of a complete automatic sprinkler system for the fitting-out works for the building.  
The Contractor is to note to include but not limit to the following:-
- i. Providing tee-off from existing main sprinkler pipes for connection of new sprinkler pipes and sprinkler heads at fitting-out area.
  - ii. Supply and installation of sprinkler heads, pipework, valve sets, alarm bells and all associated accessories shall be included as required so as to meet FSD's requirements and to suit actual site condition.
- b) Relocation and replacement of the existing hose reel set including the associated pipeworks, manual call points/breakglass units and fire alarm bell, etc., for the existing hose reel set as required so as to meet FSD's requirements and to suit actual site condition.
- c) Modification on existing addressable automatic fire detection and alarm system for the premises including modification on existing fire services panel, modification on existing battery and chargers, supply and installation of new battery and charger for the new visual fire alarms, relocation of existing breakglass units, relocation of existing fire alarm bell, alarm contacts, conduit, wirings and all associated accessories as required so as to meet FSD's requirements and to suit actual site condition.
- d) Supply and installation of a complete Manual and Visual Fire Alarm System for the fitting-out area.
- e) Tee off from the existing sprinkler system. This shall include the notification to FSD for the suspension of services for the A&A works and resume of service upon completion.
- f) Modification of the existing main fire services control panel and repeater panel in the existing F.S. Control Room and Guard Room on G/F for incorporating the addition of fire/fault signals and graphics from the newly added fire alarm equipment and the relocated fire alarm equipment as required complying latest F.S.D.'s requirements.
- g) The Contractor shall employ the current F.S. maintenance contractor of KCC as his named sub-contractor for all F.S. works as specified in the contract. In addition, such sub-contractor shall make all interfacing / connection works between the newly added fire alarm equipment and the existing F.S. systems. Unless otherwise specified, the F.S. maintenance contractor of KCC shall be the following:

American Fire Engineering CO., LTD..

The contact of the FS maintenance contractor are as below:

☐ Ms. Sonia Ng (Tel.: 2394 1455) or

☐ Mr. Kenny Chung (Tel : 2394 1455 / Mobile : 9685 5011)

- h) Submission of calculations for the provision of new battery / charger for the newly added visual fire alarm system.



Section 2      Scope of Works (Cont'd)

- i) Submission of Form 314A with F.S.I. layout plans to F.S.D. in accordance with the latest requirements of F.S.D.
- j) Submission of all forms as required by WSD including all relevant F.S.I. layout plans for WSD's comments and approval.
- k) Submission of forms WR1/WR2 and FS/251 for all F.S. systems.
- l) Provision of special tools and spare parts.
- m) Testing and commissioning of all F.S. systems.
- n) Painting and labelling of equipment and materials. Painting shall be applied to all fire services installations exposed to view.
- o) Shop drawing submission including detailed design and engineering calculations for completion of the entire fire service installation.
- p) As-fitted drawing submission, sample board submission and O&M Manual submission.
- q) Provision of twelve (12) months comprehensive free maintenance and breakdown services during Defects Liability Period (DLP) and submission of maintenance certificates (F.S. 251) to FSD after maintenance services and at the end of the DLP.
- r) Associated builder's works and interface works with builder and other Contractors as specified in the following section for 'Interface Works' as required.
- s) Training of the Employer's staff for proper operation of the entire fire services installation.
- t) Liaison with Fire Services Department, Water Authority and other statutory authorities to obtain all necessary certificates and approvals, including the completion and submission of all forms, preparation of all shop drawings and other documents necessary for submissions and inspection purposes and payment of any fees and charges. The costs for each of the tests required by various statutory authorities shall be included in this Contract.
- u) Provision of all the works related to obtaining BA14 including all necessary temporary works required to satisfy statutory requirements from BD and FSD.
- v) The entire installation shall fully comply with the Energy Efficiency Ordinance (Cap. 610).
- w) Submit the photos & report showing before and after completion of the Works within Seven (7) calendar days after completion of the Works.
- x) Submit a CD-ROM copy of the full set of "as-fit" drawings (AutoCAD version) showing the routing of conduit and trunking installations within Fourteen (14) calendar days after Practical Completion of the Works. (The AutoCAD template of floor layout plans shall be provided by the CIC). \*The actual routing of the Conduit and Trunking should be determined by the Contractor and approved by the Architect / CIC subject to the actual Site condition.\*

Section 3      Interface Works

The following sub-clauses detail the associated builder's works and interface works with other service trades and the works which shall be carried out by others and are therefore excluded from this Contract. Notwithstanding this clause, all necessary co-ordination, provision of shop drawings and other information necessary for the satisfactory interface and execution of works to be carried out by others shall be furnished at the correct time and in the prescribed manner by the Contractor in accordance with the provision of this Contract condition.

The Contractor shall allow for all interfacing and co-ordinations with all other service trades not limited to the following:-

3.1 Interface Works With the Builder

The Contractor shall check and provide information and drawings to indicate setting outs of all openings and penetrations through structure including all excavation works.

The builder shall provide all building penetrations through slab, beams and structural walls and the building in of all pipe sleeves, puddle flanges and equipment holding down bolts where required to be built-in during construction.

This Contractor shall supply all bolts, pipe sleeves, puddle flanges and detailed drawings accurately positioning such items.

This Contractor shall be responsible for supply and building in of pipe sleeves for block work walls and concrete walls where the sleeves are not structurally embedded.

The builder shall seal up openings between sleeves and structure or building elements.

This Contractor shall seal up the annular space between sleeves and pipes with approved materials to achieve fire resistant, waterproof, air tight and / or acoustic barrier as appropriate.

The builder shall provide all access hatches, doors and panels as nominated by this Contractor and in accordance with his details as required in false ceiling, masonry riser, walls, roof spaces, plant rooms and at other places as required to allow access for adjustment, maintenance and cleaning.

The builder shall provide all cutting, patching, framing up, furring in, chasing and making good associated with the building construction for the passage of pipe works and conduits. (Detailed drawings shall be provided by this Contractor).

This Contractor shall provide fully dimensioned drawings showing details of builder's work required for all concrete water tanks.

The builder shall provide all underflashing of all roof penetrations for cables and pipes. Overflashing shall be carried out by this Contractor.

Section 3      Interface Works (Cont'd)

The builder shall provide all concrete inertia bases including steel frameworks and reinforcements for all fire pumps. Anti-vibration high density corks shall be supplied and installed by this Contractor

Excavation and back filling/forming of pipe trenches shall be carried out by the Builder.

The builder shall provide thrust blocks for underground pipeworks. The installation details and calculations for the thrust block shall be submitted by the Contractor.

The builder shall supply and install fire shutters including all builder's work, concrete lintel, hanger wall, shutter guides and necessary accessories.

The builder shall provide cabinets for control valves sets, fire hose reels, fire service inlets and water check meter.

The builder shall provide site facilities including temporary water and electrical supply for lighting, operation of power tools, testing, commissioning and maintenance up to and including final acceptance of the installation by the Architect. This Contractor shall be deemed to have noted these provision as set out in the Form of Contract and to have made due allowance for any additional requirements not described therein.

This Contractor shall submit to the Builder all necessary information, schedules and fully dimensioned drawings showing details of builder's work required in connection with this Contract work. Such submissions shall be made in sufficient time for the builder to obtain the Architect's approval and to enable the builder to incorporate all holes, chases and the like to be left in the structural building work as it proceeds so as not to be cut out subsequently.

This Contractor shall provide all structurally embedded materials such as pipe sleeves, anchor bolts and the like to the builder sufficiently well in advance of the progress of the works to enable such items to be cast-in by the builder.

This Contractor shall provide adequate supervision on site to ensure that the entire builder's works are carried out in accordance with his requirements and as approved by the Architect. Any matters not in accordance with his requirements shall be drawn to the attention of the builder who will amend / alter as necessary.

Section 3      Interface Works (Cont'd)

3.2 Interface With Electrical Contractor

Power supply and Equipotential bonding terminals shall be provided by the Electrical Contractor and terminated at specified locations. Power supplied by the Electrical Contractor shall be finally checked by the Contractor to suit actual equipment offered. The Contractor shall be responsible to connect their equipment to the equipotential bonding terminals.

Sufficient relays inside a relay box and all associated conduits & wirings shall be provided by the Contractor for the connection of the signals indication of the operation and status of emergency generator from the marshalling box inside the Generator Room (provided by the Electrical Contractor) to the F.S. Control Panels inside F.S. Control Room.

The Electrical Contractor shall provide electrical power supply for all F.S. panels / battery chargers in the form of a 13A fused spur unit for each F.S. panel / battery charger.

The Electrical Contractor shall provide an earthing terminal in each fire pump room for supplementary equipotential bonding of fire service equipment.

This Contractor shall specify the power requirements of each of his proposed items of plant and equipment.

This Contractor shall install all wiring from the power supply points to his equipment.

This Contractor shall responsible for testing and inspection of his own electrical works specified under this Specification and Drawings to comply with the electricity (wiring) regulations and power company requirements.

## Section 4 Description of Systems

### 4.1 Automatic Sprinkler System

- a) The Contractor shall supply and install the complete automatic sprinkler installation including sprinkler control valve sets, sprinkler heads, pipework and fittings, pressure gauges, pressure switches, flow switches, sprinkler inlets, electrical work etc. as required. The whole sprinkler installation shall be installed and commissioned in accordance with Loss Prevention Council (L.P.C.) Rules incorporating BS EN 12845 for Automatic Sprinkler Installation, and the General Specification.
- b) The Contractor shall provide orifice plates of adequate sizes at the inlet of each control valve group for adjustment of the hydraulic pressure to cope with the requirements of L.P.C. Rules.
- c) All the sprinkler heads and major equipment shall be of LPC approved type and be supplied and installed in accordance with L.P.C. Rules, General Specification and the latest requirements of Fire Services Department. Samples of different types of sprinkler heads together with the cover plates shall be submitted for approval by the Architect prior to placing an order.
- d) The sprinkler heads shall, unless otherwise specified, generally be quartzoid bulb type. The type of sprinkler head to be used in various locations shall comply with the following table :-

	Location	Type of Sprinkler head
i)	Without false ceiling areas	Spray Upright or Pendent
ii)	False ceiling areas	Spray Pendent

Temperature rating of sprinkler heads shall comply of 68 deg. C unless otherwise stated in the drawings

- e) Where the sprinkler heads are fitted to false ceiling, they shall be of recessed type and coloured powder coating or chromium plated finished plate to match the ceiling panels to seal up the gap between the pipe and ceiling tiles. All metal parts of the sprinkler heads shall be chromium plated brass. Samples of the plates with the sprinkler heads shall be submitted to the Architect for approval before order and installation.

Sprinkler heads and pipes shall be installed matching in time sequence with the installation of ceiling tiles. The Contractor shall coordinate with all concerned parties on the sequences and timing of works by them and schedule his work to suit. The Contractor shall be liable of all possible consequences and implications if he neglects to do so.

Section 4      Description of Systems (Cont'd)

4.1      Automatic Sprinkler System (Cont'd)

- f) The Contractor shall supply and install L.P.C. and F.S.D. approved flow switches, electrical monitored gate valve complete with the associated wirings and conduits for the sprinkler system. The sprinkler system is divided into zones as shown on the Drawings. Flow switches shall be utilized for giving a signal back to the fire alarm control panel to indicate which location is under operation. High sensitivity flow switch capable of actuation by operation of one sprinkler head shall be used.

Electrical monitored stop valve shall be fitted with micro-switches for monitoring the status or mode of the valves so that any partial or total closing of the valves shall be signalled by visible and audible alarms at the fire alarm panel.

- g) All pipework, valves and fittings, unless otherwise specified, shall be supplied and installed by the Contractor and shall comply with the relevant clauses in the General Specification, and of this Specification. All valves as required by Fire Services regulations or as directed by the Architect shall be provided with padlocks and leather straps capable of locking the valves in either the open or closed position, as relevant. Common key shall be used for all the padlocks.
- h) The pipe sizes as shown on the Drawings are indicative and for reference only.
- i) The positions of sprinkler heads are shown diagrammatically on the Drawings. The Contractor shall allow for the exact positioning of the sprinkler heads, and fixing all bends, tees etc. for the pipework due to necessity of diverting the pipework to avoid structural beams and all other services, with full coordination with all involved parties, to the satisfaction of the Architect and F.S.D.

For areas with false ceiling, the Contractor is responsible for coordination with the builder for the false ceiling services once the ceiling plan layout is issued/revised. The coordinated FS layout shall be submitted to Architect for approval before starting the installation.

The Contractor shall also coordinate on site with all concerned parties on line, level and sequence of installation and avoid any conflict with other services installed in the same spatial zone.

- j) Drain pipes connection to the system shall be led to conspicuous positions as approved by the Architect and comply with the Water Authority requirement.

Section 4 Description of Systems (Cont'd)

4.1 Automatic Sprinkler System (Cont'd)

- k) Test legs shall be provided at the end of each pipe run branching off from the main riser.

A separate and permanent flow testing and zone drainage to waste facility shall be provided just after the flow switch of each pipe run branching off from the main riser for verifying the water supply characteristics and drainage.

- l) All sprinkler pipe sizes shall be at least 32mm in diameter, unless otherwise specified.

All sprinklers must pass through sleeves in beams as far as possible and the Contractor should be responsible for providing for such sleeves.

- m) Sprinkler guards shall be provided to protect sprinkler heads at staircases and in those critical areas where headroom is below 2 metres, and at locations where the sprinkler heads are liable to mechanical and accidental damages.

- n) The Contractor shall install the sprinkler subsidiary stop valves implementing the management system in accordance with FSD's latest circulation 4/2010 accordingly.

- o) Drain valve and pipe shall be of at least 50mm in diameter.

4.2 Fire Hydrant/Hose Reel System

- a) The Contractor shall supply and install the complete fire hydrant/hose reel system in accordance with the current "Codes of Practice" issued by the Fire Services Department, Hong Kong.

- b) Type of hose reel shall be determined by Architect before placing order.

- c) An operation instruction plate shall be provided adjacent to each hose reel.

4.3 Street Fire Hydrant System

[Not Applicable]

4.4 Connection for LPC/FSD approved Fibreglass Transfer Tanks

[Not Applicable]

4.5 Fire Services Pumps

[Not Applicable]

4.6 Flexible Pipe Connectors

[Not Applicable]

Section 4 Description of Systems (Cont'd)

4.7 Identification of System

- a) The Contractor is to allow for colour banding of pipework to the following code :-

Automatic Sprinkler System,	
Fire hydrant/hose reel System,	- signal red

- b) The colour bands are to be approximately 50 mm wide and paint stencilled to pipe at intervals not exceeding 3 m. Additional bands are to be provided adjacent to valves, cross-overs and else-where, where required for identification.
- c) At reasonable intervals on straight pipes and adjacent to valves, coloured arrows are to be stencilled to the pipework to indicate direction of flow.

4.8 Pipework

All pipework and fittings for automatic sprinkler system and fire hydrant/hose reel system shall be galvanised mild steel of medium grade to B.S. 1387 while those for underground pipework and pipes of diameter larger than 150mm aboverground shall be ductile iron to B.S. 4772 K12 with screwed on flanges jointing and dimension of flanges to be B.S. 4504.

4.9 Hydraulic Testing

- a) All pipework installed shall be tested as work proceeds. The Contractor shall provide suitable test pumps and arrange for a supply of water required in connection with testing of pipework. Pressure gauge with suitable range is to be fitted with the test pump.
- b) All pipework are to be hydraulically tested for a period of not less than 6 hours to a pressure of not less than 1.5 times of the working pressure without leaks appearing. Test figures must be recorded by the Contractor and be witnessed by the Architect.



Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System

a) General

The Contractor shall supply, install and commission the manual fire alarm system including fire alarm call points, alarm bells, end of line testers, controls, wiring, etc. as shown on the Drawings and as specified in this Specification.

The complete Fire Detection and Alarm System shall comply with current requirements of the Hong Kong Fire Services Department, the power supply rules of CLP Power Hong Kong Ltd., the I.E.T. regulation, the LPC rules for automatic fire alarm installation, and B.S. 5839 and other relevant British Standard and shall be provided in the development to give visual and audible indication of alarm conditions and appropriate control functions including locating status of all F.S. equipment at the main fire control/ annunciator panel upon operation of the following items.

- i) Breakglass Unit
- ii) Fire Detectors (Smoke & Heat Type)
  - fire detection in the mechanical and electrical plant rooms, lift machine rooms and E & M rooms, etc.
- iii) Flow Switch/Pressure Switch
- iv) Status Signal of Controlled/Monitored Equipment
  - subsidiary valves of sprinkler systems (open & close)
  - operation status of all pumps
  - level alarm status of all water tanks
  - fire/fault/disabled signals of fire detectors
  - fire/fault/disabled signals of break glass units
  - fire/fault/disabled signals of all alarm bells etc.
  - emergency generator on/fault status and manual status
  - alarm bell of sprinkler alarm control valve sets
  - pressure switch for sprinkler systems
  - signals from all Spr./F.S. / S.F.H. systems
- v) Other signals of fire protection system including but not limited to ACMV override and lift homing.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

The system shall be electrically operated, electrically supervised, "intelligent" and "analogous addressable" type as described herein.

The Contractor shall supply and install twisted pair P.V.C. insulated cables in trunkings or conduit system for the complete system. All wiring shall be "4-wire fault tolerant loop" connecting to the main fire control/annunciator panel for fully multiplexing alarm and control signal transmission of the entire system.

Documentary approval for the use of the proposed system shall be submitted together with the returned tender which shall include certificate of F.S.D. approval with listing of all approved equipment, complete manufacturer's catalogue for all equipment/devices that are specified in this specification.

b) Functionalities of the System

The Fire Detection and Alarm System panel shall be complete with all of the following functionalities in each section of the panel for all individual fire service system installation :-

Type of Fire Service System	Zone Input/Output of Equipment/Devices	
	Alarm Initiating Devices	Associated Control/Monitoring Equipment
Automatic Sprinkler System	Flow switch	-Fire pumps -Alarm bells -Shut down exhaust/fresh air fans -Visual fire alarm
Manual Fire Alarm System incorporated in FH/HR System	Manual breakglass unit	- Fire pumps - Alarm bells - Shut down exhaust/fresh air fans - Visual fire alarm
Automatic Fire Detection/Alarm System	- Smoke detector - Heat detector	- Fire pumps -Alarm bells - Shut down fresh/exhaust air fans - Visual fire alarm

The alarm buzzer at fire control/annunciator panel can be muted by means of key switch but the alarm indication light can only be reset after the system has been restored.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

c) Basic Facilities of Fire Detection and Alarm System

The fire detection and alarm system shall be basically an intelligent type and constructed by main fire control/annunciator panel. The system shall provide fire detection and alarm zoning indication in accordance with current requirements of the Fire Services Department and necessary provision as follows :-

i) Basic indication/control facilities for main fire control/annunciator panel

- 1) "Supply On" indicator, green
- 2) "System Isolated" indicator, amber with buzzer
- 3) "System Trouble" indicator, amber with buzzer
- 4) System reset button for every zone
- 5) Test button for testing of all indicator lights and local buzzer
- 6) "Battery Fault" indicator, amber
- 7) Key switch/keypad for alarm bell testing for every zone
- 8) Key switch for silencing alarm with buzzer
- 9) Auxiliary relay contacts/control modules and indicator light, red, for the status of interconnection of fire station direct link
- 10) Alarm/Event acknowledge button
- 11) Individual zone isolating facilities with password protection for each alarm zone

ii) Automatic fire detection alarm section (Not applicable)

- 1) "Alarm" indicator for each zone, red, for fire detectors used as automatic fire alarm/ detection or initiating device for the operation of smoke fire proof damper as specified and arranged in individual addressable zone.
- 2) Control modules for shut down exhaust/fresh air fan.

iii) Manual fire alarm section

- 1) "Alarm" indicator for each zone and individual breakglass alarm point reported on the LCD display with the address.
- 2) "Fixed Fire Service Pump Running" indicator, red.
- 3) "Fire Services Jockey Pump Running" indicator, red.
- 4) "System Status" indicator for loss of power supply to Fire Services Jockey Pumps, red.
- 5) Level indicators with buzzer for each Tank, red,
  - Overflow alarm
  - High water level
  - Low water level
  - Pump stop level
- 6) Auxiliary relay contacts for automatic starting of the fixed fire services pumps by pressure switch and manual fire alarm call point.
- 7) Auxiliary relay contacts for automatic starting of the fire services jockey pumps by pressure switch.
- 8) Fixed fire services pump "start/stop" buttons.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

d) Type of Zoning Configuration for Fire Services System

All type of alarm initiating devices and associated interface control point for each fire service system as listed below shall be arranged as INDIVIDUAL system.

- |      |                              |   |                                                           |
|------|------------------------------|---|-----------------------------------------------------------|
| i)   | FH/HR System                 | - | Manual breakglass unit                                    |
| ii)  | Automatic Fire Alarm System  | - | Smoke/heat detector                                       |
| iii) | Automatic Sprinkler System   | - | Flow switch/ Pressure switch / Sprinkler subsidiary valve |
| iv)  | Override Control for fans    | - | Shut down the fans for any fire alarms                    |
| v)   | Other associated interfacing | - | Emergency generator monitoring                            |

Total zoning arrangement and intelligent circuit loop required for the entire Fire Detection and Alarm System and associated interface control equipment shall refer to layout plans and schematic diagrams for exact quantities of alarm initiating devices and interface control facilities. The main fire control/annunciator panels shall have a minimum of 20% spare capacity for intelligent sensors and addressable modules for future expansion.

Four-wired (ring circuit) intelligent circuit loops shall be arranged for the following group of devices :-

- |      |                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------|
| i)   | Smoke/heat detectors, manual call points, flow switches/ pressure switch with analogue addressable module |
| ii)  | Alarm bells control & visual fire alarm                                                                   |
| iii) | Mechanical ventilation system and lift homing interface control and generator sets                        |
| iv)  | Associated control to all pumps for different systems                                                     |

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

d) Function of Main Fire Control/Annunciator Panels (Not applicable)

The system as employed with functions including,

- i) Triggered fire alarm signals from all kinds of initiating devices to the main fire control/annunciator panel (i.e. fire detectors, manual call points, flow switches, etc.).
- ii) Control signals as resulted from these triggered signals to various equipment to be controlled such as subsidiary valves, fan coil unit with smoke fire proof damper, fans, etc.
- iii) Monitoring signals from all the controlled equipment including subsidiary valves, pressure switches and generator sets, etc.

shall be in the form of fully multiplexing/digital analogue configuration.

When any of the breakglass alarm call points, flow switches, fire detectors is activated, the corresponding zone indicator light on the panel shall glow and the buzzer and the master alarm bells in main fire control/ annunciator panel shall sound, and further functioning by each section shall be performed as detailed in the following Sections.

A visible and audible signal shall be provided when the power supply unit is under battery supply.

Normally closed type control module shall be provided individually to shut down fans in the event of fire alarm.

e) Function of Main Fire Control/Annunciator Panels

i) Manual Fire Alarm Section

Upon actuation of any breakglass alarm call point, alarm indication shall be given on the fire detection and alarm system as follows :-

1) General

- Visual and audible indication to show the floor no., area zone, circuit line no. and device no. which addressably locate the origin of fire spot.
- Pumps running signal to be given.
- All status indication signals of fire services tanks and fire services pumps to be given.

2) Actuation of Sub-system

Upon actuation of any breakglass unit in the particular floor, fans serving this floor and zone shall shut-down at the same time.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

e) Function of Main Fire Control/Annunciator Panels (Cont'd)

ii) Automatic Fire Detection System (Not applicable)

Upon actuation of any fire detectors (smoke detector and heat detector), alarm bell shall sound as manual fire alarm section and annunciation shall be given on the main fire control/annunciator panel as follows :-

1) General

- Visual and audible indication to show the floor no., area zone, loop no., and detector no. which addressably locate the spot where detector(s) is activated.
- Pumps running signal to be given.

2) Actuation of Sub-system

- Upon actuation of any smoke detector within the particular area having the smoke fire damper shall shut-down by electron-thermal link at the same time.
- Upon actuation of any smoke detector in the particular floor, fans serving this floor and zone shall shut-down at the same time.

Master alarm bells of weather proof type shall be provided at ground floor and shall be actuated should any fire point in the system concerned be operated.

(f) Requirement for Equipment for Fire Detection and Alarm System (Not applicable)

i) General Requirements

Automatic smoke detectors and heat detectors shall be installed at locations as shown on the Drawings.

The specification of detectors shall be referred to the General Specification. The smoke detectors and heat detectors shall have the approval of the Fire Services Department and that of the Loss Prevention Council.

Should any one of the smoke detectors or heat detectors within the development is actuated, the corresponding master alarm bell shall sound to give audible warning and fixed fire services pump shall start simultaneously.

Sample of the smoke detector and heat detector shall be submitted to the Architect for approval prior to placing order.

In areas where suspended ceiling is provided, semi-flush mounting (or low profile) type detector shall be used.

Unless specified in this Particular Specification, all fire detectors shall comply with relevant Clauses in the General Specification.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

(f) Requirement for Equipment for Fire Detection and Alarm System (Cont'd)

All types of detector shall incorporate separate detector base and sensing component part assembly which adopting a simple push-twist mechanism for insert or remove from the detector base.

All types of detector shall be compatible for functioning of signal transmission by a fully multiplexing/digital analogue system and could be individually addressable at the relevant section of the main fire control/annunciator panel.

For all types of fire detectors, indicating lights shall be incorporated at the detector which is clearly visible from all angles and shall be activated upon the actuation of the detector.

All fire detectors shall be capable of connecting a remote alarm indicating lamp arranged in group or individually.

Remote indicating lights shall be provided for those fire detectors located inside rooms and false ceiling.

Electronic circuitry for all type of fire detectors shall be solid state type, sealed which shall not be affected or damaged by dust, humidity, usual electrical transients, electromagnetic interference and even reversed polarity or fault zone wire connection.

i) General Requirements

All fire detectors where cleaning is required after a period of service, they should be designed for fast and simple cleaning at the manufacturer's/supplier's laboratory in Hong Kong.

1) Smoke Detectors (Low Profile Type)

Photoelectronic smoke detector shall respond to invisible and visible smoke particles and its sensor shall be inherently stable with built-in automatic drift compensation for changes in ambient conditions.

Safeguarded measure against tempering shall be provided for all electronic parts of the smoke detector and the light emitting source shall be hermetically encapsulated.

2) Heat Detectors

Heat detectors shall be combined rate-of-rise & fixed temperature type which consist of two independent thermistors and designed to compensate changes automatically in the ambient condition.

The detector shall be highly resistant to disturbance phenomena as generated by either lightning, direct/indirect sunlight and artificial light sources such as welding, strobe lights, etc.

Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

(f) Requirement for Equipment for Fire Detection and Alarm System (Cont'd)

ii) Detector Base

All fire detectors including photoelectronic smoke detectors and heat detector shall be capable of installing in the same type of standard base for ease to interchange the type of detector.

Wiring terminal of the standard base shall be of screwless type or the equivalent and capable of securing the entry cable of size not less than #16 twisted pair cable or equivalent type of cable with built-in strain limits to prevent permanent terminal deformation of the cable.

iii) Main Fire Control/Annunciator Panel

The main fire control/annunciator panel shall be a single cubical or as combination of sections of standard panel for the Fire Detection and Alarm System. The capacity of the main fire control/annunciator panel is capable of performing all the fire alarm annunciation, fire signals/ control and monitoring signals transmission between all other associated sub-systems, equipment/ initiating devices as forming a stand alone panel. There shall not be any host computer or network controller that stand alone panels rely on for interlocking sequences, communication or cross-zoning feature, etc.

The zoning capacity of the standard panel shall be of ample size as to form a component section of the fire detection and alarm system and the employment of it as a component section shall be approved by the Architect.

The main fire control/annunciator panel shall be configured to a microprocessor (controlled by programme contained in non-volatile memory, ROM and EEPROM) based data transmission system which shall be capable of connecting all input and output circuitry in addressable zone/loop circuits.

The Intelligent AFA panel shall be 100% field programmable such that adding, deleting or modifying of interlocking sequence and panel options can be done via the built-in keypad at the panel without shut down of the system or the need of adding external devices. System that must be shut down for programming alternation is not acceptable.

The addressable circuit shall be capable of connecting individual initiating devices in zone basis arrangement.

The address presentation of the addressable system shall be in numeric and analogue display form to locate the exact area zone, circuit no. and device no. of the fire alarm/detection system for fast and easy alarm identification.

As required by the product manufacturer and the system performance as a whole of the complete fire services installation as described in this Particular Specification, any necessary additional facilities/devices for the required functions such as data transmission unit, accessories for interface requirement such as modules, etc. which are not indicated on Drawings and/or Specification shall be included.



Section 4 Description of Systems (Cont'd)

4.10 Intelligent / Addressable Automatic Fire Detection and Fire Alarm System (Cont'd)

(f) Requirement for Equipment for Fire Detection and Alarm System (Cont'd)

iii) Main Fire Control/Annunciator Panel (Cont'd)

The selected type of panel shall be completely compatible for all of the system components as forming the fire detection and alarm system including fire detectors, manual call points, sprinkler flow switch and all associated equipment/devices for control of the related sub-system, etc.

The Contractor shall incorporate all the requirements as stipulated in this Particular Specification and Drawings as to the final selection of all constituent components which all of them shall be compatible to one another. The main fire alarm control/ annunciator panel shall be a LPC/UL/FM and FSD approval make.

iv) Monitor Modules

Monitor module shall provide an addressable input for N.O. or N.C. contact devices such as manual call points alarm bells, detectors, sprinkler flow switch, subsidiary valves, etc. The monitor module shall provide a supervised initiating circuit, an open-circuit fault shall be annunciated at the panel.

v) Control Modules

Control modules shall provide an addressable output for a separately powered alarm indicating circuit or for a control relay. The control module shall provide a supervised indicating circuit, an open-circuit fault shall be annunciated at the panel. Activation of control modules status shall be fed back to the fire control/annunciator panel.

## Section 5 Miscellaneous Provision

### 5.1 Portable Fire Fighting Appliances (Not applicable)

- (a) The Contractor shall supply and install all portable fire equipment such as fire extinguishers, fire blankets and sand buckets as indicated on the Drawings.
- (b) The installation of all portable fire fighting equipment shall include provision of proper facilities for hanging/supporting of these equipment and so positioned to locations as shown on Drawings.

### 5.2 Painting

All painting shall be included. Requirement shall comply with the General Specification where applicable.

### 5.3 Sleeves

All the sleeves through beams, floor slabs and structural walls etc. for the installation of fire services pipework shall be supplied by the Contractor, fixed in position and installed by the builder. The infill within sleeves wherever necessary shall be provided by the Contractor. Sample shall be submitted to Architect for approval prior to fabrication.

Position through all structural elements shall be approved by the Architect. The Contractor shall submit sleeve and opening drawings to Architect for approval immediately after the award of the Contract.

### 5.4 Fire Alarm Link (Not applicable)

The Contractor shall liaise with the current FS maintenance contractor for the connection of the new FS equipment to the existing FS annunciation panel inside the existing FS control room ensuring that fire signals from the new FS equipment shall actuate the existing fire alarm link accordingly.

The operation status of the direct telephone line shall be indicated on the new fire alarm control and indicating panel.

### 5.5 Spares Parts

The Contractor is to supply spares as follows:-

Section 5 Miscellaneous Provision (Cont'd)

5.5 Spares Parts (Cont'd)

- a) Two pieces of glass for break glass units, pad locks with keys, metal strikers and glass fronted box for hose reel nozzle.
- b) As per BS EN 12845, clause 20.1.3, sprinkler heads and one set of sprinler spanners supplied by the manufacturer of the sprinklers, which shall be kept in cabinets located in preminent and easily accessible position inside the F.S. Control Room.
- c) One number break glass units complete with test keys.
- d) Two number visual fire alarms.
- e) One number hose reel nozzle.

5.6 Form Submission

The Contractor shall be responsible for undertaking all Form Submission together with drawings including WSD submission, Form WR1, Form FSI/314A, & FS/251 (including emergency lights and exit sign) submission to F.S.D., but the emergency lighting and exit sign boxes shall be supplied and installed by other Contractors.

The Contractor shall submit working drawings to Fire Services Department for certification and examination, in co-ordination with the Architect's submissions. The drawings shall be forwarded to the Architect for checking before submission.

Upon final completion of the work, the Contractor shall commission and test the fire services installation to the satisfaction of the Architect and final acceptance shall be subject to Buildings' Department/Fire Services Department's inspections and approval if necessary.

The Contractor shall make arrangements through the Architect with Building Department/Fire Services Department to carry out the inspections.

Section 6     Labels and Notices

- 6.1 All labels and notices complying with the F.S. General Specification and to the requirements of Fire Service Department shall be provided and installed in the proper locations.
- 6.2 All major fire service equipment and components such as sprinkler, hose reel, visual fire alarm, pipes and fittings etc. shall have premises applied permanent nameplates indicating, where relevant :-
- (a) Name of Manufacturer
  - (b) Model
  - (c) Serial Number
  - (d) Operating Voltage, Ampere
  - (e) Date of Manufacture
  - (f) British Standards or other Authorities' markings to indicate their compliance and grades of application.
  - (g) Any other necessary data to conform with specified requirements and to indicate the equipment performances.

All equipment shall also be clearly and permanently labelled, to the approval of the Architect, with designations to indicate their functions, number, precautions, operating instructions etc. engraved in both English and Chinese. Where labels are provided for making clear the method of operation of apparatus under normal and emergency conditions and precaution notices, they shall be concise and preferably diagrammatic in form.

Labels, number plates etc. and their fixing screws shall be stainless steel or other corrosion resistant material other than plastic. Where the use of vitreous enamelled labels is approved in certain circumstances, the whole surface including the back and edges shall be properly covered and protective washers shall be provided front and back on the fixing screws.

Labels for similar equipment shall be of uniform appearance and size, and the dimensions and sizes of lettering shall be to the approval of the Architect.

The Contractor shall provide an Instruction in both English and Chinese language to describe the operation of the Fire Service Installation. The Instruction shall be framed and protected by non-flammable transparent materials and shall be fixed in position as directed by the Architect. The wordings of the Instruction shall be submitted to the Architect for approval.

## Section 7 Electrical Installation

All electrical installation shall comply with the F.S. General Specification, the I.E.T. Wiring Regulations, the supply rules of the electricity supply authority and to the satisfaction of Fire Service Department and the Architect.

The electrical wiring shall be installed in trunking and conduit system. Trunkings and conduits shall be completely separated from those of other services, and the trunking and conduit system for the fire service installation shall be used exclusively and solely for the purpose with no wirings of other services present in the same trunking and conduit system, unless otherwise specified.

Conduit and trunking shall be of G.I. complying with the Electrical General Specification. PVC conduit and trunking shall NOT be permitted.

Unless otherwise specified, the conduit and wiring for the entire Fire Service Installation shall be supplied and installed by the Contractor. The Contractor shall submit conduit run drawings for his electrical work, in addition to other drawings required as specified in F.S. General Specification and this part of Specification to the Architect for approval before installation.

All circuits and equipment shall be so designed and selected that they are not susceptible to external electrical and magnetic interference as well as to supply harmonics on their normal operations and performances. On the other hand, they shall not cause interference, harmonics or other adverse effects to the normal and essential electrical supply system as well as to other electrical equipment.

The electrical supply for the fire service equipment and control panels shall be provided as a part of the electrical work. The final wirings from the switchgear to the corresponding fire service equipment and control panels shall be carried out by the Contractor.

The Contractor shall liaise with all involved parties and with the Architect's representative on the exact locations of terminations of switchgears on site to suit his requirements and produce a neat and tidy arrangement with the shortest possible cable runs.

The Contractor shall also coordinate with the related parties and the Architect's representative on his exact requirements of the electrical supply such as ratings and types. In any circumstances, unless the Contractor can give sufficient information to all concerned parties on his requirements and provide all relevant details and calculations to substantiate his design to the Architect for approval on time, he shall make full use of the originally proposed or installed power supply as a part of the electrical work as approved by the Architect. Any necessary additional provisions or modifications as accepted by the Architect and any consequences shall be the full responsibility of the Contractor.

All power/control cables, signal wirings for the entire F.S. Installation, fire service related equipment and components shall be of fire resisting type to BS 6387 Category CWZ AND/PH30 Classification according BSEN50200 and survival time to Annex E of the standard as stipulated in COP for F.S.I.

Whenever possible, all wiring shall be grouped and installed together in a neat and tidy manner. For control and auxiliary circuit wirings in particular, different insulant colours shall be provided to distinguish the various circuits. In any circumstances, all wires shall have at both ends a coded ferrule of insulating materials permanently marked with suitable characters and codes for identification purpose. Each connection shall terminate at an approved type of terminal block, which shall also be suitably labelled.

## Section 7 Electrical Installation (Cont'd)

Wiring from the fixed part of the circuits within control panels, starter panels etc. to the movable parts, such as hinged front plates of the panels, shall be grouped together in a proper manner and be enclosed in flexible PVC tubing strong enough for mechanical protection, and yet flexible enough that the hinged plates can be opened and closed with ease. The wirings from the fixed part to the movable part shall also be long enough to allow the hinged front covers to swing through at least 90 degrees from their normally closed positions.

The Contractor shall be responsible for providing proper earthing of his electrical equipment as well as the bonding of all exposed conductive parts of the fire service installation, all as described in the Electrical General Specification and so called for by the I.E.T. Wiring Regulations, to the main earthing system of the electrical system provided as a part of the electrical work of this Contract. The Contractor shall coordinate with all parties on the exact locations of the earthing terminals provided as a part of electrical work of this Contract.

All conductive moving parts such as hinged front doors of panels, battery and charger cabinets etc. shall be properly and sufficiently bonded by suitably sized flexible insulated cables to the fixed conductive parts of the panels which are in turns electrically earthed as necessary.

### 7.1 Electrical Work

A separate Electrical Contractor will provide electric supply to the fire services pumps and fire control/annunciator panel and will terminate with isolators in the vicinity of room concerned. From the isolators, all work including bus bar chamber, cabling, electric motors, starters, controls, etc. is included within this Contract.

Electric supply - the electricity supply will be 380/220 volts 3 phase/1 phase 50 Hertz.

All electrical work shall satisfy the requirements laid down by the Supply Company, the relevant I.E.T. Regulations (latest Edition) and special regulations issued by Hong Kong Government.

Section 7 Electrical Installation (Cont'd)

7.8 System of Wiring

The system of wiring shall be P.V.C. insulated cable enclosed in galvanised conduit, surface run or concealed in floor slabs.

7.9 P.V.C. Insulated Cable

P.V.C. Insulated cables are to consist of copper conductors, P.V.C. insulated to C.M.A. standard and to B.S. 6004 : 1991 450/750 volt grade.

Minimum size of cables is to be as follows :-

Power Cables	2.5 mm <sup>2</sup>
Control Circuit	1.5 mm <sup>2</sup>

7.10 Conduit and Accessories

Unless otherwise specified, all conduits shall be concealed inside walls.

All conduits shall be heavy gauge galvanised welded steel complying with B.S. 4568 : Part 1 Class 4 and 2 and subsequent amendments. Minimum size of conduit used shall be 20 mm O.D.

All conduit systems are to be installed fully in accordance with the requirement of I.E.E. Wiring Regulations, latest Edition.

The maximum number of cables which may be accommodated in a given size conduit shall not exceed the number calculated in accordance with the I.E.E. Wiring Regulations, latest Edition.

Where conduits are run on the surface of walls or on the soffit of slabs they shall be fixed with heavy spacing saddles at intervals not exceeding 1.2 m.

All conduit outlet boxes are to be pressed steel, galvanised finish and of standard square pattern to B.S. 4662.

Adaptable boxes are to be of cast iron with galvanised finish. Box covers shall be of galvanised malleable cast iron and shall be secured to the conduit boxes by brass screws.

Section 8     Testing and Commissioning

All testing shall be witnessed by the Architect/Engineer. The Contractor shall give due advance notice of his intention and provide details of date, time, location and type of test to be performed. Additional requirement in accordance with F.S.D., Manufacturer's specification, etc. shall be carried out as appropriate.

All Fire Services Installation shall be tested and commissioned fully in accordance with "Building Services Branch Testing and Commissioning Procedure for Fire Service Installation in Government Buildings, Hong Kong (Latest Edition)".

The Contractor shall provide all labour, instruments and materials necessary for the performance tests and make all necessary adjustments, including checking of operation and submits test results.



### **Schedule of Equipment and Delivery for MVAC Installation**

#### **(A) Schedule of Equipment**

##### (1) VRV AIR CONDITIONING UNIT

##### VRV Indoor Unit

Particular : PAU-1

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	Fresh Air Processing Unit	
- Total cooling capacity (kW)	14	
- Total heating capacity (kW)		
- On coil temperature (summer) (°C)	33.0 D.B. / 28.0 W.B.	
- On coil temperature (winter) (°C)		
- Supply air flow rate (m³/s)	0.3	
- External static pressure (Pa)	185	
- Refrigerant	R410a	
- Overall dimensions (HxWxD) (mm)		
- Operating weight (kg)		
- Noise level (dB(A))		
- Unit main power (V/Ph/Hz)	220/1/50	
- Total motor power (kW)		
- Running Current (A)		
- Remark:	<ul style="list-style-type: none"> <li>- Equipped with wired remote controller</li> <li>- Indoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)</li> </ul>	

(1) VRV AIR CONDITIONING UNIT (Cont'd)

VRV Outdoor Unit

Particular : VRV-OU

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	Wall mounted type	
- Total cooling capacity (kW)	15	
- Total heating capacity (kW)		
- Correction factor for refrigerant pipes length of 60 m	0.9 (min.)	
- Compressor:		
- Type	Hermetic	
- No.		
- Fan:		
- Type	Propeller, front discharge	
- No.		
- Air flow rate (l/s)		
- External static pressure (Pa)		
- Ambient air temperature (°C)	(summer) 35.0 D.B. (winter) 7.0 D.B. / 6.0 W.B.	
- Refrigerant	R410a	
- Overall dimensions (HxWxD) (mm)		
- Operating weight (kg)		
- Noise level (dB(A))		
- Unit main power (V/Ph/Hz)	380/3/50	
- Total input power (kW)		
- Running Current (A)		
- Remark:	Outdoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)	

(2) SPLIT TYPE AIR CONDITIONING UNIT

Particular : AC-IU-1/AC-OU-1; AC-IU-2/AC-OU-2; AC-IU-3/AC-OU-3

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	1 to 1 split	
- Total input power (kW)		
- Unit main power (V/P/Hz)	220/1/50	
- Indoor units:		
- Designation	AC-IU-1; AC-IU-2; AC-IU-3	
- Type	Ceiling Mount Cassette Type	
- Total cooling capacity (kW)	2.5	
- Total heating capacity (kW)		
- On coil temperature (°C)	27.0 D.B./19.0 W.B.	
- Standard air flow (m³/s)	0.15/0.1	
- External static pressure (Pa)	-	
- Noise level (dBA)		
- Outside dimension (LxWxH)mm		
- Outdoor unit:		
- Designation	AC-OU-1; AC-OU-2; AC-OU-3	
- Compressor	Hermetic	
- No. of compressor		
- No. of Ref. CCT		
- Compressor input power (kW)		
- Type of condenser fan	Horizontal discharge	
- No. of condenser fans		
- Standard air volume (l/s)		
- Condenser air inlet temp. (°C)	35.0 D.B.	
- Noise level (dBA)		
- Remark:		
- Refrigerant – R-410A		
- Both indoor unit and outdoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)		
- Indoor unit shall be equipped with a wired remote controller.		
- Indoor unit AC-IU-2 and AC-IU-3 shall be equipped with interface adapter and other necessary for group back up control.		

(2) SPLIT TYPE AIR CONDITIONING UNIT (Cont'd)

Particular : AC-IU-4/AC-OU-4; AC-IU-5/AC-OU-5; AC-IU-6/AC-OU-6; AC-IU-7/AC-OU-7;  
AC-IU-8/AC-OU-8;

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	1 to 1 split	
- Total input power (kW)		
- Unit main power (V/P/Hz)	220/1/50	
- Indoor units:		
- Designation	AC-IU-4; AC-IU-5; AC-IU-6; AC-IU-7; AC-IU-8	
- Type	Ceiling Mounted Cassette Type	
- Total cooling capacity (kW)	10	
- Total heating capacity (kW)		
- On coil temperature (°C)	27.0 D.B./19.0 W.B.	
- Standard air flow (m <sup>3</sup> /s)	0.35/0.225	
- External static pressure (Pa)	-	
- Noise level (dBA)		
- Outside dimension (LxWxH)mm		
- Outdoor unit:		
- Designation	AC-OU-4; AC-OU-5; AC-OU-6; AC-OU-7; AC-OU-8	
- Compressor	Hermetic	
- No. of compressor		
- No. of Ref. CCt		
- Compressor input power (kW)		
- Type of condenser fan	Horizontal discharge	
- No. of condenser fans		
- Standard air volume (l/s)		
- Condenser air inlet temp. (°C)	35.0 D.B.	
- Noise level (dBA)		
- Remark:		
- Refrigerant – R-410A		
- Both indoor unit and outdoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)		
- Each indoor unit shall be equipped with a wired remote controller.		

(2) SPLIT TYPE AIR CONDITIONING UNIT (Cont'd)

Particular : AC-IU-9/AC-OU-9; AC-IU-10/AC-OU-10; AC-IU-11/AC-OU-11;

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	1 to 1 split	
- Total input power (kW)		
- Unit main power (V/P/Hz)	220/1/50	
- Indoor units:		
- Designation	AC-IU-9; AC-IU-10; AC-IU-11	
- Type	Duct Type	
- Total cooling capacity (kW)	12.5	
- Total heating capacity (kW)		
- On coil temperature (°C)	27.0 D.B./19.0 W.B.	
- Standard air flow (m³/s)	0.65 / 0.47	
- External static pressure (Pa)		
- Noise level (dBA)		
- Outside dimension (LxWxH)mm		
- Outdoor unit:		
- Designation	AC-OU-9; AC-OU-10; AC-OU-11	
- Compressor	Hermetic	
- No. of compressor		
- No. of Ref. CCt		
- Compressor input power (kW)		
- Type of condenser fan	Horizontal discharge	
- No. of condenser fans		
- Standard air volume (l/s)		
- Condenser air inlet temp. (°C)	35.0 D.B.	
- Noise level (dBA)		
- Remark:		
- Refrigerant – R-410A		
- Both indoor unit and outdoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)		
- Each indoor unit shall be equipped with a wired remote controller.		

(2) SPLIT TYPE AIR CONDITIONING UNIT (Cont'd)

Particular : AC-IU-12/AC-OU-12;

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Daikin or equal	
- Country of origin		
- Model		
- Type	1 to 1 split	
- Total input power (kW)		
- Unit main power (V/P/Hz)	220/1/50	
- Indoor units:		
- Designation	AC-IU-12	
- Type	Pressure Duct Type	
- Total cooling capacity (kW)	10	
- Total heating capacity (kW)		
- On coil temperature (°C)	27.0 D.B./19.0 W.B.	
- Standard air flow (m³/s)	0.53 / 0.38	
- External static pressure (Pa)		
- Noise level (dBA)		
- Outside dimension (LxWxH)mm		
- Outdoor unit:		
- Designation	AC-OU-12	
- Compressor	Hermetic	
- No. of compressor		
- No. of Ref. CCt		
- Compressor input power (kW)		
- Type of condenser fan	Horizontal discharge	
- No. of condenser fans		
- Standard air volume (l/s)		
- Condenser air inlet temp. (°C)	35.0 D.B.	
- Noise level (dBA)		
- Remark:		
- Refrigerant – R-410A		
- Indoor unit shall be equipped with control adapter and BMS gateway interface (Lonworks / BACnet) for individually monitoring and control (on/off; temperature setpoint etc.)		
- Indoor unit shall be equipped with a wired remote controller.		

(3) VENTILATION FAN

Particular : EAF-1; EAF-2; EAF-3

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Ostberg or equal	
- Country of Origin		
- Model		
- Type	Inline centrifugal	
- Volume Flow (1/s)	1800	
- Fan Static Pressure (Pa)	250	
- Type of drive	Direct	
- Impeller Diameter (mm)		
- Fan Speed (rpm)	<1500	
- Motor Type		
- Motor Power (W)		
- Fan Efficiency (%)		
- Volt/Phase/Hz	380/3/50	
- Octave Band SWL (dB)		
- 63Hz		
- 125Hz		
- 250Hz		
- 500Hz		
- 1000Hz		
- 2000Hz		
- 4000Hz		
- 8000Hz		
- Starter Required	Refer to drawings or Specification	
- Overall Dimensions (HxWxD)		
- Unit Weight (kg)		
- Remark:		

(2) VENTILATION FAN (Cont'd)

Particular : EAF-4

<u>Description</u>	<u>Specified</u>	<u>Offered</u>
- Manufacturer	Ostberg or equal	
- Country of Origin		
- Model		
- Type	Inline centrifugal	
- Volume Flow (l/s)	300	
- Fan Static Pressure (Pa)	350	
- Type of drive	Direct	
- Impeller Diameter (mm)		
- Fan Speed (rpm)	<1500	
- Motor Type		
- Motor Power (W)		
- Fan Efficiency (%)		
- Volt/Phase/Hz	220/1/50	
- Octave Band SWL (dB)		
- 63Hz		
- 125Hz		
- 250Hz		
- 500Hz		
- 1000Hz		
- 2000Hz		
- 4000Hz		
- 8000Hz		
- Starter Required	Refer to drawings or Specification	
- Overall Dimensions (HxWxD)		
- Unit Weight (kg)		
- Remark:		



**(B) Schedule of Equipment and Delivery**

	<u>Description</u>	<u>Acceptable Manufacturer/ Country of Origin</u>	<u>Offered by the Tenderer</u>	<u>Delivery (Weeks from Contract Award)</u>
A	<u>Air Handling Equipment</u>			
A.1	VRV air conditioning unit	Daikin Mitsubishi Hitachi or Equivalent		
A.2	Split type air conditioning unit	Daikin Mitsubishi Panasonic or Equivalent		
B	<u>Ventilating Fans</u>			
B.1	Inline fan	Nicotra Ostberg Wolter or Equivalent		
C	<u>Air Distribution Accessories</u>			
C.1	Stainless steel/G.I. sheet metal ducting	Moonstar Nisshin Nippon Kawasaki or Equivalent		
C.2	Grilles, diffuser & registers	Laser Golden Horse Janford or Equivalent		
C.3	Proprietary fire damper	Ruskin Lloyd Trox or Equivalent		
C.4	Rectangular duct flanges	Local		
C.5	Fibreglass for air duct	Owens-Corning Afico ASK or Equivalent		
C.6	Flexible duct	Superflex Interlock ATCO or Equivalent		

	<u>Description</u>	<u>Acceptable Manufacturer/ Country of Origin</u>	<u>Offered by the Tenderer</u>	<u>Delivery (Weeks from Contract Award)</u>
D	<u>Pipework and Accessories</u>			
D.1	Galvanized steel pipe fittings	TOP ASK RING or Equivalent		
D.2	Copper pipe and fittings	Kembla Wednesbury Eagle or Equivalent		
D.3	Expansion/flexible joint	Tozen Mason Shin-nihin or Equivalent		
D.4	Close cell elastomeric pipe insulation	Armaflex K-flex Thermaflex or Equivalent		
E	<u>Electrical &amp; Control Equipment</u>			
E.1	Starter	Telemecanique Merlin Gerlin Mitsubishi or Equivalent		
E.2	Motor	Crompton VEM Siemens or Equivalent		
E.3	Control relay and relay socket	Siemens Omron Izumi or Equivalent		
E.4	Contactor/changeover switch	Schneider Electric Metrix – Plasma Socomec or Equivalent		
E.5	Push button/indicating light/selector switch	Breter Izumi Mibuka Denki or Equivalent		

	<u>Description</u>	<u>Acceptable Manufacturer/ Country of Origin</u>	<u>Offered by the Tenderer</u>	<u>Delivery (Weeks from Contract Award)</u>
E	<u>Electrical &amp; Control Equipment (Cont'd)</u>			
E.6	Emergency stop	Breter MD or Equivalent		
E.7	Ammeter/voltmeter	Celsa GEC Crompton or Equivalent		
E.8	Galvanized iron conduit (BS4568 Class 4)	NH Wai Ming ZS or Equivalent		
E.9	Adaptable box	Lik Hung Wai Ming NH or Equivalent		
E.10	Flexible conduit	Adaptaflex Flixicon Burn Tubes or Equivalent		
E.11	Galvanized cable tray (return edged)	Shun Cheong WEW Lik Hung or Equivalent		
E.12	Trunking	Shun Cheong WEW Lik Hung Boson or Equivalent		
E.13	MCCB/MCB	Schneider Electric Hager Legrand ABB or Equivalent		
E.14	HRC fuse	Lawson MEM Bussmann or Equivalent		

	<u>Description</u>	<u>Acceptable Manufacturer/ Country of Origin</u>	<u>Offered by the Tenderer</u>	<u>Delivery (Weeks from Contract Award)</u>
E	<u>Electrical &amp; Control Equipment (Cont'd)</u>			
E.15	PVC copper cable	AEI BICC Prysmian Draka or Equivalent		
E.16	XLPE/SWA/PVC copper cable	AEI BICC Prysmian Draka or Equivalent		
E.17	Cable gland	Peppers CCG or Equivalent		
F	<u>Miscellaneous Equipment</u>			
F.1	Spring/rubber vibration isolators	Mason Kinetics Amber-Booth or Equivalent		

**Schedule of Equipment and Delivery for Electrical Installation**

<u>Item</u>	<u>Materials/Equipment</u>	<u>Specified Brands</u>	<u>Offered Brands</u>	<u>Delivery Period</u> <u>(Week)</u>
A.	<u>L.V. System &amp; Electrical</u> <u>Accessories</u>			
A1.	MCB, RCCB, RCBO & MCB Distribution Board	Schneider Hager MEM or Equivalent		
A2.	Isolating Switch	Metrix-plasma Hager MEM or Equivalent		
A3.	PVC Insulated Copper Cable	AEI BICC Prysmian Draka or Equivalent		
A4.	Fire Resistance Cables (to BS 6387)	AEI BICC Prysmian Draka or Equivalent		
A5.	Contactors	Telemecanique Hager or Equivalent		
A6.	Galvanized Iron Conduit	Nippon Maruichi ZS or Equivalent		
A7.	Flexible Conduit & Accessories	Adaptaflex GE or Equivalent		
A8.	Adaptable Box, BS 4662 Box, BESA Box	Lik Hung Wai Ming HN or Equivalent		

Item	Materials/Equipment	Specified Brands	Offered Brands	Delivery Period (Week)
A9.	Hot-dip Galvanized Cable Tray	Shun Cheong WEW Lik Hung or Equivalent		
A10.	Trunking	Shun Cheong WEW Lik Hung or Equivalent		

Item	Materials/Equipment	Specified Brands	Offered Brands	Delivery Period (Week)
A11.	uPVC Conduit & Accessories	Schneider Univolt Kinglion Wai Ming or Equivalent		
A12.	Electrical Accessories	MK Schneider Legrand or Equivalent		
A13.	Timer Switch	Panasonic Legrand Schneider or Equivalent		
A14.	Fluorescent Tube	Philips Osram or Equivalent		
A15.	Electronic Ballast	Philips Osram or Equivalent		
A16.	Control Relay	Izumi Omron or Equivalent		
A17.	Dimming Control	Crestron Lutron or Equivalent		

<u>Item</u>	<u>Materials/Equipment</u>	<u>Specified Brands</u>	<u>Offered Brands</u>	<u>Delivery Period (Week)</u>
B.	<u>Lighting Fixtures</u>			
B1.	L01	As specified on Drawings		
B2.	L02	As specified on Drawings		
B3.	L03	As specified on Drawings		
B4.	L04	As specified on Drawings		
B5.	L05	As specified on Drawings		
B6.	L06	As specified on Drawings		
B7.	L07	As specified on Drawings		



<u>Item</u>	<u>Materials/Equipment</u>	<u>Specified Brand</u>	<u>Offered Brand</u>	<u>Delivery Period</u> <u>(Week)</u>
C.	<u>CCTV System</u>			
C1.	IP Camera	Axis Panasonic Sony or Equivalent		
C2.	NVR	Axis Panasonic Sony or Equivalent		
C3.	LCD Monitor	Dell Philips Samsung or Equivalent		
C4.	Cat.6 UTP Cable	AMP Belden Commscope or Equivalent		
C5.	Network Switch	H3C Cisco HP or Equivalent		
C6.	PC Station	Lenovo Dell HP or Equivalent		

Item	<u>Materials/Equipment</u>	Specified Brand	Offered Brand	Delivery Period (Week)
D.	<u>Public Address System</u>			
D1.	Loudspeaker	TOA AEX or Equivalent		
D2.	Power Amplifier and Mixer	TOA AEX or Equivalent		
D3.	Microphone	TOA AEX or Equivalent		
D4.	Zone Control Panel	TOA AEX or Equivalent		
D5.	Audio Cable	Belden Commscope or Equivalent		
E.	Telecom Cabling Installation			
E1.	Data Outlet	Krone AMP or Equivalent		
E2.	Cat.6 UTP Cable	AMP Belden Commscope or Equivalent		
E3.	Patch Panel	Krone AMP or Equivalent		
E4.	Patch Cord	AMP Belden Commscope or Equivalent		
E5.	Server Rack	Austin Hughes Eaton APC or Equivalent		

### **Schedule of Equipment and Delivery for Fire Services Installation**

The tenderer shall offer the equipment /materials as indicated in Part B – List of Approved Equipment / Material.

The information supplied in the following items of the Schedule of Equipment shall be supplemented by the trade catalogues and other literature.

The tenderers offer shall be checked in principle, the acceptance of the tender does not imply acceptance of the equipment offer which must comply with the specification.

#### **Part A**

**Note** Selection of the following items of equipment and material shall be in accordance with relevant Sections of this Specification and General Specification.

#### **1. Automatic Sprinkler System**

a.	Sprinkler Head	Specified	Offered
	Type	Spray	
	Manufacturer	-	
	Model	-	
	Finish	Chromium Plated	
	Material	Bronze	
	Construction	Quartzoid Bulb	
	Pattern	Upright/Pendent	
	Orifice Size (mm)	15	
	Operating temperature (°C)	To suit LPC requirement	
	Working Pressure (Bar)	12	
b.	Sprinkler Head under False Ceiling	Specified	Offered
	Type	Recessed	
	Manufacturer	-	
	Model	-	
	Finish	Chromium Plated	
	Material	Bronze	
	Construction	Quartzoid Bulb	
	Pattern	Pendent	
	Orifice Size (mm)	15	
	Operating temperature (°C)	To suit LPC requirement	
	Working Pressure (Bar)	12	

Part A (Cont'd)

2. FH/HR System

a.	Hose Reel Set		Specified	Offered
	Manufacturer		-	
	Model	Fixed Type	-	
		Swing Type	-	
	Glass-fronted Box With Lock		Required	
	Nozzle		copper alloy	
	Working Pressure (Bar)		16	

3. Fire Alarm/Detection Systems

a.	Fire Alarm Bell		Specified	Offered
	Manufacturer		-	
	Model		-	
	Operating Voltage (V)		24V D.C.	
	Gong Diameter (mm)		150	
b.	Fire Alarm Call Point		Specified	Offered
	Manufacturer		-	
	Model		-	
	Type		Break-glass	
	Pattern		Flush mounted	
	Addressable Module		Provided	

4. Power Supplies

a.	Batteries		Specified	Offered
	Manufacturer		-	
	Type		Maintenance free type-	
	Output Voltage		24 V D.C.	
b	Charger		Specified	Offered
	Manufacturer		-	
	Model		-	
	Type		Automatic trickle charge	
	Main Supply	Voltage	220V A.C.	
	Output	Voltage	24V D.C.	

Part A (Cont'd)

5. Miscellaneous Components of Piping Systems

Description	Manufacturer	Country of Origin
G.I. pipe		
Pipe Fittings & Flanges		
Grooved-end Mechanical Couplings & Fittings		

6. Electrical Components

Description	Manufacturer	Country of Origin
G.I. Conduit & Accessories		
B.S. 4662 Box, G.I. Junction Box		
Flexible Steel Conduit & Accessories		
Cable P.V.C. Insulated		
Cable P.V.C. S.W.A. & P.V.C. Sheathed & Accessories		
Fire Resisting Cable		
Indicating Lamp		
Microswitch		

Part B List of Approved Equipment/Material

<u>Item</u>	<u>Equipment/Material</u>	<u>Specified Brand</u>	<u>Offered Brand / Origin</u>	<u>Delivery Period (Week)</u>
1.	Galvanized M.S. pipework	Tosa SeAH or Equivalent		
2.	Galvanized steel pipe fitting	Plum TM Cocoon Bowling Mech or Equivalent		
3.	Grooved joint couplings	Gruvlok Victaulic Quickcoup or Equivalent		
4.	Hose reel	Yue Hing Chau Hung Wah Hung SRI or Equivalent		
5.	Sprinkler head	Reliable Viking Tyco or Equivalent		
6.	Manual Call Point	Johnson Control Honeywell Esser Thorn KAC or Equivalent		
7.	Alarm bell	Kobishi Potter Gent Honeywell HC or Equivalent		
8.	Visual Fire Alarm	Gentex System Sensor AG A & B or Equivalent		

Part B List of Approved Equipment/Material (Cont'd)

<u>Item</u>	<u>Equipment/Material</u>	<u>Specified Brand</u>	<u>Offered Brand / Origin</u>	<u>Delivery Period (Week)</u>
9.	G.I. conduit (B.S. 4568 Class 4)	ZS Maruichi Nippon or Equivalent		
10.	Metal adaptor/junction box (Hot-dip galvanized)	Wai Ming GEC C.O.T. or Equivalent		
11.	Flexible conduit	Adaptaflex Burn Tubes GE or Equivalent		
12.	FSD approved Cable	P.G. AEI Draka Prymian or Equivalent		
13.	Ni-Cd Battery (Maintenance Free Type)	ALCAD Yuasa Burn or Equivalent		

## **Annex 12 – Drawing List**

<b><u>Drawing No.</u></b>	<b><u>Rev.</u></b>	<b><u>Descriptions</u></b>
<b><u>Architectural Drawings</u></b>		
AT-00-00	-	Drawing List
AT-00-01	-	General Notes 1
AT-00-02	-	General Notes 2
AT-00-03	-	General Legend
AT-00-04	-	General Legend 2
AT-01-00	-	G/F - Location Plan
AT-01-01	-	G/F - General Layout Plan
AT-01-02	-	G/F - Dimension and Builder's work Plan
AT-01-03	-	G/F - Door, Louvre and Signage Location Plan
AT-01-04	-	G/F - Floor Finishes Plan
AT-01-05	-	G/F – Location Plan of Simulation Equipment for the SETC and Safety Zone Demarcation Plan
AT-01-06	-	G/F - Furniture and TV Equipment Layout Plan
AT-01-21	-	G/F - Demolition and Hoarding Plan
AT-01-31	-	2/F - Layout Plan - Temporary Training Area
AT-01-32	-	List of Existing Training Equipment at G/F for Relocation to 2/F
AT-02-01	-	G/F - Reflected Ceiling and Finishes Plan
AT-02-02	-	G/F - Ceiling Dimension Plan
AT-03-01	-	Building Section 1



**Annex 12 – Drawing List (Cont'd)**

<u>Drawing No.</u>	<u>Rev.</u>	<u>Descriptions</u>
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**Architectural Drawings (Cont'd)**

AT-03-02	-	Building Section 2
AT-03-03	-	Building Section 3
AT-03-04	-	Building Section 4
AT-03-05	-	Elevations 1 - Reception Area
AT-03-06	-	Elevations 2 - Brief Area
AT-03-07	-	Elevations 3 - Brief Area
AT-03-08	-	Elevations 4 - Office
AT-03-09	-	Elevations 5 - Zone A
AT-03-10	-	Elevations 6 - Zone B & C
AT-03-11	-	Elevations 7 - Zone B & C
AT-03-12	-	Elevations 8 - Zone B & C
AT-03-13	-	Elevations 9 - Zone D
AT-03-14	-	Elevations 10 - Zone E
AT-03-15	-	Elevations 11 - Zone F
AT-03-16	-	Elevations 12 - Zone G
AT-03-17	-	Elevations 13 - Zone H
AT-03-18	-	Elevation of SETC Entrance
AT-03-21	-	External Elevation
AT-04-01	-	Material Code List 1
AT-04-02	-	Material Code List 2
AT-04-03	-	Finishes Schedule
AT-05-01	-	Door Schedule (Metal)
AT-05-02	-	Door Schedule (Glass)

**Annex 12 – Drawing List (Cont'd)**

<u>Drawing No.</u>	<u>Rev.</u>	<u>Descriptions</u>
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**Architectural Drawings (Cont'd)**

AT-05-03	-	Door Schedule (Wooden)
AT-05-04	-	Door Schedule (Wooden 2)
AT-05-05	-	Door Schedule (Access panel/Door)
AT-05-11	-	Louvre Schedule
AT-05-21	-	Door Details 1
AT-05-22	-	Door Details 2
AT-05-23	-	Door Details 3
AT-05-24	-	Door Details 4
AT-05-25	-	Fire Rated Glass Door Details
AT-05-31	-	Louvre Details 1
AT-05-32	-	Louvre Details 2
AT-05-41	-	Ironmongery Schedule
AT-05-42	-	Ironmongery Catalogue 1
AT-05-43	-	Ironmongery Catalogue 2
AT-05-44	-	Ironmongery Catalogue 3
AT-05-45	-	Ironmongery Catalogue 4
AT-05-46	-	Ironmongery Catalogue 5
AT-05-47	-	Ironmongery Catalogue 6
AT-05-48	-	Ironmongery Catalogue 7
AT-05-51	-	Furniture Schedule 1 (office chair)
AT-05-52	-	Furniture Schedule 2 (locker and cabinet)
AT-05-53	-	Equipment Schedule (electronic product)
AT-07-01	-	Reception Counter 1
AT-07-02	-	Reception Counter 2

**Annex 12 – Drawing List (Cont'd)**

<b><u>Drawing No.</u></b>	<b><u>Rev.</u></b>	<b><u>Descriptions</u></b>
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**Architectural Drawings (Cont'd)**

AT-07-03	-	Reception Counter 3
AT-07-04	-	Entrance TV Wall with Leaflet
AT-07-05	-	Office Glass Wall and Glass Sliding Door Detail
AT-07-06	-	TV Display on Block Wall
AT-07-07	-	TV Display on Drywall - Type A (40 Inch Size TV)
AT-07-08	-	TV Display on Drywall - Type B (55 Inch Size TV)
AT-07-09	-	Feature Wall Surrounding Zone H (VR Cave) 1
AT-07-10	-	Feature Wall Surrounding Zone H (VR Cave) 2
AT-07-11	-	Feature Wall Surrounding Zone H (VR Cave) 3
AT-07-12	-	Feature Wall Surrounding Zone H (VR Cave) 4
AT-07-13	-	Vinyl Floor Pattern - Zone G
AT-07-14	-	Vinyl Floor Pattern - Zone E
AT-07-16	-	3M Pattern - Zone D
AT-07-17	-	3M Pattern - Zone E
AT-07-18	-	3M Pattern - Zone G
AT-07-19	-	Shelving at Office
AT-07-20	-	Built-In Hanging Feature (I-Beam)
AT-07-21	-	Partition Feature Between Zone A & B
AT-07-22	-	Notice Panel For All Zones
AT-07-23	-	Display Rack for Zone G (Machinery)
AT-07-24	-	Feature Ceiling and Associated Wall at Reception Area 1
AT-07-25	-	Feature Ceiling and Associated Wall at Reception Area 2
AT-07-26	-	Feature Ceiling and Associated Wall at Reception Area 3
AT-07-27	-	Feature Ceiling and Associated Wall at Reception Area 4
AT-07-28	-	Feature Ceiling and Associated Wall at Reception Area 5
AT-07-29	-	Built-In Feature at Zone C (Lifting and Rigging Plant) 1

**Annex 12 – Drawing List (Cont'd)**

<u>Drawing No.</u>	<u>Rev.</u>	<u>Descriptions</u>
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**Architectural Drawings (Cont'd)**

AT-07-30	-	Built-In Feature at Zone C (Lifting and Rigging Plant) 2
AT-07-31	-	Drywall at Server Room
AT-07-32	-	Drywall Detail
AT-07-34	-	Reflected Ceiling Plan of Baffle Ceiling
AT-07-35	-	Elevation of Baffle Ceiling
AT-07-36	-	Display Tool Board at Zone F
AT-07-41	-	Feature Column at Briefing Area 1
AT-07-42	-	Feature Column at Briefing Area 2
AT-07-43	-	Feature Column at Briefing Area 3
AT-08-01	-	Typical External Wall Detail with Waterproofing
AT-08-02	-	Typical Floor and Wall Detail
AT-08-03	-	Typical Drywall Fixing Detail
AT-08-04	-	Concrete Block Wall Details 1 (Y-Tong)
AT-08-05	-	Concrete Block Wall Details 2 (Y-Tong)
AT-08-06	-	Hose Reel Cabinet Details
AT-08-07	-	Rack for AC Outdoor Unit
AT-08-08	-	False Ceiling Detail (Baffle Ceiling)
AT-08-09	-	False Ceiling Detail (Suspended Acoustic Rockwool Ceiling Tile)
AT-08-10	-	Indoor Manhole Matching Cover Detail
AT-08-11	-	Louvre Connection to Exhaust Duct
AT-08-12	-	Typical Finishes Detail 1 (Floor)
AT-08-13	-	Typical Finishes Detail 2 (Ceiling)
AT-08-15	-	RC Steps Details (at entrance)
AT-08-16	-	RC Junction with Block Wall Details

## **Annex 12 – Drawing List (Cont'd)**

<b><u>Drawing No.</u></b>	<b><u>Rev.</u></b>	<b><u>Descriptions</u></b>
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### **Architectural Drawings (Cont'd)**

AT-08-17	-	Spalling Concrete Repair
AT-08-21	-	Typical Detail for Acoustic Gypsum Block Wall 1
AT-08-22	-	Typical Detail for Acoustic Gypsum Block Wall 2
AT-08-23	-	Typical Detail for Acoustic Gypsum Block Wall 3
AT-08-24	-	Typical Detail for Acoustic Gypsum Block Wall 4
AT-09-01	-	Exit Sign Detail (S-01)
AT-09-02	-	Typical Signages Detail
AT-09-03	-	Graphic Sign Details (S-09)
AT-09-04	-	Detail of CIC Logo
AT-09-21	-	Reference Perspective 1
AT-09-22	-	Reference Perspective 2
AT-09-23	-	Reference Perspective 3

### **Building Plans**

BD Approval Letter Dated 22 Dec 2017

AA-01	-	Block Plan, Notes, Legend, Calculations, Schedules, Part G/F Plan & Part Elevation
AA-02	-	Part G/F Framing Plan & Details

### **Building Services Drawings**

BS-001		Drawing List
BS-101	-	Demolition Plan for G/F
BS-102	-	Demolition Plan for M/F

**Annex 12 – Drawing List (Cont'd)**

<b><u>Drawing No.</u></b>	<b><u>Rev.</u></b>	<b><u>Descriptions</u></b>
<b><u>MVAC</u></b>		
AC-001	-	Legend, Abbreviations and General Notes
AC-002	-	Electrical Control Diagram for Motor Control Panel
AC-101	-	MVAC Layout Plan
AC-102	-	Section Drawing for MVAC Installation and Layout Plan for Existing M/F Store Room
AC-201	-	Installation Details
<b><u>Electrical</u></b>		
EL-001	-	General Notes, Legend, Abbreviations, Cable Schedule, Lighting Schedule & MCB Board Details
EL-002	-	Schematic Diagram for ELV System
EL-101	-	Lighting Layout Plan
EL-201	-	Power Layout Plan for G/F
EL-202	-	Power Layout Plan for M/F
EL-301	-	ELV Layout Plan
EL-401	-	Typical Installation Details
<b><u>Fire Services</u></b>		
FS-001	-	F.S. Notes, General Notes, Abbreviations, Legend, Schematic Diagram & Installation Details
FS-101	-	Fire Services Layout Plan

**Annex 12 – Drawing List (Cont'd)**

<b><u>Drawing No.</u></b>	<b><u>Rev.</u></b>	<b><u>Descriptions</u></b>
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**Record Drawing of Existing Fire Services Plans (For Reference Only)**

F821152/M2 80/FP/S1	-	Schematic Diagram for Sprinkler System
F821152/M2 80/FP/S2	-	Schematic Diagram for FH / HR System
F821152/M2 80/FP/L3	-	Fire Service Layout for LG/F
F821152/M2 80/FP/L4	-	Fire Service Layout for G/F
F821152/M2 80/FP/L5	-	Fire Service Layout for M/F

**Drawing for Equipment (For Reference Only)**

NS-01	-	Equipment and Power Socket Layout Plan at G/F
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TENDER DRAWINGS (BUILDER'S WORK)

FOR

MAIN CONTRACTOR

FOR

RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC)

AT

KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL

- NOTES:**
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: QUANTITIES SETS AT NEW CHANGE OF TRAINING CENTRE - CIVIL  
- EXISTING WORKS CONTRACT (KCC) - 15-01-2016-15-01-2016

SCALE: **A3 @ N.T.S.**

PROJECT  
**RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**COVER**

DRAWING NO.	REV.
-	
PROJECT NO.	DA17003



TYPE	DRAWING NO.	TITLE	
GENERAL	–	COVER	
	AT-00-00	DRAWING LIST	
	AT-00-01	GENERAL NOTES 1	
	AT-00-02	GENERAL NOTES 2	
	AT-00-03	GENERAL LEGEND	
	AT-00-04	GENERAL LEGEND 2	
PLANS	AT-01-00	G/F – LOCATION PLAN	
	AT-01-01	G/F – GENERAL LAYOUT PLAN	
	AT-01-02	G/F – DIMENSION AND BUILDER’S WORK PLAN	
	AT-01-03	G/F – DOOR, LOUVRE AND SIGNAGE LOCATION PLAN	
	AT-01-04	G/F – FLOOR FINISHES PLAN	
	AT-01-05	G/F – LOCATION OF SIMULATION EQUIPMENT FOR THE SETC AND SAFETY ZONE DEMARCATION PLAN	
	AT-01-06	G/F – FURNITURE AND TV EQUIPMENT LAYOUT PLAN	
	AT-01-21	G/F – DEMOLITION AND HOARDING PLAN	
	AT-01-31	2/F – LAYOUT PLAN – TEMPORARY TRAINING AREA	
	AT-01-32	LIST OF EXISTING TRAINING EQUIPMENT AT G/F FOR RELOCATION TO 2/F	
	AT-02-01	G/F – REFLECTED CEILING AND FINISHES PLAN	
	AT-02-02	G/F – CEILING DIMENSION PLAN	
	SECTIONS AND ELEVATIONS	AT-03-01	BUILDING SECTION 1
		AT-03-02	BUILDING SECTION 2
		AT-03-03	BUILDING SECTION 3
AT-03-04		BUILDING SECTION 4	
AT-03-05		ELEVATIONS 1 – RECEPTION AREA	
AT-03-06		ELEVATIONS 2 – BRIEF AREA	
AT-03-07		ELEVATIONS 3 – BRIEF AREA	
AT-03-08		ELEVATIONS 4 – OFFICE	
AT-03-09		ELEVATIONS 5 – ZONE A	
AT-03-10		ELEVATIONS 6 – ZONE B & C	
AT-03-11		ELEVATIONS 7 – ZONE B & C	
AT-03-12		ELEVATIONS 8 – ZONE B & C	
AT-03-13		ELEVATIONS 9 – ZONE D	
AT-03-14		ELEVATIONS 10 – ZONE E	
AT-03-15		ELEVATIONS 11 – ZONE F	
AT-03-16		ELEVATIONS 12 – ZONE G	
AT-03-17		ELEVATIONS 13 – ZONE H	
AT-03-18		ELEVATION OF SETC ENTRANCE	
AT-03-21		EXTERNAL ELEVATION	
FINISHES		AT-04-01	MATERIAL CODE LIST 1
	AT-04-02	MATERIAL CODE LIST 2	
	AT-04-03	FINISHES SCHEDULE	
SCHEDULE	AT-05-01	DOOR SCHEDULE (METAL)	
	AT-05-02	DOOR SCHEDULE (GLASS)	
	AT-05-03	DOOR SCHEDULE (WOODEN)	
	AT-05-04	DOOR SCHEDULE (WOODEN 2)	
	AT-05-05	DOOR SCHEDULE (ACCESS PANEL/DOOR)	
	AT-05-11	LOUVRE SCHEDULE	
	AT-05-21	DOOR DETAILS 1	
	AT-05-22	DOOR DETAILS 2	
	AT-05-23	DOOR DETAILS 3	
	AT-05-24	DOOR DETAILS 4	
	AT-05-25	FIRE RATED GLASS DOOR DETAILS	
	AT-05-26	CONCEALED DOOR DETAILS	
	AT-05-27	ACCESS PANEL DETAILS	
	AT-05-31	LOUVRE DETAILS 1	
	AT-05-32	LOUVRE DETAILS 2	
	AT-05-41	IRONMONGERY SCHEDULE	
	AT-05-42	IRONMONGERY CATALOGUE 1	
	AT-05-43	IRONMONGERY CATALOGUE 2	
	AT-05-44	IRONMONGERY CATALOGUE 3	
	AT-05-45	IRONMONGERY CATALOGUE 4	
	AT-05-46	IRONMONGERY CATALOGUE 5	
	AT-05-47	IRONMONGERY CATALOGUE 6	
	AT-05-48	IRONMONGERY CATALOGUE 7	
	AT-05-51	FURNITURE SCHEDULE 1 (OFFICE CHAIR)	
	AT-05-52	FURNITURE SCHEDULE 2 (LOCKER AND CABINET)	
	AT-05-53	EQUIPMENT SCHEDULE (ELECTRONIC PRODUCT)	

[illegible]

GENERAL NOTES:

1. ALL MEASUREMENT MUST BE CHECKED ON SITE. THE CONTRACTOR SHALL CONDUCT A THOROUGH SURVEY TO VERIFY THE EXISTING LEVELS AND DIMENSION OF ALL AREAS.
2. THE CONTRACTOR IS RESPONSIBLE TO CHECK AND MAKE ALL DEFECTIVE PLASTER AND SPALL CONCRETE ON SITE. SPALLING CONCRETE ARE PROVISION ITEM AS SPECIFIED.
3. PRIOR TO ANY WORK COMMENCEMENT, THE CONTRACTOR SHALL VERIFY THE SITE CONDITION AND DIMENSION.
4. ALL AFFECTED EXISTING AREAS TO BE MADE GOOD AND FINISHED TO MATCH THE EXISTING OR AS SPECIFIED IN THE FINISHES SCHEDULE AND DRAWINGS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFY / REMOVE/ REINSTATE EXISTING FEATURES, IF REQUIRED FOR THE EXECUTION OF THE INSIDES WORKS.
6. THE CONTRACTOR SHALL REPAIR ALL EXISTING DEFECTS SUCH AS SPALL CONCRETE, HOLES, REMOVAL OF ABANDONED NAILS AND PIPES, CRACKS, DEFECTIVE OR DEBONDED RENDERING, HONEYCOMB ETC. CLEAR ALL SURFACE WITH HIGH PRESSURISED WATER JET WHEREAS ANY LOOSE / PEELED PAINT COATS SHALL BE COMPLETED REMOVAL TO REACH SATISFACTION OF ARCHITECT BEFORE NEW WORKS CAN APPLY.
7. ALL ACCESSIBLE RAMP AND GRATING SHALLFULFILL DESIGN MANUAL BFA (2008) REQUIREMENTS.
8. THE CONTRACTOR SHALL SUBMIT A METHOD STATEMENT FOR LAYING WATERPROOFING WORKS / VAPOR BARRIOR FOR APPROVAL PRIOR TO COMMENCEMENT OF WORKS.
9. FINSHIES ON COLUMNS SHALL BE THE SAME AS THE FINISHES ON WALL UNLESS OTHER SPECIFIED.
10. TILE ADHESIVE SHOULD BE APPLIED UNDER HOMOGENEOUS FLOOR TILES AND NOSING TILES.
11. UNLESS OTHERWISE SPECIFIED, ANY STAINLESS STEEL IN THIS DRAWINGS SHOULD BE GRADE 304.
12. AS–BUILT PLANS WITH CLEARLY ALL SETTING OUT SHALL BE PROVIDED UPON COMPLETION OF THE WORKS BEFORE SUBMISSION OF FORM BA14 TO BD.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELEVANT MINOR WORKS SUBMISSION TO THE BUILDING AUTHORITY.
14. ALL FIRE EXTINGUISHERS, EXIT SIGNS AND DIRECTION SIGNS AS SHOWN IN THE DRAWING ARE NEW PROVISION.
15. PROVISION OF ANY NOSE HOSE REELS, REQUIPMENT FOR ACCESSIBLE LIFT, FSI REFER TO THE E&M DRAWINGS.
16. ALL DRAIN CHANNEL, MANHOLE COVER, GRATING REFER TO TENDER DRAWINGS.
17. ALL MANHOLE COVER TO BE PROVIDED WITH MATCHING COVERS WITH DOUBLE SEALED G.M.S. BASE COVER (AS PER DWG NO. AT–08–10)
18. THE CONTRACTOR SHALL CARRY OUT REBOUND HAMMER TEST AFTER AWARDED. METHOD STATEMENTS OF ABOVEMENTIONED SHALL BE SUBMITTED FOR ARCHITECT’S APPROVAL BEFORE THE COMMENCEMENT OF BUILDING WORKS.
19. UNLESS OTHERWISE SPECIFIED, ALL RAILINGS SHALL BE G.M.S. AND ALL SURFACES CHANNEL SHALL BE CAST IRON (IF ANY).
20. ALL NEW CHANNEL ON GROUND FLOOR TO COMPLY WITH LATEST BARRIER FREE REQUIREMENT FOR ACCESSIBLE PERSON, THE CONTRACTOR SHALL SUBMIT CATALOGUE AND MODEL FOR ARCHITECT’S APPROVAL BEFORE ANY ORDERING. (IF ANY).
21. CCTV PROVISION AS PER MEP ENGINEER’S SPECIFICATION.
22. UNLESS OTHERWISE SPECIFIED, ALL FLOOR SERVED WITH 75mmH WATERPROOFING SCREED (SC–01) WITH VAPOR BARRIER (WP–02) WITH THE FINSHES ON TOP AS SPECIFIED, SEE DETAIL DRAWING AT–08–12.
23. CONNECTION OF NEW EXIT SIGN / DIRECTIONAL SIGN / HOSE REEL AS PER MEP ENGINEER’S SPECIFICATION.
24. CCTV PROVISION AS PER MEP ENGINEER’S SPECIFICATION.
25. CONTRACTOR TO CARRY OUT MINOR WORKS SUBMISSION TO THE INSTALLATION OF ANY A/C RACKING AS SPECIFIED UNDER HIS OWN.
26. UNLESS OTHERWISE SPECIFIED, ALL FLOOR SERVED WITH 75mmH WATERPROOFING SCREED (SC–01) WITH VAPOR BARRIER (WP–02) WITH THE FINSHES ON TOP AS SPECIFIED, SEE DETAIL DRAWING AT–08–12.
27. IN THE EVENT OF "MAIN CONTRACTOR AND "THE CONTRACTOR" REFER TO THE CONTRACTOR TO BE APPOINTED FOR CARRYING OUT THE WORKS LISTED IN THIE CONTRACT / CONTRACT DRAWINGS.
28. UNLESS OTHewise SPECIFIED, ALL LED LIGHT STRIP SHALL BE THE FOLLOWING SPECIFICATION:  
BRAND : PHILIPS  
POWER : 5W PER METER  
COLOUR TEMPERATURE : 3500K  
SUCH LED LIGHT STRIP SHALL BE CONTROL WITH DALI DIMMIBLE DRIVER  
THE CONTRACTOR SHALL SUBMIT THE SAMPLE AND CATALOG FOR ARCHITECT/ENGINEER/CIC ’S APPROVAL BEFORE THE EXECUTION OF THE WORKS.
29. UNLESS OTHERWISE SPECIFIED IN OTHER DRAWING, THE CONTRACTOR SHALL PROVIDE MINIMUM OF 3mm THK ALUMINIUM BLANK OFF WITH PROPER WATERPROOFING, SEALANT AND GASKET IN ANY PART OF THE NEW LOURVE WITHOUT CONNECTION TO THE AIR DUCT.

GENERAL NOTES FOR DEMOLITION:

1. ANY DEMOLITION WORKS IN THE SPECIFIED AREA INCLUDE REMOVAL OF  
(1) EXISTING BUILDING WORKS (e.g. ANY WALL, TANKS, WINDOWS, LOUVRE, RC PLINTHS) AND NOT MEANT TO BE EXHAUSTIVE ;  
(2) ANY EXISTING WALL FINISHES AND FALSE CEILINGS IF ANY ;  
(3) ANY BUILDING SERVICES (e.g. ANY PIPES, TRUNKING, CABLE DUCT, PANELS) ;  
(4) ANY EXTRUDED STRUCTURAL ELEMENT (SUCH AS REBARS) ;  
(5) ANY EXISTING EQUIPMENTS / MACHINE / FURNITURES IN CONSENT OF EMPLOYER / PROJECT MANAGER / ARCHITECT, AND ;  
(6) THE CONTRACTOR SHALL REPAIR ANY DEFECTS AND RECTIFY SPALL CONCRETE IF FOUND DURING THE DEMOLTION WORKS.  
(7) ALL ITEMS SHALL BE DEMOLISHED EXCEPT THE ITEMS SHOWN IN THE APPROVAL PLANS.
2. THE EXTENT OF DEMOLITION WORKS SHALL TALLY TO THE APPROVED DEMOLITION PLAN FROM BD. THE CONTRACTOR SHALL ALSO FOLLOW THE DEMOLITION PROCEDURE IN THE SAID PLAN.
3. THE CONTRACT BARE TO PROVIDED ALL PRECAUTIONARY MEASURE SUCH AS HOARDING PANELS FOR PROTECTION FOR ANY DEMOLITION WORKS.
4. IF DEMOLITION OR REMOVAL NECESSITATES TEMPORARY WORKING PLATFORM, SCAFFOLDING AND/ OR PROPINGS, CONTRACTOR SHALL DESIGN. ERECT, AMEND, AND REMOVE SUCH TEMPORARY WORKS TO THE SATISFACTION OF STATUTORY REQUIREMENT AND THE ARCHITECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE NECESSARY STATUTORY SUBMISSION IF REQUIRED.
5. THE CONTRACTOR SHALL DESIGN TO THE EXTENT AS SPECIFIED IN THE TENDER DRAWINGS, CARRY OUT, TAKE FULL RESPONSIBILITY FOR THE CARE OF, MANAGE, CO–ORDINATE, COMPLETE AND MAINTAIN THE WORKS IN EVERY RESPECT IN ACCORDANCE WITH THE CONTRACT AND TO THE REASONABLE SATISFACTION OF THE ARCHITECT AND ENGINEER.
6. THE CONTRACTOR SHALL PREPARE THE DETAIL SHOP DRAWINGS AND STRUCTURAL CALCULATIONS (IF ANY) FOR ARCHITECT AND ENGINEER’S REVIEW BEFORE COMMENCEMENT OF THE WORKS:
7. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL OF HIS DESIGN PROPOSALS WHICH ARE NECESSARY FOR THE COMPLETION OF THE WORKS AND THEREFORE:–  
A) ANY REVISIONS, ADDITIONS ETC. REQUIRED BY THE BUILDING AUTHORITY AND OTHER AUTHORITIES TO HIS PROPOSALS SHALL BE CARRIED OUT AT THE CONTRACTOR’S OWN EXPENSE AND NO EXTENSION OF TIME WILL BE GRANTED IN THIS RESPECT:  
B) ANY REJECTIONS BY THE BUILDING AUTHORITY AND OTHER AUTHORITY OF HIS PROPOSALS AND ANY SUBSEQUENT DELAY TO THE WORKS ARE DEEMED TO BE HIS FAULT AND SHALL NOT CONSTITUTE THE GROUNDS FOR CLAIMING AN EXTENSION OF TIME.
8. ANY COMMENT AND / OR APPROVAL BY THE ARCHITECT AND ENGINEER SHALL IN NO WAY RELEASE THE CONTRACTOR’S OBLIGATIONS UNDER THIS CONTRACT. FOR CLARITY, THE ARCHITECT/ ENGINEER ACCEPT NO RESPONSIBILITY AND LIABILITY TO THE CONTRACTOR’S DESIGN AND WORKS CARRIED OUT UNDER THIS CONTRACT.
9. ANY OF THE DISMOUNTED OBJECT (EG. DRAIN OPENING OF THE SINK) SHALL BE PROPERLY BLANK OFF WITH DURABLE MATERIAL.

GENERAL NOTES FOR STRUCTURAL:

1. THE MAIN CONTRACTOR SHALL VERIFY THE INSITU CONCRETE STRENGTH OF EXISTING STRUCTURE, AND CARRY OUT REBOUNDHAMMER TEST AND MAKE GOOD THE TEST AREA, BEFORE THE APPLICATION FOR CONSENT OF COMMENCEMENT OF WORKS,
2. THE MAIN CONTRACTOR SHALL FOLLOW THE STRUCTURAL NOTES AND IMPOSED CONDITION FROM THE BD APPROVAL LETTER.
- 3, ALL WORKS INVOLVE WELDING SHALL PROVIDED WITH WELDING TEST REPORT SUBMITTED BY THE CONTRACTOR, FOR PROJECT ENGINEER’S REVIEW AND APPROVAL ACCORDINGLY.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

dca

DAVID S. K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH  
SCALE  
PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
GENERAL NOTES 1

DRAWING NO.	REV.
AT-00-01	
PROJECT NO.	DA17003

DESIGN AND BUILD ITEM

- 1. THE CONTRACTOR SHALL DESIGN TO THE EXTENT AS SPECIFIED IN THE TENDER DRAWINGS, CARRY OUT, TAKE FULL RESPONSIBILITY FOR THE CARE OF, MANAGE, CO-ORDINATE, COMPLETE AND MAINTAIN THE WORKS IN EVERY RESPECT IN ACCORDANCE WITH THE CONTRACT AND TO THE REASONABLE SATISFACTION OF THE ARCHITECT AND ENGINEER.
- 2. THE CONTRACTOR SHALL PREPARE THE DETAIL SHOP DRAWINGS AND STRUCTURAL CALCULATIONS (IF ANY) FOR ARCHITECT AND ENGINEER’S REVIEW BEFORE COMMENCEMENT OF THE WORKS:
- 3. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL OF HIS DESIGN PROPOSALS WHICH ARE NECESSARY FOR THE COMPLETION OF THE WORKS AND THEREFORE:–
  - A) ANY REVISIONS, ADDITIONS ETC. REQUIRED BY THE BUILDING AUTHORITY AND OTHER AUTHORITIES TO HIS PROPOSALS SHALL BE CARRIED OUT AT THE CONTRACTOR’S OWN EXPENSE AND NO EXTENSION OF TIME WILL BE GRANTED IN THIS RESPECT:
  - B) ANY REJECTIONS BY THE BUILDING AUTHORITY AND OTHER AUTHORITY OF HIS PROPOSALS AND ANY SUBSEQUENT DELAY TO THE WORKS ARE DEEMED TO BE HIS FAULT AND SHALL NOT CONSTITUTE THE GROUNDS FOR CLAIMING AN EXTENSION OF TIME.
- 4. ANY COMMENT AND / OR APPROVAL BY THE ARCHITECT AND ENGINEER SHALL IN NO WAY RELEASE THE CONTRACTOR’S OBLIGATIONS UNDER THIS CONTRACT. FOR CLARITY, THE ARCHITECT/ ENGINEER ACCEPT NO RESPONSIBILITY AND LIABILITY TO THE CONTRACTOR’S DESIGN AND WORKS CARRIED OUT UNDER THIS CONTRACT.

NOTE FOR FACILITATE BIM MODEL SERVICES AFTER COMPLETION OF WORKS

- 1. THE CONTRACTOR SHALL PROVIDE FULL SET OF AS–BUILT ARCHITECTURAL DRAWINGS (IN CAD FORMAT) INCLUDING BUT NOT LIMIT TO THE FOLLOWINGS:–
  - FLOOR PLAN
  - REFLECTED CEILING PLAN
  - ELEVATION PLAN
  - SECTION PLAN
  - OTHERS AS AGREED WITH CIC
- 2. THE CONTRACTOR SHALL PROVIDE FULL SET OF AS–BUILT E&M SERVICES DRAWINGS (IN CAD FORMAT), IN PARTICULAR SHOWING THE FOLLOWINGS:–
  - LIGHTING
  - CCTV
  - AIR CONDITION UNIT
- 3. THE CONTRACTOR SHALL PROVIDE THE MANUFACTURER’S SPECIFICATION AND CATALOG OF INSTALLED E&M EQUIPMENT AS MENTIONED IN ABOVE ITEM 2.
- 4. THE CONTRACTOR SHALL PROVIDE OTHER INFORMATION AS REQUESTED BY THE EMPLOYER/THE ARCHITECT FOR CREATION FOR BIM MODEL OF SETC TRAINING CENTER.

NOTE FOR ALL SIGNAGE

- 1. ALL SIGNAGE SHALL REFER TO BS ISO 3864–1:2011 (BSI STANDARD PUBLICATION – GRAPHICAL SYMBOLS – SAFETY COLOURS AND SAFETY SIGNS AND ALSO COMPLY WITH ISO 7001.)

NOTE FOR ALL FIT OUT WORKS

- 1. UNLESS OTHERWISE SPECIFIED, ALL INNER SIDE OF THE CABINET, DRAWER, ACCESS PANEL, AND ANY LOOSE FURNITURE SHALL RECEIVE PLASTIC LAMINATE FINISH,
- 2. COLOUR SHALL MATCH WITH THE OUTER SURFACE OF SUCH FURNITURE, PROVIDED THAT THE OUTER SURFACE IS ALSO LAMINATE FINISH.
- 3. THE CONTRACTOR SHALL SUBMIT COLOUR CHART AND MATERIAL SUBMISSION FOR THE ARCHITECT / CIC ’S APPROVAL BEFORE PROCEED OF WORKS.

COORDINATION WITH EMPLOYER’S DIRECT CONTRACTOR:

- 1. CONTRACTOR SHALL PROVIDE INSTALLATION (ONLY ITEM (1)), COORDINATION AND SITE ATTENDANCE WITH EMPLOYER (CIC) ’S DIRECT CONTRACTOR /SUPPLIER IN THE FOLLOWING TRADE, INSIDE SETC:
  - (1) DIRECT SUPPLIER TO SUPPLY THE SIMULATION EQUIPMENT FOR THE SETC AND INSTALL BY THE CONTRACTOR IN THIS CONTRACT, SEE DRAWING NO. AT–01–05
  - (2) SUPPLY AND INSTALLATION OF SUPPORTING SYSTEM AND EQUIPMENT IN ZONE H (VR CAVE)
  - (3) SUPPLY AND INSTALLATION OF SMART CARD ACCESS TO ALL DOOR AND PROVIDED CCTV IN SETC.
  - (4) SUPPLY AND INSTALLATION OF ANY TELECOMMUNIDCATION SERVICES IN SETC SUCH AS TELEPHONE LINES , LAN CABLE LINES, NETWORK SWITCHES, WI–FI ACCESS POINTS, OPTICAL FIBRE CONNECTION ETC.
  - (5) SUPPLY AND INSTALLATION OF EQUIPMENT FOR PROVIDING ANY AR/VR GAME/ MEDIA ILLUSTRATION.
- 2. REFER TO ITEM (1) ABOVE, THE CONTRACTOR SHALL INSTALL THE SIMULATION EQUIPMENT FOR THE SETC, FROM EMPLOYER’S DIRECT SUPPLIER, UNDER THE SUPERVISION OF SUCH SUPPLIER (ITEM 7) WITHIN THE CONTRACT PERIOD, LOCATION OF EQUIPMENT REFER TO DRAWING NO. AT–01–05. THE CONTRACTOR SHALL APPLY THE RELEVANT LICENSE FOR THE EQUIPEMNT WHO INSTALLED IN THE CONTRACT IN THIS CONTRACT.

DISCREPANCY BETWEEN TENDER / CONSTRUCTION DRAWING AND APPROVED PLAN FROM BUILDINGS DEPARTMENT

- 1. IN ANY EVENT OF ANY DISCREPANCY BETWEEN THE TENDER/CONSTRUCTION DRAWING AND THE BD APPROVED PLAN, THE CONTRACTOR SHALL FOLLOW THE LAYOUT INDICATED IN TENDER/CONSTRUCTION DRAWING FOR CONSTRUCTION FIRST. HOWEVER, THE CONTRACTOR SHALL NOT RELIEF ITS STATUTORY LIABILITY AND SHALL COMPLY ANY CONDITION, DISCRIPTION IN ANY OF THE GOVERNMENT DEPARTMENT APPROVED PLAN AND DOCUMENTS.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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NOTES:

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- 3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
- 4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
- 5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
- 6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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CAD PATH











SCALE

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
GENERAL NOTES 2

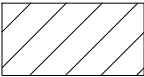
DRAWING NO.	REV.
AT-00-02	
PROJECT NO.	DA17003

INDICATION LEGEND :

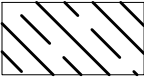
	DOOR MARK (REFER TO DWG. NO. AT-05-01 TO AT-05-05)
	LOUVRE MARK (REFER TO DWG. NO. AT-05-11)
	SIGNAGE MARK (REFER TO DWG. NO. AT-05-01 TO AT-05-06)
	FURNITURE MARK (REFER TO DWG. NO. AT-05-51 TO AT-05-52)
	EQUIPMENT MARK (ELECTRONIC PRODUCT) (REFER TO DWG. NO. AT-05-53)
(XX-XX) OR (XX-XX-XX)  OR 	MATERIAL CODE (REFER TO DWG. NO. AT-04-01 AND AT-04-02)
	HOSE REEL CABINET (REFER TO DWG. NO. AT-08-05)
	EXIT SIGN AS PER E/M ENGINEERS DWGS & SPECIFICATIONS
	EXIT SIGN AS PER E/M ENGINEERS DWGS & SPECIFICATIONS



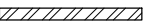
EXISTING WALL/DOORS/WINDOWS/PARTITIONS/FIXTURES/FURNISHING/  
EQUIPMENTS TO BE DEMOLISHED.



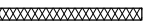
AREA NOT FOR CONTRACT CONSTRUCTION



ANY BUILDING WORKS (e.g. WALLS/DOORS/WINDOWS/LOUVERS WITHIN  
THE AREA TO BE DEMOLISHED AND RE-LAYOUT IN ACCORDING TO THE  
LATEST BD APPROVED BUILDING (A&A) PLANS.



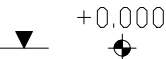
NEW 150mm FULL HEIGHT R.C. WALL



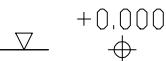
NEW FULL HEIGHT CONCRETE BLOCK WALL AS SPECIFIED.



225mm WIDTH. SURFACE CHANNEL PROVIDED MIN. 40mm THK. CAST  
IRON COVERS. (SHALL FULFILL CoP BFA (2008) REQUIREMENTS)  
(REFER TO DWG. NO. AT-08-15)



GENERAL FINISH FLOOR LEVEL



GENERAL STRUCTURAL FLOOR LEVEL

USE FIGURED DIMENSIONS. READ THE DRAWING IN  
CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT  
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FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED &  
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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: QUANTITIES SET BY KIM CHUNG CEE TRAINING CENTRE - CIPIC  
- CONSTRUCTION CONTRACT ADMINISTRATION - 2016-04-15 14:00:00

SCALE **A3 @**

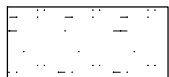
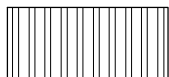

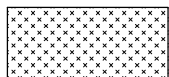
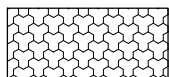
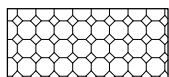
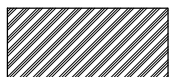

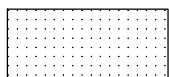

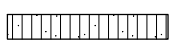
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**GENERAL LEGEND**

DRAWING NO. <b>AT-00-03</b>	REV.
PROJECT NO. <b>DA17003</b>	



INDICATION LEGEND :

	WL-01	BRAND: "RICHTER AKUSTIK & DESIGN" SERIES: "LIGHTBETON" COLOUR: 200 CLASSIC GREY
	WL-02	BRAND: "WIDEVELOP" SERIES: "FIELITZ – WEBPLATE" MODEL: FIELITZ G2310
	FL-01	BRAND: "SLENDER" MODEL: "KATANAR" FINISH: (BRUSHED)
	FN-02	BRAND: "LAMINAM" SERIES: "I METALLI" COLOUR: PLUTONIO OSSIDATO
	FN-03	BRAND: "LEVANTINA" SERIES: "TECHLAM" COLOUR: TL-87 STEEL CORTEN
	FN-04	ALUMINIUM ALLOY CIRCLE CUT OUT MESH BRAND: "ALROX" MODEL: AL-111019025 R2T3
	FN-10	BRAND: "CHILING" SERIES: "TZ-2/FG3" FINISH: INCO SUPER BLACK
	FN-11	BRAND: "COBELCO" MODEL: "CS-8882" COLOUR: HAIRLINE PIANO BLACK
	FN-12	ORIENTED STRAND BOARD
	FL-03	GYPSUM BLOCK WALL BRAND: "MULTIGIPS"
	FN-07	ALUMINIUM PANEL

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: PLAN/PROJ/SETC AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

SCALE: **A3 @**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**GENERAL LEGEND 2**

DRAWING NO. <b>AT-00-04</b>	REV.
PROJECT NO. <b>DA17003</b>	

CLIENT



1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

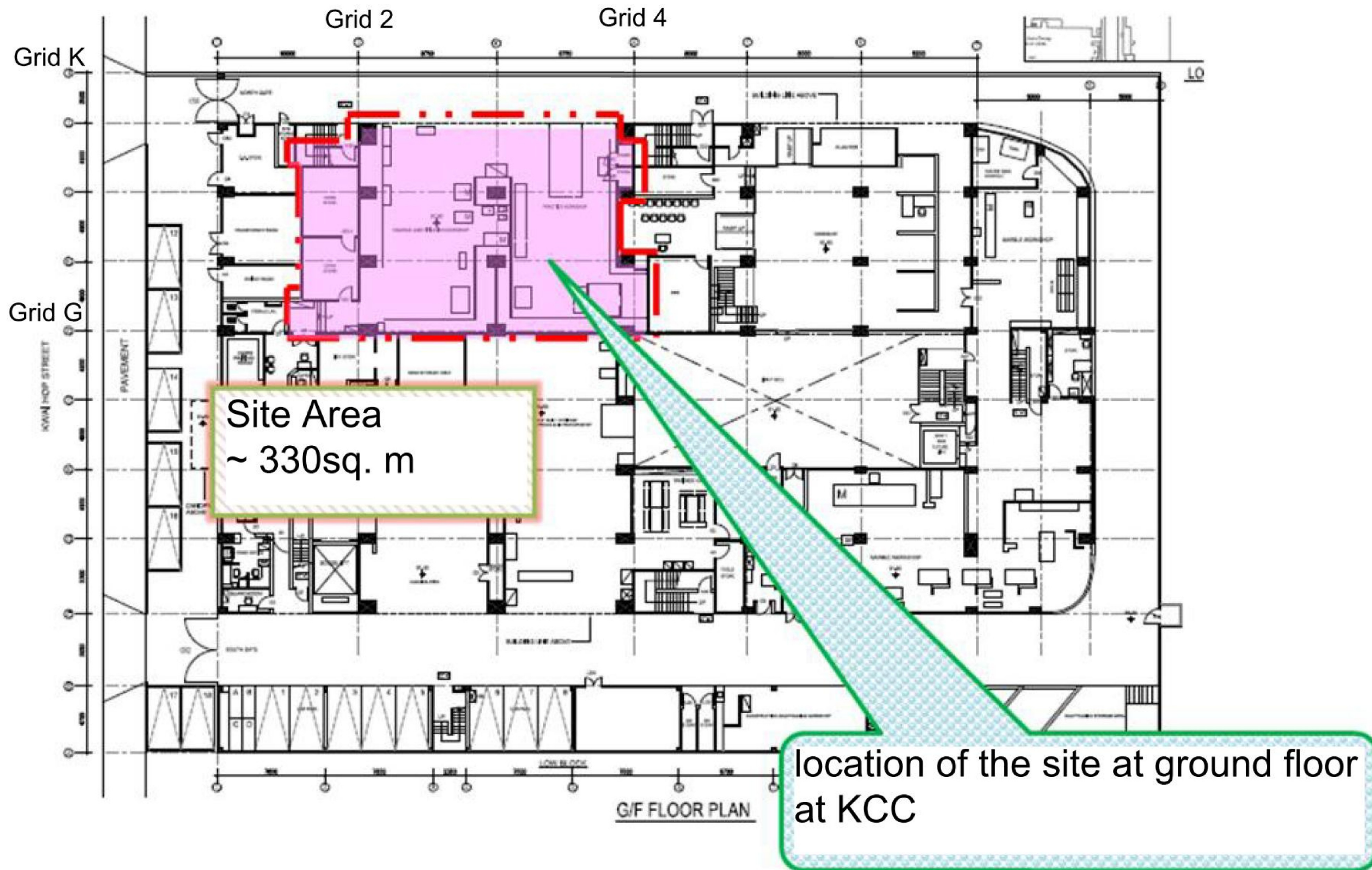
## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

CAD PATH S:\DA17003 SETC AT KNN CHUNG CIG TRAINING CENTRE\1 - CAD\1  
-TENDER\MAIN CONTRACT\WORKING\AT-01 PLANS\AT-01-00 BLOCK PLAN.DWG

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING NO.	REV.
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PROJECT NO. **DA17003**



IENT



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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

CAD PATH

SCALE                    **A3 @ 1:100**

DRAWING TITLE

**G/F - GENERAL LAYOUT PLAN**

DRAWING NO.	REV.
<b>AT-01-01</b>	
PROJECT NO.	<b>DA17003</b>



**NOTES:**

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

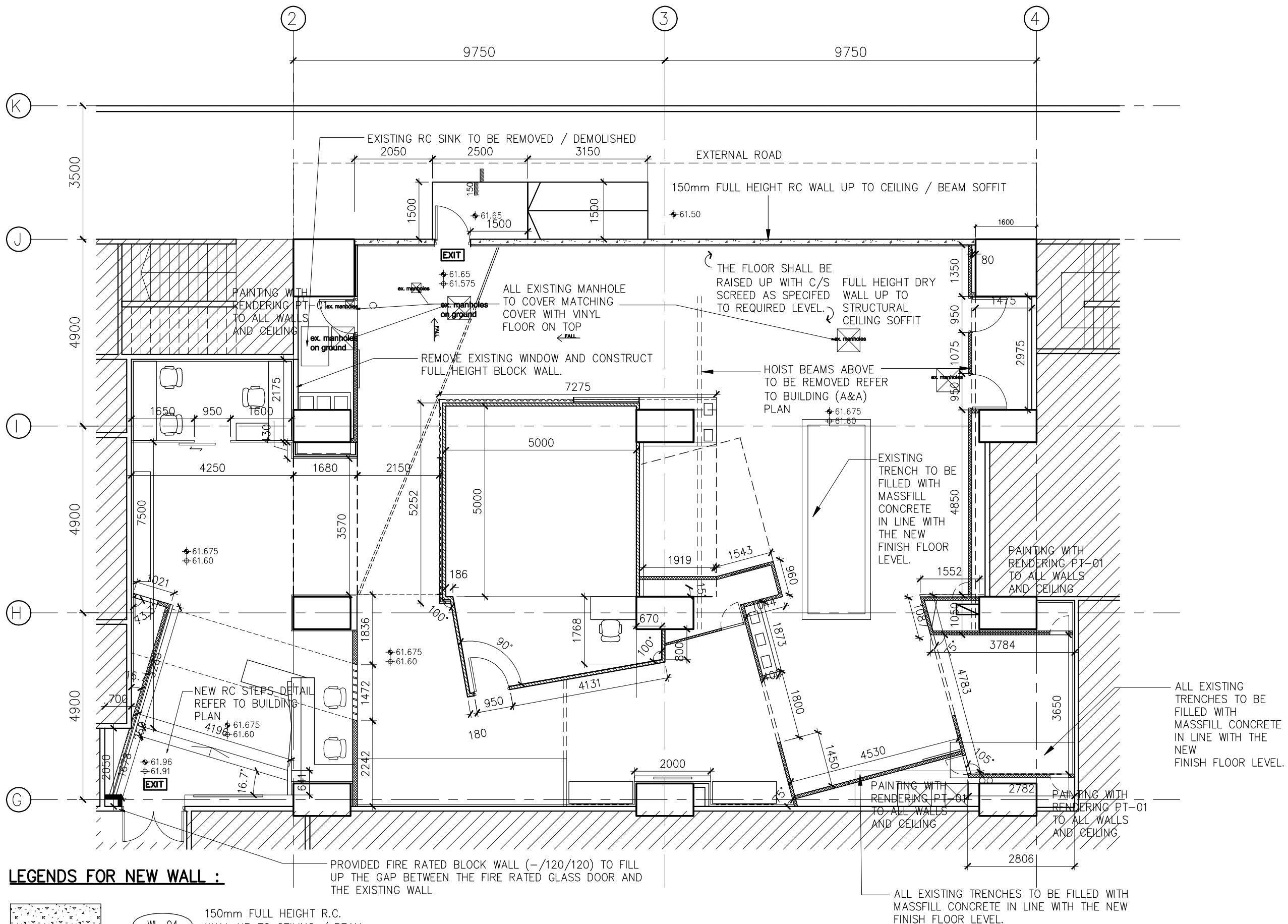
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \TEMP\PROJECT\DRAWING\A1-10\PLAN\A1-10-02\BUILDING WORK PLAN.DWG  
SCALE: **A3 @ 1:100**

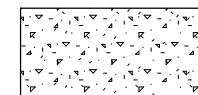
PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**G/F - DIMENSION AND  
BUILDER'S WORK PLAN**

DRAWING NO. **AT-01-02** REV.  
PROJECT NO. **DA17003**

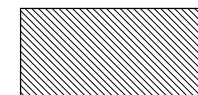


**LEGENDS FOR NEW WALL :**



WL-04

150mm FULL HEIGHT R.C.  
WALL UP TO CEILING / BEAM  
SOFFIT



WL-03

5m H GYPSUM BOARD  
OR REACHED  
STRUCTURAL SOFFIT (LOW  
HEADROOM)



WL-05

DRYWALL SYSTEM, UNLESS OTHERWISE SPECIFIED, THE DRYWALL  
PANEL GOES UP TO 2825mm AFFL BUT ALL THE SUBFRAMES GO UP  
TO STRUCTURAL SOFFIT FOR STRUCTURALLY FIXED

NOTE: THE CONTRACTOR SHALL CARRY OUT A DETAIL  
SURVEY REPORT ON SITE FOR BOTH BUILDER'S AND M&E  
WORKS. THE CONTRACTOR SHALL ALSO VERIFY THE  
LAYOUT AGAINST WITH THE BUILDING PLAN AND ON SITE.



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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \DRAWING\SETUP\PROJECT\DWG\AT-01-03.DWG  
DATE: 2016-05-10  
DRAWN: (NAME)  
CHECKED: (NAME)  
APPROVED: (NAME)

SCALE: **A3 @ 1:100**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

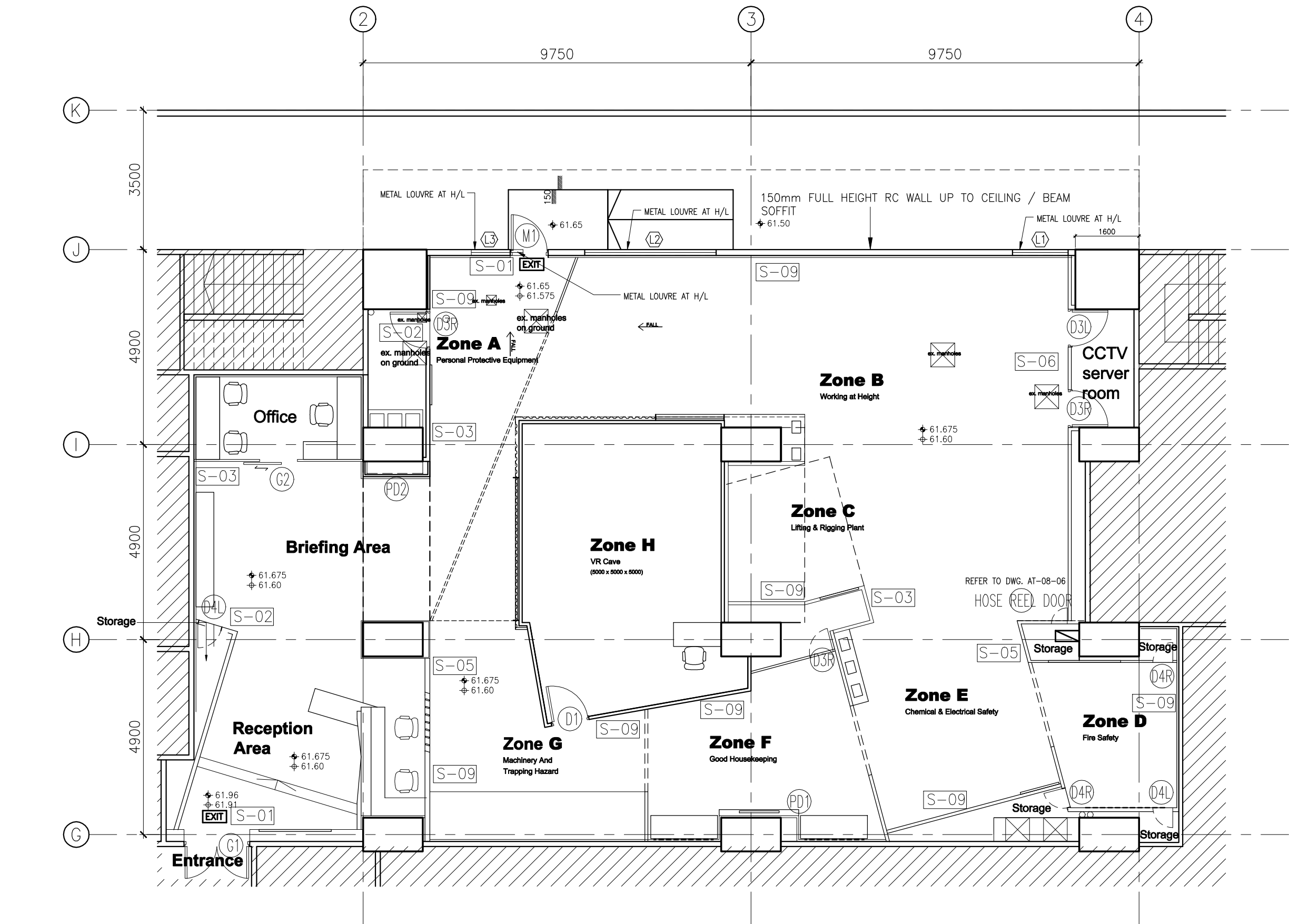
**G/F - DOOR, LOUVRE AND  
SIGNAGE LOCATION PLAN**

DRAWING NO.

**AT-01-03**

PROJECT NO. **DA17003**

REV.



**LEGEND**

- (Dxx) SELF-CLOSING WOODEN DOOR REFER TO DRAWING NO. AT-05-03 TO AT-05-04 (Lxx) LOUVRE REFER TO DRAWING NO. AT-05-11  
(Gxx) SELF-CLOSING GLASS DOOR REFER TO DRAWING NO. AT-05-02 (S-XX) SIGNAGES REFER TO DRAWING NO. AT-09-01 TO 04  
(Mxx) SELF-CLOSING METAL DOOR REFER TO DRAWING NO. AT-05-01  
(PDxx) ACCESS PANEL / DOOR REFER TO DRAWING NO. AT-05-05

**NOTE:**

THE CONTRACTOR SHALL VERIFY THE SETTING OUT/ LOCATION OF WALL OPENING AND ALL NEW LOUVRES AGAINST THE E&M DRAWING AND EXISTING SITE CONDITION.

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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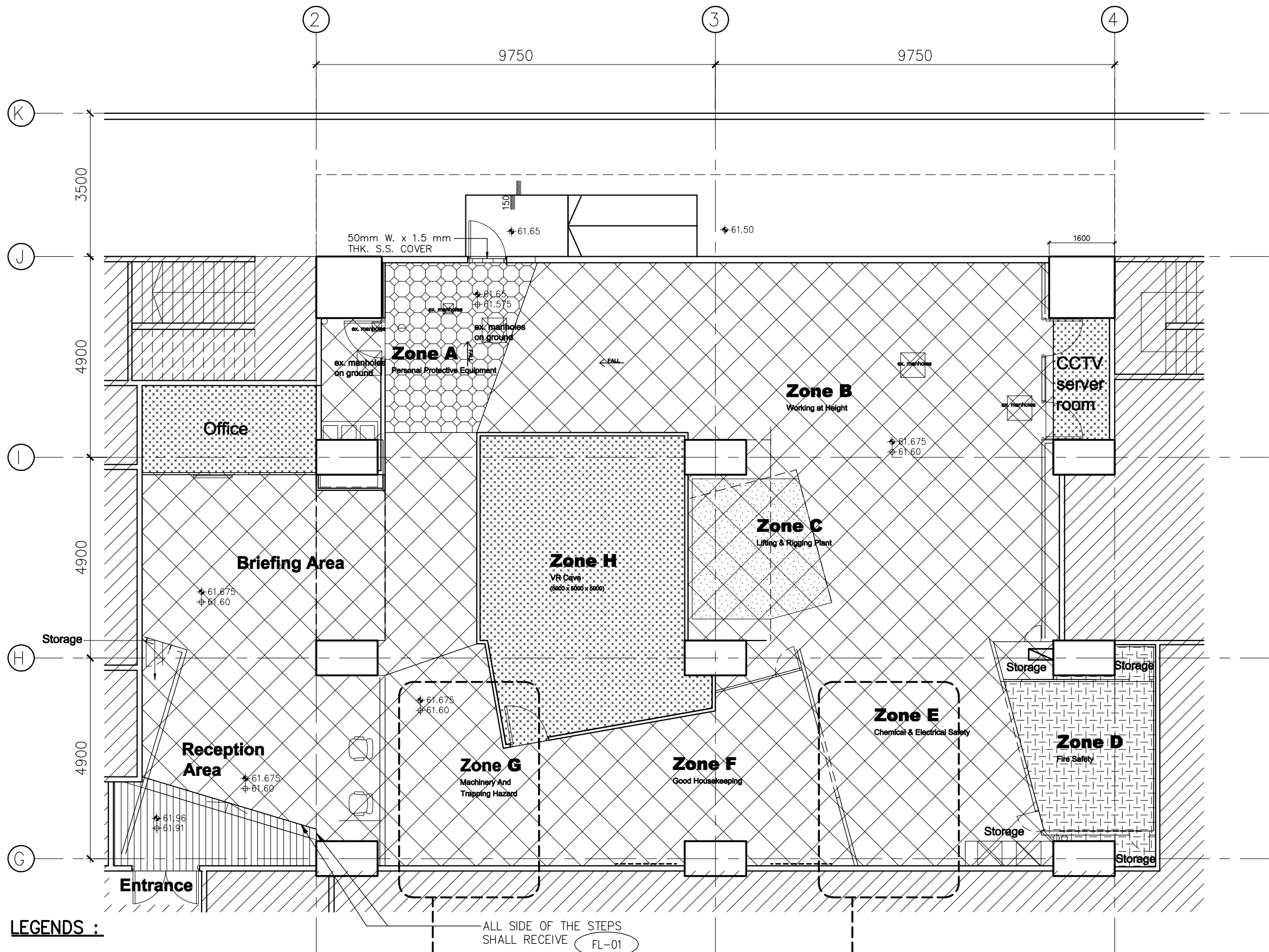
CAD PATH: S:\PROJECTS\SETC AT KWAI CHUNG CAMPUS\DRAWING\G/F FINISHES\G/F FINISHES PLANS\DWG

SCALE: A3 @ 1:100

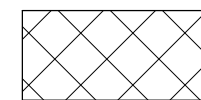
PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**G/F - FLOOR FINISHES PLAN**

DRAWING NO. **AT-01-04** REV.  
PROJECT NO. **DA17003**

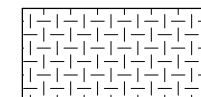


**LEGENDS :**



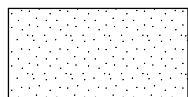
FL-02-01

VINYL FLOORING WITH  
50mmH THK.  
WATERPROOFING SCREED  
SC-01



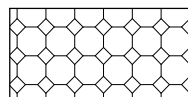
FL-02-04

VINYL FLOORING WITH  
50mmH THK.  
WATERPROOFING SCREED  
SC-01



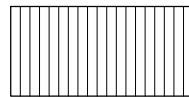
FL-02-05

VINYL FLOORING WITH  
50mmH THK.  
WATERPROOFING SCREED  
SC-01



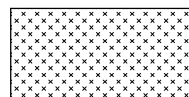
FL-02-06

VINYL FLOORING WITH  
50mmH THK.  
WATERPROOFING SCREED  
SC-01



FL-01

TILE WITH 25mmH  
MIN. C/S SCREEDING  
SC-01



FL-03

CARPET WITH 50mmH  
THK. WATERPROOFING  
SCREED SC-01



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

E/M LEGEND

INDUSTRIAL TYPE SOCKET  
OUTLET (TENTATIVE ONLY,  
ACTUAL LOCATION SHALL  
REFER TO E/M DRAWING )

## TENDER DRAWING

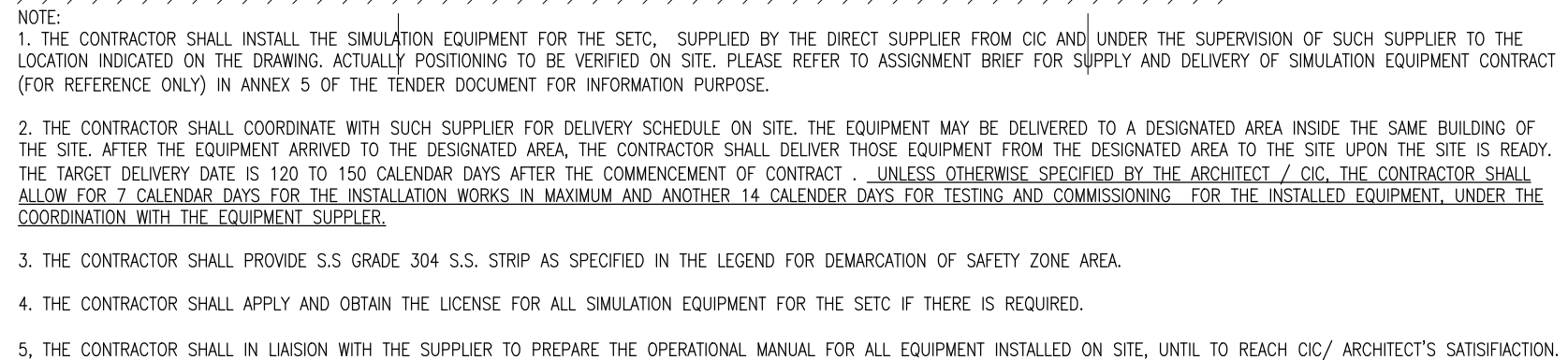
**dca** DAVID S. K. AU & ASSOCIATES LTD.

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dca.com.hk](http://www.dca.com.hk)

CAD PATH

S(ARCHT) REGD AT HKIA CHUNG CHING TRAINING CENTRE - CAD/CADD  
REGISTRATION CONTRACT (WORKING) - 01 PWS(V)-01-05 SMALLER AND  
TRANSITION 3D

DRAWING NO.	REV.
<b>AT-01-05</b>	
PROJECT NO.	<b>DA17003</b>



SIMULATION EQUIPMENT FOR THE SETC, SUPPLIED BY DIRECT SUPPLIER REFER TO ASSIGNMENT BRIED FOR SUPPLY AND DELIVERY OF SIMULATION EQUIPMENT CONTRACT (FOR REFERENCE ONLY) IN ANNEX 5 OF THE TENDER DOCUMENT. THESE EQUIPMENT SHALL BE INSTALLED BY THE CONTRACTOR IN THIS CONTRACT



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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: C:\PROJECTS\AT-01-06\AT-01-06\_FURNITURE\_LAYOUT.dwg

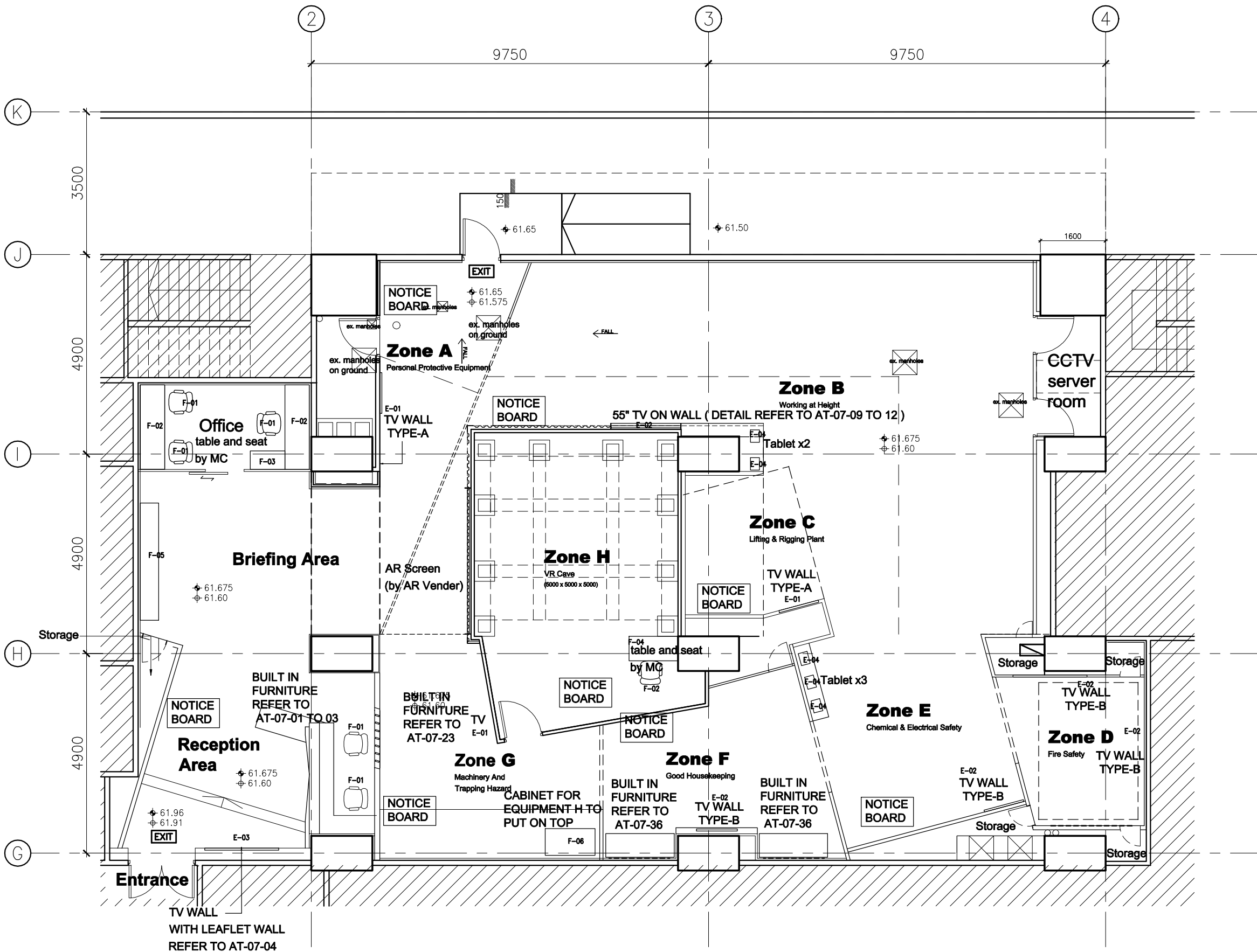
SCALE: A3 @ 1:100

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**G/F - FURNITURE AND TV  
EQUIPMENT LAYOUT PLAN**

DRAWING NO.	REV.
<b>AT-01-06</b>	
PROJECT NO.	<b>DA17003</b>



**LEGEND**

- F-XX FURNITURE TO BE PURCHASED BY CONTRACTOR AND REFER TO FURNITURE SCHEDULE DWG. AT-05-51 & AT-05-52  
E-XX EQUIPMENT TO BE PURCHASED BY CONTRACTOR AND REFER TO EQUIPMENT SCHEDULE DWG. AT-05-53

**NOTE:**

1. THE CONTRACTOR SHALL TAKE ATTENDANCE AND COORDINATE WITH THE EMPLOYER'S DIRECT CONTRACTORS, FOR THEIR INSTALLTION ON SITE, WITHIN THE CONTRACT PERIOD.
2. POWER SOCKETS FOR THE EQUIPMENTS REFER TO E/M DRAWING.
3. SIMULATION EQUIPMENTS SUPPLIED BY THE DIRECT SUPPLIER REFER TO DRAWING NO. AT-01-05 (WILL NOT SHOWN IN THIS DRAWING).



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

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CAD PATH S:\DA17003 SETC AT KNN CHUNG CIG TRAINING CENTRE\1 - CAD\1  
-TENDER\MAIN CONTRACT\BIDDING\AT-01 PLANS\4-01-21 DEMOLITION AND  
REBUILDING

SCALE **A3 @ 1:100**

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

### G/F - DEMOLITION AND HOARDING PLAN

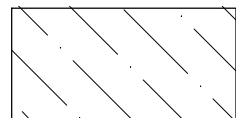
DRAWING NO.	REV.
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**AT-01-21**

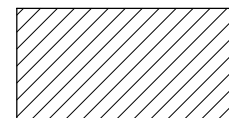
PROJECT NO. DA17003



===== FULL HEIGHT (REACH STRUCTURAL SOFFIT) OR 5M HEIGHT (IF NO CEILING) SOLIDCORE WOODEN HOARDING PANEL (AS SPECIFIED) WITH PAINTING SHALL BE PROVIDED WITH DUST SCREEN PROTECTION. THICKNESS OF HOARD PANEL TO BE PROPOSED BY THE CONTRACTOR'S STRUCTURAL ENGINEER FOR STRUCTURALLY SAFE.



- (1) REMOVE ALL EXISTING WALLS, FINISHES AND WATERPROOFING TO REACH THE STRUCTURAL LEVEL / SURFACE WITHIN THE DEMARCATED AREA.
- (2) REMOVE A PORTION OF EXISTING STEPS AND MODIFY THE FLOOR LEVELING AS ACCORDING TO THE LATEST SUBMITTED BUILDING AND STRUCTURAL (A&A) PLAN TO BUILDINGS DEPARTMENT.
- (3) PLEASE REFER TO AT-00-01 FOR DEMOLITION NOTES.
- (4) THE CONTRACTOR SHALL CARRY OUT A COMPLETE SURVEY OF THE SITE INCLUDING EXTERNAL FACE, TO IDENTIFY THE LOCATION ANY AREA OF SPALLING CONCRETE, MISSING RENDERING, CRACKS, BULGING, BOWING, SEPARATION, DELAMINATION, DELAPIDATION AND ANY CORROSION OF METAL PARTS. FOR ANY EXISTING RETAIN STRUCTURE SHALL BE RE-PAINTED TO MATCH SURROUNDING.



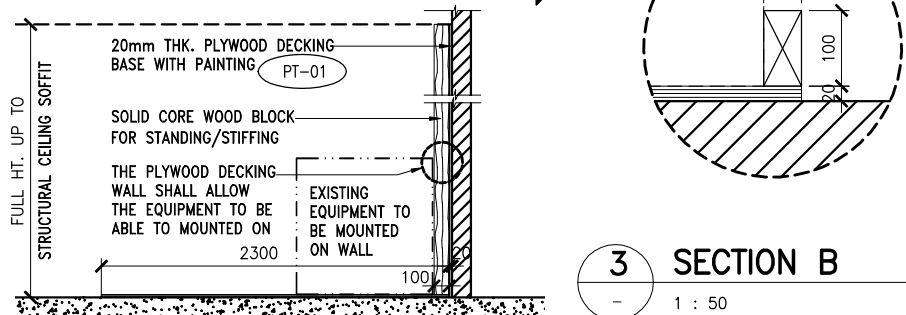
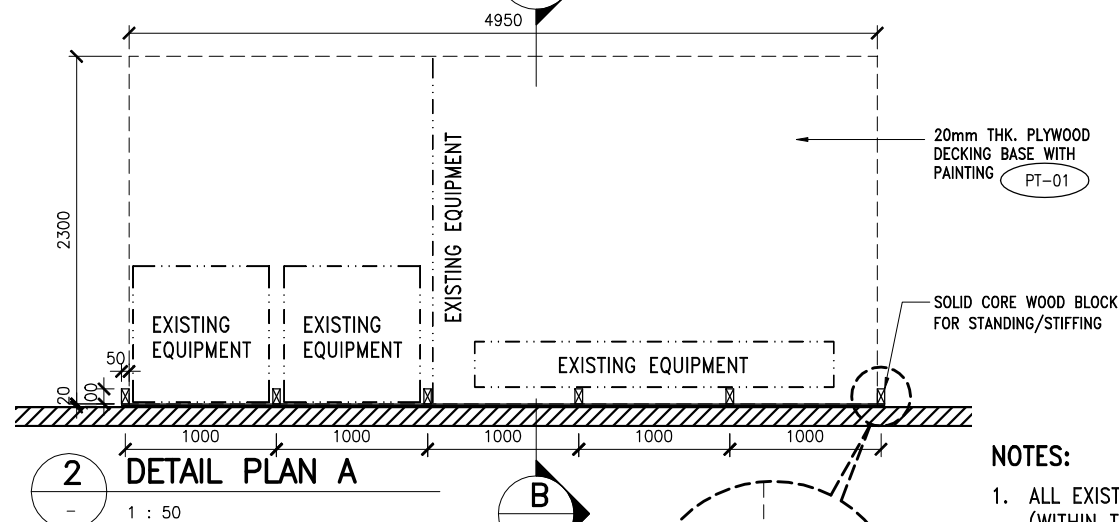
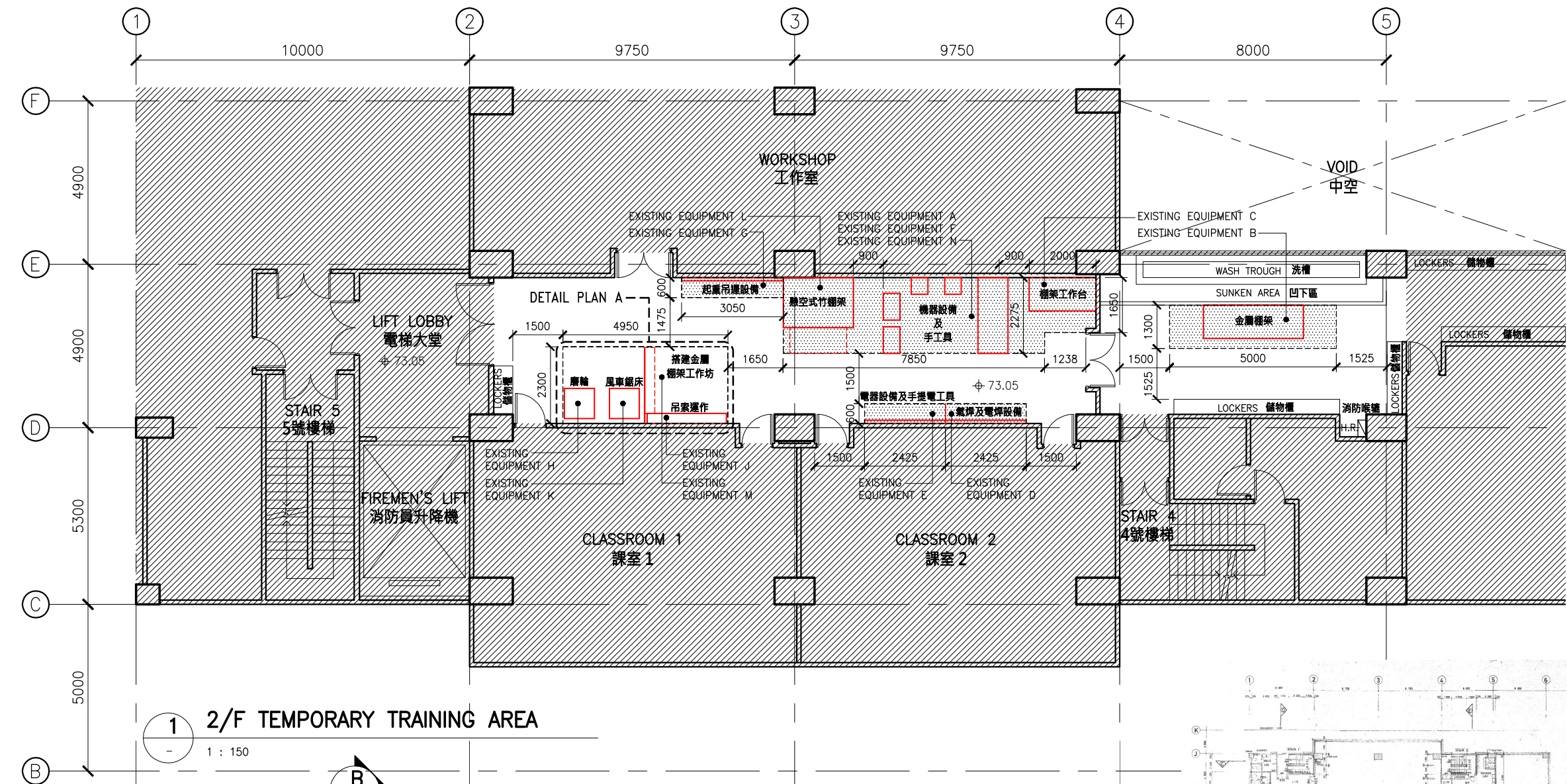
AREA REMAIN UNCHANGE.



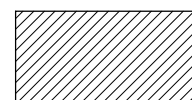
THE CONTRACTOR SHALL REMOVE ALL EXISTING  
EQUIPMENTS WITHIN THE SITE AND RELOCATED TO  
2/F TEMPORARY TRAINING AREA AS SPECIFIED IN  
THE DRAWING NO. AT-01-31 AND AT-01-32.

**NOTES:**

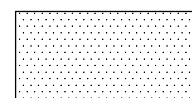
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**LEGEND**



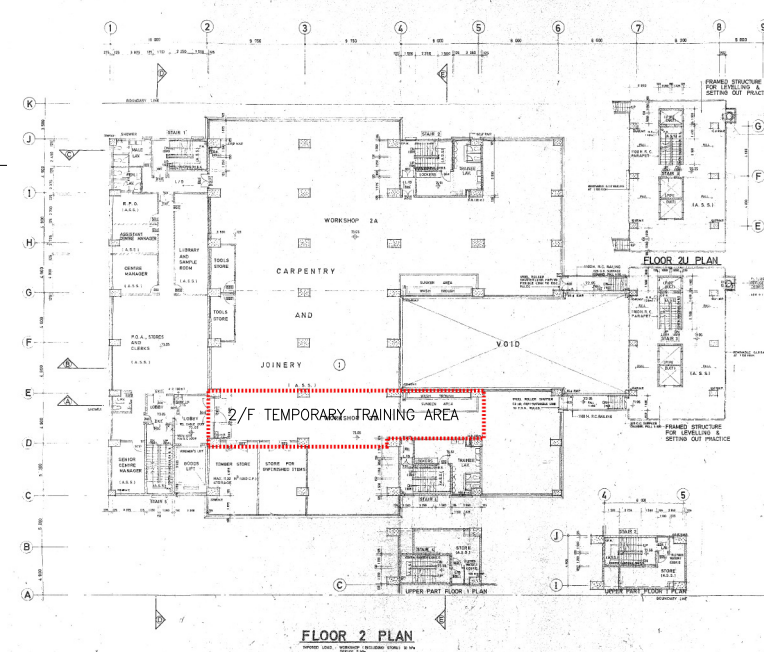
OUT OF SCOPE



TO PROVIDE MIN. 20mm THK. PLYWOOD DECKING AND WALL AS ACCORDING TO DETAIL PLAN A AND DETAIL SECTION B

**NOTES:**

1. ALL EXISTING EQUIPMENTS AS SPECIFIED TO BE RELOCATED BY THE CONTRACTOR FROM G/F (WITHIN THE SCOPE OF WORK AREA) TO 2/F AS SHOWN ON THIS DRAWING.
2. TO MINIMIZE THE SITE DISTURBANCE, THE CONTRACTOR SHALL PREFABRICATE THE PLYWOOD DECKING OUTSIDE THE SITE AND ONLY CAN INSTALL/ASSEMBLE THEM IN THE WORKS AREA INDICATED.
3. THE PLYWOOD DECKING SHALL ABLE TO BE FREE STANDING, NO FIXING OF PLYWOOD DECKING TO THE EXISTING FLOOR/WALL/COLUMN/ IS ALLOWED. THE CONTRACTOR SHALL MAKE SURE THE PLYWOOD DECKING WITH WALL ARE STRUCTURALLY STABLE.
4. THIS IS DESIGN AND BUILD ITEM, THE DETAIL SHOWN ARE INDICATIVE ONLY, THE CONTRACTOR SHALL SUBMIT DETAIL SHOP DRAWING FOR ARCHITECTS' REVIEW BEFORE THE WORKS TO BE COMMENCED.
5. THE CONTRACTOR SHALL REMOVE ALL THE WORKS AND REINSTATE AS EXISTING CONDITION UPON THE RENOVATION OF SETC AREA AT G/F IS COMPLETED.



**4 LOCATION AT 2/F**  
N.T.S.

DESIGN AND BUILD BY CONTRACTOR

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.daa.com.hk
















CAD PATH  
SCALE **A3 @ AS SHOWN**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**2/F - LAYOUT PLAN -  
TEMPORARY TRAINING AREA**


DRAWING NO. **AT-01-31** REV.  
PROJECT NO. **DA17003**



ITEM	TITLE	REMARKS	ITEM		REMARKS	ITEM		REMARKS
EQUIPMENT A	<div></div> <p>PPE AREA (機器設備及手工具)</p>	TO BE MOUNTED ON THE PLYWOOD DECKING WALL	EQUIPMENT G	<div></div> <p>HAZARDS IDENTIFICATION – LIFTING EQUIPMENT (起重吊運設備)</p>		EQUIPMENT P	<div></div> <p>BAMBOO SCAFFOLDING (竹棚架)</p>	DISMANTLED & DUMPED AWAY
EQUIPMENT B	<div></div> <p>METAL SCAFFOLDING (金屬棚架)</p>		EQUIPMENT H	<div></div> <p>PRACTICE WORKSHOP – ABRASIVE WHEELS (磨輪)</p>		EQUIPMENT Q	<div></div> <p>HAZARDS IDENTIFICATION – HOUSE KEEPING</p>	THE EQUIPMENTS TO BE DISMOUNTED AND DUMPED AS RUBBISH
EQUIPMENT C	<div></div> <p>HAZARDS IDENTIFICATION – SCAFFOLD WORKING PLATFORM (棚架工作台)</p>		EQUIPMENT J	<div></div> <p>PRACTICE WORKSHOP – SLINGING OPERATION (吊索運作)</p>		EQUIPMENT R	<div></div> <p>PRACTICE WORKSHOP – MANUAL HANDLING</p>	THE EQUIPMENTS TO BE DISMOUNTED AND DUMPED AS RUBBISH
EQUIPMENT D	<div></div> <p>HAZARDS IDENTIFICATION – GAS &amp; ELECTRIC ARC WELDING (氣焊及電焊設備)</p>	TO BE MOUNTED ON THE PLYWOOD DECKING WALL	EQUIPMENT K	<div></div> <p>PRACTICE WORKSHOP – CIRCULAR SAW TABLE (風車鋸床)</p>	NOTE: ALL EQUIPMENT COMPROMISE OF CORK BOARDS AND STEEL STANDS BEHIND FOR RELOCATION.			
EQUIPMENT E	<div></div> <p>HAZARDS IDENTIFICATION – ELECTRIC TOOLS (電器設備及手提電工具)</p>	TO BE MOUNTED ON THE PLYWOOD DECKING WALL	EQUIPMENT L	<div></div> <p>PRACTICE WORKSHOP – TRUSS-OUT BAMBOO SCAFFOLDING (懸空式竹棚架)</p>				
EQUIPMENT F	<div></div> <p>HAZARDS IDENTIFICATION – MACHINERY (機器設備及手工具)</p>		EQUIPMENT M	<div></div> <p>PRACTICE WORKSHOP – ALUMINUM SCAFFOLDING (搭建金屬棚架工作坊)</p>				

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會


REV.	DATE & DESCRIPTION	DRN	CHK	APP

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TENDER DRAWING

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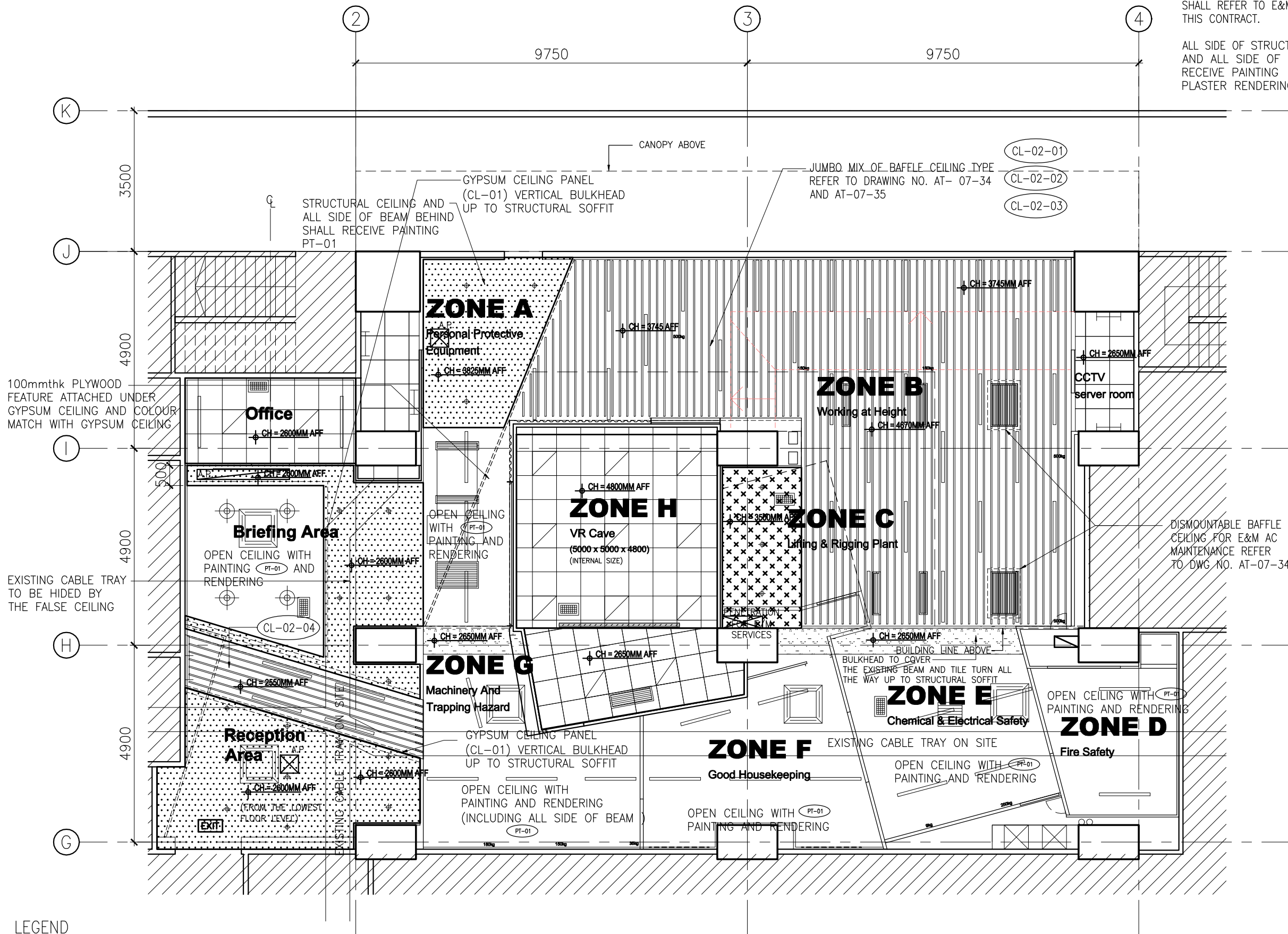
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TEL: (852) 2560 8811    FAX: (852) 2513 1828    WEB: [www.dca.com.hk](http://www.dca.com.hk)

CAD PATH	5. EXISTING SITE AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL – SAFETY EQUIPMENT LISTING
SCALE	A3 @ N.T.S.

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
LIST OF EXISTING TRAINING  
EQUIPMENT AT G/F FOR  
RELOCATION TO 2/F

DRAWING NO.	REV.
AT-01-32	
PROJECT NO.	DA17003



NOTE:  
THE LIGHT FIXTURE AS SHOWN ARE FOR  
TENTATIVE ONLY, ALL LIGHTINGS LAYOUT  
SHALL REFER TO E&M TENDER DRAWINGS OF  
THIS CONTRACT.

ALL SIDE OF STRUCTURAL CEILING SOFFIT  
AND ALL SIDE OF BEAMS SHALL RECEIVE  
RECEIVE PAINTING AND ASSOCIATE  
PLASTER RENDERING.

USE FIGURED DIMENSIONS. READ THE DRAWING IN  
CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT  
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REV. DATE & DESCRIPTION DRN CHK APP

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CAD PATH: QUANTITIES SET BY NAME CHANGE OF TRAINING CENTRE - 000000  
CONSTRUCTION CONTRACT/WORKING/00-00-000000-00-000000-00-000000-00-000000

SCALE: **A3 @ 1:100**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**G/F - REFLECTED CEILING AND  
FINISHES PLAN**

DRAWING NO. **AT-02-01** REV.  
PROJECT NO. **DA17003**

- LEGEND**
- |  |                                         |  |                                                |  |                                                                           |  |                            |
|--|-----------------------------------------|--|------------------------------------------------|--|---------------------------------------------------------------------------|--|----------------------------|
|  | CL-01 GYPSUM BOARD CEILING AS SPECIFIED |  | CL-03 600 X 600 ACOUSTIC CEILING AS SPECIFIED  |  | GYPSUM CEILING PANEL (CL-01) VERTICAL BULKHEAD UP TO STRUCTURAL SOFFIT    |  | A.P. 450x450 ACCESS PANEL  |
|  | WL-01 TILE AS SPECIFIED                 |  | CL-02-xx ALUMINIUM BAFFLE CEILING AS SPECIFIED |  | FN-07 ALUMINIUM OPENING WITH LIGHT FIXTURE AND OTHER E&M SERVICES OPENING |  | A.P. 250x2300 ACCESS PANEL |





NOTES:

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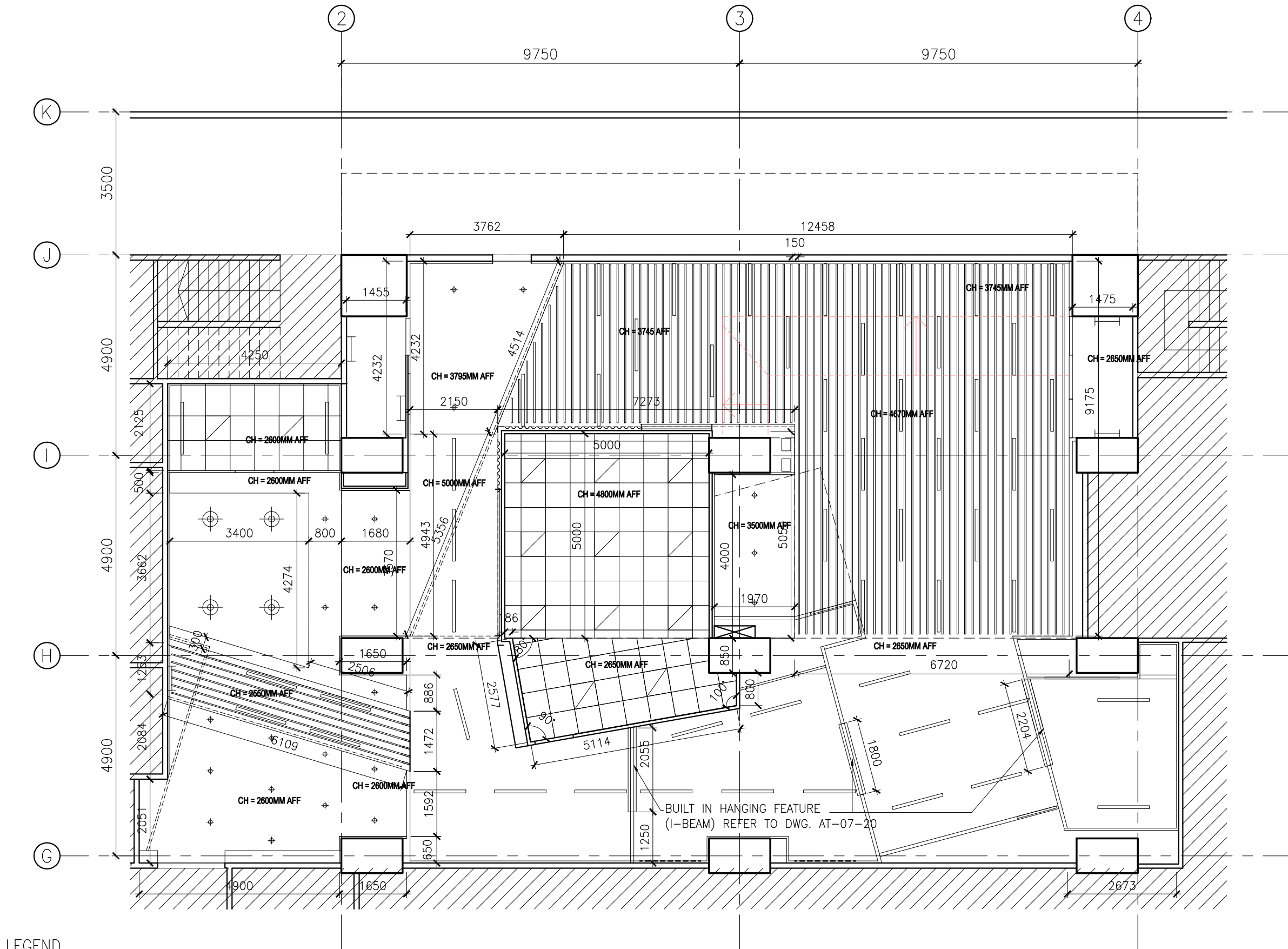
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SCALE: A3 @ 1:100

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

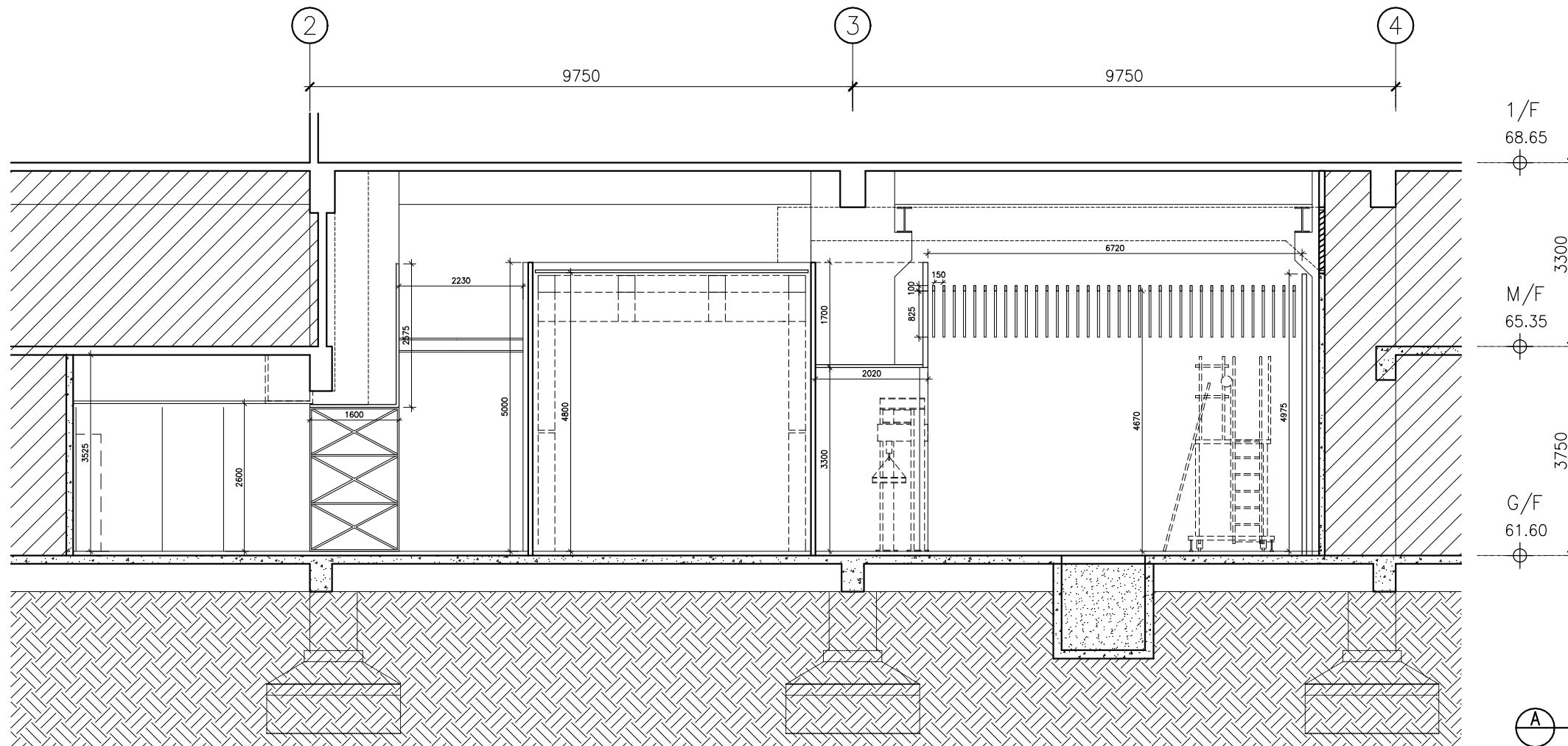
DRAWING TITLE  
G/F - CEILING DIMENSION PLAN

DRAWING NO. AT-02-02  
PROJECT NO. DA17003  
REV.

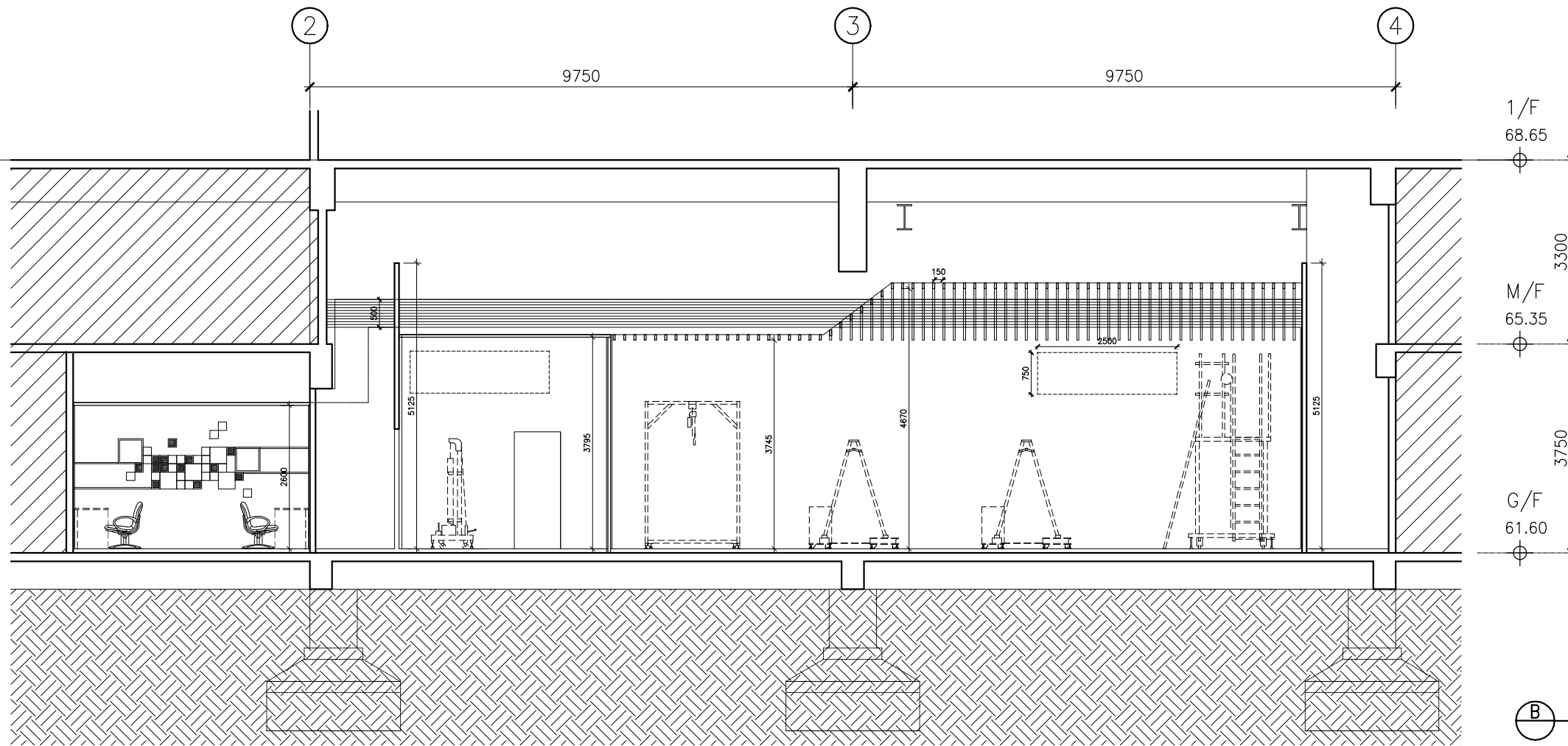


LEGEND

	CL-01 GYPSUM BOARD CEILING AS SPECIFIED		CL-03 600 X 600 ACOUSTIC CEILING AS SPECIFIED
	FN-03 TILE AS SPECIFIED		CL-02-xx ALUMINIUM BAFFLE CEILING AS SPECIFIED



**A** BUILDING SECTION A-A  
SCALE 1:100



**B** BUILDING SECTION B-B  
SCALE 1:100

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**TENDER DRAWING**

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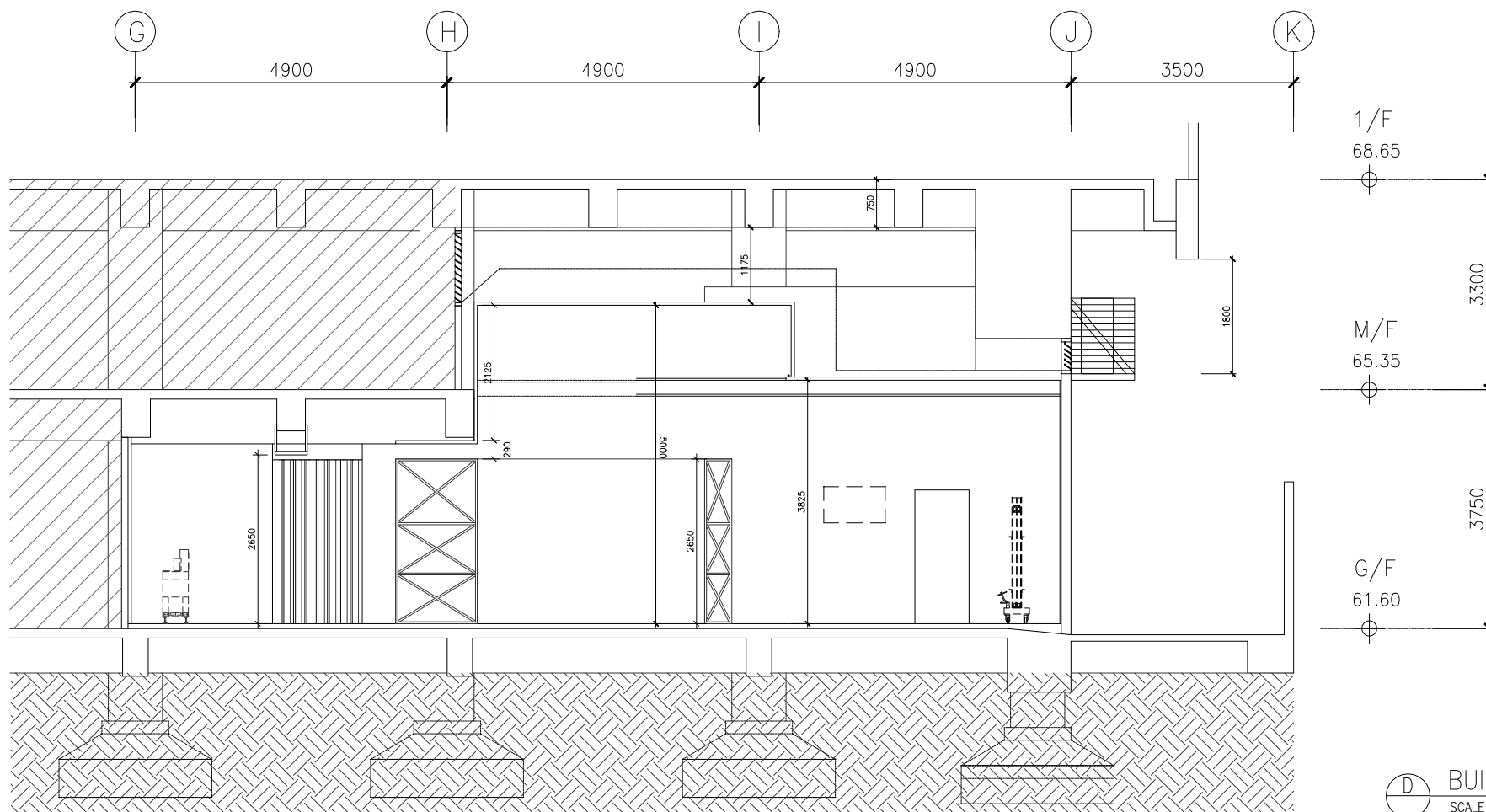
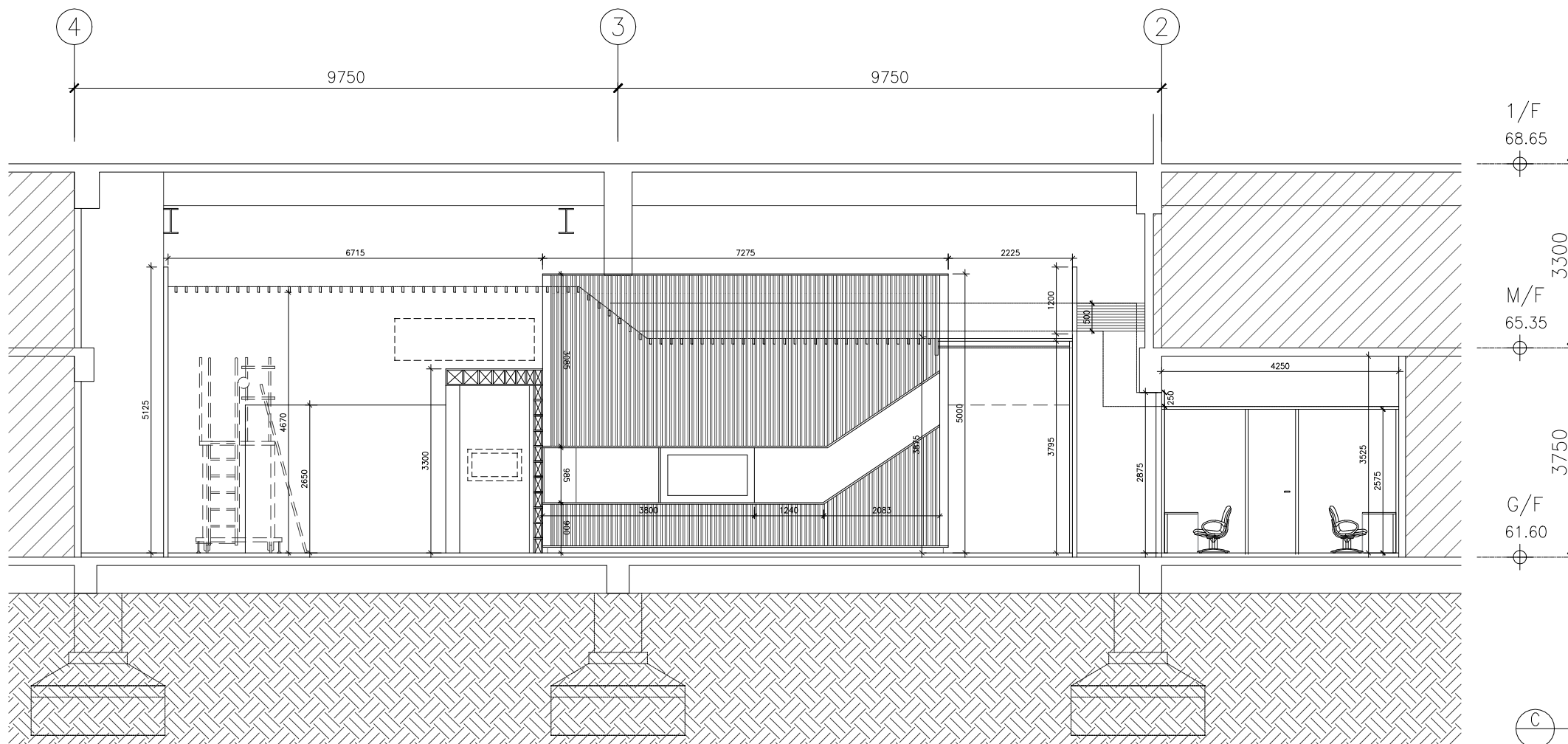
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CAD PATH: \DRAWING\PROJECT\AT-03\BUILDING SECTION 1 TO 100  
SCALE: A3 @ 1:100

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**BUILDING SECTION 1**

DRAWING NO. **AT-03-01** REV.  
PROJECT NO. **DA17003**



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CAD PATH: QUANTITIES SET BY KIM CHANG CEE TRAINING CENTRE - CIPAC  
CONSTRUCTION CONTRACT DRAWING AT-03 SECTION AND QUANTITIES AT-03-01  
BY AT-03-01 BUILDING SECTION 1 TO 1000

SCALE: **A3 @ 1:100**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**BUILDING SECTION 2**

DRAWING NO. <b>AT-03-02</b>	REV.
PROJECT NO. <b>DA17003</b>	

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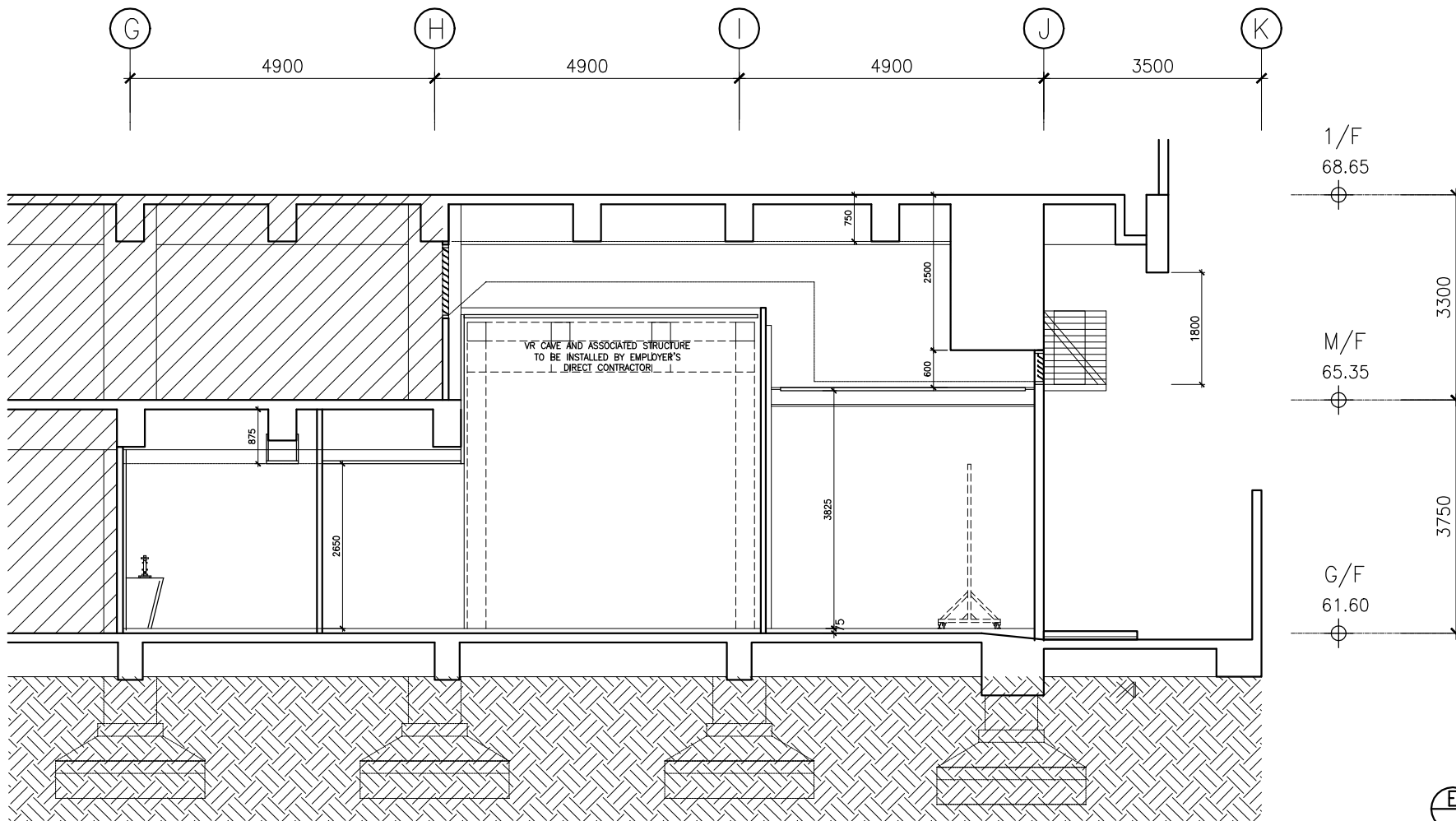
CLIENT



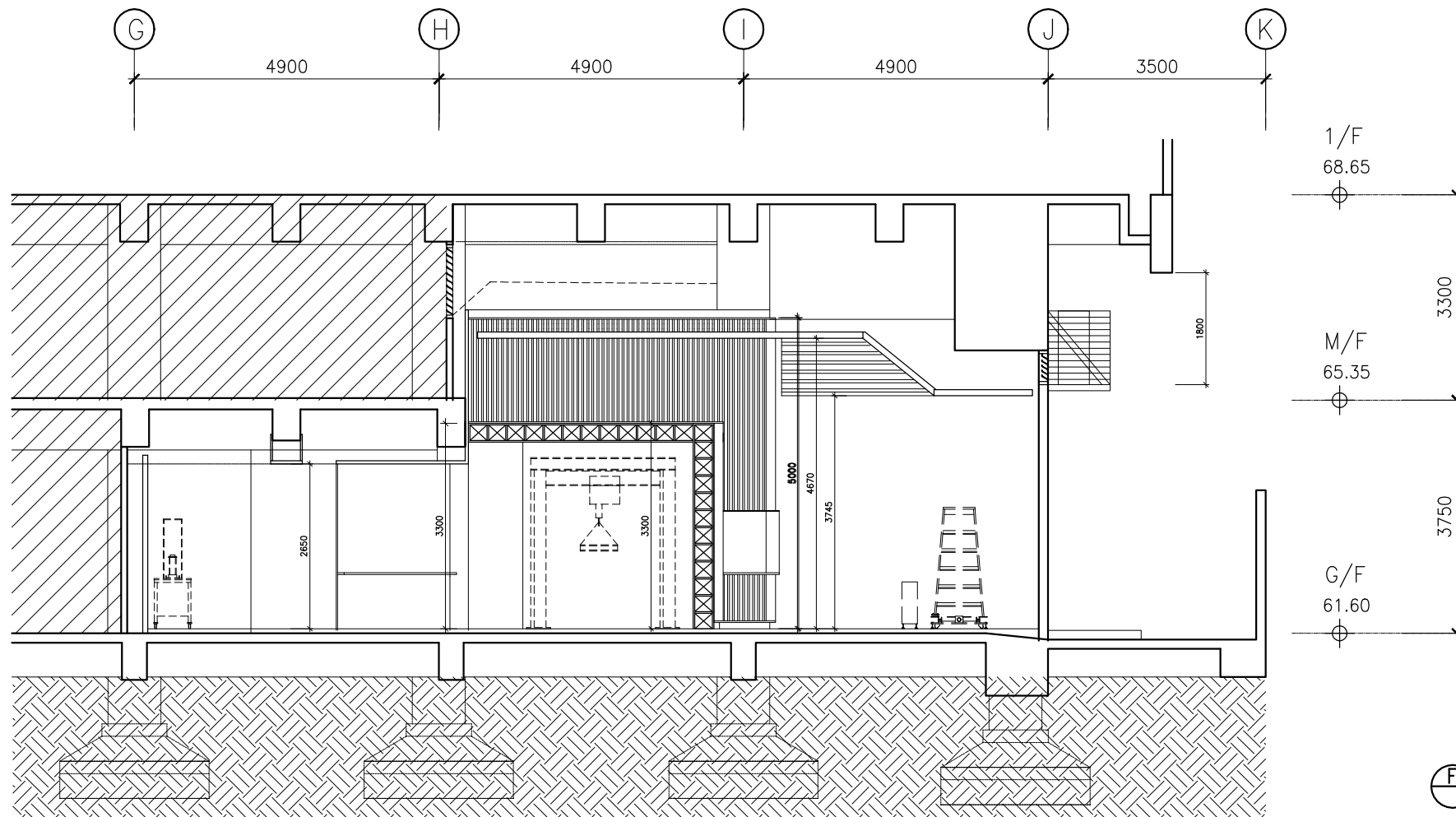
REV. DATE & DESCRIPTION DRN CHK APP

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**E BUILDING SECTION E-E**  
SCALE 1:100



**F BUILDING SECTION F-F**  
SCALE 1:100

**TENDER DRAWING**

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CAD PATH: C:\PROJECTS\AT-03-03\BUILDING SECTION F-F TO L2000.dwg  
SIGNATURE: [Signature] DATE: 2016-08-04

SCALE: A3 @ 1:100

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

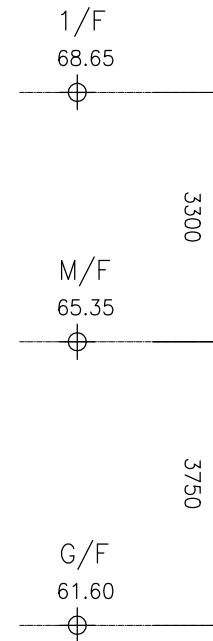
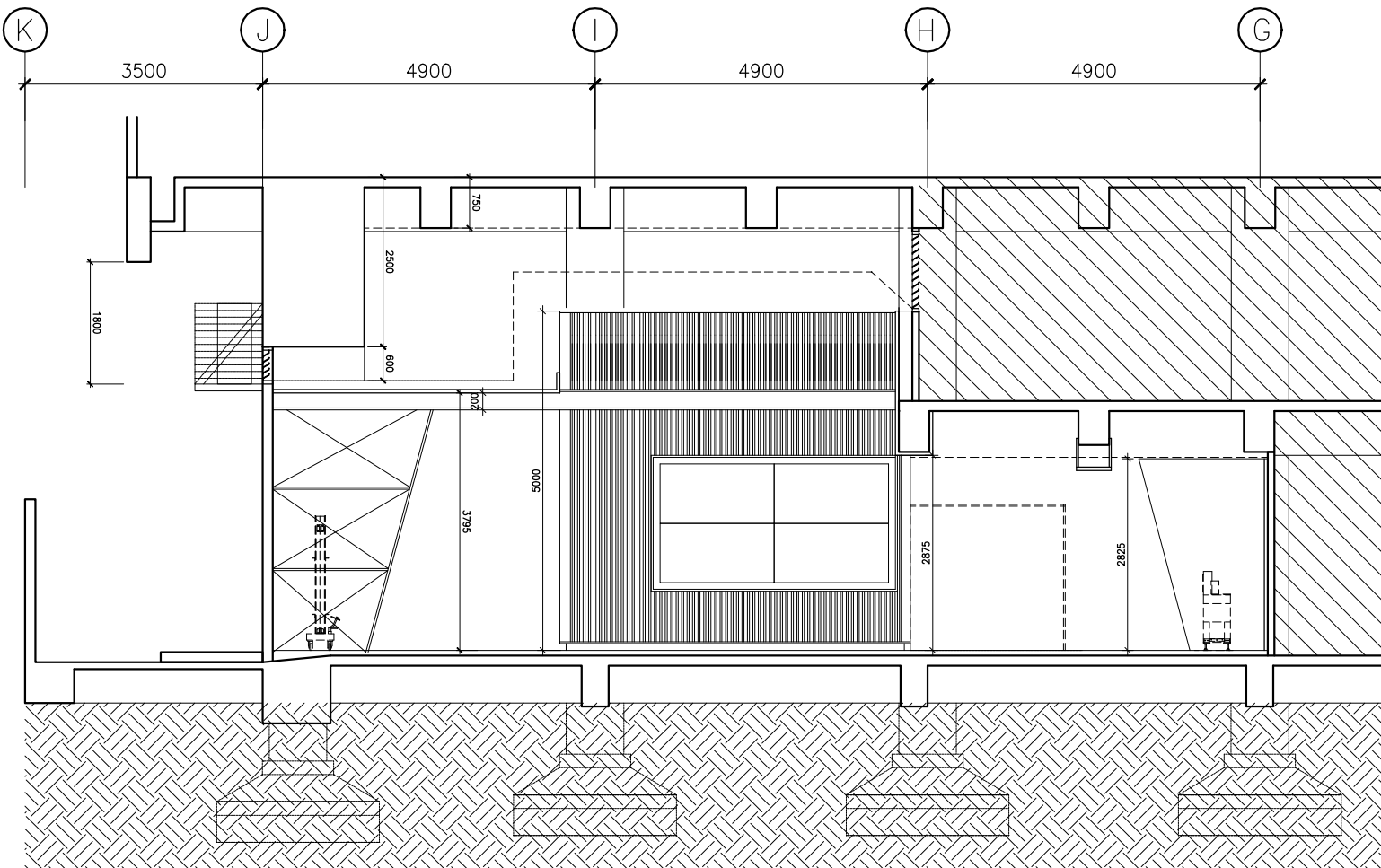
DRAWING TITLE:  
**BUILDING SECTION 3**

DRAWING NO.	REV.
<b>AT-03-03</b>	
PROJECT NO.	<b>DA17003</b>

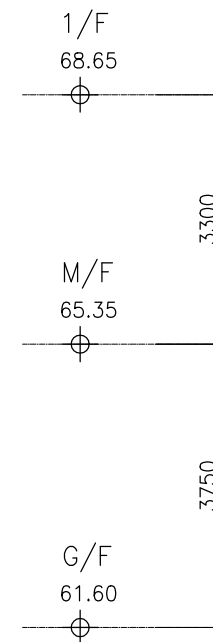
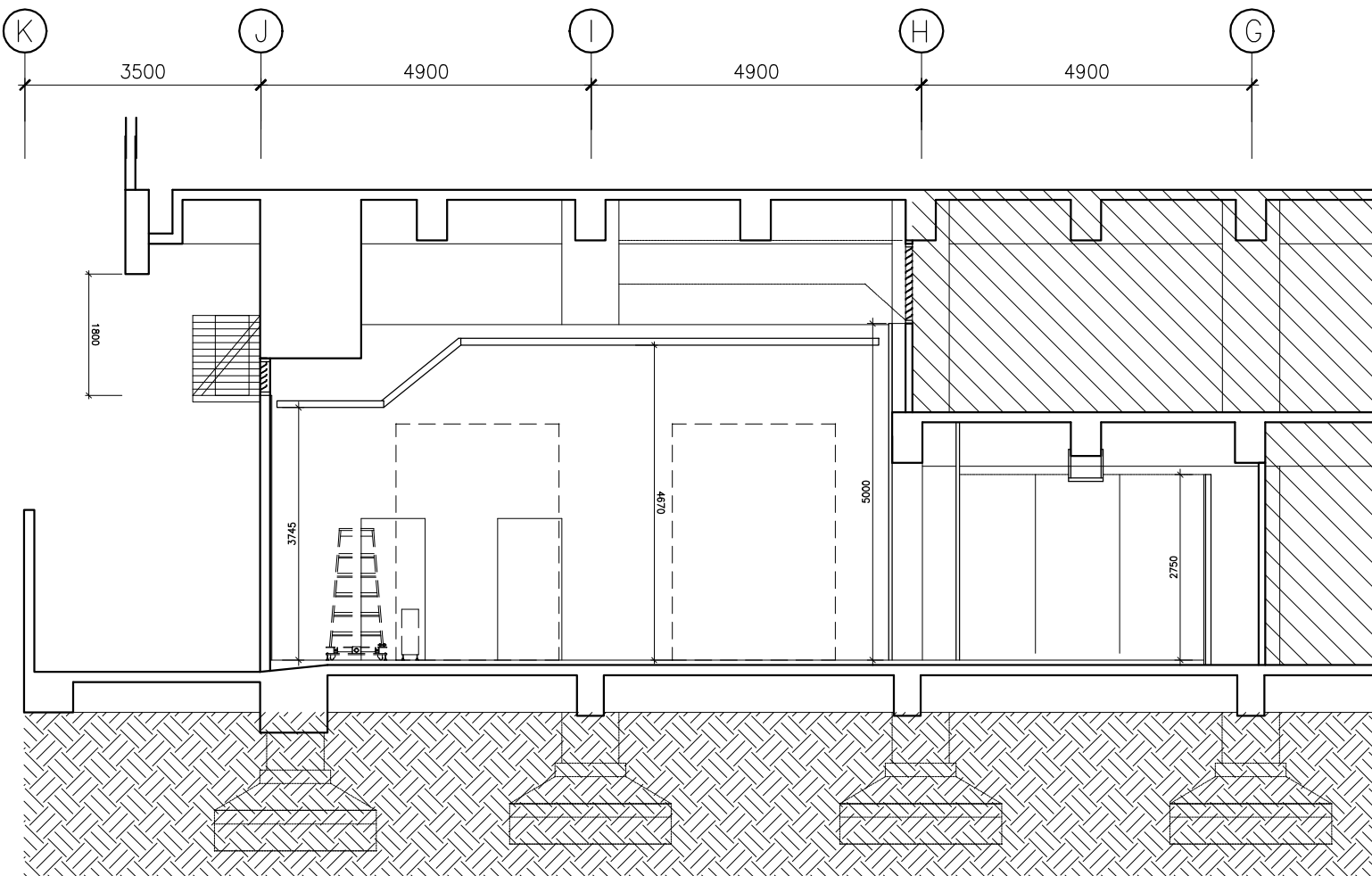


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**G BUILDING SECTION G-G**  
SCALE 1:100



**H BUILDING SECTION H-H**  
SCALE 1:100

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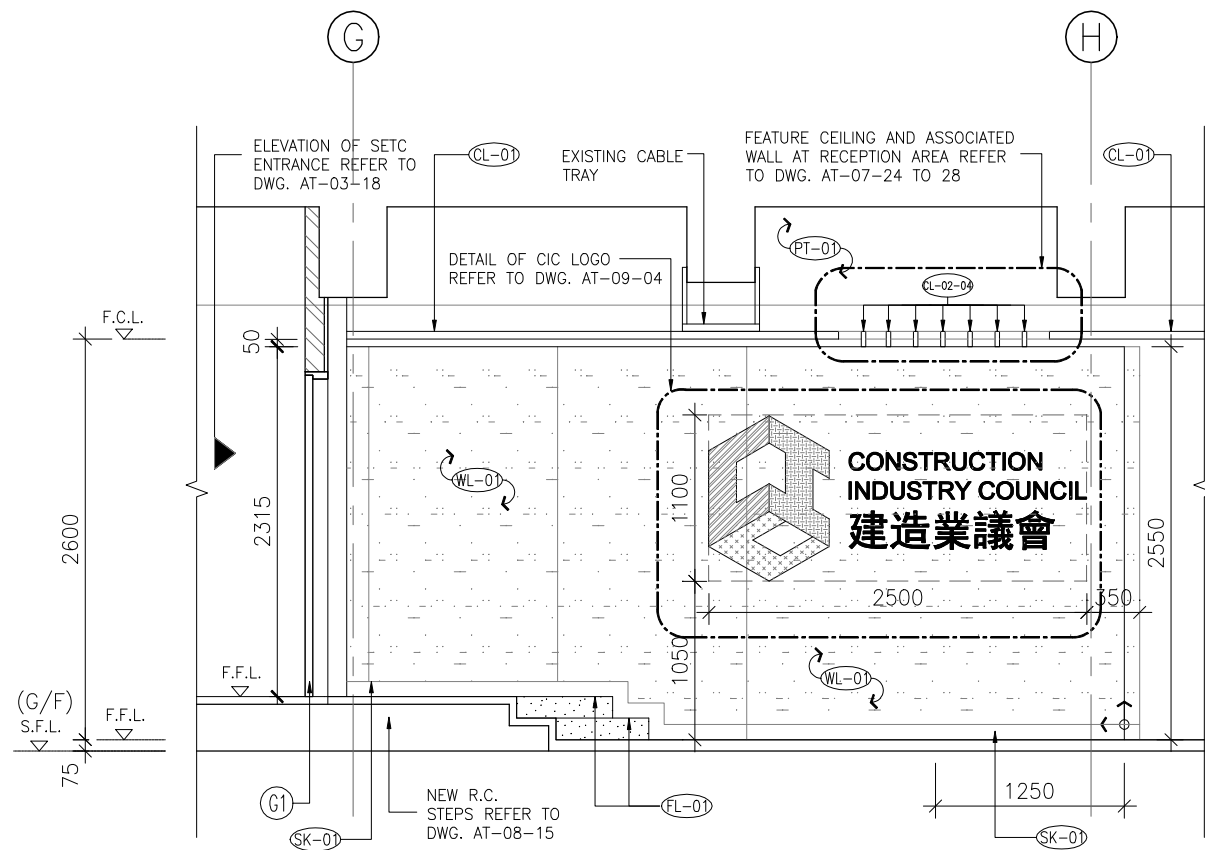
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SCALE: A3 @ 1:100

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

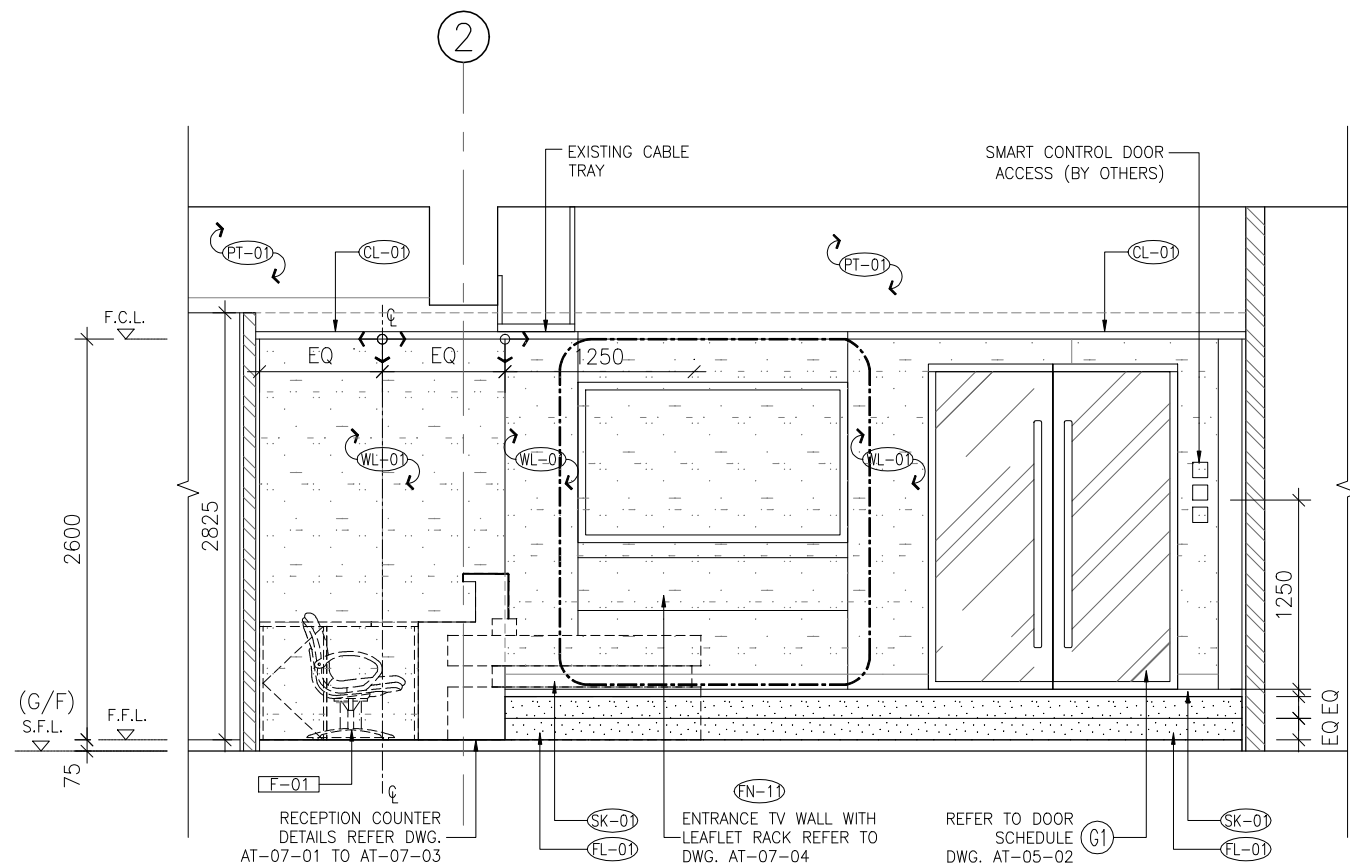
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**BUILDING SECTION 4**

DRAWING NO. **AT-03-04** REV.  
PROJECT NO. **DA17003**

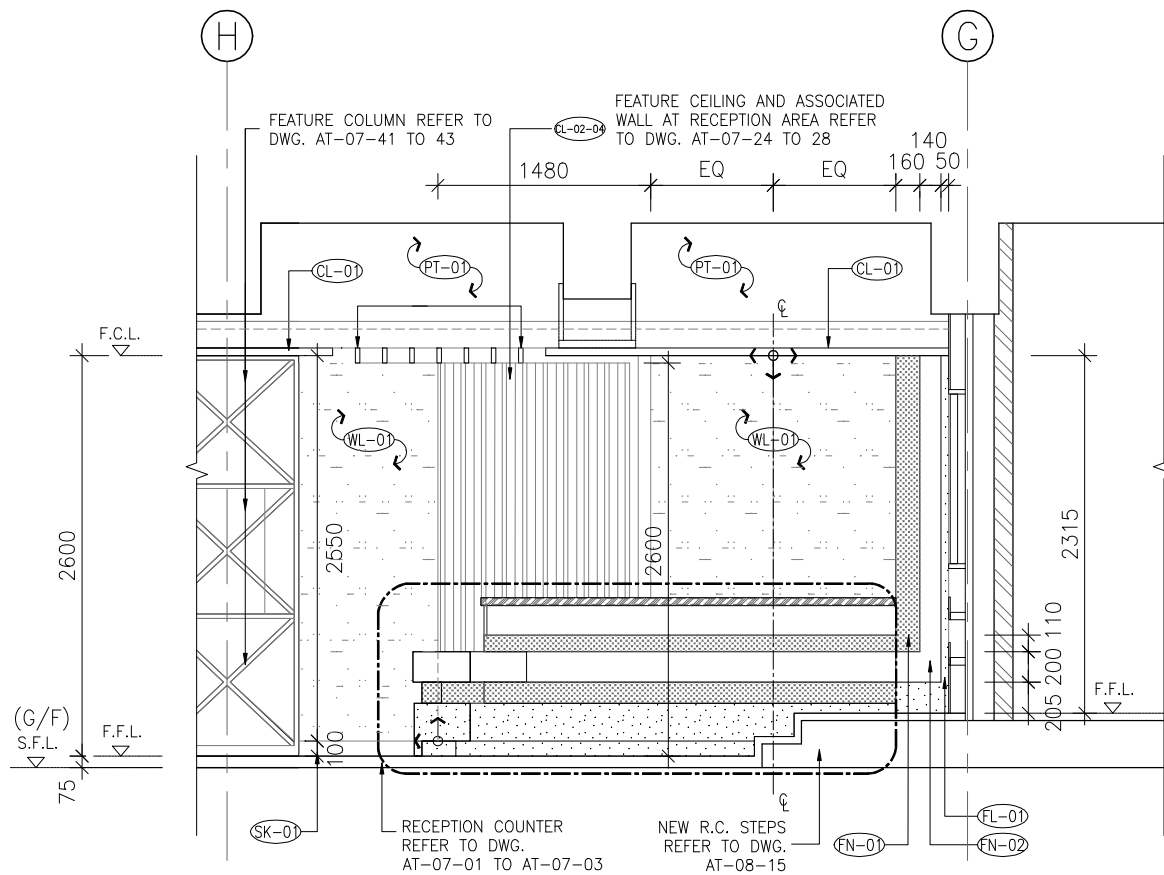




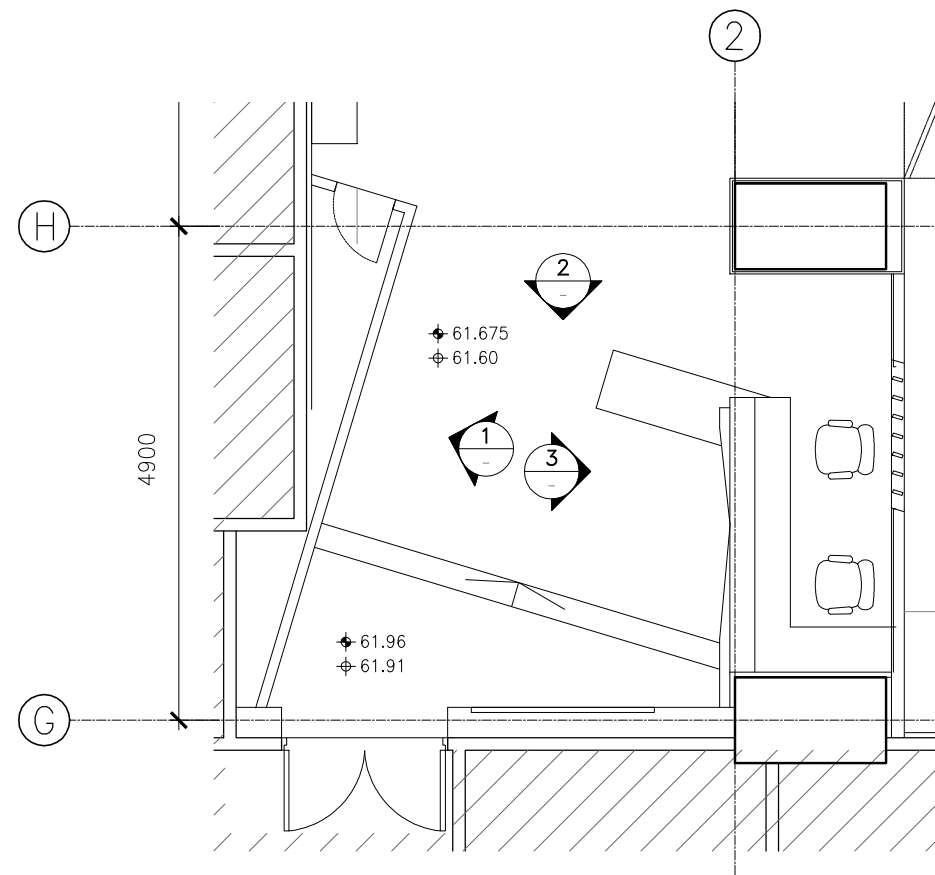
1 ELEVATION  
SCALE 1:50



2 ELEVATION  
SCALE 1:50



3 ELEVATION  
SCALE 1:50



A LAYOUT PLAN FOR RECEPTION AREA  
SCALE 1:75

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CAD PATH: QUANTITIES SET BY NEW CHANGE OF DRAWING SYSTEM - CADP  
-REVISIONS CORRECTED/REMOVED-AS NOTED AND QUANTITIES-AS-NO

SCALE **A3 @ 1:50**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**ELEVATIONS 1 - RECEPTION  
AREA**

DRAWING NO.	REV.
<b>AT-03-05</b>	
PROJECT NO.	<b>DA17003</b>

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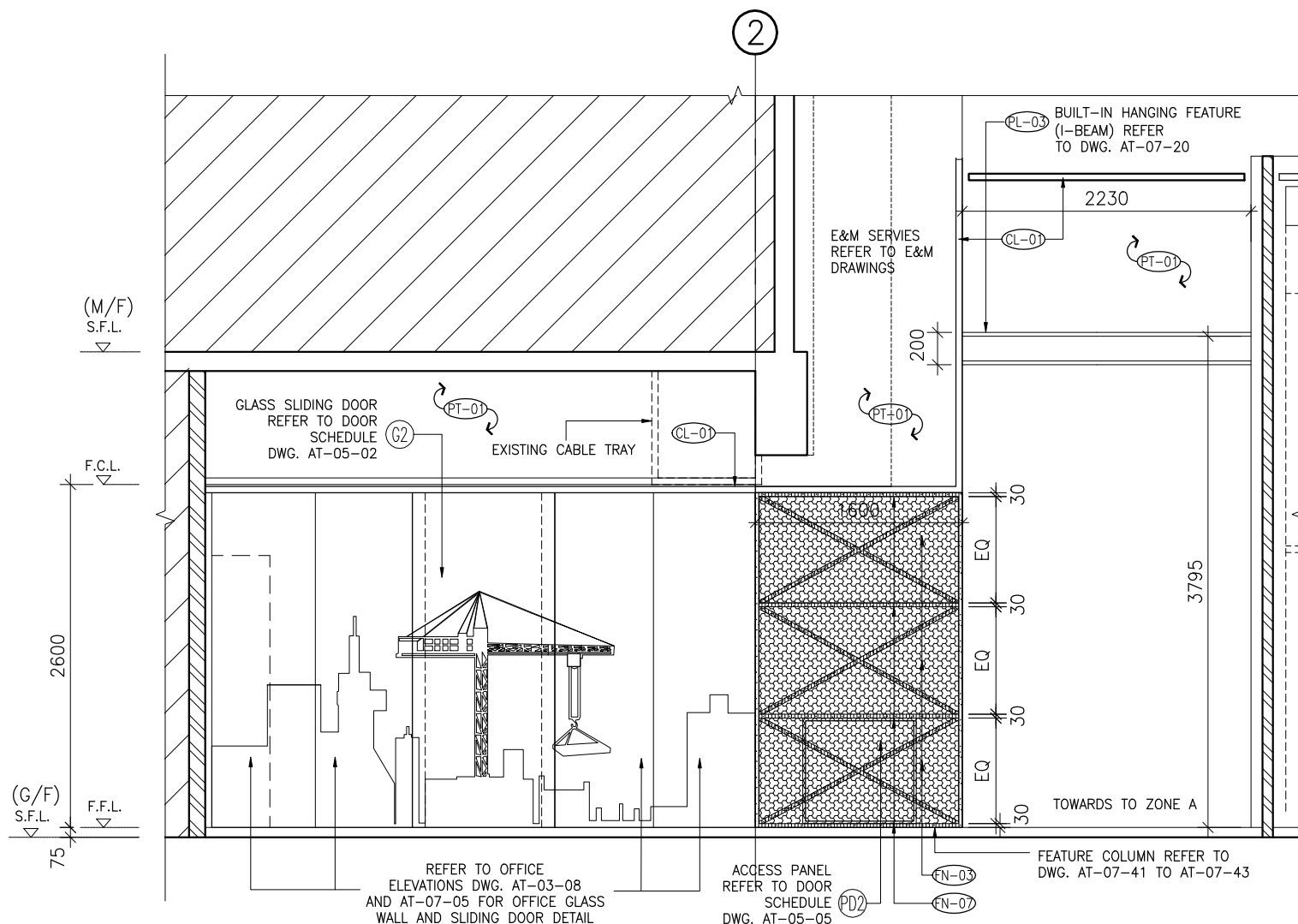
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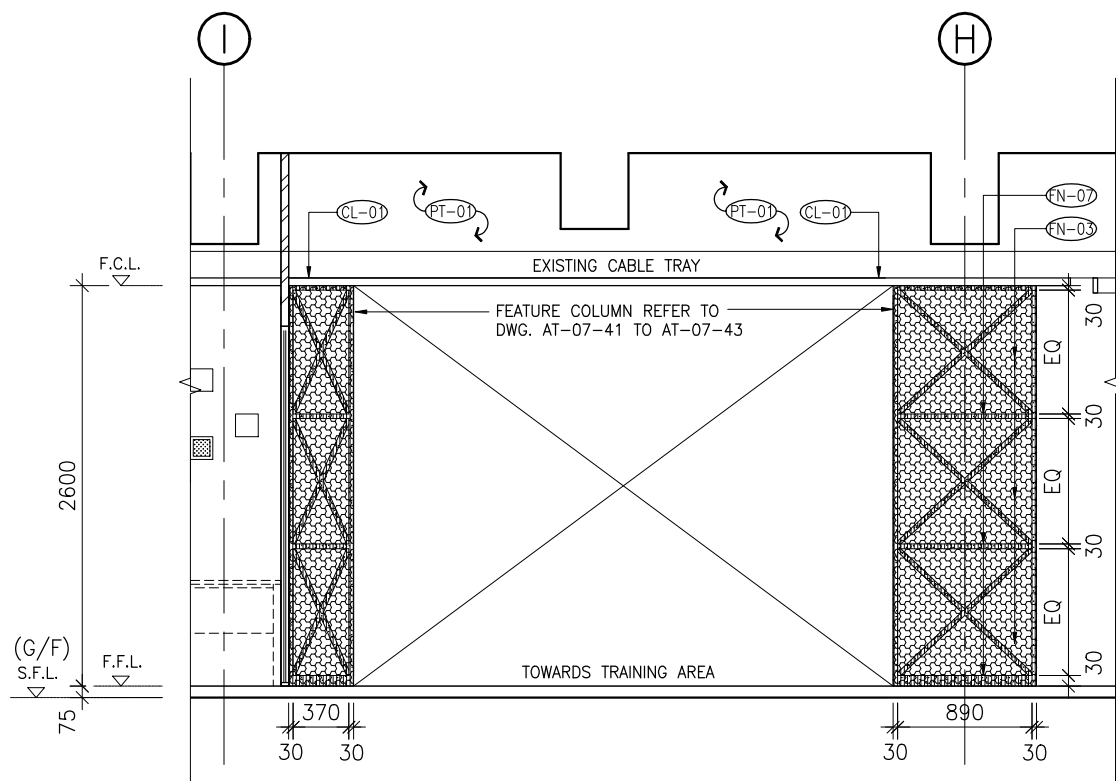
REV. DATE & DESCRIPTION DRN CHK APP

#### NOTES:

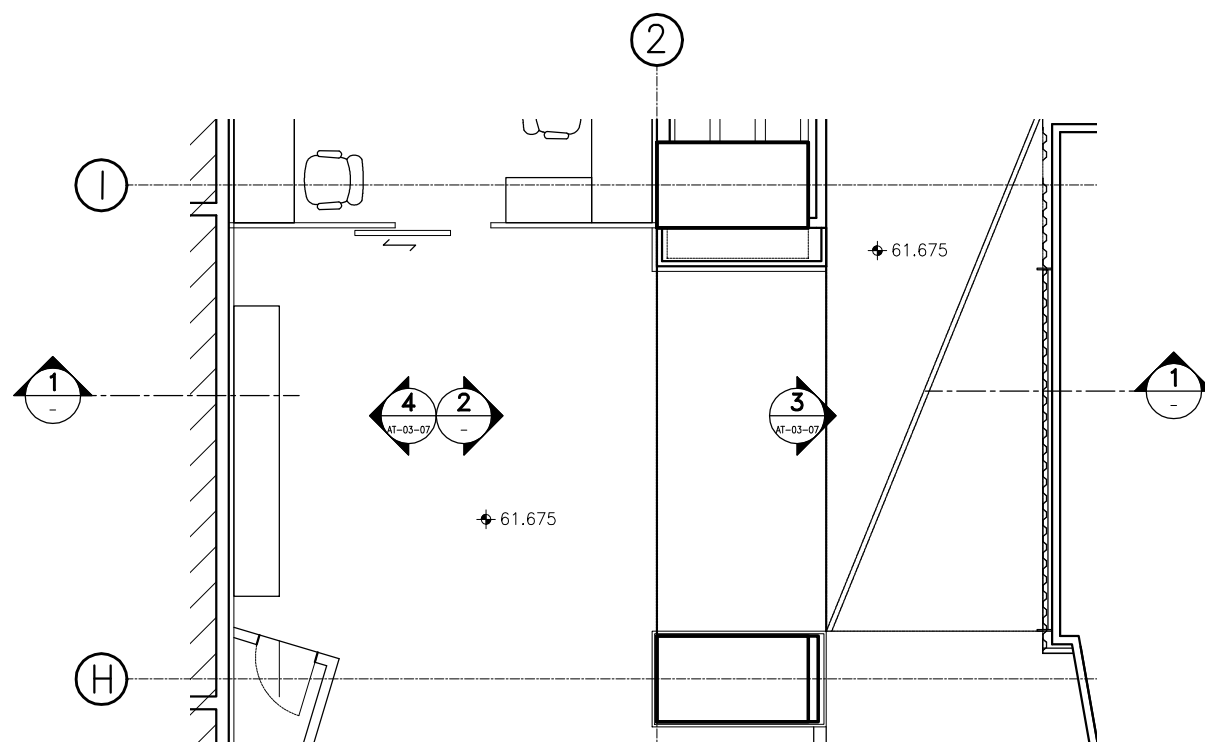
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**1 ELEVATION**  
SCALE 1:50



**2 ELEVATION**  
SCALE 1:50



**A LAYOUT PLAN FOR BRIEFING AREA**  
SCALE 1:75

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CAD PATH: \DRAWING\PROJECT\AT-03-06\2D\SECTION AND ELEVATIONS\AT-03-06-02.dwg

SCALE: A3 @ 1:50

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**ELEVATIONS 2 - BRIEF AREA**

DRAWING NO.	REV.
<b>AT-03-06</b>	
PROJECT NO.	<b>DA17003</b>



NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: SUBMITTED SETS OF NEW CHINESE TRAINING CENTRE - CONCEPT  
CONSTRUCTION CONTRACT DRAWINGS - 2D SECTION AND ELEVATIONS - 03-04  
TO AT-03-01 ELEVATIONS 3 - BRIEF AREA

SCALE A3 @ 1:50

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

ELEVATIONS 3 - BRIEF AREA

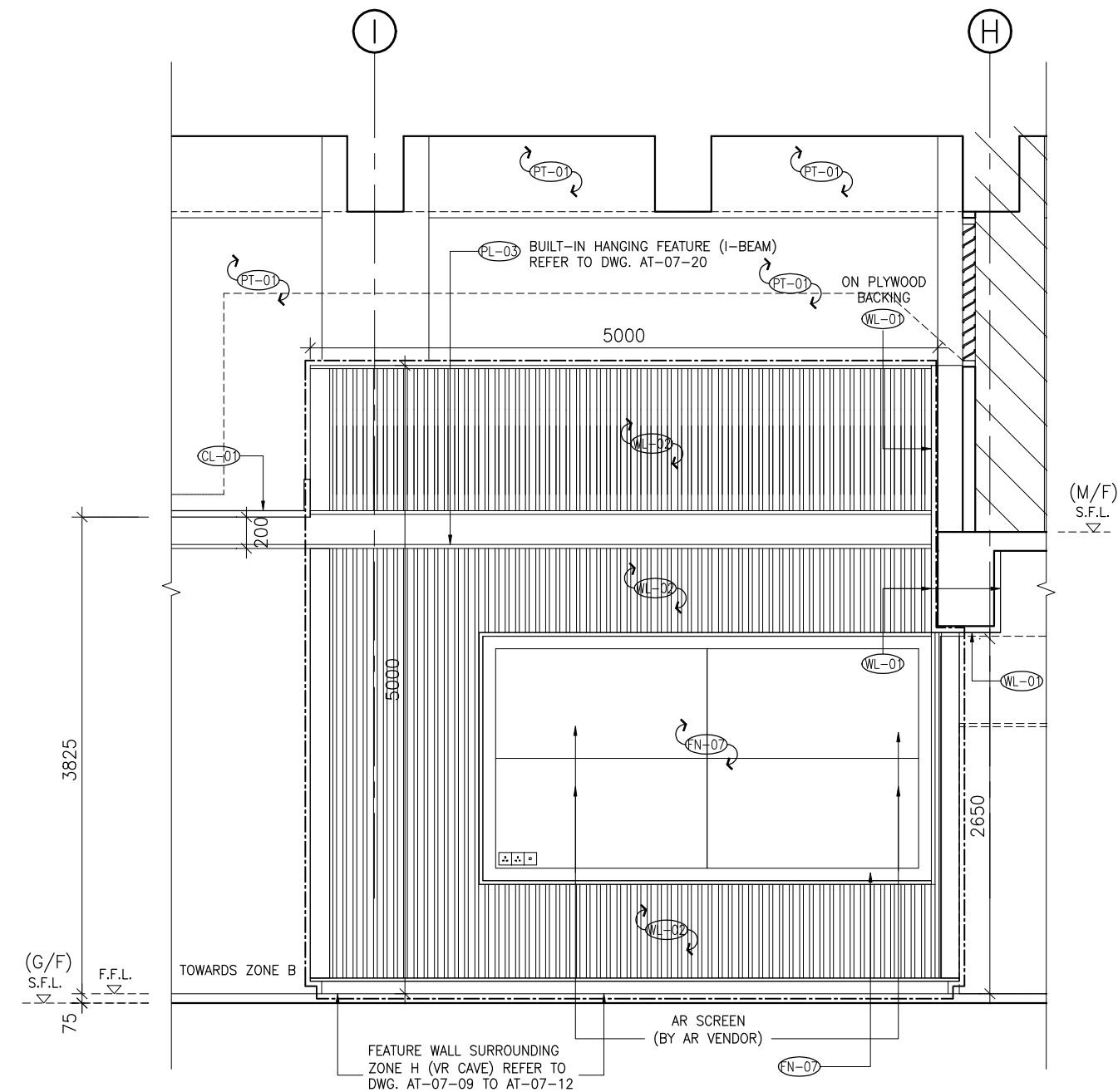
DRAWING NO.

AT-03-07

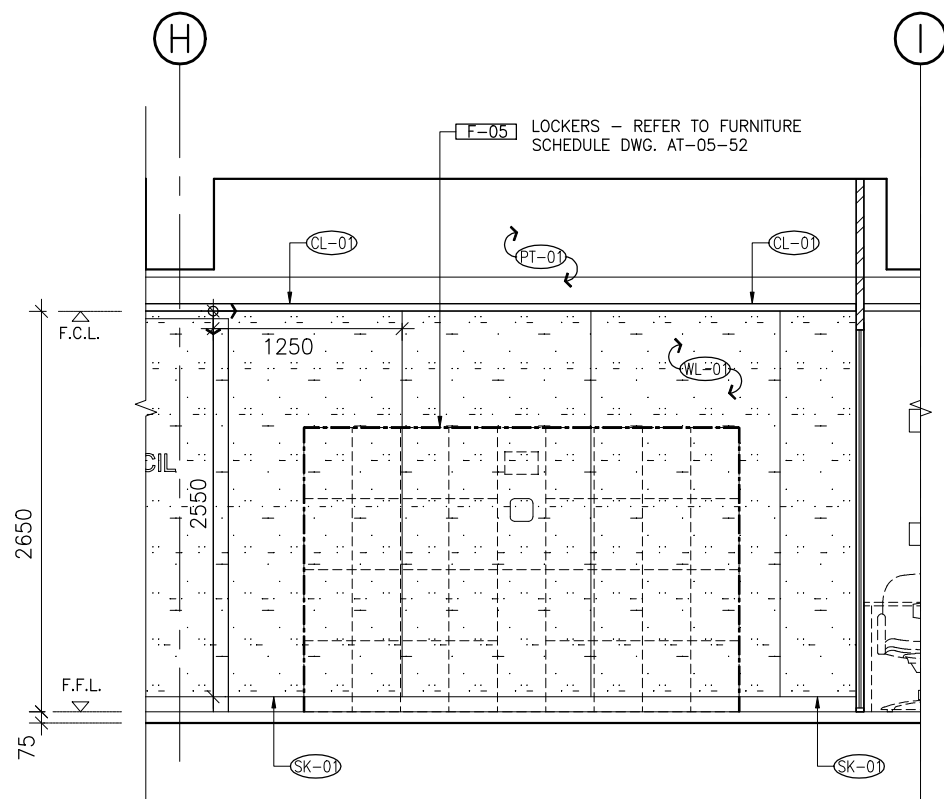
PROJECT NO.

DA17003

REV.



3 ELEVATION  
SCALE 1:50



4 ELEVATION  
SCALE 1:50



LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION  
WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED  
ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE  
RELATIVE TO HONG KONG PRINCIPAL DATUM.

UNLESS OTHER DRAWINGS EXTRACT FROM THE  
ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR  
EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.

ADEQUATE TEMPORARY MEASURES TO BE PROVIDED  
TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE  
INCLUDED IN THE CONTRACT.

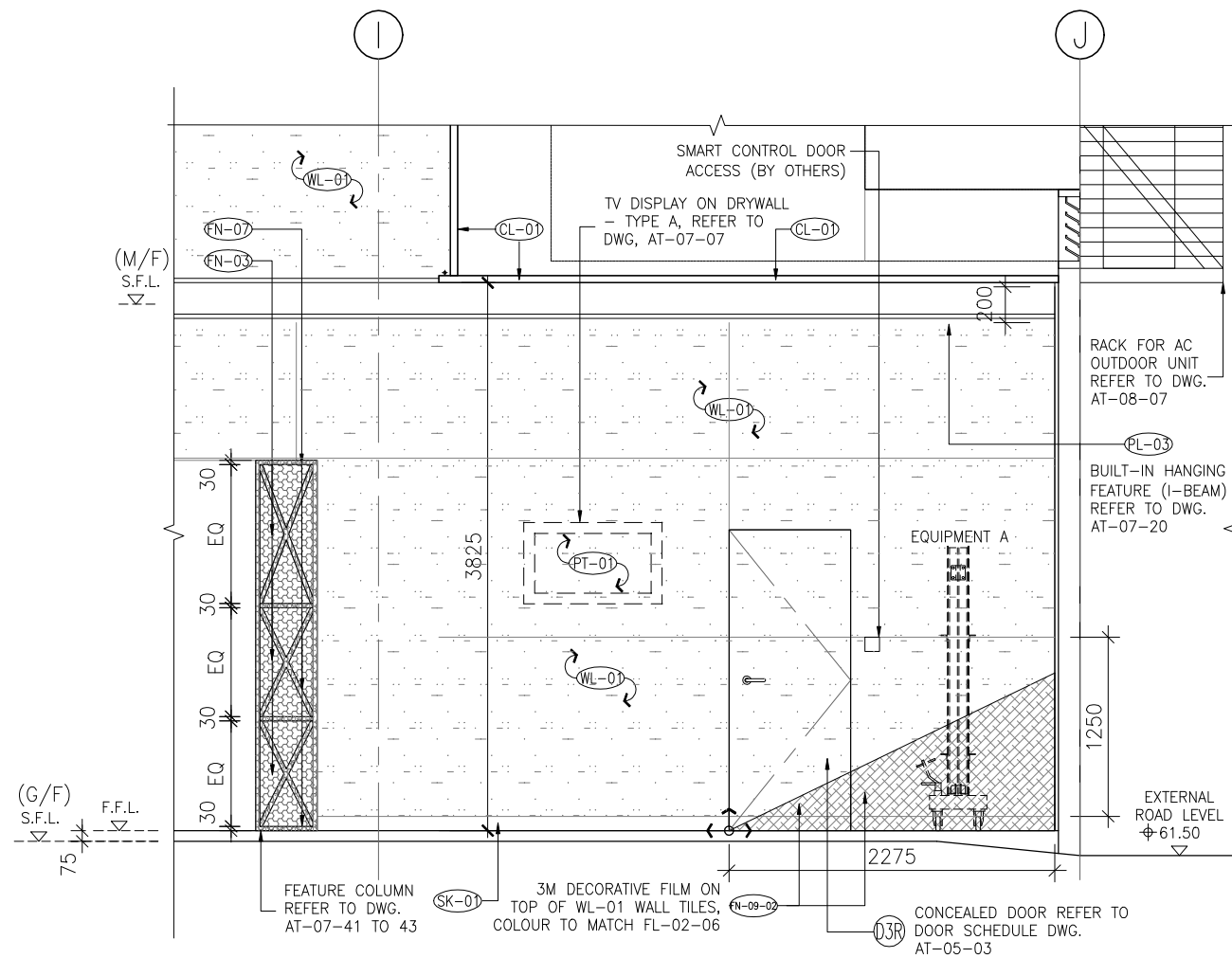
## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

SCALE                      A3 @ 1:50

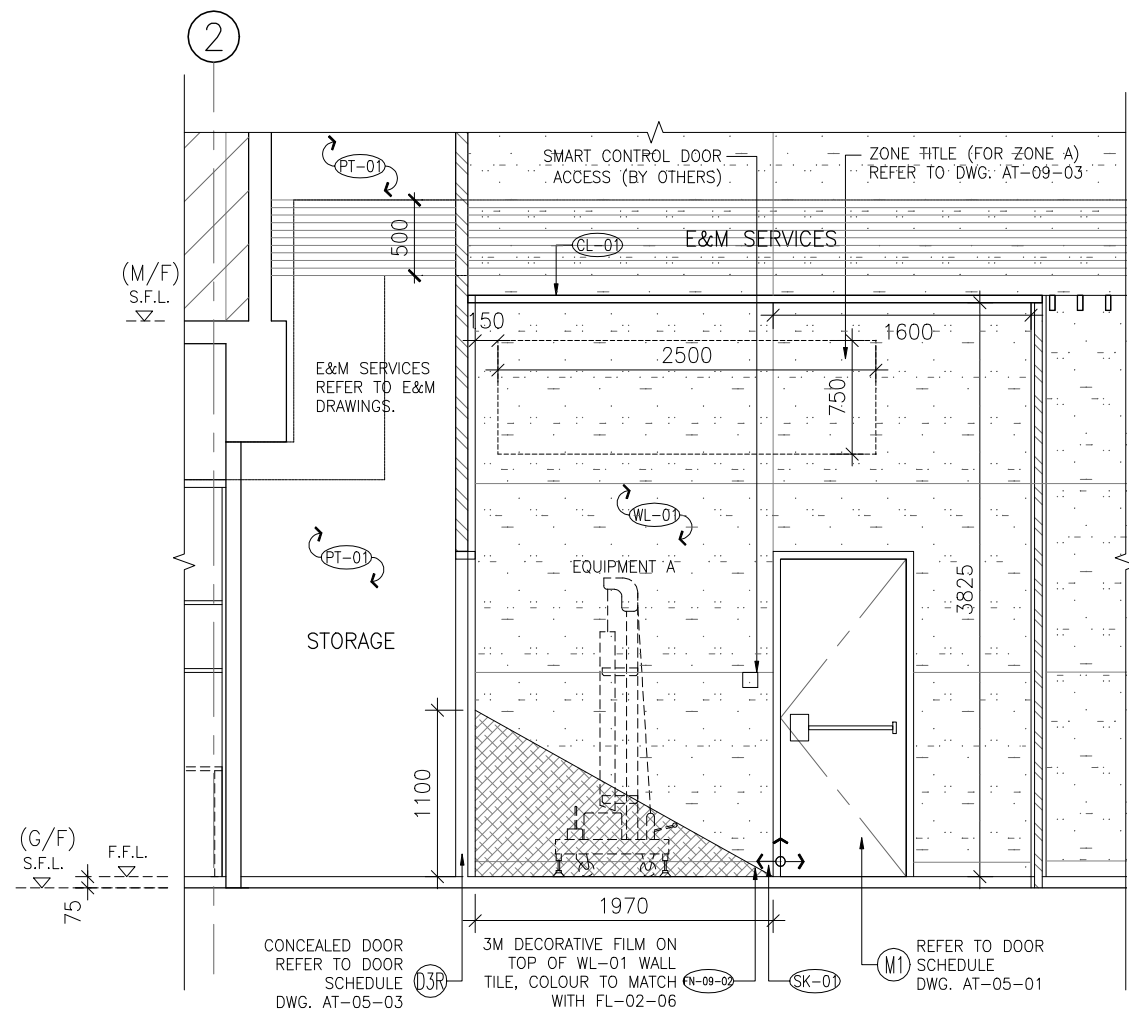
DRAWING TITLE  
**ELEVATIONS 4 - OFFICE**

DRAWING NO.		REV.
AT-03-08		
PROJECT NO.		DA17003

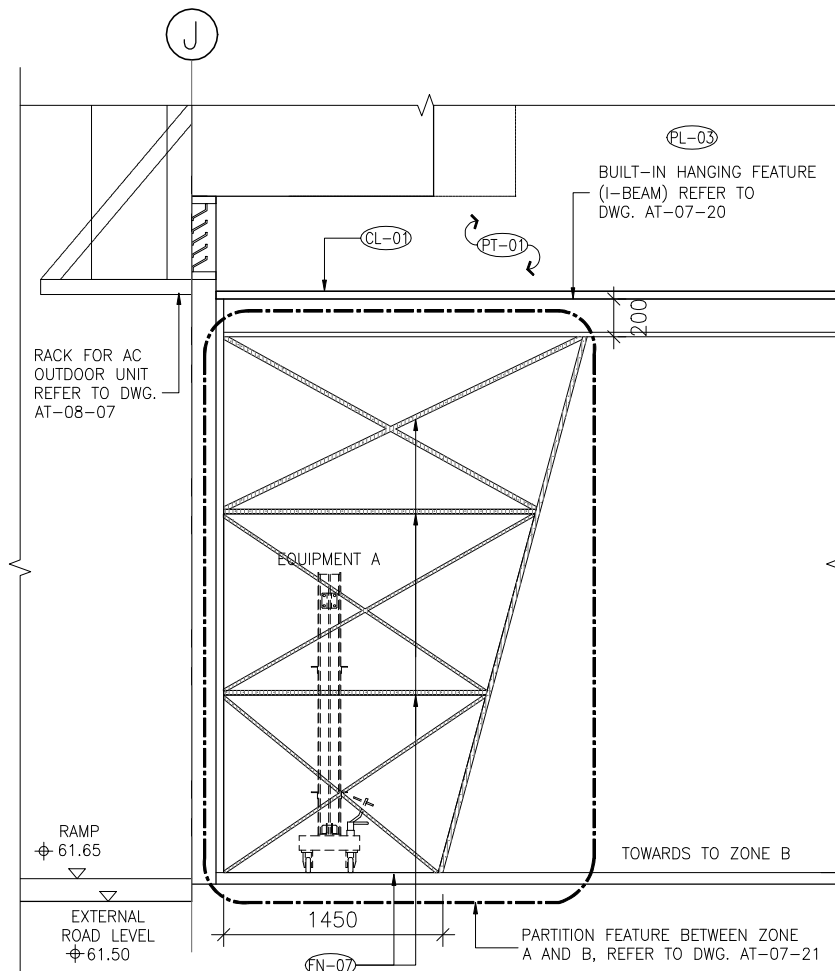




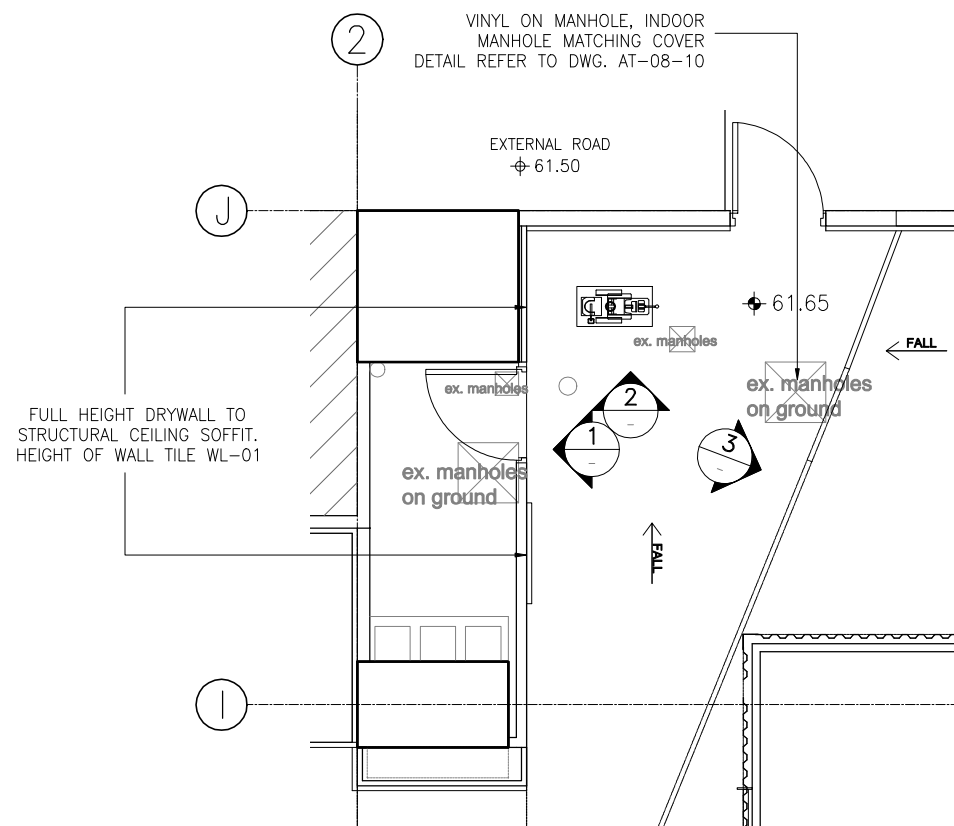
1 ELEVATION  
SCALE 1:50



2 ELEVATION  
SCALE 1:50



3 ELEVATION  
SCALE 1:50



A LAYOUT PLAN FOR ZONE A  
SCALE 1:75

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

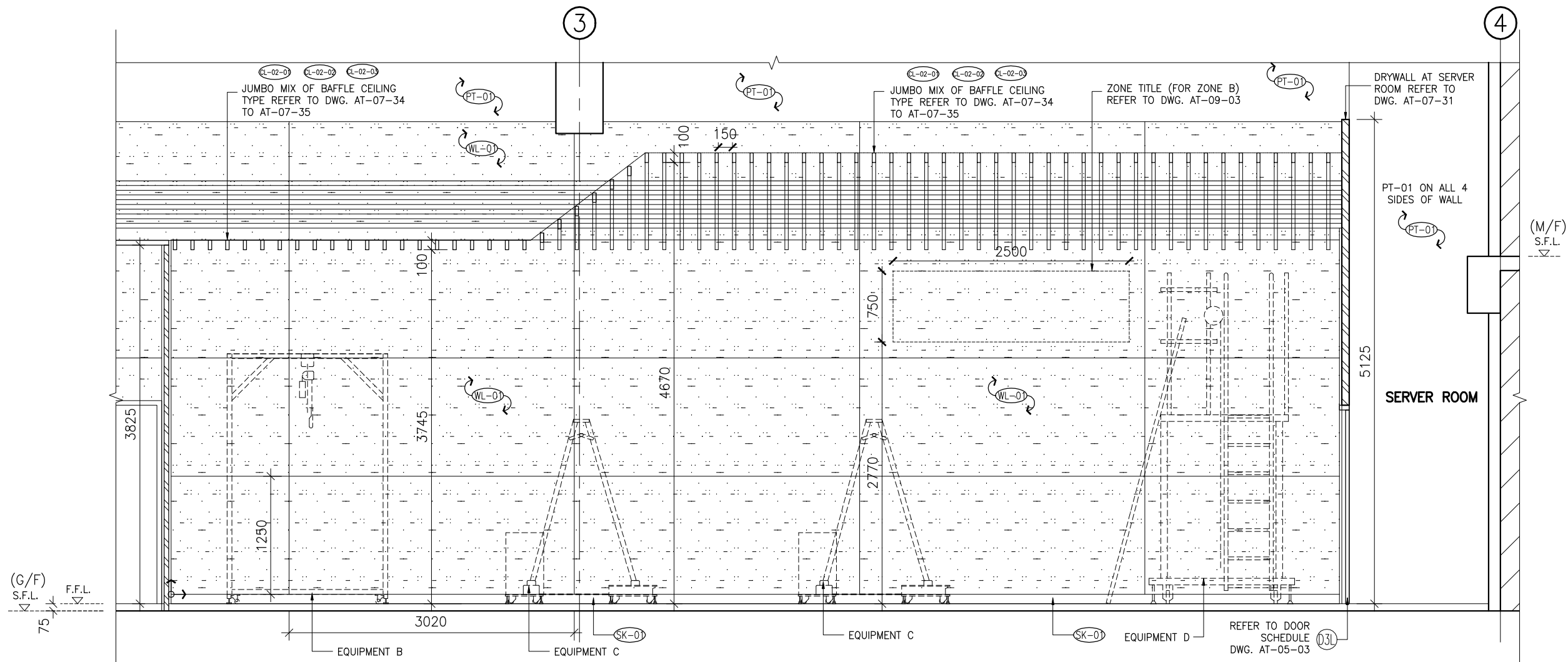
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: QUANTITY SURVEYOR OF NEW CHINESE TRADING COMPANY - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/ARCHITECT/MECHANICAL/PLUMBING/EL-01-01  
ELEVATIONS 5 - ZONE A/01  
SCALE: A3 @ 1:50

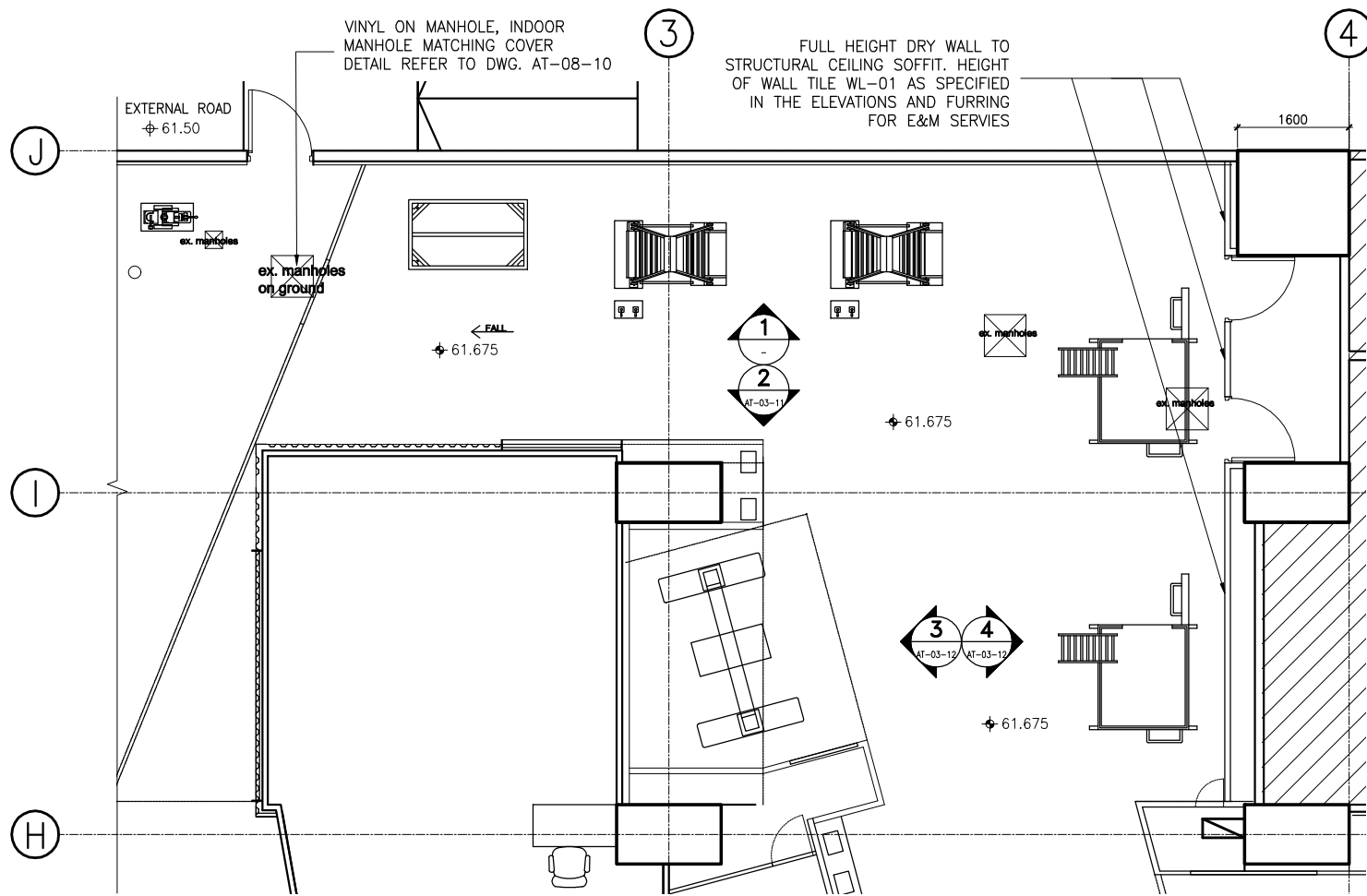
PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
ELEVATIONS 5 - ZONE A

DRAWING NO.	REV.
AT-03-09	
PROJECT NO.	DA17003



1 ELEVATION  
SCALE 1:50



A LAYOUT PLAN FOR ZONE B & C  
SCALE 1:100

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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- NOTES:**
- THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  - MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  - UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  - UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  - ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  - ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dael.com.hk

CAD PATH: QUANTITIES SET BY HONG CHANG CEE TRADING COMPANY - CIVIL  
STRUCTURAL CONSULTING/ENGINEERING/ARCHITECTURE AND PLANNING/48-10  
TO AT-03-12 ELEVATIONS 5 & 6 - ZONE B AND C/06

SCALE **A3 @ 1:50**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**ELEVATIONS 6 - ZONE B & C**

DRAWING NO.	REV.
<b>AT-03-10</b>	
PROJECT NO.	<b>DA17003</b>

LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.

UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.

ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\DA17003 SEC AT KNN CHNG CC TRAINING CENTRE\1 - CAG\C  
-TENDER\MAN CONTRACT\WORKING\AT-03 SECTIONS AND ELEVATIONS\AT-03-10  
TO AT-03-12 ELEVATIONS 5 & 6 - ZONE B AND C.DWG

SCALE                      A3 @ 1:50

DRAWING TITLE  
**ELEVATIONS 7 - ZONE B & C**

DRAWING NO.	REV.
<b>AT-03-11</b>	
PROJECT NO.	<b>DA17003</b>



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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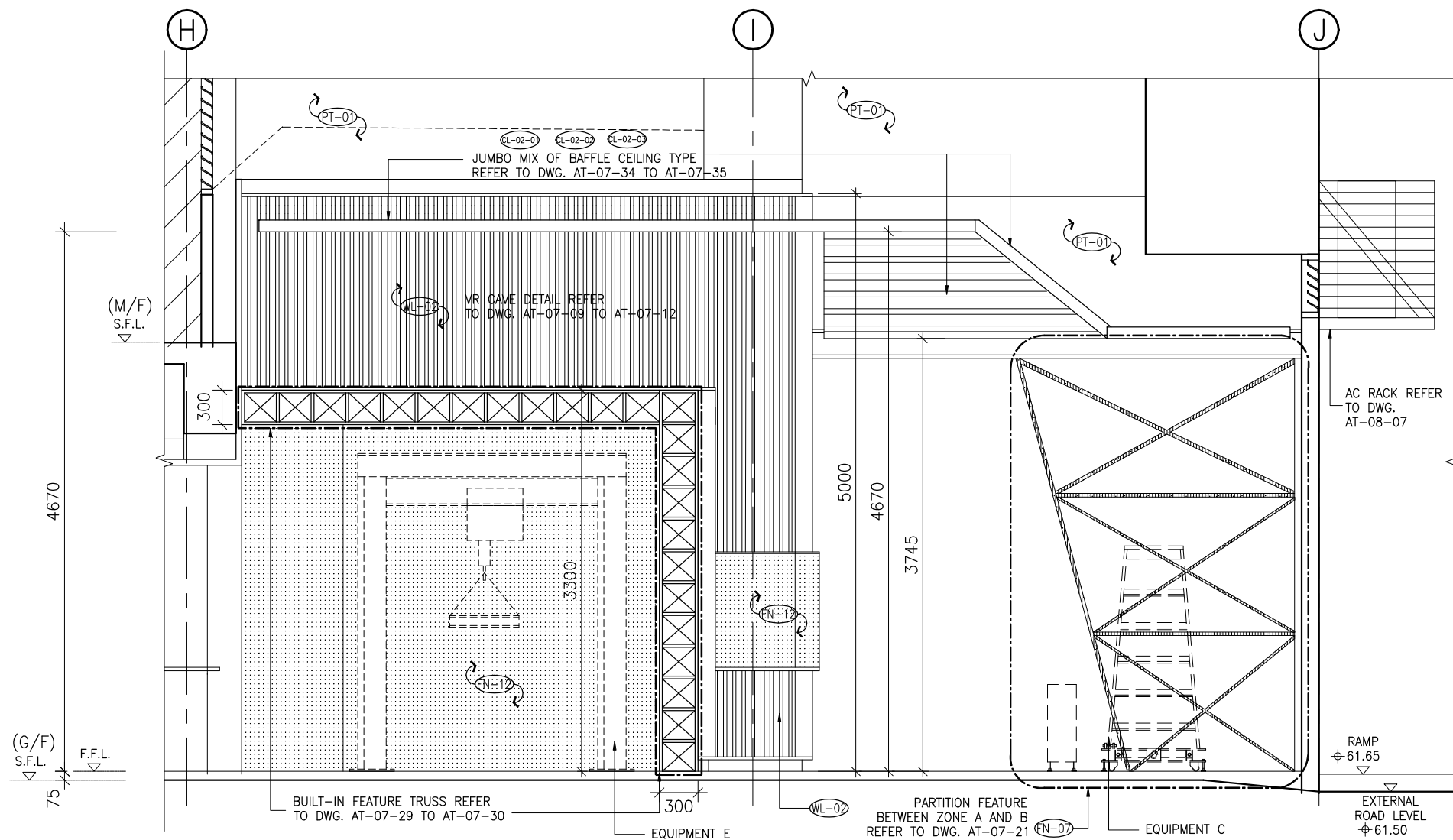
CLIENT



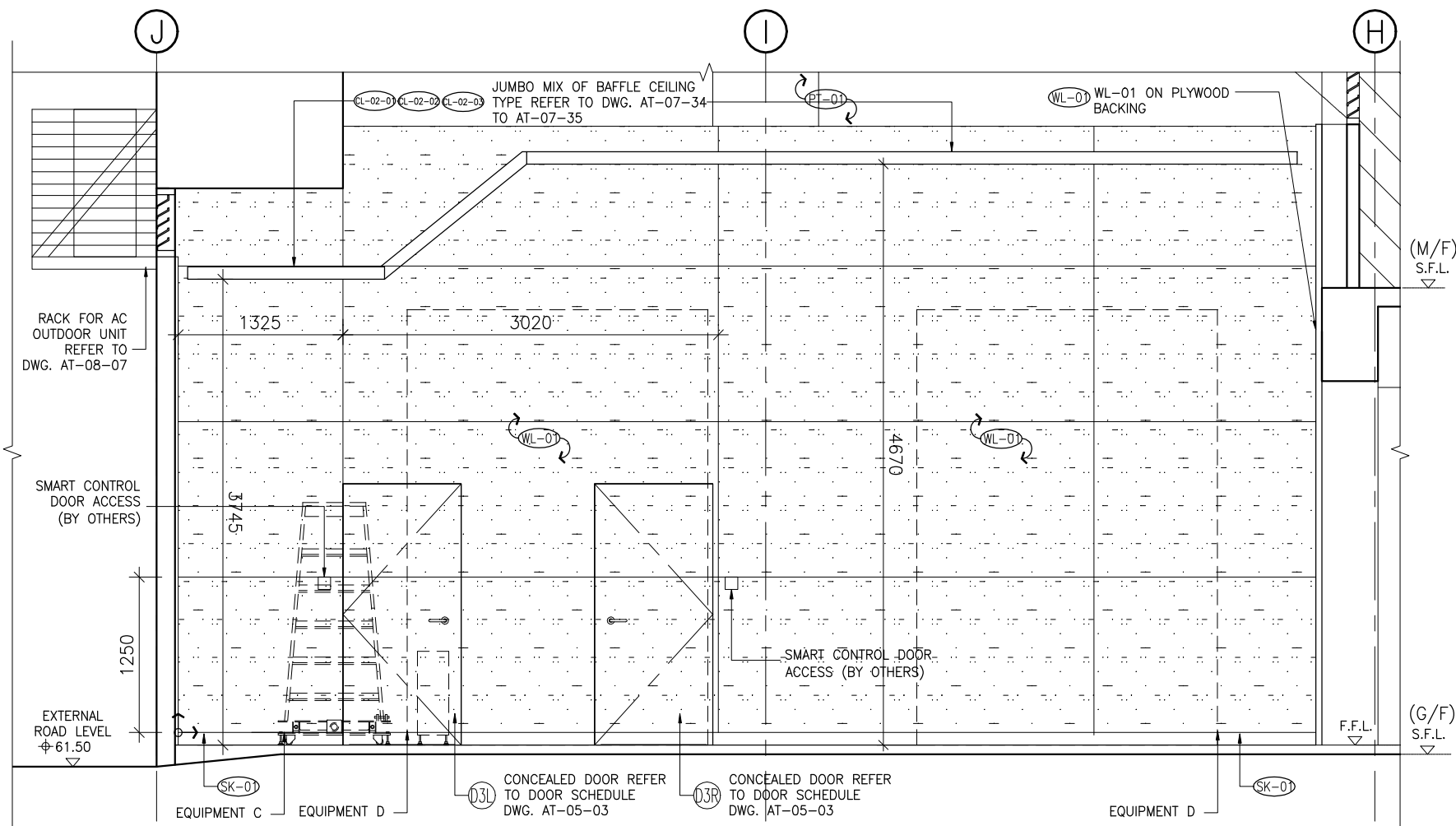
REV. DATE & DESCRIPTION DRN CHK APP

#### NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
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3 ELEVATION  
SCALE 1:50



4 ELEVATION  
SCALE 1:50

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: QUANTITIES SET BY KIM CHANG CEE TRAINING CENTRE - CIVIL  
CONSTRUCTION CONTRACT DRAWING SET-03 SECTION AND ELEVATIONS-08-10  
TO AT-05-12 ELEVATIONS 3 & 4 - ZONE B AND C

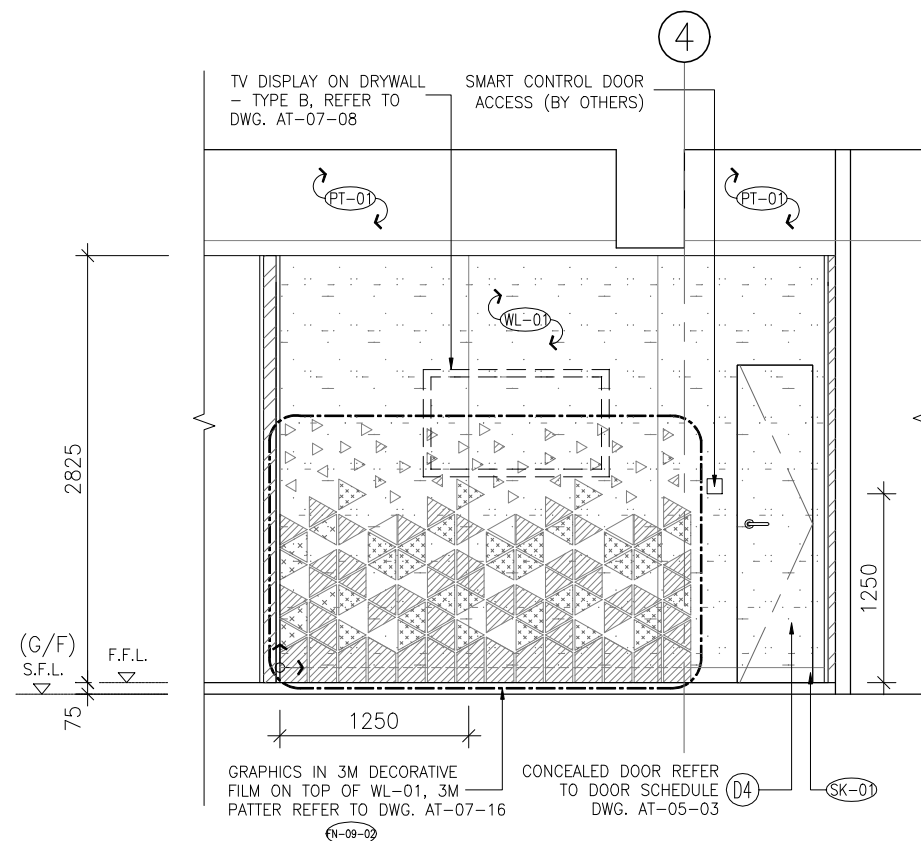
SCALE **A3 @ 1:50**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

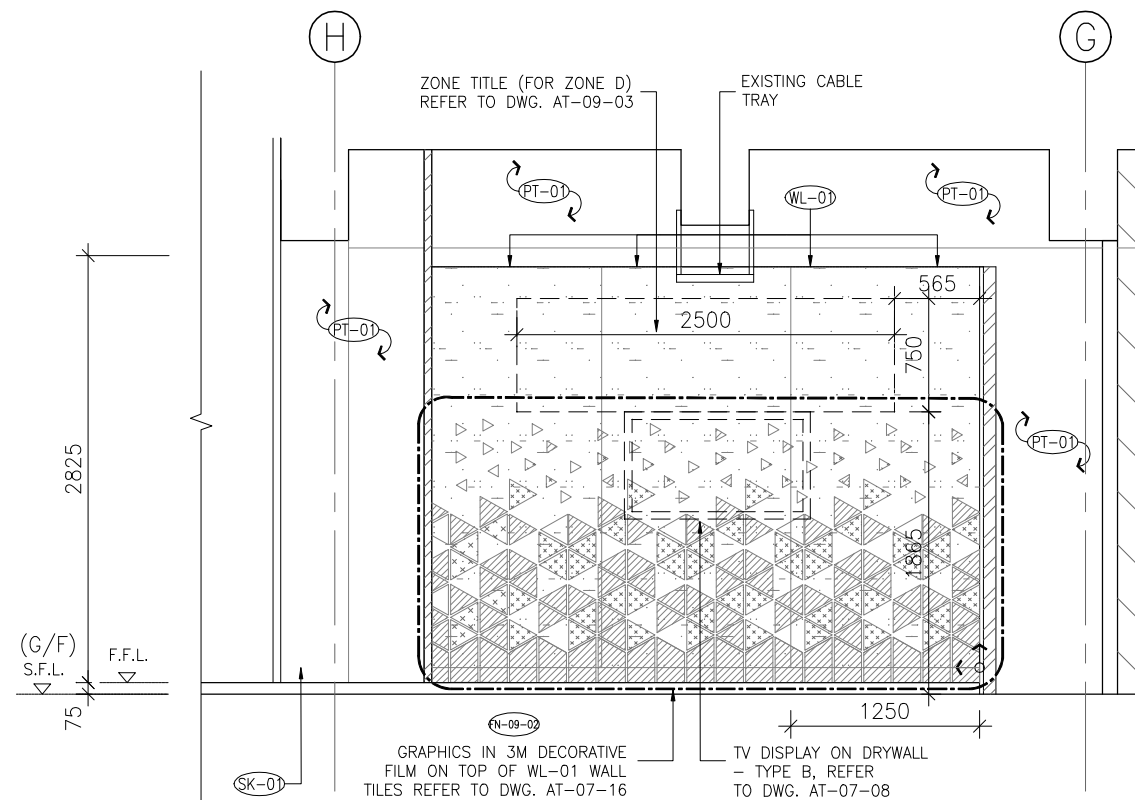
DRAWING TITLE  
**ELEVATIONS 8 - ZONE B AND C**

DRAWING NO. <b>AT-03-12</b>	REV.
PROJECT NO. <b>DA17003</b>	

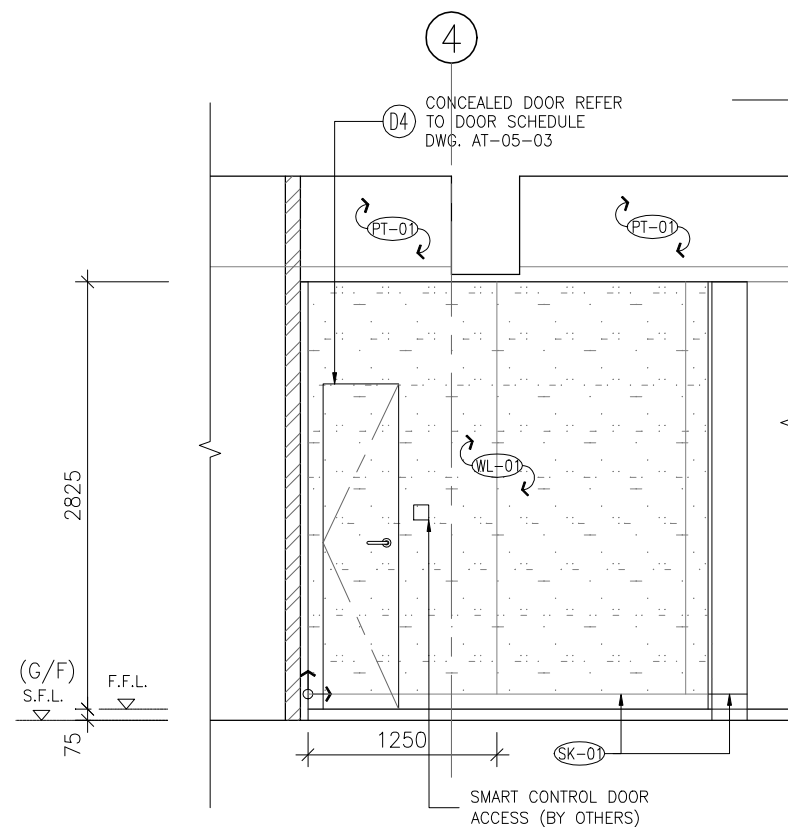




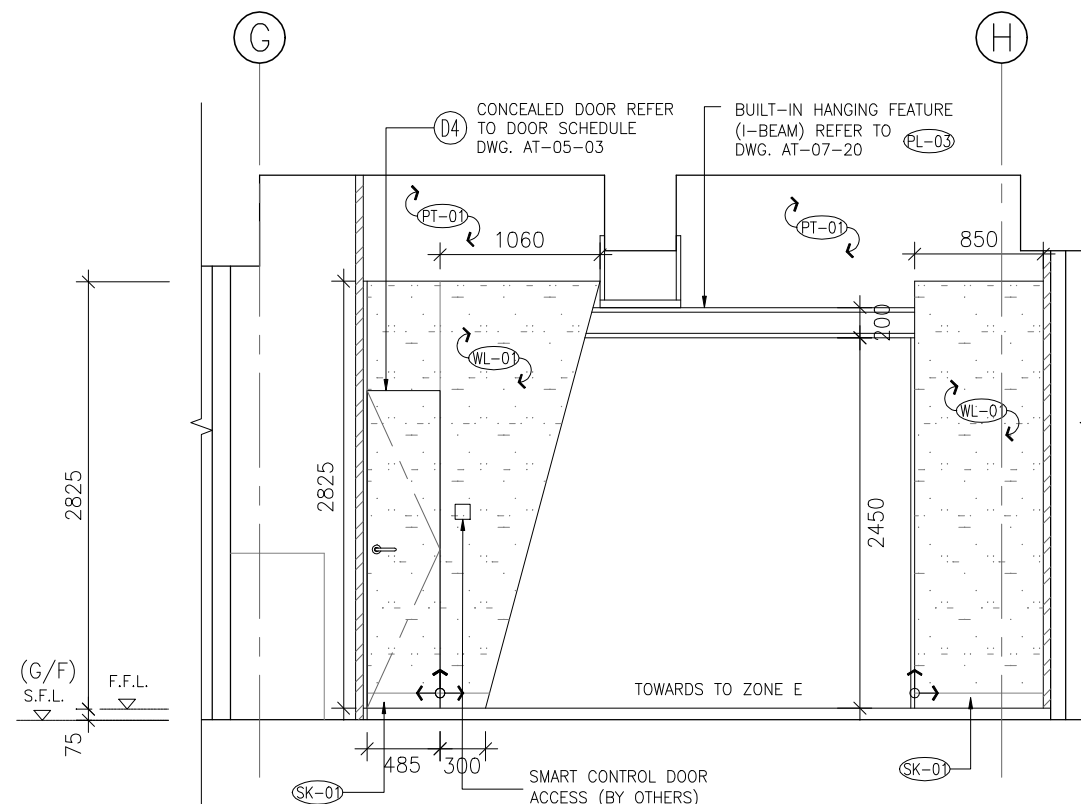
1 ELEVATION  
SCALE 1:50



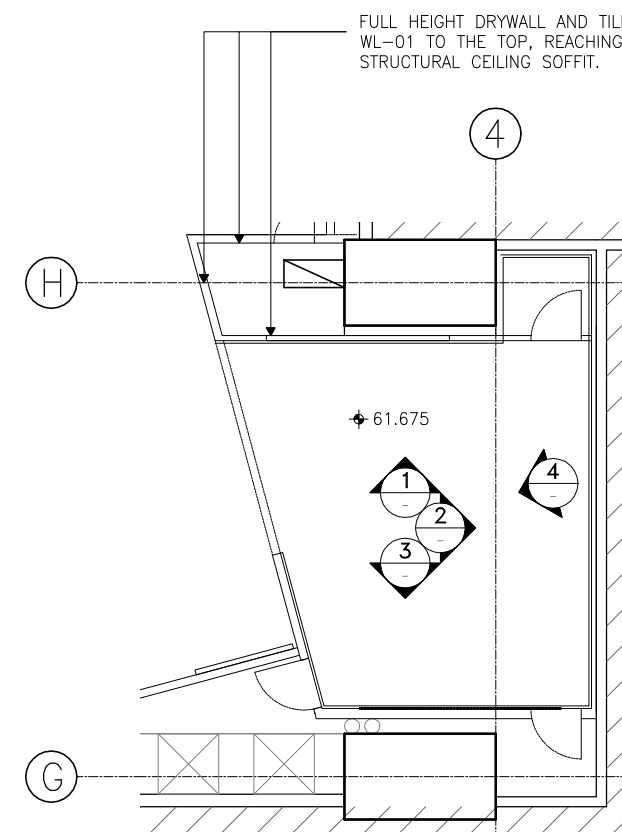
2 ELEVATION  
SCALE 1:50



3 ELEVATION  
SCALE 1:50



4 ELEVATION  
SCALE 1:50



A LAYOUT PLAN FOR ZONE D  
SCALE 1:75

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: SUBMITTED SETS OF NEW CHANGE OF DRAWING CONTENT - 04/07/2016  
REVISIONS: 1 - 04/07/2016 2 - 04/07/2016 3 - 04/07/2016 4 - 04/07/2016 5 - 04/07/2016 6 - 04/07/2016 7 - 04/07/2016 8 - 04/07/2016 9 - 04/07/2016 10 - 04/07/2016 11 - 04/07/2016 12 - 04/07/2016 13 - 04/07/2016 14 - 04/07/2016 15 - 04/07/2016 16 - 04/07/2016 17 - 04/07/2016 18 - 04/07/2016 19 - 04/07/2016 20 - 04/07/2016 21 - 04/07/2016 22 - 04/07/2016 23 - 04/07/2016 24 - 04/07/2016 25 - 04/07/2016 26 - 04/07/2016 27 - 04/07/2016 28 - 04/07/2016 29 - 04/07/2016 30 - 04/07/2016 31 - 04/07/2016 32 - 04/07/2016 33 - 04/07/2016 34 - 04/07/2016 35 - 04/07/2016 36 - 04/07/2016 37 - 04/07/2016 38 - 04/07/2016 39 - 04/07/2016 40 - 04/07/2016 41 - 04/07/2016 42 - 04/07/2016 43 - 04/07/2016 44 - 04/07/2016 45 - 04/07/2016 46 - 04/07/2016 47 - 04/07/2016 48 - 04/07/2016 49 - 04/07/2016 50 - 04/07/2016 51 - 04/07/2016 52 - 04/07/2016 53 - 04/07/2016 54 - 04/07/2016 55 - 04/07/2016 56 - 04/07/2016 57 - 04/07/2016 58 - 04/07/2016 59 - 04/07/2016 60 - 04/07/2016 61 - 04/07/2016 62 - 04/07/2016 63 - 04/07/2016 64 - 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CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

**NOTES:**

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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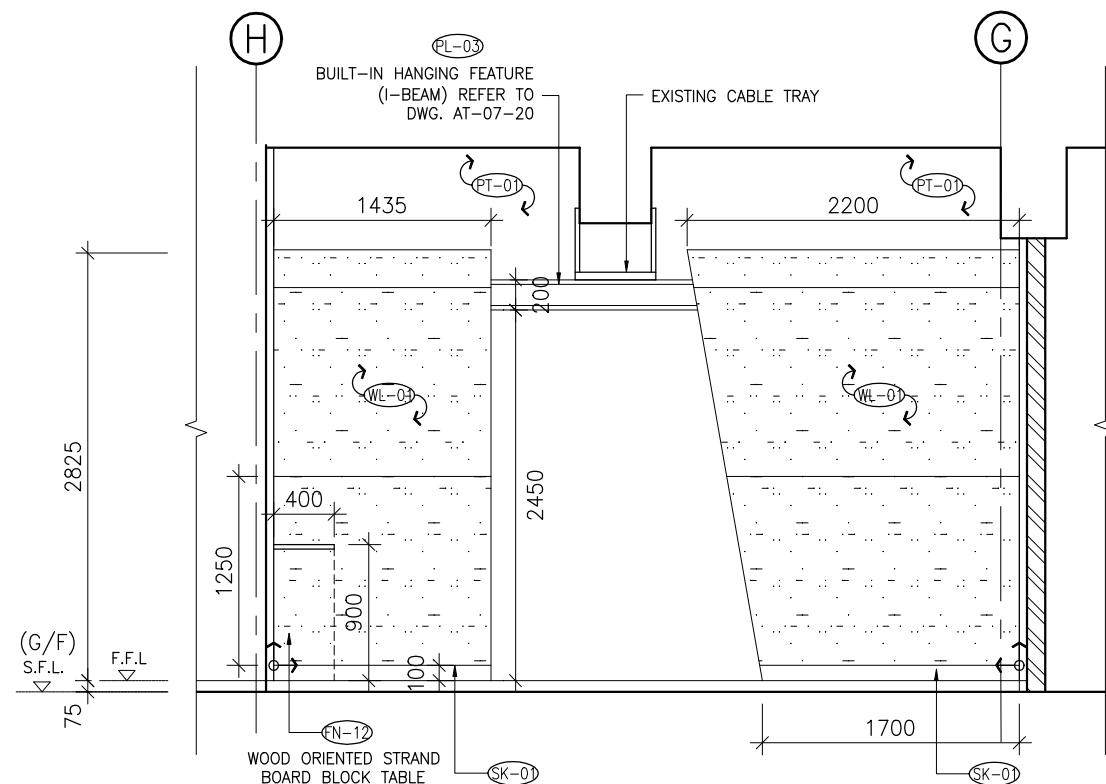
**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING NO.	REV.
<b>AT-03-14</b>	
PROJECT NO.	<b>DA17003</b>

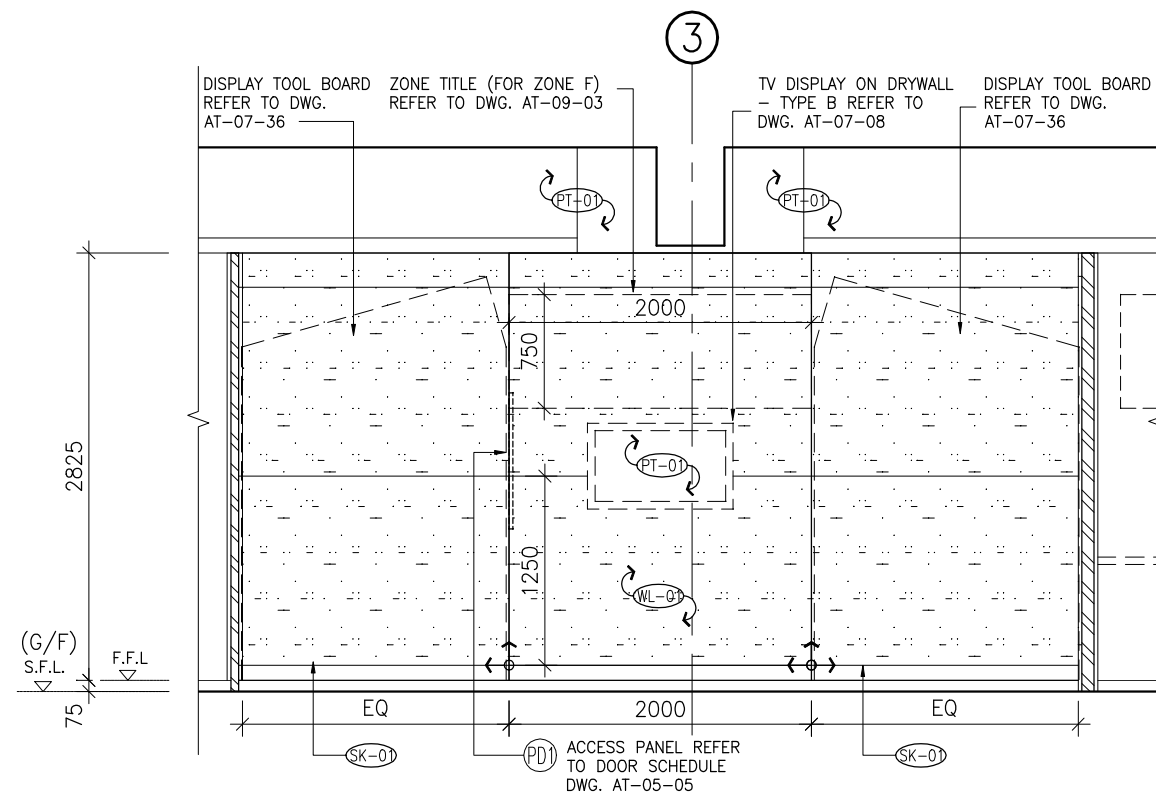


**NOTES:**

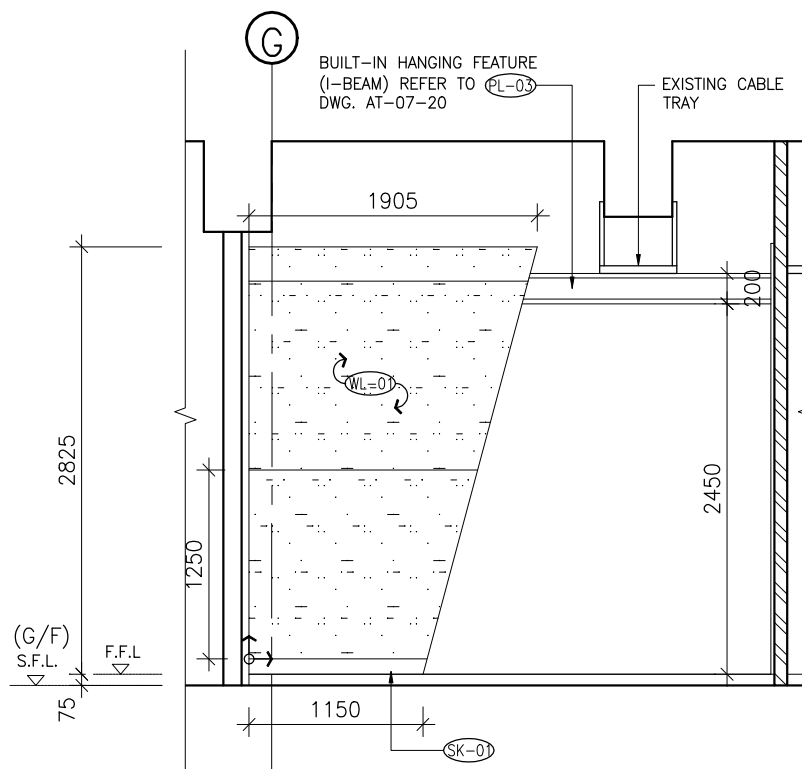
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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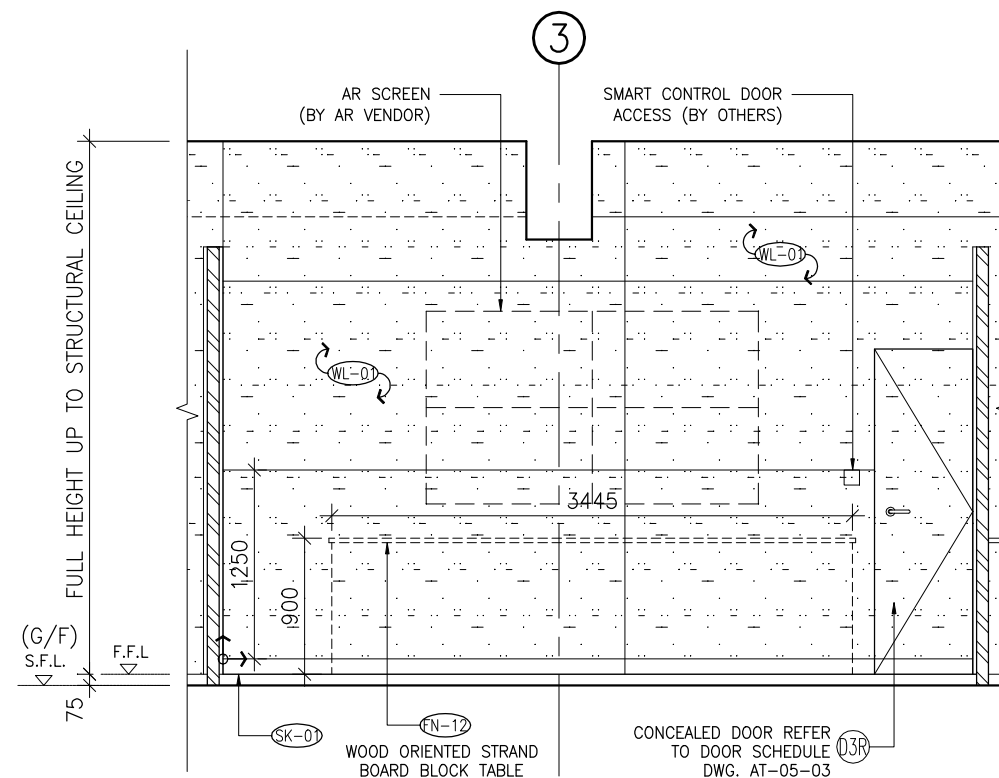
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SCALE 1:50



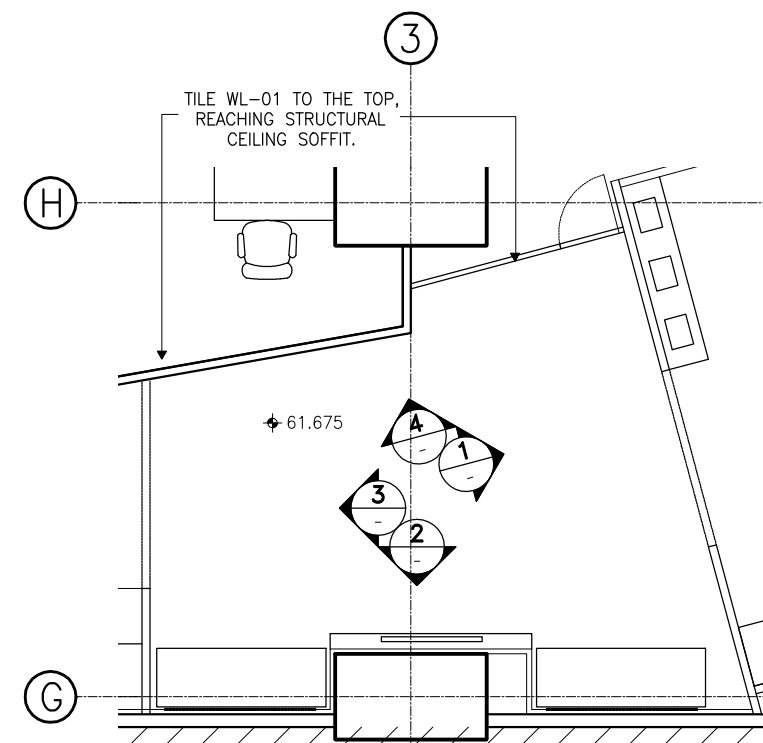
**2 ELEVATION**  
SCALE 1:50



**3 ELEVATION**  
SCALE 1:50



**4 ELEVATION**  
SCALE 1:50



**A LAYOUT PLAN FOR ZONE F**  
SCALE 1:75

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

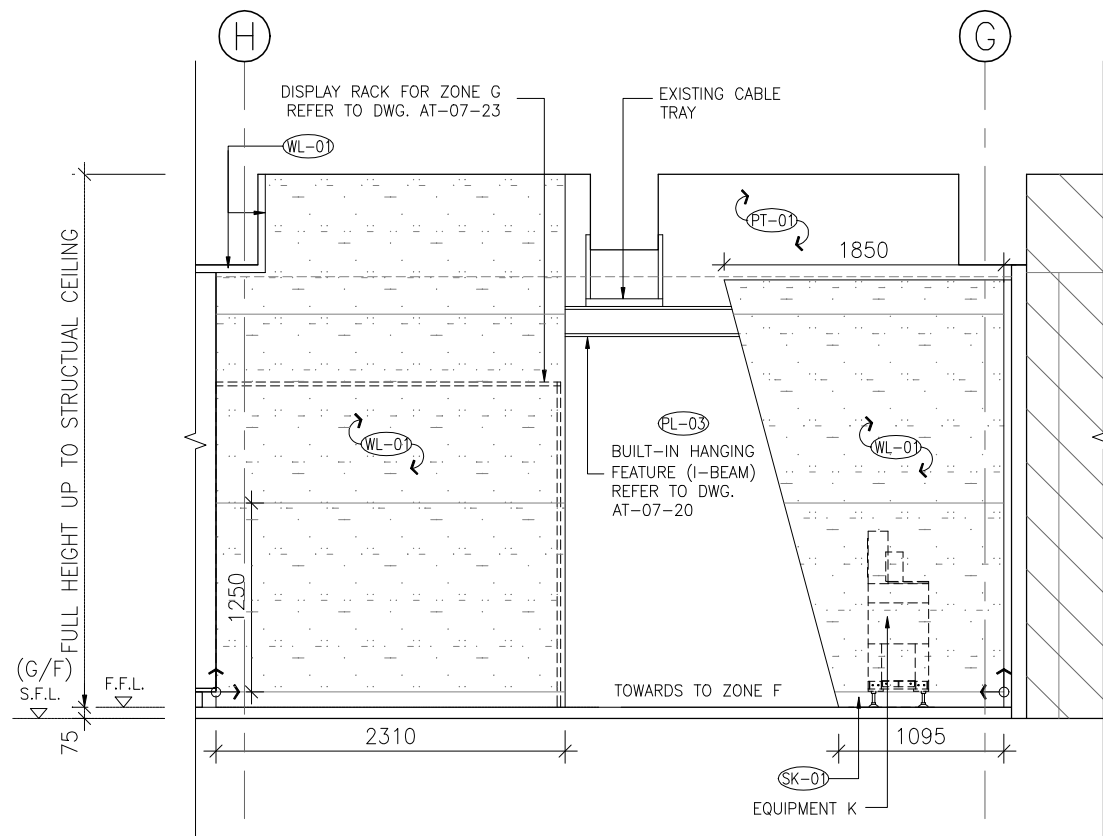
**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH: SUBMITTED SETS OF NEW CHANGE OF DRAWING CONTENT - CADSET  
REVISIONS: 11 - ZONE F TITLES

SCALE **A3 @ 1:50**

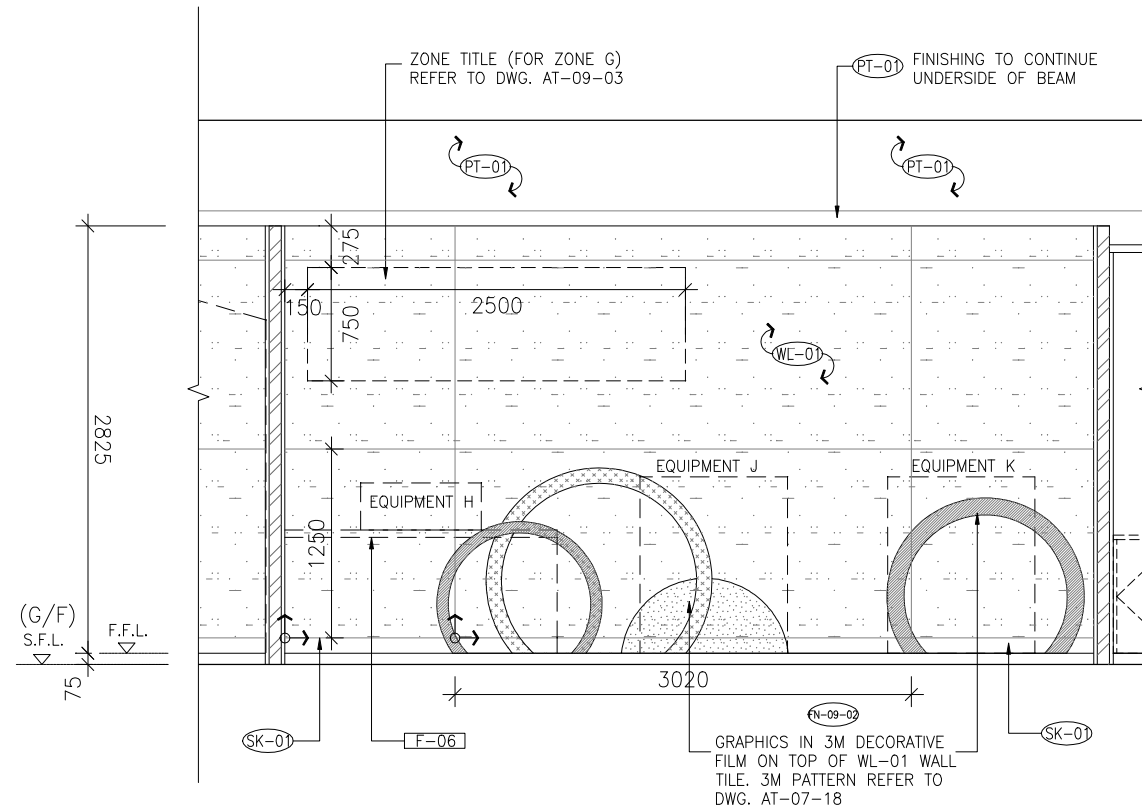
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**ELEVATIONS 11 - ZONE F**

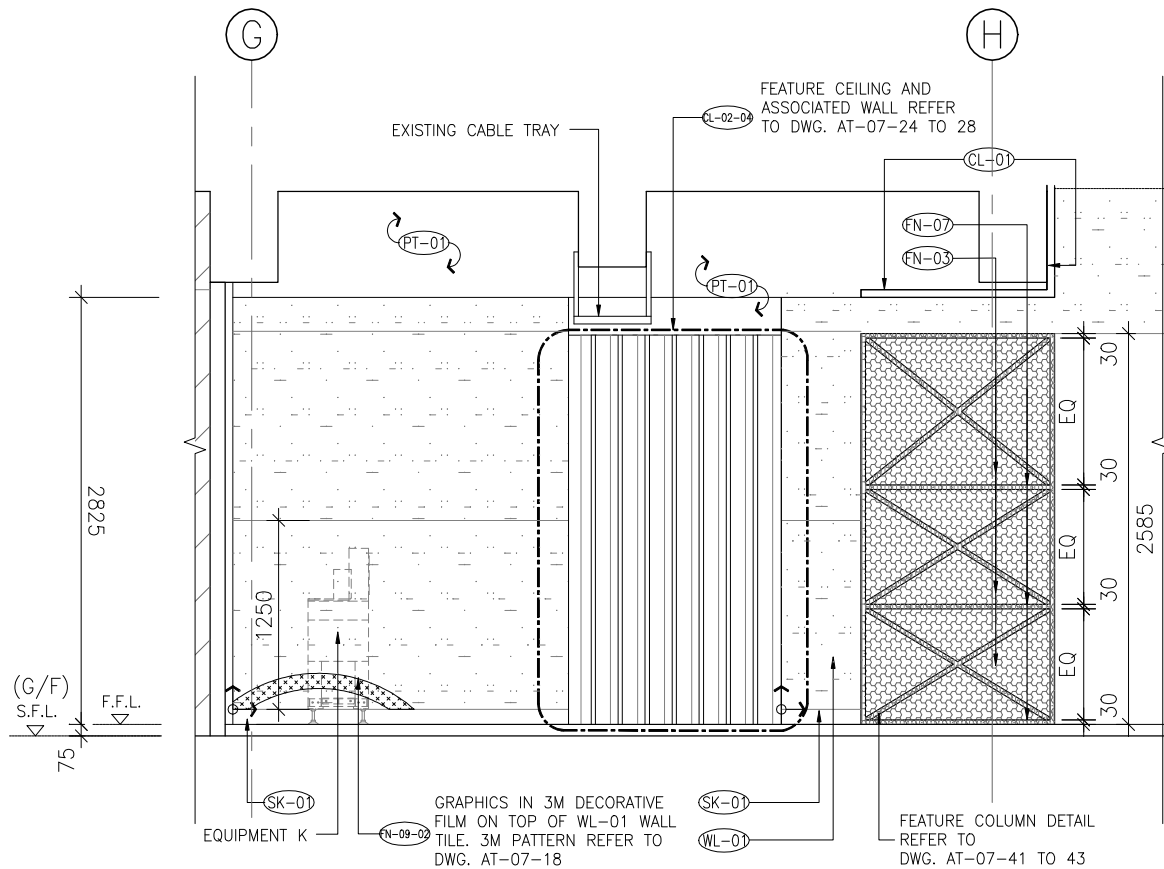




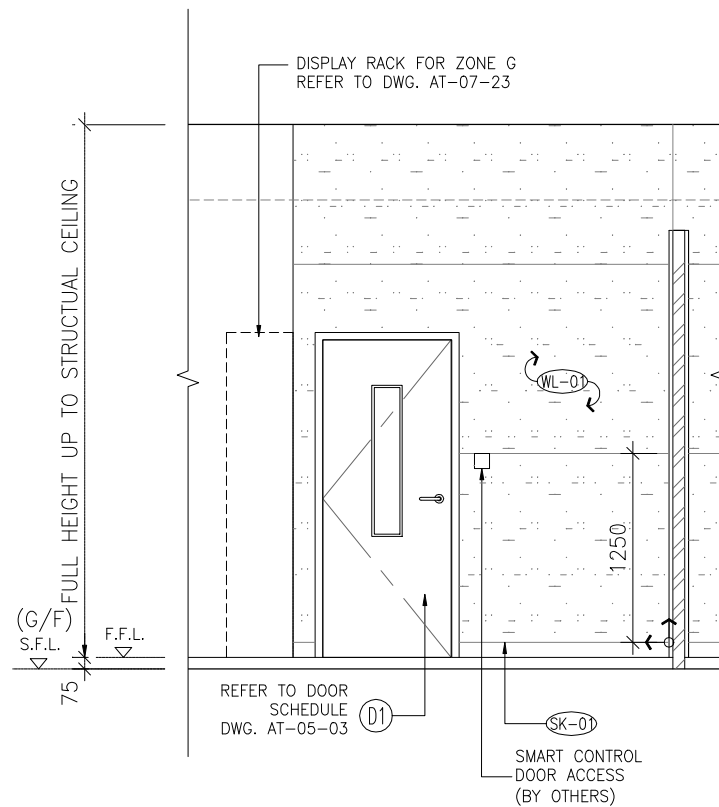
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SCALE 1:50



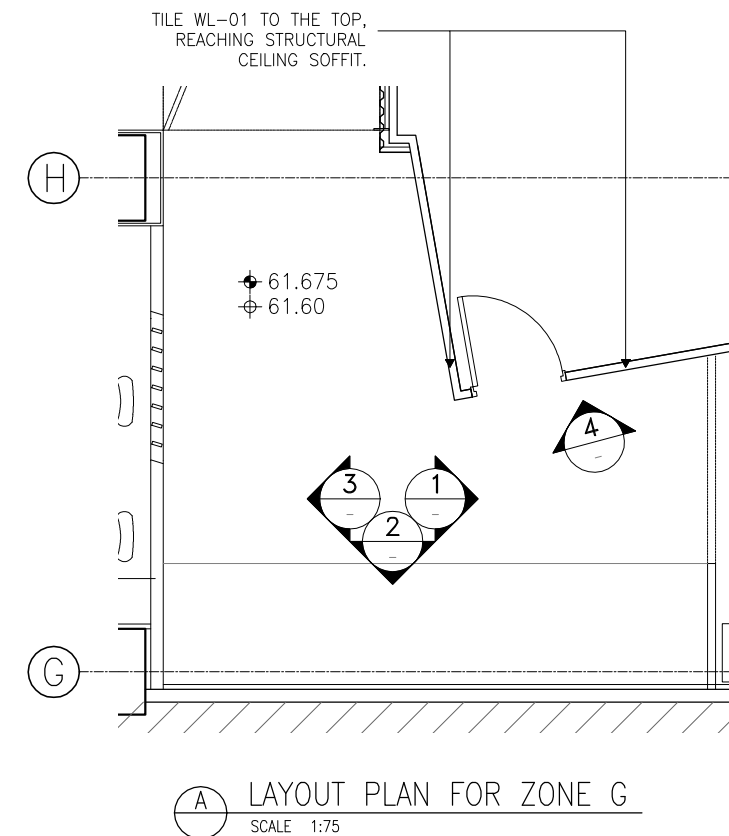
2 ELEVATION  
SCALE 1:50



3 ELEVATION  
SCALE 1:50



4 ELEVATION  
SCALE 1:50



A LAYOUT PLAN FOR ZONE G  
SCALE 1:75

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

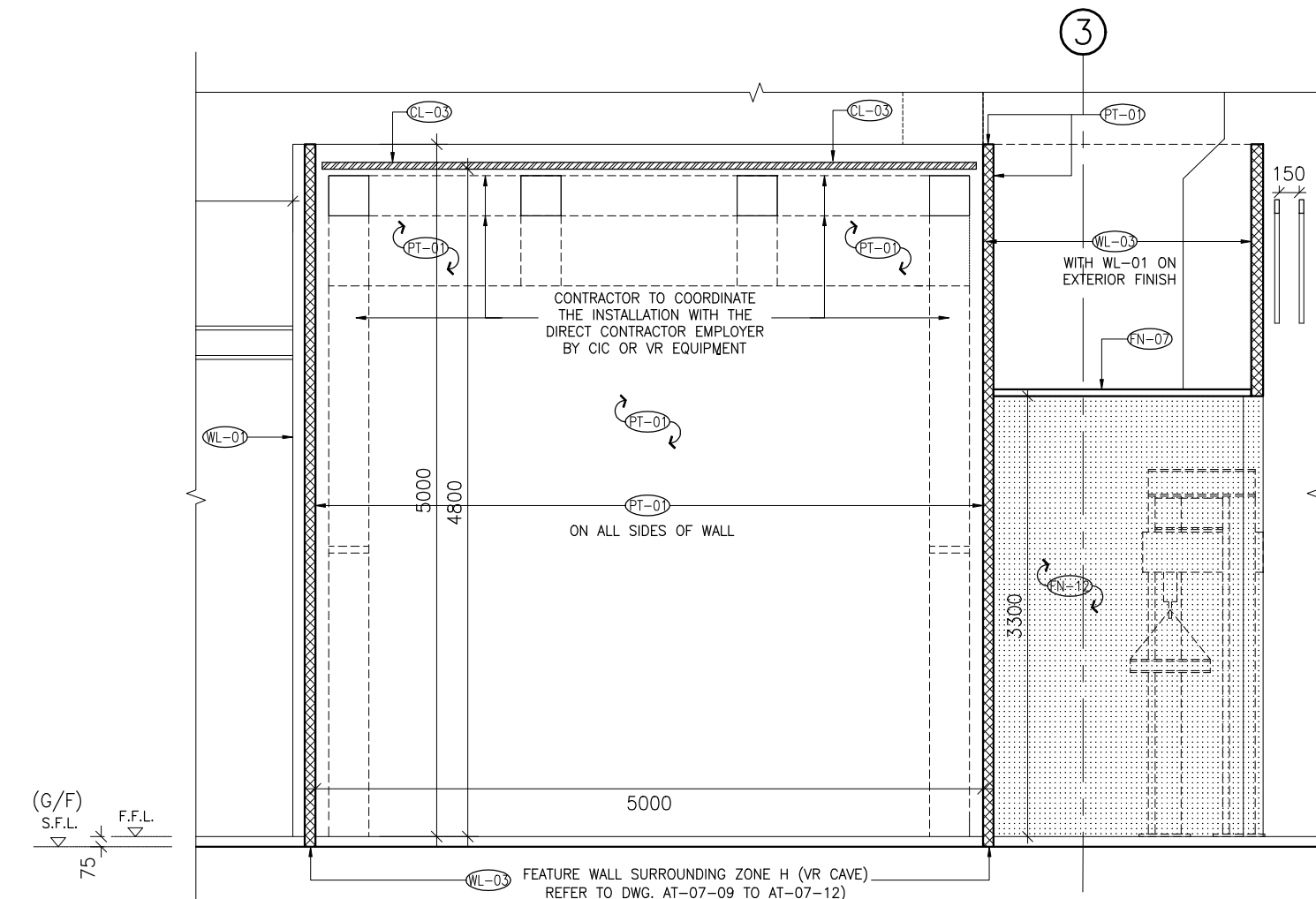
DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH  
SCALE  
A3 @ 1:50

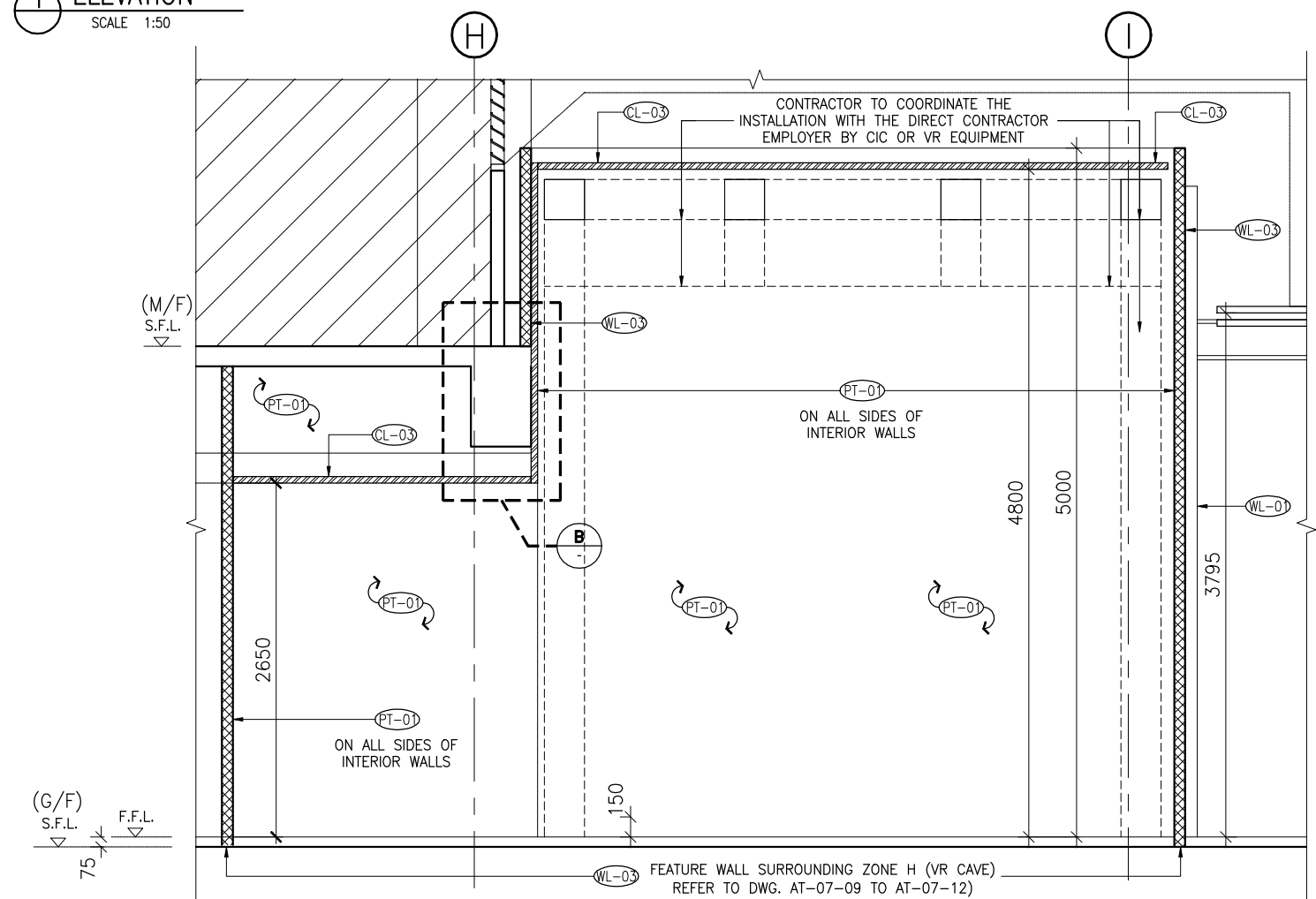
PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
ELEVATIONS 12 - ZONE G

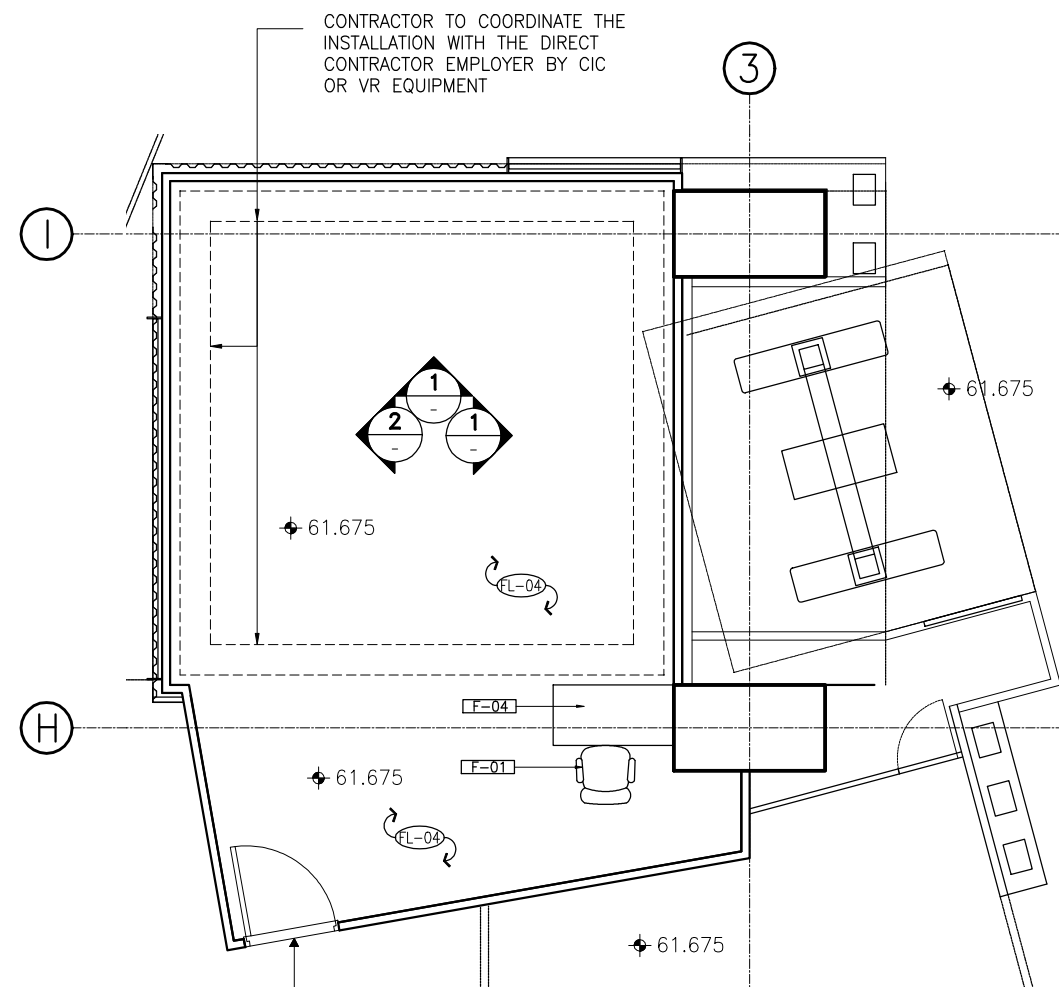
DRAWING NO. AT-03-16  
PROJECT NO. DA17003  
REV.



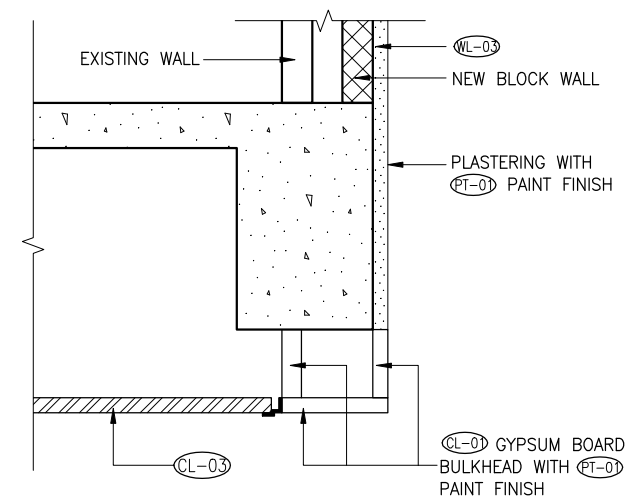
**1 ELEVATION**  
SCALE 1:50



**2 ELEVATION**  
SCALE 1:50



**A LAYOUT PLAN FOR ZONE H**  
SCALE 1:75



**B DETAIL "B"**  
SCALE 1:25

NOTES: FRAME TO BE INSTALLED BY EMPLOYER'S DIRECT CONTRACTOR (OTHERS) WITHIN THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL TAKE ATTENDANCE AND COORDINATE WITH THE AFORESAID DIRECT CONTRACTOR FOR INSTALLATION OF ABOVEMENTIONED WORKS.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

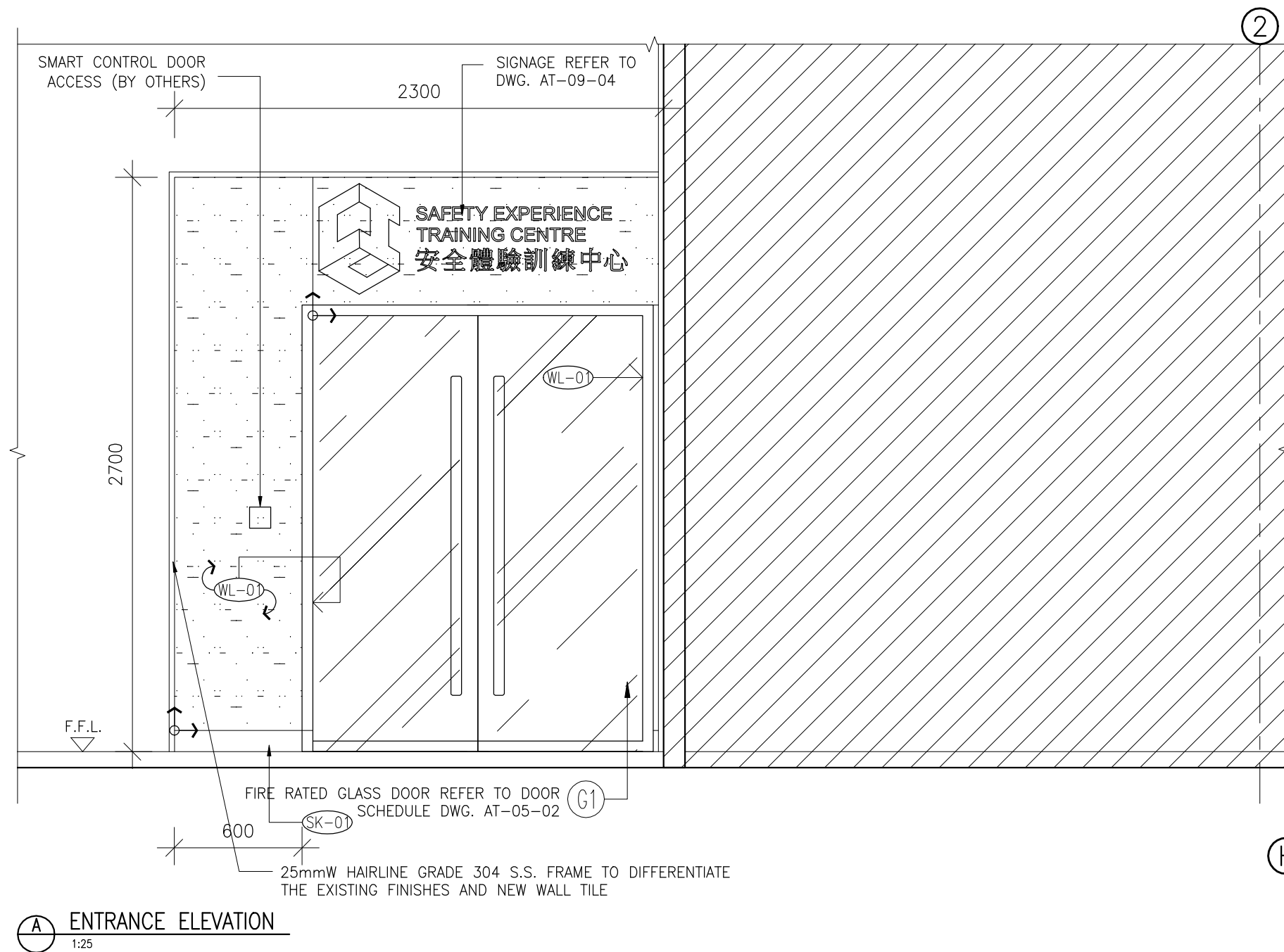
CAD PATH: QUANTITIES SET BY HONG KONG C.C. TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTANT: HONG KONG C.C. TRAINING CENTRE - CIVIL  
ELEVATIONS 11 - ZONE H (2016)

SCALE **A3 @ 1:50**

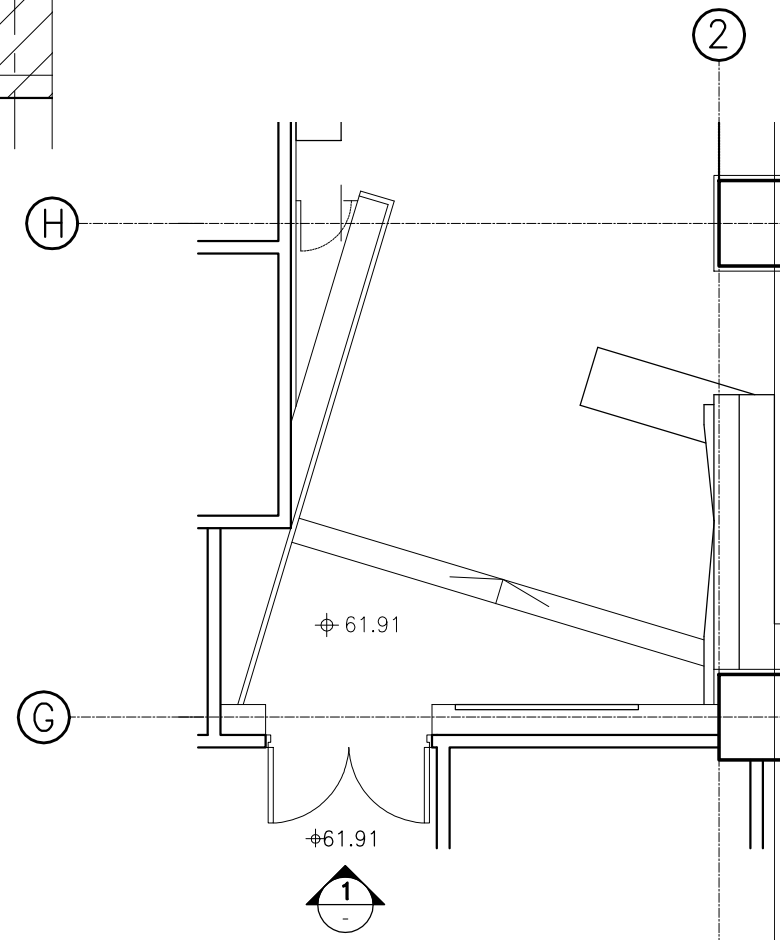
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**ELEVATIONS 13 - ZONE H**

DRAWING NO.	REV.
<b>AT-03-17</b>	
PROJECT NO.	<b>DA17003</b>



NOTE: INTERNAL SIDE OF THE DOOR ALSO TO RECEIVE WALL TILE WL-01



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REV. DATE & DESCRIPTION DRN CHK APP

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#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: \DRAWINGS\CONSTRUCTION\AT-03-18 SETC ENTRANCE ELEVATION.dwg

SCALE: A3 @ 1:25

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**ELEVATION OF SETC ENTRANCE**

DRAWING NO.

**AT-03-18**

PROJECT NO.

**DA17003**

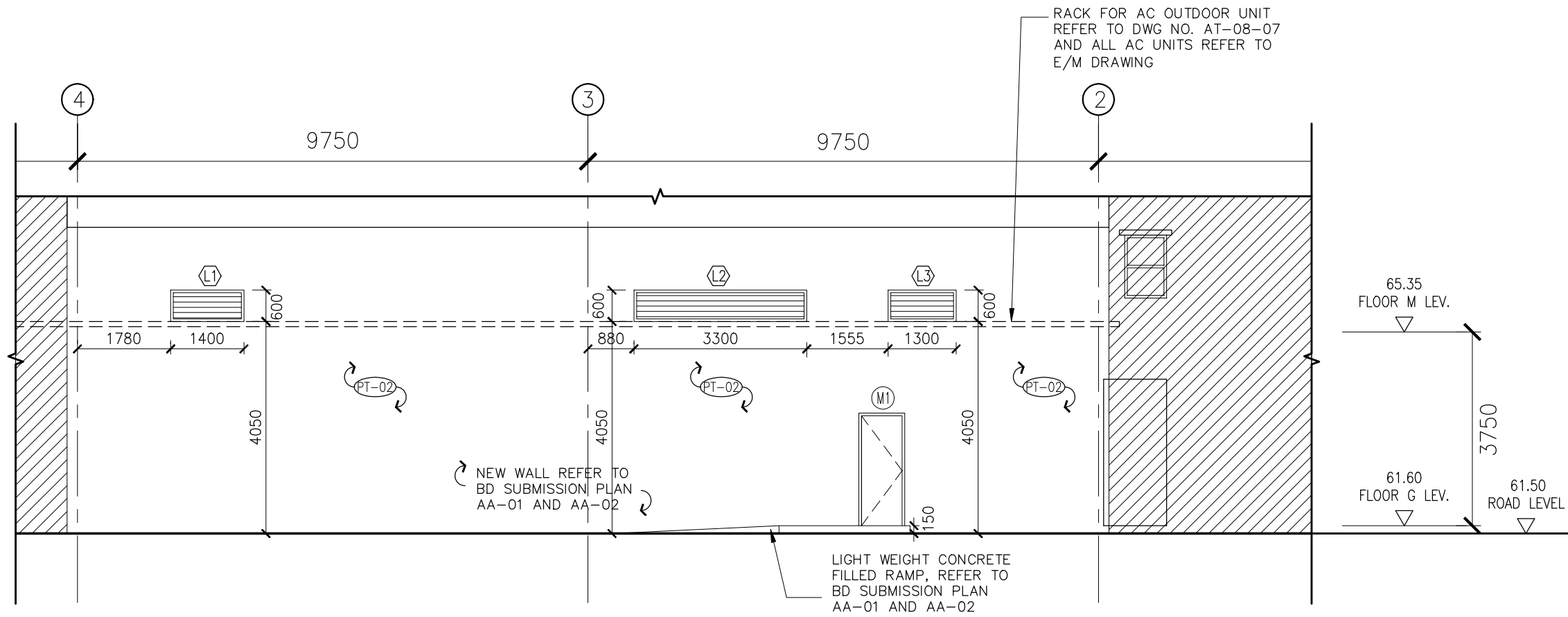
REV.



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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**A** EXTERNAL ELEVATION  
1:100

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \DRAWING\PROJECT\WORKING\4-10 EXTERIOR AND ELEVATIONS\4-10-01 EXTERNAL ELEVATIONS.DWG  
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PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**EXTERNAL ELEVATION**

DRAWING NO.	REV.
<b>AT-03-21</b>	
PROJECT NO.	<b>DA17003</b>





PROPOSED MATERIAL LIST OR EQUIVALENT							
CODE	MATERIAL DESCRIPTION	PROPOSED BRAND / MODEL (OR EQUIVALENT)	SIZE	ORIGIN	SUPPLIER REFERENCE	CONTACT	REMARKS
FN-01	PORCELAIN E TILE	BRAND: "LAMINAM" SERIES: "I METALLI"	3000 x 1000 x 3mm THK.	ITALY	BUONA IDEA BUILDING MATERIAL (INT'L) LTD.	MR. GAVIN LAM TEL 2543 4243 FAX 2543 0408	COLOUR: PLUTONIO OSSIDATO FOR RECEPTION COUNTER
FN-02		BRAND: "LAMINAM" SERIES: "I NATURALI - PIETRE"					COLOUR: OSSIDIANA VENA GRIGIA FOR RECEPTION COUNTER
FN-03	PORCELAIN E TILE	BRAND: "LEVANTINA" SERIES: "TECHLAM"	3000 x 1000 x 3mm THK.	SPAIN	GMA STONE (HK) CO. LTD.	MR. ALISON FAN TEL 2187 2880 FAX 2187 2763	COLOUR: TL-87 STEEL CORTEN FOR PORTAL GATE
FN-04	ALUMINIUM ALLOY CIRCLE CUT OUT MESH	BRAND: "ALROX" MODEL: AL-111019025 R2T3	1250 X 2500 X 1.0mm THK. (STANDARD PANEL SIZE)		WIDEVELOP (HONG KONG) LTD.	MR. TERRY LO TEL 2415 9966 FAX 2415 9842	
FN-06	TILE ADHESIVE	H40 IDEAL		CHINA	BUONA IDEA BUILDING MATERIAL (INT'L) LTD.	MR. GAVIN LAM TEL 2543 4243 FAX 2543 0408	TILE ADHESIVE FOR WALL IS REQUIRED WHEN APPLICATION OF HOMOGENOUS AND PORCELAIN TILE ON WALL AND REFER TO THE PARTICULAR SPECIFICATION
FN-07	ALUMINIUM PANEL	BY CONTRACTOR	MIN. 3mm. THK.				TYPE OF PAINT: PVDF COATING SYSTEM: 3 COATS COLOUR: TBC SAMPLES TO BE SUBMITTED BY CONTRACTOR FOR APPROVAL APPROVED APPLICATOR TO BE APPOINTED
FN-08	TEMPERED CLEAR GLASS	BY CONTRACTOR	MIN. 12mm. THK.				SUPER CLEAR WHITE GLASS WITH 3M STICKER FOR OFFICE
FN-09-01	DECORATIVE FILM ON GLASS	BRAND: "3M™" SERIES: "ENVISION™ LX480Cv3 NON-PVC GRAPHIC FILM - (FOR LATEX DIGITAL PRINTING)" OVERLAMINATE: "ENVISION™ 8550M MATTER			3M HONG KONG LTD.	TED M.T. LEUNG TEL 2806 6111 / 93152550 FAX 2807 0916	FILM PROFILE TO BE CONFIRMED. THE CONTRACT SHALL SUBMIT SAMPLES FOR ARCHITECT'S APPROVAL.
FN-09-02	DECORATIVE FILM ON WALL / TILE	BRAND: "3M™" SERIES: "SCOTCHCAL IJ8150 CLEAR VIEW GRAPHIC FILM - (FOR LATEX DIGITAL PRINTING)" OVERLAMINATE: "SCOTCHCAL IJ8150 CLEAR VIEW GRAPHIC FILM"			3M HONG KONG LTD.	TED M.T. LEUNG TEL 2806 6111 / 93152550 FAX 2807 0916	FILM PROFILE TO BE CONFIRMED. THE CONTRACT SHALL SUBMIT SAMPLES FOR ARCHITECT'S APPROVAL.
FN-10	DECORATIVE STAINLESS STEEL	BRAND: "CHILING" SERIES: "TZ-2/FG3"	1219mm x 2438mm x 1.2mm THK.	JAPAN	CHILING ARCHITECTURAL METAL LTD.	CYRUS LI TEL 2541 3658 FAX 2187 2287	COLOUR / FINISH: INCO SUPER BLACK / HAIRLINE BLACK / ANTI- FINGER PRINT / COATING: FINE GUARD 3 COAT (FG3)
FN-11	DECORATIVE STAINLESS STEEL	BRAND: "COBELCO" MODEL: "CS-8882" COLOUR: HAIRLINE PIANO BLACK	1.5mm min THK	JAPAN	COBELCO (HK) LIMITED	JOY LO TEL 3702 6204 / 6016 3054 FAX 3705 1010	FOR LEAFLET HOLDER SHELF AT RECEPTION
FN-12	ORIENTED STRAND BOARD	BY CONTRACTOR	4 ft x 8 ft minimum				SUBMISSION OF PRODUCT FOR ARCHITECT'S APPROVAL IS REQUIRED
FN-13	DECORATIVE MESH	BRAND: "WIDEVELOP" MODEL: M22	1200mm X 2400mm (STANDARD PANEL SIZE)		WIDEVELOP (HONG KONG) LTD.	MR. TERRY LO TEL 2415 9966 FAX 2415 9842	FOR SHELVEING IN ZONE G
SK-01	GRADE 304 STAINLESS STEEL	BY CONTRACTOR					HAIRLINE FINISHES, COLOUR TO BE SUBMITTED FOR APPROVAL
WP-01	WATERPROOFING FOR EXTERNAL WALL	BRUSHBOND FLX III WATER PROOFING SYSTEM	AS SPECIFIED	CHINA	FOSROC HONG KONG LIMITED	MR. ANTHONY TSANG TEL 9366 4884 / 22400339	WATERPROOFING SYSTEM NOT LIMITED TO THE MATERIAL PRODUCT, REFER TO PARTICULAR SPECIFICATION
WP-02	WATERPROOFING SYSTEM WITH VAPOR BARRIER	PROOFEX GEOMEMBRANE WATER PROOFING SYSTEM	AS SPECIFIED	CHINA			FOR GROUND FLOOR SLAB REFER TO PARTICULAR SPECIFICATION
SC-01	WATERPROOF CEMENT SAND SCREEDING WITH POLYMER BONDING AIR AND ADDITIVE	NITOBOND SBR	AS SPECIFIED	CHINA	FOSROC HONG KONG LIMITED	MR. ANTHONY TSANG TEL 9366 4884 / 22400339	
SC-02	SELF LEVELING SCREED	E MIX FLOWMENT 550	AS SPECIFIED		SIGNAL PLUS BUILDING SUPPLIES LTD.	MS. ANITA HO TEL 2803 5600 / 6823 8728 FAX 2803 5900	
SC-03	ISOCRETE K-SCREED	FLOWCRETE	AS SPECIFIED				
PL-01	PLASTIC LAMINATE	FORMICA BRAND	AS SPECIFIED		FORMICA (ASIA) LIMITED	MR. MAX WONG TEL 2189 8191	FOR ALL WOODEN DOORS
PL-02	PLASTIC LAMINATE	FORMICA BRAND	1.5mm min		FORMICA (ASIA) LIMITED	MR. MAX WONG TEL 2189 8191	FOR BACK SIDE OF RECEPTION TABLE
PL-03	PLASTIC LAMINATE	FORMICA BRAND MODEL: "D8105" COLOUR: ALUMINIUM BRUSHED BLACK	AS SPECIFIED		FORMICA (ASIA) LIMITED	MR. MAX WONG TEL 2189 8191	FOR HANGING FEATURE I BEAM, ZONE E IPAD CABINET
PT-01	INTERNAL RESIN PAINT	COMPO URETHANE W	N/A	JAPAN	SKK PAINT (H.K.) CO. LTD	MS. INGRID WONG TEL 2529 3988	INTERIOR CEILING AREA : BLACK COLOUR TO BE SUBMITTED FOR ARCHITECT'S APPROVAL
PT-02	EXTERNAL ARCYLIC PAINT	COMPO SILICON WITH TEXTURE PAINT	N/A	JAPAN	SKK PAINT (H.K.) CO. LTD	MS. INGRID WONG TEL 2529 3988	EXTERIOR WALL AREA : MATCH TO EXTERIOR FAÇADE WITH TEXTURE. AND COLOUR TO BE SUBMITTED FOR ARCHITECT'S APPROVAL

NOTES: MAIN CONTRACTOR SHALL SUBMIT MATERIAL SAMPLES FOR ARCHITECT'S REVIEW AND APPROVAL PRIOR CONSTRUCTION.  
MATERIALS IN THE LIST ABOVE IS NOT EXHAUSTIVE. CONTRACTOR SHALL REFER TO DETAIL DRAWINGS.  
ALL TILES ARE 45 DEGREE V - JOINT ON CORNER UNLESS OTHERWISE SPECIFIED BY ARCHITECT

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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CLIENT



REV. DATE & DESCRIPTION DRN CHK APP

NOTES:

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2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH SCALE A3 @ AS SHOWN

PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE MATERIAL CODE LIST 2





- NOTES:**
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  3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
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FINISHING SCHEDULE		CEILING / ALL SIDE OF BEAM							FLOOR							WALL / COLUMN											MISC				
SPECIAL NOTE:  1.UNLESS OTHERWISE SPECIFIED, THE ROOM AS SPECIFIED MUST RECEIVE THE FINISHES AS SPECIFED IN THIS TABLE AS MARKED "●"  2. FOR ANY DISCREPANCIES BETWEEN FINSHES SCHEDULE AND FINISHES DETAILS, <u>FINISHES SCHEDULE SHALL BE GIVEN PRECEDENCE.</u>  3. FINISHES SCHEDULE SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION; FOR ANY DISCREPANCYIES BETWEEN FINISHES SCHEDULE AND SPECIFICATIONS, <u>SPECIFICATION SHALL BE GIVEN PRECEDENCE.</u>  4. IF NO SKIRTING NOR DADO SPECIFIED, WALL FINISHES TO BE APPLIED TO WHOLE WALL UP TO CEILING SOFFIT OR 100mm ABOVE FALSE CEILING, IF ANY OTHERWISE SPECIFIED.  5. ALL FINISHES TO BE LAIED IN ACCORDANCE WITH RELEVANT STANDARDS / PRACTICES/ AND SPECIFICATION. SAMPLE AND CATALOGUE TO BE SUBMITTED FOR ARCHITECT'S APPROVAL.  6. ALL SUBSTRATE FOR RECEIVING NEW FINISHES TO BE PROPERLY PREPARED, PRIMED AND TREATED.  7. UNLESS OTHERWISE SPECIFIED THE CONTRACTOR SHALL PROPOSED ALL MATERIALS (BRAND AND PRODUCT NAME ) TO FIT THE REQUIRED SPECIFICATION IN THE DRAWING.  8. FOR ANY WATERPROOFING WORKS, WATERPROOFING SLURRY TO BE APPLIED TO THE FLOOR SURFACES, UPTURNS WITH ANGLE FILLET AND BLOCK WALLS AS SPECIFIED  9. ALL C/S SCREEDING ARE LAID TO FALL ACCORDING TO THE APPROVED DRAINAGE PLAN WITH WIRE MESH.		TOP FINISHES ON CEILING SOFFIT		FALSE CEILING					TOP FINISH			BASE SCREED / WATER PROOFING				TOP FINISH							RENDERING								
		INTENAL RESIN PAINT WITH 25mm THK RENDERING AS SPECIFIED				GYPSUM BOARD FALSE CEILING	ALUMINIUM BAFFLE CEILING ( CL-02-01 TO 04 AS SPECIFD AND REFER TO PARTICULAR DRAWINGS	600 X 600 ACOUSTIC CEILING AS SPECIFIED	TILE FOR UNDER THE PORTAL GATE WITH TILE ADHESIVE AS SPECIFIED	ALUMINIUM PANEL	STONE TILE	HOMOGENEOUS VINYL FLOOR (FROM FL-02-01 TO 05)	CARPET FLOORING	WATERPROOFING SYSTEM (VAPOR BARRIER ON FLOOR)	MIN 50 mm THK. WATERPROOFING CEMENT SAND SCREED WITH ADDITIVE AS SPECIFIED	SELF LEVEING SCREED	1.5mm THK GRADE 304 HAIRLINE STAINLESS STEEL AS SPECIFIED		INTERNAL RESIN PAINT WITH 25mm THK RENDERING AS SPECIFIED	EXTERNAL RESIN TEXTURE PAINT WITH 25mm THK RENDERING AS SPECIFIED	THIN CONCRETE PANEL SYSTEM	CORRGUATED METAL SHEET	GYPSUM BLOCK WALL	FULL HEIGHT R.C. WALL WITH 150mm THK.	DRY WALL SYSTEM WITH SUPPORTING FRAME (FOR MOUNTING EQUIPMENTS)	ALUMINIUM PANEL	WATERPROOFING SYSTEM ON WALL	MIN 25mm THK. WATERPROOFING CEMENT SAND SCREED AS SPECIFIED	MIN 25mm THK. CEMENT SAND SCREED AS SPECIFIED		
	AREA NAME	PT-01			CL-01	CL-02	CL-03	FN-03	FN-07	FL-01	FL-02	FL-03	WP-02	SC-01	SC-02	SK-01		PT-01	PT-02	WL-01	WL-02	WL-03	WL-04	WL-05	FN-07	WP-01	SC-01				
G/F	ALL SETC AREA EXCEPT OFFICE, CCTV SERVER ROOM VR CAVE ROOM AND STORAGE AREA	●			●	●		●	●	●	●		●	●	●	●		●		●		●	●	●	●			●			
	OFFICE	●					●					●	●	●	●	●		●										●			
	ZONE H VR CAVE ROOM	●						●				●	●	●	●	●		●		●	●				●			●			
	ALL STORAGE AREA	●			●	●		●	●		●		●	●	●	●		●			●			●				●			
	CCTV SERVER ROOM	●					●					●	●	●	●	●		●										●			
	G/F EXTERNAL WALL																		●				●		●						
2/F	2/F TEMPORARY AREA											●							●					●			●				

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CAD PATH

SCALE A3 @ -

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
FINISHES SCHEDULE





DOOR TYPE		G1		DOOR TYPE		G2	
ELEVATION (VIEW FROM PULL SIDE)				ELEVATION (VIEW FROM PULL SIDE)			
ELEVATION (VIEW FROM PUSH SIDE)				ELEVATION (VIEW FROM PUSH SIDE)			
LOCATION	ENTRANCE TO RECEPTION				OFFICE		
LEAF SIZE	800+800				1000		
CONSTRUCTION	REFER TO DETAIL DRAWING				12mm THK. SUPER WHITE CLEAR TEMPERED GLASS SLIDING DOOR		
FIRE RATING	-/120/120 MINS. F.R.R.				-		
DOOR FRAME	HAIRLINE STAINLESS STEEL GRADE 304. FRAME TO ACCOMMODATE CONDUIT FOR SMART ACCESS.				FRAMELESS		
ARCHITRAVE	HAIRLINE STAINLESS STEEL GRADE 304				FRAMELESS		
FINISHES	HAIRLINE FINSH				-		
IRONMONGERY	HINGE	REFER TO IRONMONGERY SCHEDULE			HINGE	REFER TO IRONMONGERY SCHEDULE	
	PULL HANDLE				PULL HANDLE		
	PUSH PLATE				PUSH PLATE		
	LOCKSET				LOCKSET		
	PANIC BOLT				PANIC BOLT		
	FLUSH BOLT				FLUSH BOLT		
	DOOR CLOSER				DOOR CLOSER		
	DOOR SELECTOR				DOOR SELECTOR		
	KICK PLATE				KICK PLATE		
	DOOR STOP	DOOR STOP			DOOR STOP		
OTHERS	REFER TO DWG. AT-05-25 FOR FIRE RATED GLASS DOOR DETAIL			OTHERS	TO ACCOMMODATE SMART ACCESS. REFER TO DWG. AT-07-05 FOR GLASS SLIDING DOOR DETAIL		

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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## TENDER DRAWING

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**daal** DAVID S. K. AU &  
ASSOCIATES LTD.

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.daal.com.hk](http://www.daal.com.hk)

CAD PATH

5-LEVELS SET AT NEW CHINA CO TRAINING CENTRE - CHINA  
- 5-LEVELS CONSTRUCTION WORKING AT-05 SCHEDULE AT-05-02 DOOR SCHEDULE  
(CLASSING)

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**DOOR SCHEDULE (GLASS)**

DRAWING NO.	REV.
<b>AT-05-02</b>	
PROJECT NO.	<b>DA17003</b>

DOOR TYPE	D1		DOOR TYPE	D3L		DOOR TYPE	D3R			
ELEVATION (VIEW FROM PULL SIDE)										
ELEVATION (VIEW FROM PUSH SIDE)										
LOCATION	VR ROOM			CCTV SERVER ROOM		CCTV SERVER ROOM, STORAGE ROOM				
LEAF SIZE	900 (50mm THK.)			700 (50mm THK.)		700 (50mm THK.)				
CONSTRUCTION	HARDWOOD SOLID CORE SELF-CLOSING DOOR			CONCEALED DOOR		CONCEALED DOOR				
FIRE RATING	-			-		-				
DOOR FRAME	HARDWOOD FRAME W/ PAINT, COLOUR MATCH W/ DOOR LEAF. FRAME TO ACCOMMODATE CONDUIT FOR SMART ACCESS			-		-				
ARCHITRAVE	HARDWOOD W/ PAINT, COLOUR MATCH W/ DOOR FRAME. REFER TO DOOR DETAILS			-		-				
FINISHES	PLASTIC LAMINATE (PL01) ON B/S, HARDWOOD DOOR EDGE			(WL-01) FINISH ON HARDWOOD DOOR, (PT-01) FINISH ON INNER SIDE		(WL-01) FINISH ON HARDWOOD DOOR, (PT-01) FINISH ON INNER SIDE				
IRONMONGERY	HINGE	REFER TO IRONMONGERY SCHEDULE		HINGE	REFER TO IRONMONGERY SCHEDULE		HINGE	REFER TO IRONMONGERY SCHEDULE		
	PULL HANDLE					PULL HANDLE				PULL HANDLE
	PUSH PLATE					PUSH PLATE				PUSH PLATE
	LOCKSET					LOCKSET				LOCKSET
	PANIC BOLT					PANIC BOLT				PANIC BOLT
	FLUSH BOLT					FLUSH BOLT				FLUSH BOLT
	DOOR CLOSER					DOOR CLOSER				DOOR CLOSER
	DOOR SELECTOR					DOOR SELECTOR				DOOR SELECTOR
	KICK PLATE					KICK PLATE				KICK PLATE
	DOOR STOP					DOOR STOP				DOOR STOP
OTHERS			OTHERS	TO ACCOMMODATE SMART ACCESS		OTHERS	TO ACCOMMODATE SMART ACCESS			

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECTS SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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## TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER



CAD PATH S:\DATA03 SETC AT KIRU CHUNG CIC TRAINING CENTRE\1 - CAD\1  
-TENDERMAN CONTRACT\WORKING\AT-05 SCHEDULE\AT-05-03 DOOR SCHEDULE  
(WOODEN).DWG

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**DOOR SCHEDULE (WOODEN)**


DRAWING NO. <b>AT-05-03</b>	REV.
PROJECT NO. <b>DA17003</b>	

DOOR TYPE				
ELEVATION (VIEW FROM PULL SIDE)				
ELEVATION (VIEW FROM PUSH SIDE)				
LOCATION	STORAGE ROOMS		STORAGE ROOMS	
LEAF SIZE	550 (50mm THK.)		550 (50mm THK.)	
CONSTRUCTION	CONCEALED DOOR		CONCEALED DOOR	
FIRE RATING	-		-	
DOOR FRAME	-		-	
ARCHITRAVE	-		-	
FINISHES	(WL-01) FINISH ON HARDWOOD DOOR, (PT-01) FINISH ON INNER SIDE		(WL-01) FINISH ON HARDWOOD DOOR, (PT-01) FINISH ON INNER SIDE	
IRONMONGERY	HINGE	REFER TO IRONMONGERY SCHEDULE	HINGE	REFER TO IRONMONGERY SCHEDULE
	PULL HANDLE		PULL HANDLE	
	PUSH PLATE		PUSH PLATE	
	LOCKSET		LOCKSET	
	PANIC BOLT		PANIC BOLT	
	FLUSH BOLT		FLUSH BOLT	
	DOOR CLOSER		DOOR CLOSER	
	DOOR SELECTOR		DOOR SELECTOR	
	KICK PLATE		KICK PLATE	
	DOOR STOP		DOOR STOP	
	OTHERS	TO ACCOMMODATE SMART ACCESS	OTHERS	TO ACCOMMODATE SMART ACCESS

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.

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CLIENT



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會


REV.	DATE & DESCRIPTION	DRN	CHK	APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

 **DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: PLAN/PROJ/SET/AT/IRON/DOOR/DOOR SCHEDULE - 01.dwg  
CONSTRUCTION CONTRACT/PROJ/SET/AT/IRON/DOOR/DOOR SCHEDULE - 01.dwg

SCALE: **A3 @ -**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**DOOR SCHEDULE (WOODEN 2)**

DRAWING NO.	REV.
<b>AT-05-04</b>	
PROJECT NO.	<b>DA17003</b>



LOUVRE MARK	<div>L1</div>	<div>L3</div>
ELEVATION (VIEW FROM OUTSIDE)		
LOCATION	EXTERNAL	EXTERNAL
LOUVRE FRAME	(SIZE: 600H x 1400Wmm) 50mm ALUMINUM NATURAL ANODIZED SECTION	(SIZE: 600H x 1300Wmm) 50mm ALUMINUM NATURAL ANODIZED SECTION
LOUVRE BLADE	ALUMINUM BLADE	ALUMINUM BLADE
REMARK	FIXED WEATHERPROOF LOUVRE REFER TO DETAIL.	FIXED WEATHERPROOF LOUVRE REFER TO DETAIL.
LOUVRE MARK	<div>L2</div>	
ELEVATION (VIEW FROM OUTSIDE)		
LOCATION	EXTERNAL	
LOUVRE FRAME	(SIZE: 600H x 3300Wmm) 50mm ALUMINUM NATURAL ANODIZED SECTION	
LOUVRE BLADE	ALUMINUM BLADE	
REMARK	FIXED WEATHERPROOF LOUVRE REFER TO DETAIL.	

NOTE: ALL LOUVRES MAY BE REQUIRED FOR STRUCTURAL SUBMISSION TO BD. THE CONTRACTOR SHALL PREPARE AND COMPLETE THE STRUCTURAL SUBMISSION PLANS, DESIGN CALCULATION, ENDORSED BY AN INDEPENDANT REGISTERED STRUCTURAL ENGINEER (RSE), TO REACH BD’S SATISFACTION’S AND APPROVAL.

THE CONTRACTOR SHALL ALSO FULFILL ALL IMPOSED CONDITIONS IN THE APPROVAL LETTER TO OBTAIN CONSENT FOR CARRYING OUT THE WORKS.



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

dca

DAVID S.K. AU & ASSOCIATES LTD.

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CAD PATH

QUANTITY SURVEYOR OF WORKS OF THE TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/ARCHITECT/MECHANICAL/PLUMBING/ROOFING

SCALE

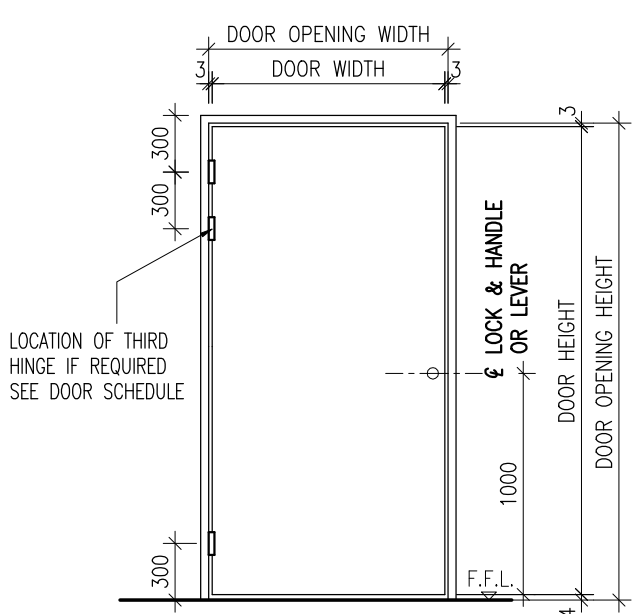
A3 @ -

PROJECT

RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

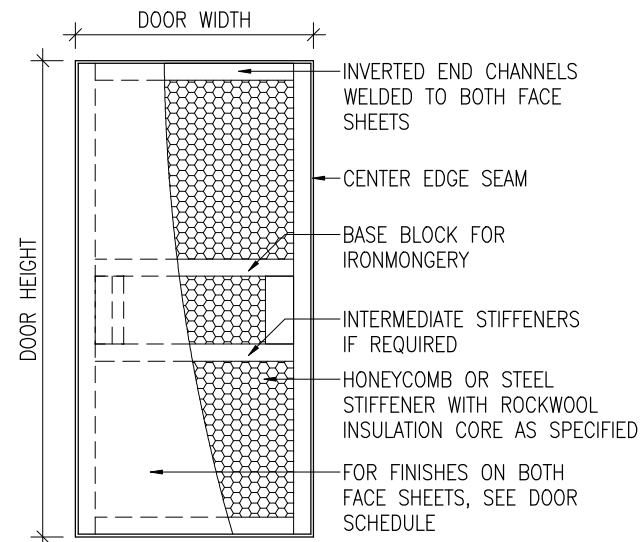
DRAWING TITLE  
LOUVRE SCHEDULE

DRAWING NO.	REV.
AT-05-11	
PROJECT NO.	DA17003



## TYPICAL STEEL DOOR DIMENSIONING

1:4



NOTE: DRAWING SHOWS DESIGN INTENT ONLY. PROPRIETARY AND/OR FIRE-RATED PRODUCT TO BE DETAILED BY CONTRACTOR

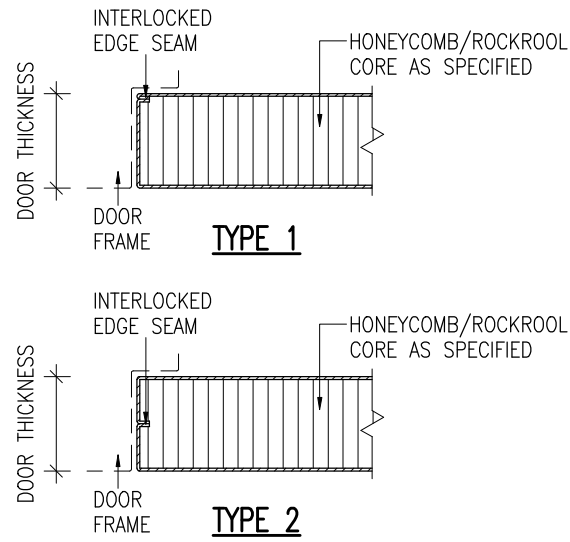
## HONEYCOMB/ROCKWOOL CORE DOOR

1:4



## TYPICAL STEEL DOOR DIMENSIONING

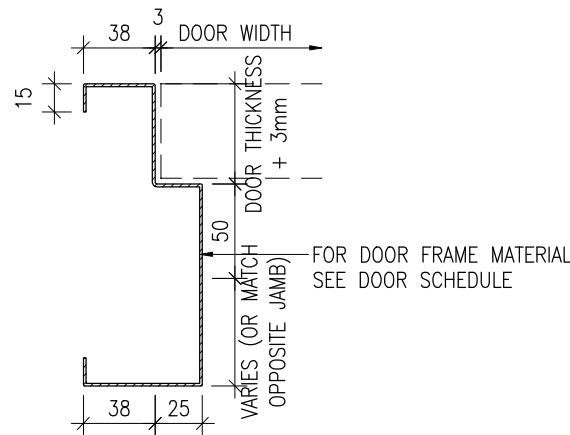
1:4



NOTE: DRAWING SHOWS DESIGN INTENT ONLY. PROPRIETARY AND/OR FIRE-RATED PRODUCT TO BE DETAILED BY CONTRACTOR

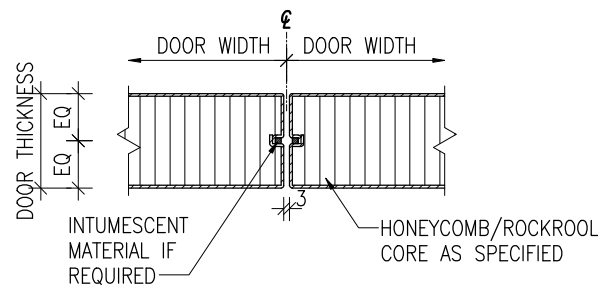
## DOOR EDGE

1:4



## METAL DOOR FRAME (TYPE 1)

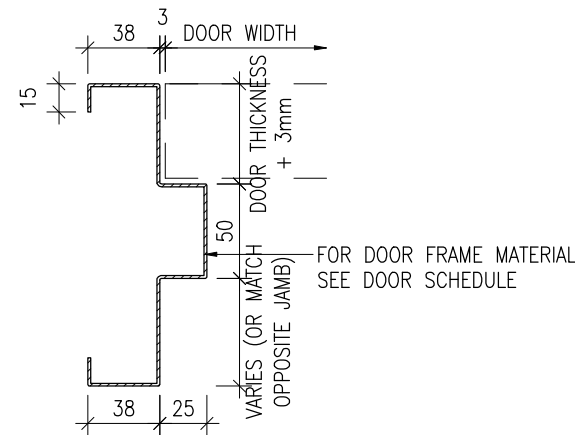
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NOTE: DRAWING SHOWS DESIGN INTENT ONLY. PROPRIETARY AND/OR FIRE-RATED PRODUCT TO BE DETAILED BY CONTRACTOR

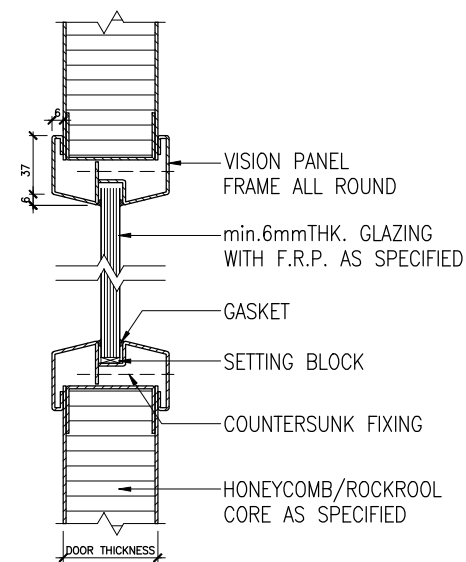
## MEETING STYLES

1:4



## METAL DOOR FRAME (TYPE 2)

1:4



NOTE: DRAWING SHOWS DESIGN INTENT ONLY. PROPRIETARY AND/OR FIRE-RATED PRODUCT TO BE DETAILED BY CONTRACTOR

## GLAZING PANEL

1:4

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REV. DATE & DESCRIPTION DRN CHK APP

### NOTES:

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6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: PLANT/PROJ/SETC/AT/KCC/DOOR DETAILS/DOOR DETAILS.dwg

SCALE: A3 @ 1:4

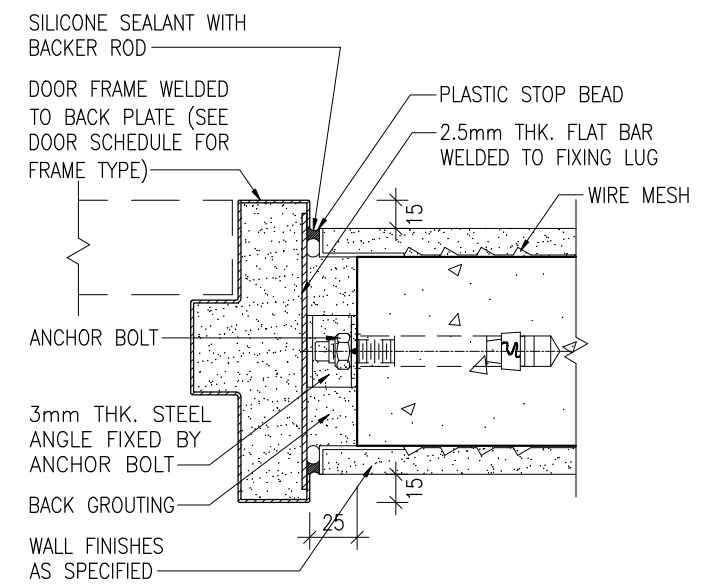
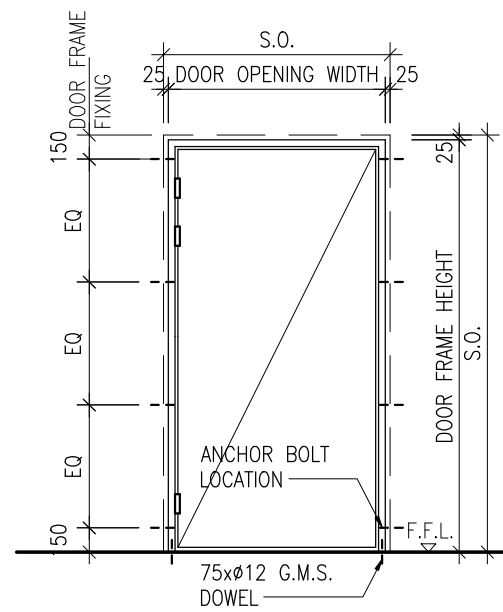
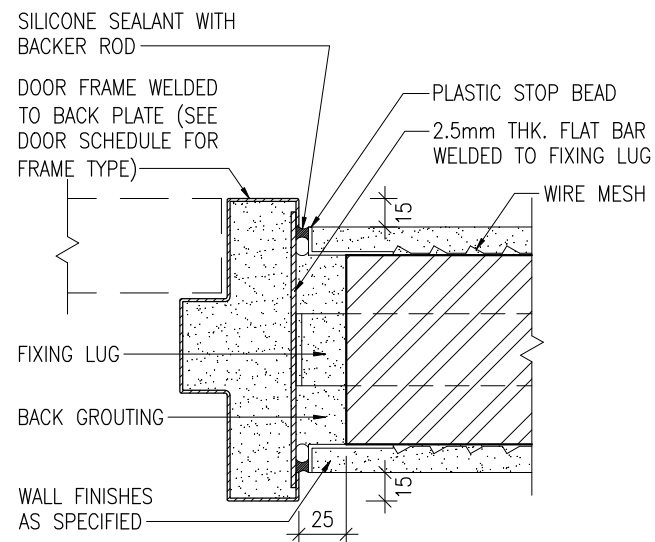
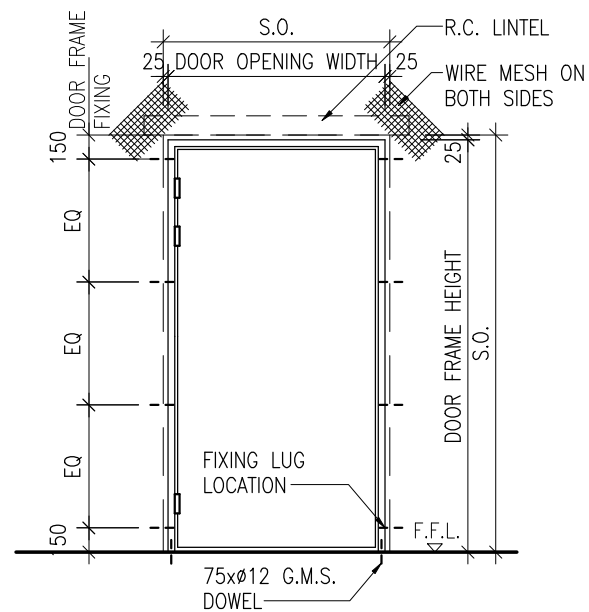
PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

DOOR DETAILS 1

DRAWING NO.	REV.
AT-05-21	
PROJECT NO.	DA17003





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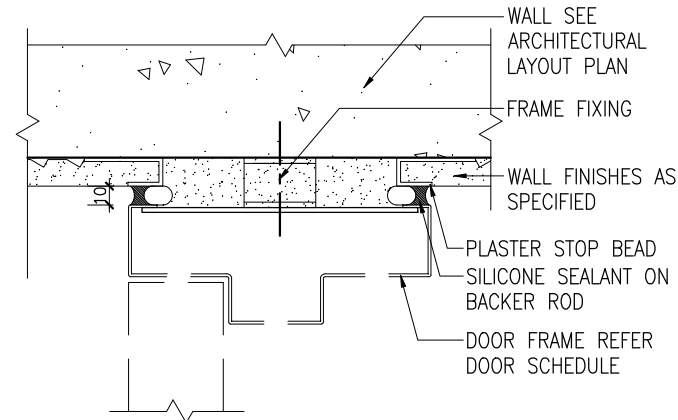
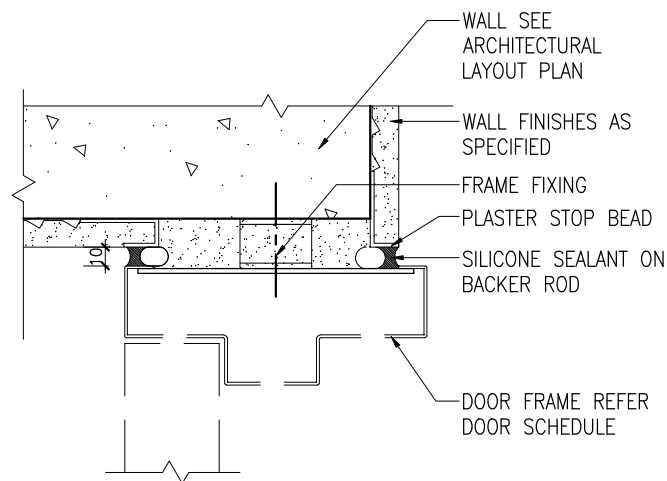
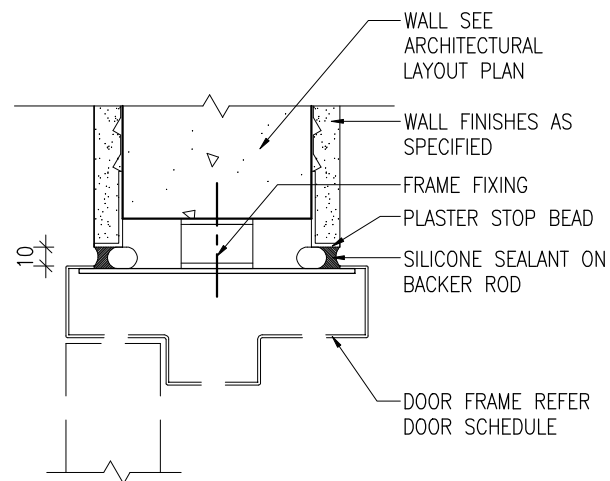
CLIENT



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

REV.	DATE & DESCRIPTION	DRN	CHK	APP
------	--------------------	-----	-----	-----

- NOTES:**
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EXTERNAL WALL  
FINISHES AS SPECIFIED

MASTIC SEALANT ON  
BACKER ROD

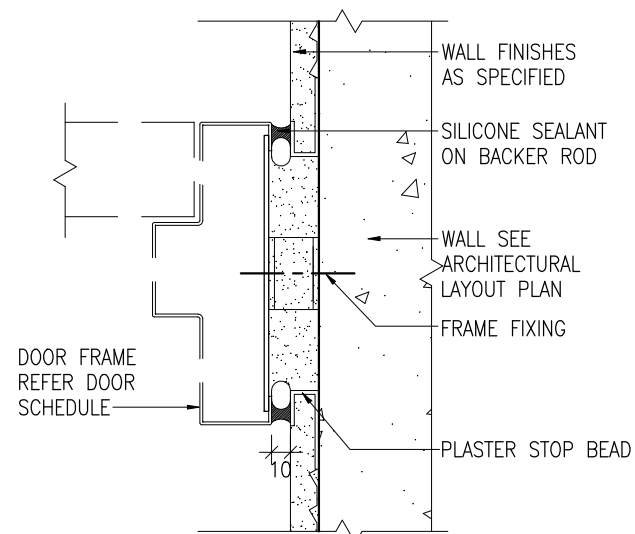
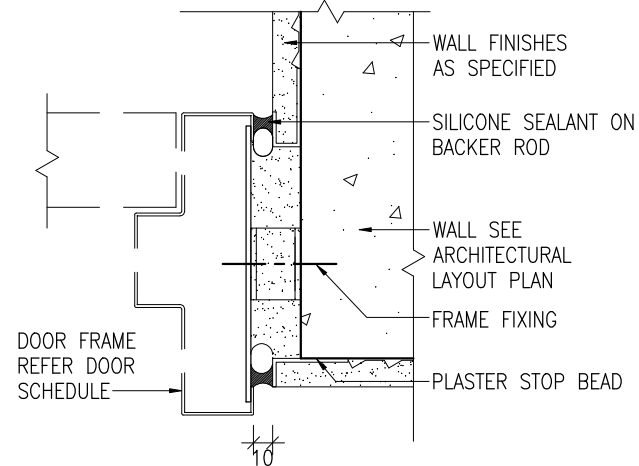
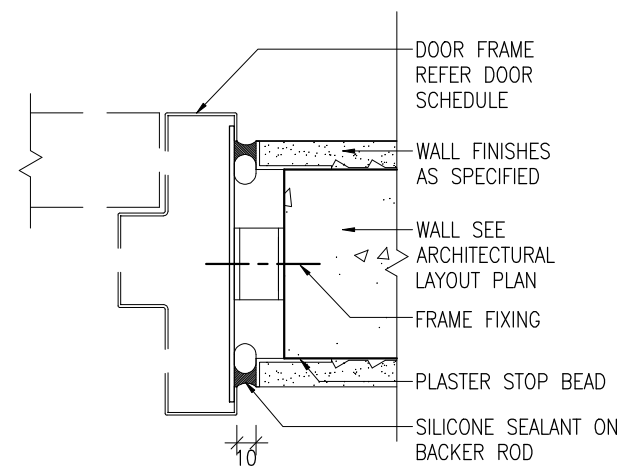
3mm THK. METAL  
FLASHING WITH  
MATCHING FINISH  
AND MATERIAL

**EXTERNAL**

HONEYCOMB/ROCKWOOL  
CORE AS SPECIFIED

30 25

10



HEAD DETAIL  
(EXTERNAL OPENING W/O FINS)  
1:4

**TENDER DRAWING**

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

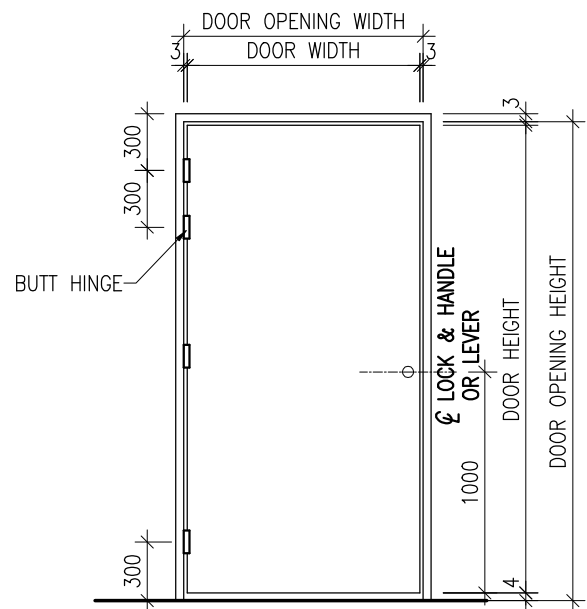
**dca** DAVID S. K. AU &  
ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dca.com.hk](http://www.dca.com.hk)

SCALE **A3 @ 1:4**

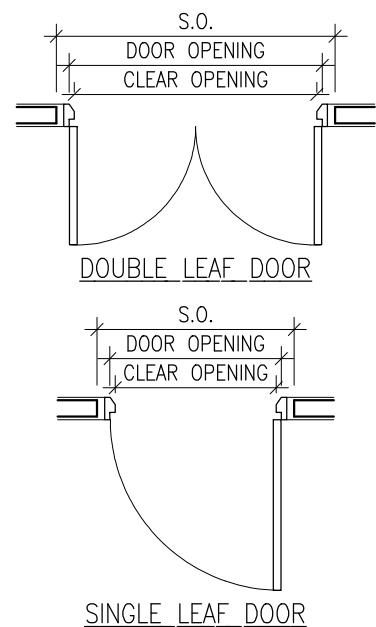
DRAWING TITLE

**DOOR DETAILS 2**

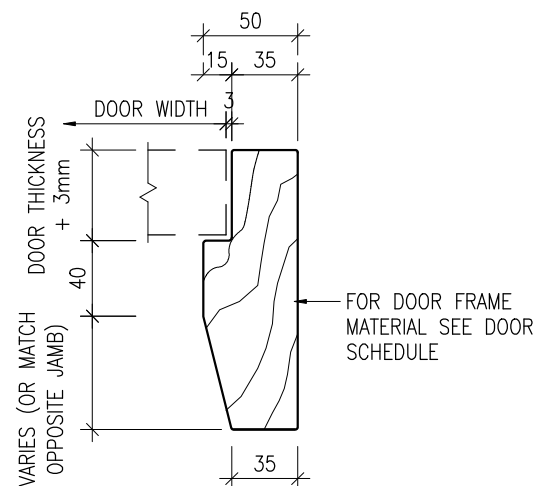
DRAWING NO.	REV.
<b>AT-05-22</b>	
PROJECT NO.	<b>DA17003</b>



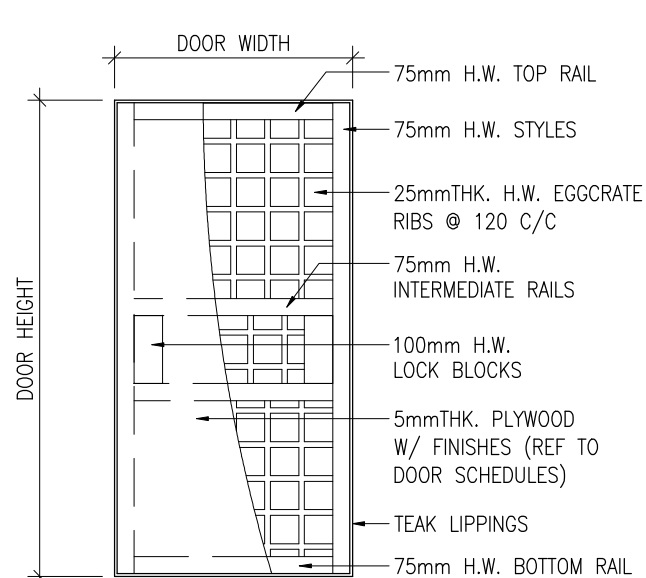
**TYPICAL TIMBER DOOR DIMENSIONING**  
1:4



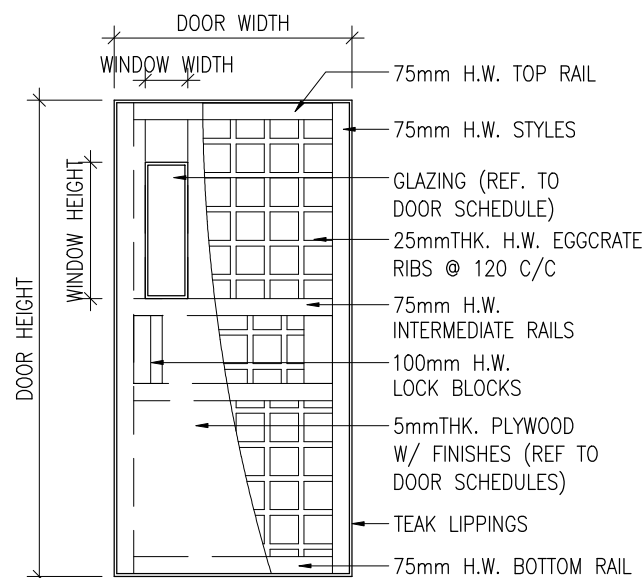
**TYPICAL TIMBER DOOR DIMENSIONING**  
1:4



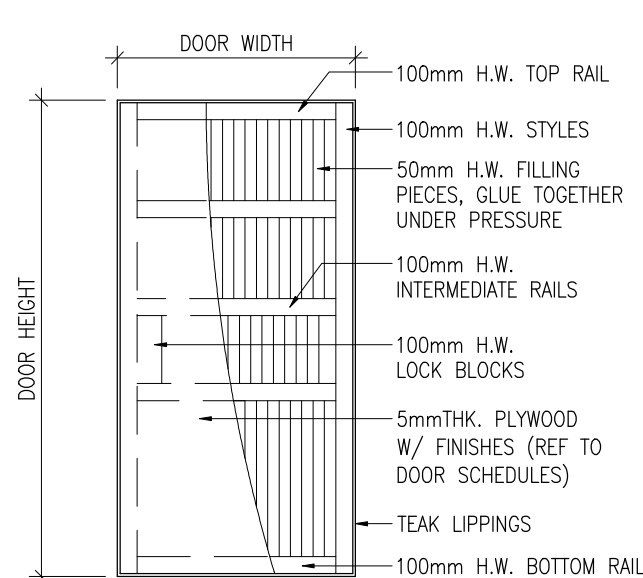
**TYPICAL TIMBER DOOR FRAME**  
1:4



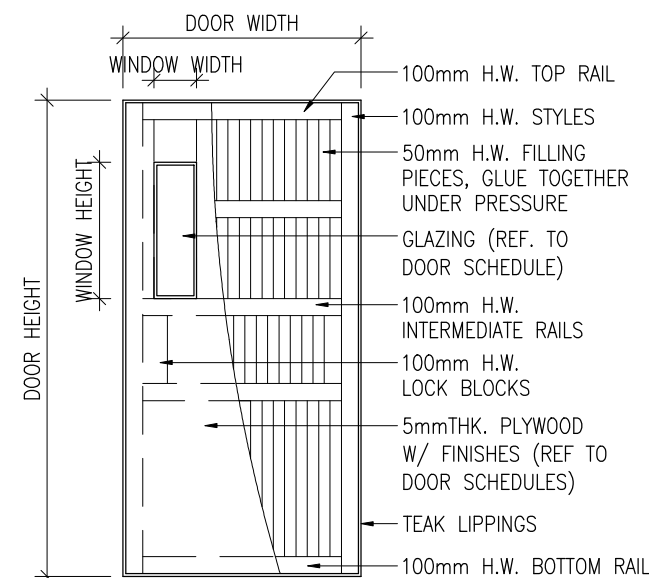
**HOLLOW FLUSH DOOR**  
1:4



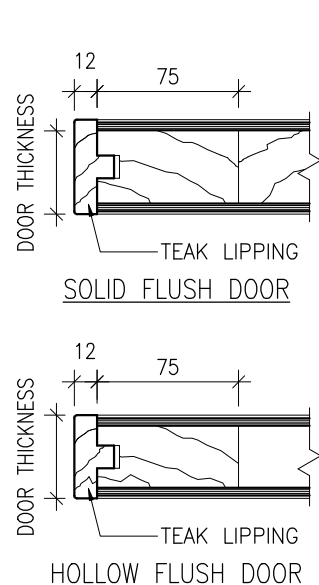
**HOLLOW FLUSH DOOR W/ GLAZING**  
1:4



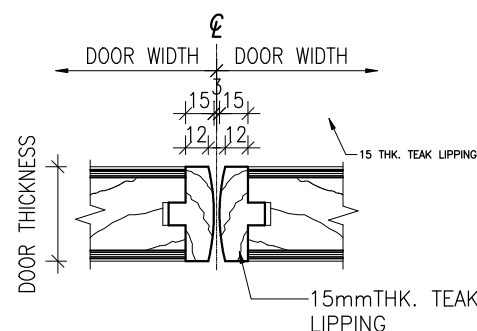
**SOLID FLUSH DOOR**  
1:4



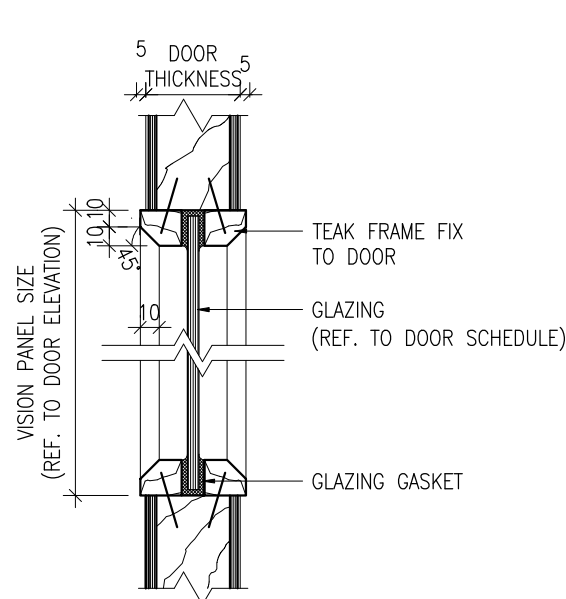
**SOLID FLUSH DOOR W/ GLAZING**  
1:4



**DOOR EDGE**



**MEETING STYLE**



**GLAZING PANEL**

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REV. DATE & DESCRIPTION DRN CHK APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: **A3 @ 1:4**

PROJECT: **RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)**

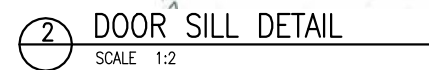
DRAWING TITLE: **DOOR DETAILS 3**

DRAWING NO. **AT-05-23**  
PROJECT NO. **DA17003**





DRAWING NO. <b>AT-05-24</b>	REV.
PROJECT NO. <b>DA17003</b>	



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

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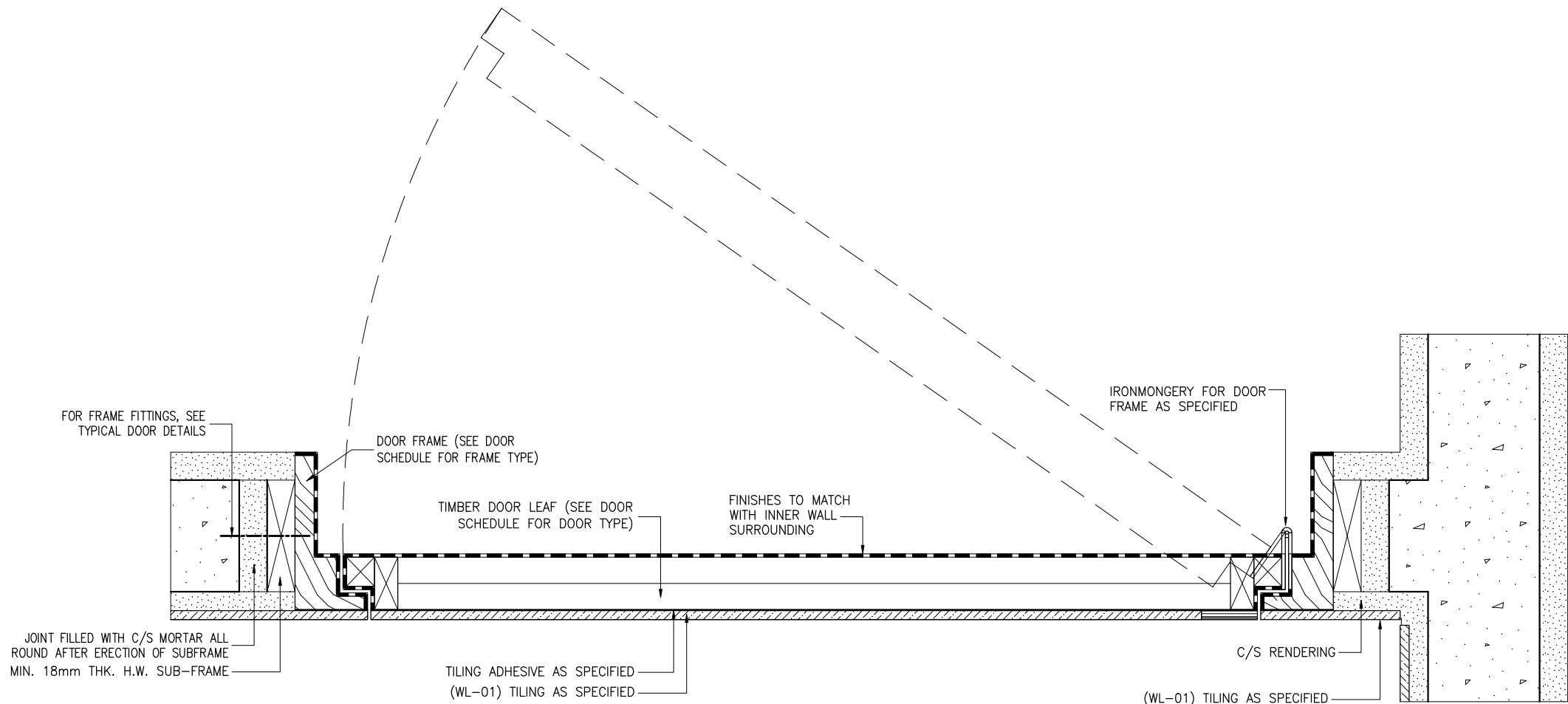
DRAWING NO.	REV.
<b>AT-05-25</b>	
PROJECT NO.	<b>DA17003</b>





NOTES:

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1 CONCEALED TILE DOOR  
SCALE 1:5 0 50 100

TENDER DRAWING

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15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: QUANTITIES SET BY KIM CHANG DE TONGING GENERAL - CHANG  
CONSTRUCTION CONTRACT/WORKING DRAWING/AS-BUILT/REVISIONS/REVISIONS/REVISIONS

SCALE A3 @ 1:5

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
CONCEALED DOOR DETAILS

DRAWING NO.	REV.
AT-05-26	
PROJECT NO.	DA17003

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**TENDER DRAWING**

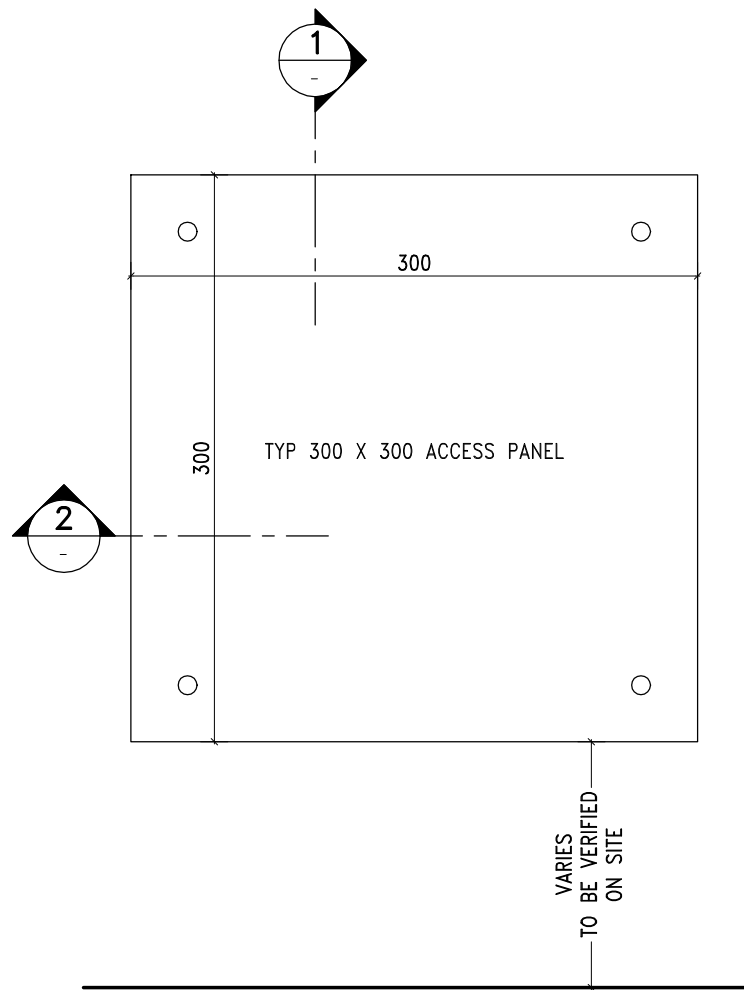
ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

 **DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: QUANTIFIED SETS OF NEW CHINESE TRAINING CENTER - 0502  
CONSTRUCTION CONTRACT/WORKING-ON-SITE/WORKING-ON-SITE ACCESS PANEL  
DETAILS.DWG  
SCALE: **A3 @ AS SHOWN**

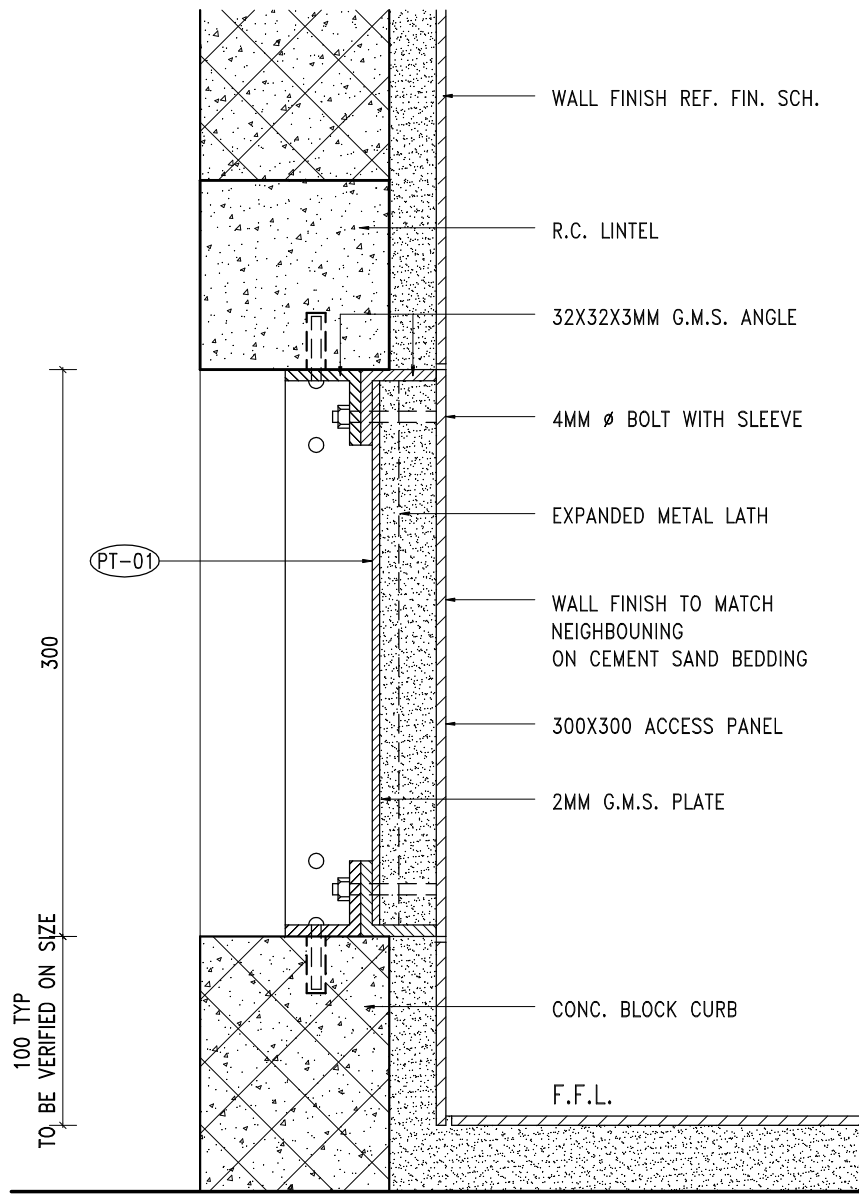
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**ACCESS PANEL DETAILS**

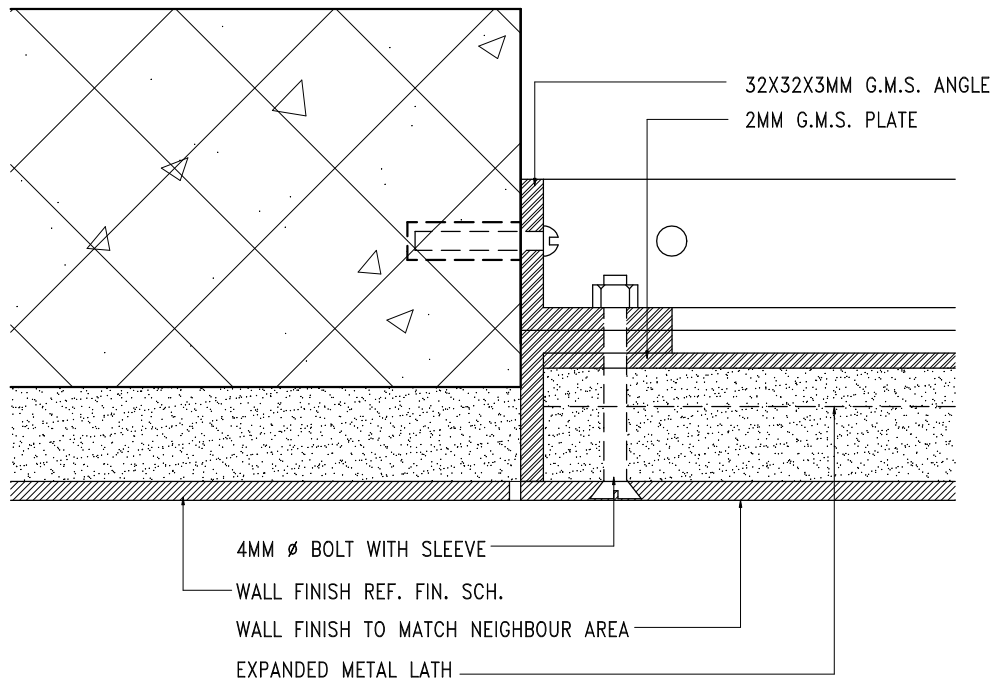
DRAWING NO.	REV.
<b>AT-05-27</b>	
PROJECT NO.	<b>DA17003</b>



**1 ACCESS PANEL ELEVATION**  
SCALE 1:4



**2 SECTION 1-1**  
SCALE 1:4

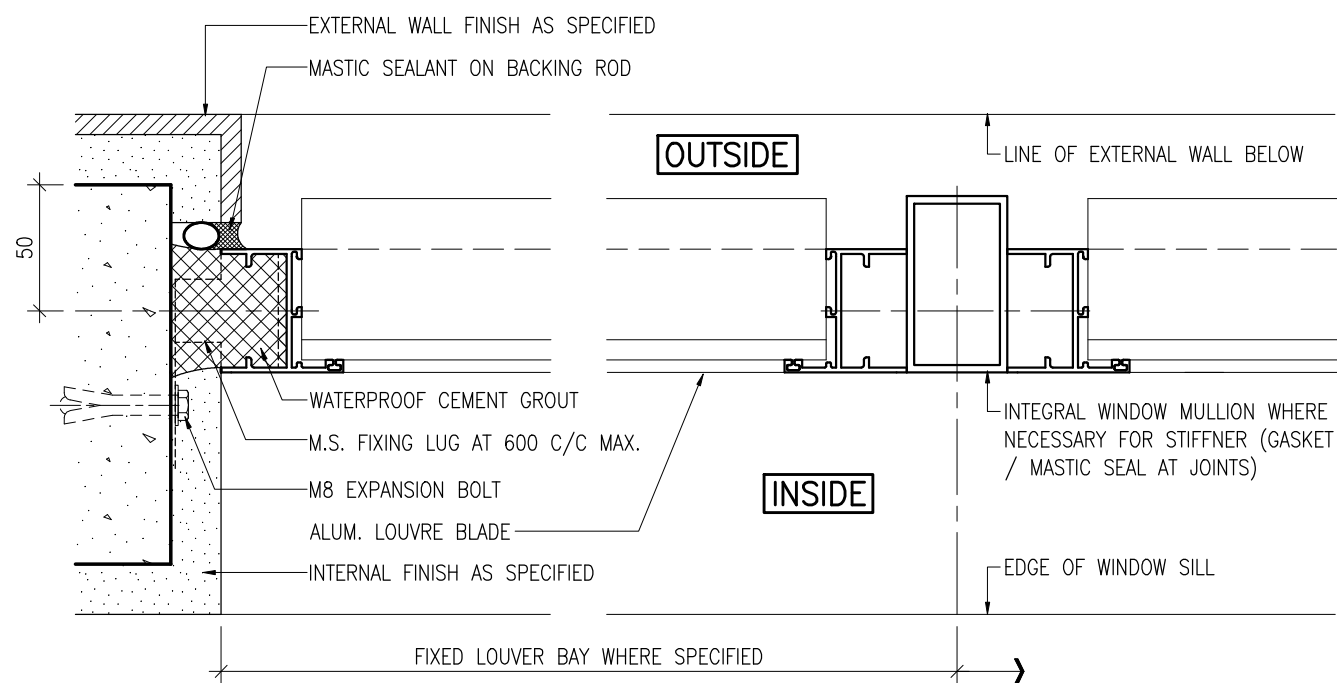
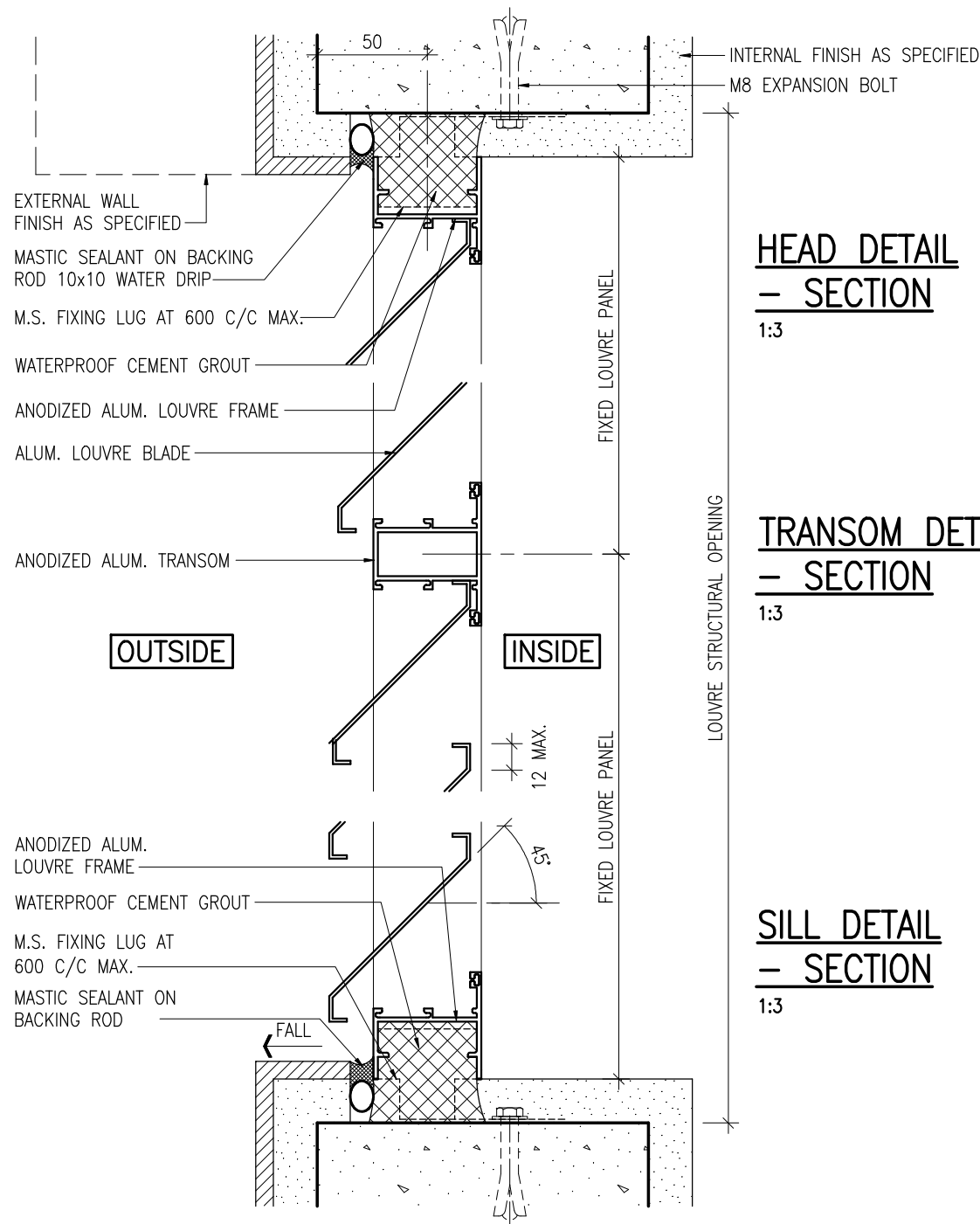


**3 SECTION 2-2**  
SCALE 1:2



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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: C:\PROJECTS\DAVID S.K. AU & ASSOCIATES LTD. - CIVIL\DWG\LOUVRE DETAILS.DWG  
SCALE: **A3 @ 1:3**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**LOUVRE DETAILS 1**

IENT



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ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

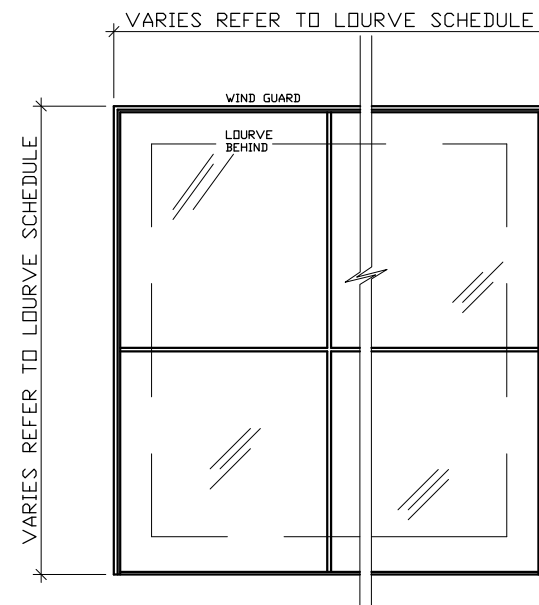
**A3 @ 1:5 & 1:30**

DRAWING TITLE

DRAWING NO.	REV.
<b>AT-05-32</b>	
PROJECT NO.	<b>DA17003</b>



## WIND GUARD ELEVATION







BRAND: DORMAKABA  
CONTACT: WINNIE WONG  
TEL: T: +852 2302 3911 / M: +852 6970 2082

UNLESS OTHERWISE SPECIFIED, ALL IRONMONGERY USED IN THE CONTRACT SHALL BE THE FOLLOWING OR EQUIVALENT.

IRONMONGERY SCHEDULE					Training Centre Project																											
					HINGE		CLOSER			AUTOMATIC SLIDING DOOR			LOCK & CYLINDER					PANIC EXIT			HANDLE		DOOR STOP	MISC								
					PRODUCT DESCRIPTION																											
					3044BB "Frankson" 102x102x3mm stainless steel butt hinge with two ball bearings, sss finish. (Complies BS7352, BS1227, BS1449, BS6323, BSEN10088-1)																											
					ST-443-SA-SS316 "Frankson" 100x100x3mm grade 316 stainless steel single action spring hinge, sss finish. (Complies BS7352, BSEN10088-1)																											
					"DORMA" BTS-80-316SS Enduring Package (8066+8064+7421) heavy duty double action floor spring with accessories, included frame portion, door portion & bottom strap EN 3/4/6, complied with EN 1154 and EN1634 for FRP door, BFA 2008 requirement, ANSI 156.4 Grade 1, 2 million cycles, with backcheck, adjustable hold-open & delay action, max. loading 300kg, 316 SSfinish cover plate																											
					"DORMA" 8066-8064+7421+7475AX, floor pivot bearing with angular contact roller bearing, loading capacity max. 300 kgs, with accessories included frame & door portion, cover plate & bottom strap.																											
					"DORMA" TS72-EN2-4-NHO-SV Surface mounted rack & pinion overhead door closer, with regular arm, adjustable closing force size EN 2-4, Tested to EN1154 CERTIFIRE approved, non hold open, silver finish																											
					"DORMA" CS 80 MAGNEO Automatic Sliding Door operator & Accessories (Privacy Door System), in contour design and driven by the magnetic and contractless shear wave of a linear DC motor, opening force within 10N in case of power failure,with soft motion technology, w/ inwall mounting (1x80kg), Low-Energy Mode, Low-Noise Application																											
					"DORMA" IXIO-DT1 combined sensor radar+IR, max. for 3.5m high, black. (Art. No. 1720252) + ACC Ceiling cover, white (Art.No. 1720261)																											
					"DORMA" Programme switch for ES, (G), 3-pos (off / automatic / permanent open), lockable, for flushmount, alum., white. (Art. No. 19135601150)																											
					"DORMA" 381 mortise sash lockcase, B/S 70mm, with grade 316 stainless steel latch, deadbolt, forend and strike plate. (Complies EN12209 Grade 3 classification 3-X-8:1:0-G:4:B:C:2:0 : 200,000 cycles, EN1634-1 2-hour fire-rated approved for fire-rated doors with CE certificate, with CERTIFIRE ref - CE267)																											
					"DORMA" 392 mortise night latch lockcase, B/S 70mm, with grade 316 stainless steel latch bolt, forend and strike plate. (Complies EN12209 Grade 3 classification 3-S:8:1:0-G:3:B:0:2:0 : 200,000 cycles, EN1634-1 2-hour fire-rated approved for fire-rated doors with CE certificate, with CERTIFIRE ref - CE267)																											
					"DORMA" EM 1800 AM Mortice mounting Electromagnetic Locks, fail-safe operation, dual 12/24 VDC power supply, magnetic holding force 180kg																											
					"DORMA" euro-profile cylinder & turn, in master keying system																											
					"DORMA" euro-profile single cylinder, in master keying system																											
					"DORMA"Pure612-SS316 grade 316 stainless steel escutcheon, sss finish. (Complies EN1906 classification : 3:7:-1:1:4:0:A)																											
					DORMA 9700 stainless steel one point locking panic latch, sss finish. (Complies EN1125 classification : 3:7:6:B:1:3:2:2:B:A & ANSI/BHMA A156.3 Grade 1 - extended cycling tested to 15,000,000 cycles (30 times of industrial standard), with CERTIFIRE ref - CE375)																											
					"DORMA" 9800 426 stainless steel two point locking panic bolt, sss finish. (Complies EN1125 classification : 3:7:6:B:1:3:2:2:B:A & ANSI/BHMA A156.3 Grade 1 - extended cycling tested to 15,000,000 cycles (30 times of industrial standard), with CERTIFIRE ref - CE375)																											
					"DORMA" ZT08EPx630 lever outside access device, sss finish. (Complies EN1125 classification : 3:7:6:B:1:3:2:2:B:A & ANSI/BHMA A156.3 Grade 1, with CERTIFIRE ref - CF875)																											
					2050 X 38MM DIA, Stainless steel pull handle fixed in pair, pss finish , complies with BS149, BS EN12209																											
					1161S-SS316 "Frankson" grade 316 stainless steel cylinder pull, sss finish. (Complies BSEN10088-1)																											
					"DORMA" Pure8100-SS316 grade 316 stainless steel lever handle on spring rose, sss finish. (Complies EN1906 classification : 3:7:-1:1:4:0:A : 200,000 cycles)																											
					"DORMA" stainless steel dome shape floor mount door stop, sss finish.																											
					"DORMA" Push Button, single-pole changeover contact, standard frame, white, flush-mounted, 80 x 80mm																											
					Emergency Break Glass in Green																											
					Access Card Control (by others)																											
DOOR MARK	DOOR OPENING	DOOR THICKNESS	DOOR LEAF SIZE	FIRE RATE (HR.)	LOCATION	DOOR QTY.	H1	H2	C1	C2	C3	ASL1	L1	L2	L3	CY1	CY2	ES1	PB1	PB2	PB3	PH1	PH2	LH1	DS	M1	M2	M3				
IRONMONGERY SET																																
G1	SWING		800+800 x 2100	2	ENTRANCE TO RECEPTION	1			2						2							2				1	1	1				
G2	SLIDING	12	1000 X 2700		OFFICE	1						1	2	1																		
D1	SWING	50	900 x 2125		VR ROOM	1	4				1			1		1		1						1	1							
D3L	SWING	50	700 X 2125		CCTV, SERVER ROOM	1				1				1		1		1						1	1							
D3R	SWING	50	700 X 2125		CCTV SERVER ROOM / ZONE A / ZONE F	3				3				3		3		3						3	3							
D4L	SWING	50	550 X 2125		CCTV SERVER ROOM	2				2				2		2		2						2	2							
D4R	SWING	50	550 X 2125		CCTV SERVER ROOM	2				2				2		2		2						2	2							
M1	SWING	50	800 X 2125		ZONE A	1	4				1								1		1											
PD1	SWING	50	450x900		ZONE F	1		2							1	1		1					1									
PD2	SWING	50	900x750		BRIEFING AREA	1		2							1	1		1					1									

CLIENT



Technical drawing of a mechanical part, likely a bracket or support. The drawing shows two views: a top view and a side view. The top view is a rectangle with a width of 100 and a height of 20. It features a central circular hole with a diameter of 10. There are also two smaller circular holes, one on each side, with a diameter of 5. The side view shows a height of 20 and a width of 100. It also features a central circular hole with a diameter of 10. The drawing includes dimension lines and numerical values for all specified dimensions.

NOTE: ALL IRONMONGERY PRODUCT LIST ABOVE ARE INTENT TO MATCH WITH INDICATES IN THE IRONMONGERY SCHEDULE  
THE CONTRACTOR COULD SUBMIT ANY EQUIVALENT MODEL FOR ARCHITECT'S APPROVAL.

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## IRONMONGERY CATALOGUE 1

PROJECT NO. **DA17003**



LIENT

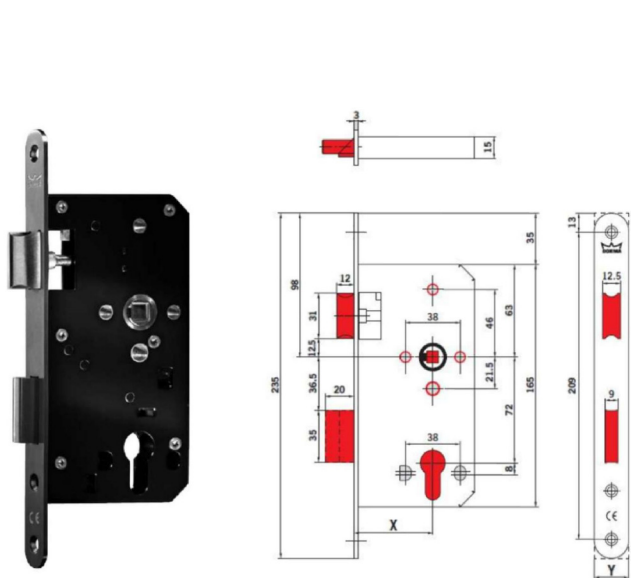


DRAWING NO.	REV.
<b>AT-05-43</b>	
PROJECT NO.	<b>DA17003</b>

PROJECT:

Ironmongery Specification

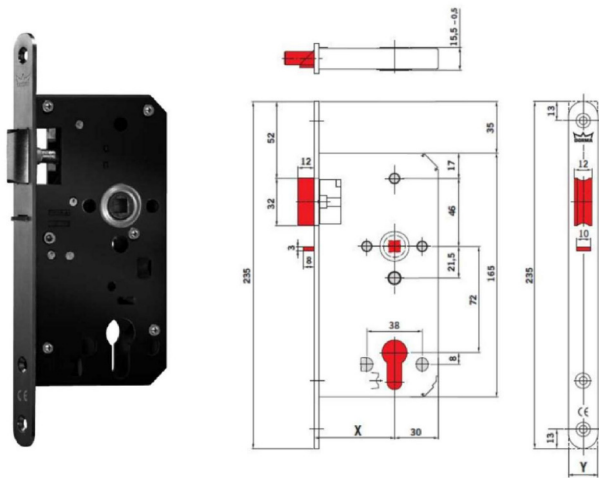
Brand : dormakaba Item Code: L1  
Location: Model: Dorma381  
Description: 'DORMA' 381 mortise sash lockcase, B/S 70mm, with grade 316 stainless steel latch, deadbolt, forend and strike plate. (Complies EN12209 Grade 3 classification 3.X:8:1.0:G:4:B:C:2.0 : 200,000 cycles, EN1634-1 2-hour fire-rated approved for fire-rated doors with CE certificate, with CERTIFIRE ref : CF267)



PROJECT:

Ironmongery Specification

Brand : dormakaba Item Code: L2  
Location: Model: Dorma392  
Description: 'DORMA'392 mortise night latch lockcase, B/S 70mm, with grade 316 stainless steel latch bolt, forend and strike plate. (Complies EN12209 Grade 3 classification 3.S:8:1.0:G:3:B:0:2.0 : 200,000 cycles, EN1634-1 2-hour fire-rated approved for fire-rated doors with CE certificate, with CERTIFIRE ref : CF267)



PROJECT:

Ironmongery Specification

Brand : dormakaba Item Code: CY1  
Location: Model: DEC  
Description: "DORMA" DEC euro-profile cylinder and turn, in master keying system



NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
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6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

 **DAVID S.K. AU &  
ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH:  QUANTITY SETS AT NEW CHINESE TRAINING CENTRE - COPY  
CONSTRUCTION CONTRACT NUMBER: AT-05 2016/01/14-15 15:45:10  
IRONMONGERY CATALOGUE.DWG

SCALE **A3 @**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**IRONMONGERY CATALOGUE 3**


NOTE: ALL IRONMONGERY PRODUCT LIST ABOVE ARE INTENT TO MATCH WITH INDICATES IN THE IRONMONGERY SCHEDULE  
THE CONTRACTOR COULD SUBMIT ANY EQUIVALENT MODEL FOR ARCHITECT'S APPROVAL.

PROJECT:

Ironmongery Specification

Brand :	dormakaba	Item Code:	CY2
Location:		Model:	DEC

Description: "DORMA" euro-profile single cylinder, in master keying system





PROJECT:

Ironmongery Specification

Brand :	dormakaba	Item Code:	ES1
Location:		Model:	Pure6612

Description: Pure6612-SS316 grade 316 stainless steel escutcheon, sss finish. (Complies EN1906 classification : 3;7-:1;1;4;0;A)





**6612**

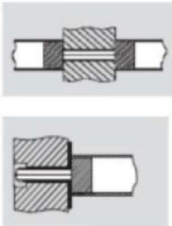
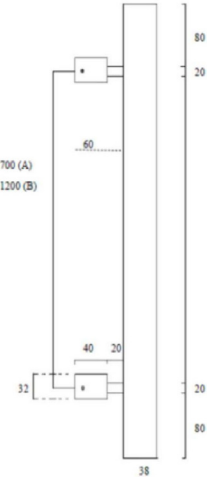



PROJECT:

Ironmongery Specification

Brand :	Frankson	Item Code:	PH1
Location:		Model:	

Description: 2050 x 38mm dia. Stainless steel pull handle fixed in pair, pss finish, complies with BS1449, BS EN12209



NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

 **DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: QUANTITIES SET BY KIM CHANG CO. DRAWING GENERATED BY: CHANG  
RENDERING GENERATED BY: CHANG

SCALE **A3 @**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**IRONMONGERY CATALOGUE 4**

NOTE: ALL IRONMONGERY PRODUCT LIST ABOVE ARE INTENT TO MATCH WITH INDICATES IN THE IRONMONGERY SCHEDULE  
THE CONTRACTOR COULD SUBMIT ANY EQUIVALENT MODEL FOR ARCHITECT’S APPROVAL.



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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PROJECT:

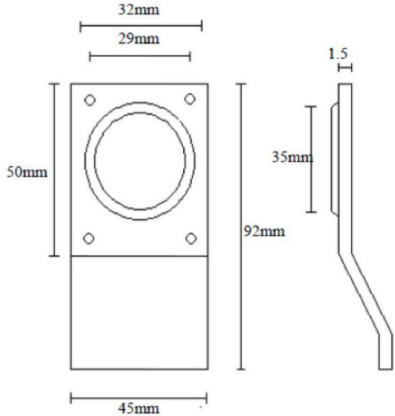

Ironmongery Specification

Brand : Frankson

Item Code: PH2

Location: Model: 1161S

Description: 1161S-SS316 'Frankson' grade 316 stainless steel cylinder pull, sss finish. (Complies BSEN10088-1)



PROJECT:

Ironmongery Specification

Brand : dormakaba

Item Code: LH1

Location: Model: Pure8100

Description: "DORMA" Pure8100-SS316 grade 316 stainless steel lever handle on spring rose, sss finish. (Complies EN1906 classification : 3:7~:1:14:0:A : 200,000 cycles)



PROJECT:

Ironmongery Specification

Brand : Frankson

Item Code: DS

Location: Model:


Description: "Frankson" stainless steel dome shape floor mount door stop, sss finish.



- NOTES:**
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER



DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH

SCALE A3 @

PROJECT

RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

IRONMONGERY CATALOGUE 5

NOTE: ALL IRONMONGERY PRODUCT LIST ABOVE ARE INTENT TO MATCH WITH INDICATES IN THE IRONMONGERY SCHEDULE THE CONTRACTOR COULD SUBMIT ANY EQUIVALENT MODEL FOR ARCHITECT’S APPROVAL.

DRAWING NO.	REV.
AT-05-46	
PROJECT NO.	DA17003





**NOTES:**

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

 **DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH: QUANTITY SETS AT NEW CHINESE TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTING SERVICES - CIVIL  
IRONMONGERY CATALOGUE.DWG

SCALE **A3 @**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**IRONMONGERY CATALOGUE 7**

DRAWING NO.	REV.
<b>AT-05-48</b>	
PROJECT NO.	<b>DA17003</b>

PROJECT:

Ironmongery Specification

Brand :	dormakaba	Item Code:	M1
Location:		Model:	Push Button
Description:	"DORMA" Push Button, single-pole changeover contact, standard frame, white, flush-mounted, 80 x 80mm		



PROJECT:

Ironmongery Specification

Brand :	dormakaba	Item Code:	M2
Location:		Model:	Emergency Breakglass
Description:	Emergency Break Glass in Green		



PROJECT:

Ironmongery Specification

Brand :	dormakaba	Item Code:	L3
Location:		Model:	EM1800AH
Description:	"DORMA" EM 1800 AH Mortice mounting Electromagnetic Locks, fail-safe operation, dual 12/24 VDC power supply, magnetic holding force 180kg		

**EM 1800 AH**

Surface mounting

Monitoring by built in Reed contac

Dual voltage power supply: 12 V DC / 24 V DC

Consumption: 370 mA / 185 mA

Size:

Body magnet (W x H x D): 165 x 38, 5 x 21 mm

Armature plate (W x H x D): 133 x 31 x 8 mm



NOTE: ALL IRONMONGERY PRODUCT LIST ABOVE ARE INTENT TO MATCH WITH INDICATES IN THE IRONMONGERY SCHEDULE  
THE CONTRACTOR COULD SUBMIT ANY EQUIVALENT MODEL FOR ARCHITECT’S APPROVAL.

LIENT



SUPPLIER: POSH  
SPECIFICATION: AS SHOWN BELOW.

THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.

UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.

ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\DA17005 SEC AT KNO CHUNG CIC TRAINING CENTRE\1 - CAD\C  
-TENDER\MAIN CONTRACT\WORKING\AT-05 SCHEDULE\AT-05-51 TO AT-05-52

SCALE                      **A3 @ -**


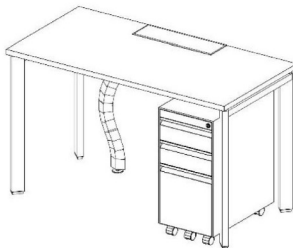
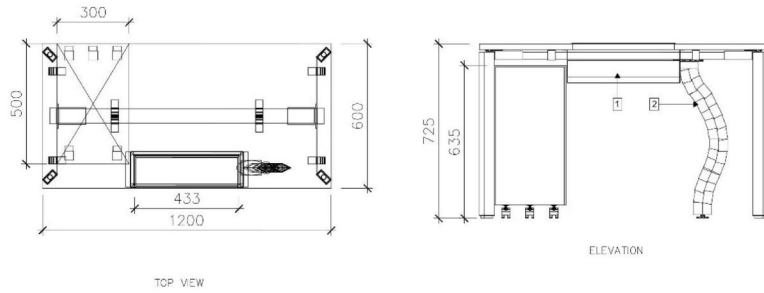



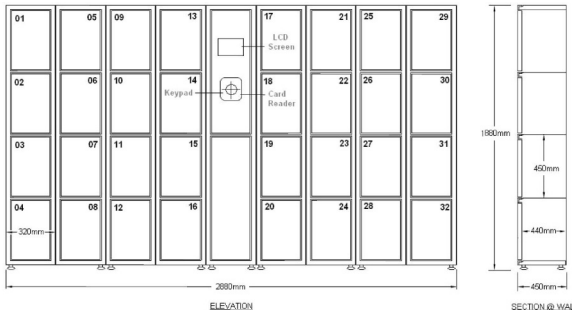


RAWING TITLE  
FURNITURE SCHEDULE 1  
OFFICE CHAIR)

DRAWING NO.	REV.
<b>AT-05-51</b>	
PROJECT NO.	<b>DA17003</b>























THE CONTRACTOR SHALL APPOINT THE FOLLOWING SUPPLIER TO SUPPLY THE EQUIPMENT FOR OFFICE AREA AS SPECIFIED.

SUPPLIER: POSH FOR F-04 AND F-06  
SPECIFICATION: AS SHOWN BELOW.

FURNITURE CODE: F-04		F-05		F-06																																																													
QUANTITY: 1		QUANTITY: 1		QUANTITY: 1																																																													
<div>AREA: ZONE H (VR CAVE) THE CONTRACTOR MAY SUPPLY THE PROPOSED FURNITURE BELOW OR EQUIVALENT</div> <div> <b>POSH</b> A HermanMiller Company</div> <div><b>FURNITURE SPECIFICATIONS AND DETAIL</b></div> <table><tr><td>DESCRIPTION</td><td>Desk with drawer</td></tr><tr><td>MODEL</td><td>Imagine Desk with CK8 drawer</td></tr><tr><td>ORIGIN</td><td>Asia</td></tr><tr><td>FINISH / COLOUR</td><td>Finish: Frame: #MH – Core white/ Melamine: #VV – Ivory vivid/ Pedestal: # NS- New snow</td></tr><tr><td>SUPPLIER</td><td>POSH - Herman Miller (Dongguan) Furniture Co., Ltd.</td></tr><tr><td>ADDRESS</td><td>Shop B, G/F., 251 Hennessy Road, Wan chai, Hong Kong</td></tr><tr><td>CONTACT</td><td>Mathew Lam</td></tr><tr><td>TELEPHONE</td><td>(852) 9181 1182</td></tr><tr><td>FAX.</td><td>(852) 2816 6621</td></tr><tr><td>OTHERS</td><td>Free standing table melamine top with aluminium flipper, cable box and cable riser with CK8 3 drawer slim mobile pedestal Size: Desk: W2075 x D600 x H725 MP: W300 x D500 x H635</td></tr></table> <div></div> <div><b>DIMENSIONS</b></div> <div></div>		DESCRIPTION	Desk with drawer	MODEL	Imagine Desk with CK8 drawer	ORIGIN	Asia	FINISH / COLOUR	Finish: Frame: #MH – Core white/ Melamine: #VV – Ivory vivid/ Pedestal: # NS- New snow	SUPPLIER	POSH - Herman Miller (Dongguan) Furniture Co., Ltd.	ADDRESS	Shop B, G/F., 251 Hennessy Road, Wan chai, Hong Kong	CONTACT	Mathew Lam	TELEPHONE	(852) 9181 1182	FAX.	(852) 2816 6621	OTHERS	Free standing table melamine top with aluminium flipper, cable box and cable riser with CK8 3 drawer slim mobile pedestal Size: Desk: W2075 x D600 x H725 MP: W300 x D500 x H635	<div> <b>Ansen Security Networks Ltd.</b> Flat 812, 8/F., Block F, Shun Fat Industrial Building, 17 Wang Hoi Road, Kowloon Bay, Hong Kong. Telephone : (+852) 2331-2776 Fax : (+852) 2331-2981 Website : www.ansensafes.com</div> <div>THE CONTRACTOR MAY SUPPLY THE PROPOSED LOCKER SHOWN BELOW OR EQUIVALENT</div> <div><b>FURNITURE SPECIFICATIONS AND DETAIL</b></div> <table><tr><td>DESCRIPTION</td><td>RFID Smart card locker</td></tr><tr><td>MODEL</td><td>RFID Smart card locker</td></tr><tr><td>ORIGIN</td><td>Asia</td></tr><tr><td>FINISH / COLOUR</td><td>Multi colour door works (3 colours)</td></tr><tr><td>SUPPLIER</td><td>Ansen Security Networks Ltd.</td></tr><tr><td>ADDRESS</td><td>Flat 812, 8F., Block F Shun Fat Industrial Building, 17 Wang Hoi Road, Kowloon Bay, Hong Kong</td></tr><tr><td>CONTACT</td><td>Maisy Cheng</td></tr><tr><td>TELEPHONE</td><td>(852) 2331 2776</td></tr><tr><td>FAX.</td><td>(852) 2331 2981</td></tr><tr><td>OTHERS</td><td>- Smart card operated lockers - 32 compartments - Size: 2880W x 450D x 1880Hmm - Use existing TPTG operating System</td></tr></table> <div></div> <div></div> <div><b>DIMENSIONS</b></div> <div></div>		DESCRIPTION	RFID Smart card locker	MODEL	RFID Smart card locker	ORIGIN	Asia	FINISH / COLOUR	Multi colour door works (3 colours)	SUPPLIER	Ansen Security Networks Ltd.	ADDRESS	Flat 812, 8F., Block F Shun Fat Industrial Building, 17 Wang Hoi Road, Kowloon Bay, Hong Kong	CONTACT	Maisy Cheng	TELEPHONE	(852) 2331 2776	FAX.	(852) 2331 2981	OTHERS	- Smart card operated lockers - 32 compartments - Size: 2880W x 450D x 1880Hmm - Use existing TPTG operating System	<div> <b>POSH</b> A HermanMiller Company</div> <div><b>FURNITURE SPECIFICATIONS AND DETAIL</b></div> <table><tr><td>DESCRIPTION</td><td>Storage Cabinet</td></tr><tr><td>MODEL</td><td>PK4</td></tr><tr><td>ORIGIN</td><td>Asia</td></tr><tr><td>FINISH / COLOUR</td><td></td></tr><tr><td>SUPPLIER</td><td>POSH - Herman Miller (Dongguan) Furniture Co., Ltd.</td></tr><tr><td>ADDRESS</td><td>Shop B, G/F., 251 Hennessy Road, Wan chai, Hong Kong</td></tr><tr><td>CONTACT</td><td>Mathew Lam</td></tr><tr><td>TELEPHONE</td><td>(852) 9181 1182</td></tr><tr><td>FAX.</td><td>(852) 2816 6621</td></tr><tr><td>OTHERS</td><td></td></tr></table> <div></div> <div><b>DIMENSIONS</b></div>		DESCRIPTION	Storage Cabinet	MODEL	PK4	ORIGIN	Asia	FINISH / COLOUR		SUPPLIER	POSH - Herman Miller (Dongguan) Furniture Co., Ltd.	ADDRESS	Shop B, G/F., 251 Hennessy Road, Wan chai, Hong Kong	CONTACT	Mathew Lam	TELEPHONE	(852) 9181 1182	FAX.	(852) 2816 6621	OTHERS	
DESCRIPTION	Desk with drawer																																																																
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ADDRESS	Shop B, G/F., 251 Hennessy Road, Wan chai, Hong Kong																																																																
CONTACT	Mathew Lam																																																																
TELEPHONE	(852) 9181 1182																																																																
FAX.	(852) 2816 6621																																																																
OTHERS	Free standing table melamine top with aluminium flipper, cable box and cable riser with CK8 3 drawer slim mobile pedestal Size: Desk: W2075 x D600 x H725 MP: W300 x D500 x H635																																																																
DESCRIPTION	RFID Smart card locker																																																																
MODEL	RFID Smart card locker																																																																
ORIGIN	Asia																																																																
FINISH / COLOUR	Multi colour door works (3 colours)																																																																
SUPPLIER	Ansen Security Networks Ltd.																																																																
ADDRESS	Flat 812, 8F., Block F Shun Fat Industrial Building, 17 Wang Hoi Road, Kowloon Bay, Hong Kong																																																																
CONTACT	Maisy Cheng																																																																
TELEPHONE	(852) 2331 2776																																																																
FAX.	(852) 2331 2981																																																																
OTHERS	- Smart card operated lockers - 32 compartments - Size: 2880W x 450D x 1880Hmm - Use existing TPTG operating System																																																																
DESCRIPTION	Storage Cabinet																																																																
MODEL	PK4																																																																
ORIGIN	Asia																																																																
FINISH / COLOUR																																																																	
SUPPLIER	POSH - Herman Miller (Dongguan) Furniture Co., Ltd.																																																																
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CONTACT	Mathew Lam																																																																
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  - UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  - UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  - ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  - ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.



E-01	E-02	E-03																																																												
QUANTITY: 3	QUANTITY: 5	QUANTITY: 1																																																												
<div></div> <div>SPECIFICATION AND DETAILS</div> <table><tr><td>MODEL NO.</td><td>LG ULTRA HD TV 40UF7700</td><td rowspan="5"></td></tr><tr><td>BRAND</td><td>LG</td></tr><tr><td>ORIGIN</td><td>KOREA</td></tr><tr><td>SIZE</td><td>40 INCH 906 x 524 x 56.7mm</td></tr><tr><td>RESOLUTION</td><td>4K RESOLUTION</td></tr><tr><td>NETWORK (WI-FI)</td><td>YES</td><td rowspan="4"></td></tr><tr><td>USB</td><td>USB 3.0/2.0</td></tr><tr><td>SUPPLIER</td><td>LG.COM.HK</td></tr><tr><td>OTHERS</td><td>ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR</td></tr></table>	MODEL NO.	LG ULTRA HD TV 40UF7700		BRAND	LG	ORIGIN	KOREA	SIZE	40 INCH 906 x 524 x 56.7mm	RESOLUTION	4K RESOLUTION	NETWORK (WI-FI)	YES		USB	USB 3.0/2.0	SUPPLIER	LG.COM.HK	OTHERS	ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR	<div></div> <div>SPECIFICATION AND DETAILS</div> <table><tr><td>MODEL NO.</td><td>LG SJ9500</td><td rowspan="5"></td></tr><tr><td>BRAND</td><td>LG</td></tr><tr><td>ORIGIN</td><td>KOREA</td></tr><tr><td>SIZE</td><td>55 INCH 1228 x 765 x 57mm</td></tr><tr><td>RESOLUTION</td><td>4K RESOLUTION</td></tr><tr><td>NETWORK (WI-FI)</td><td>YES (802.11ac)</td><td rowspan="4"></td></tr><tr><td>USB</td><td>USB 3.0/2.0</td></tr><tr><td>SUPPLIER</td><td>LG.COM.HK</td></tr><tr><td>OTHERS</td><td>ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR</td></tr></table>	MODEL NO.	LG SJ9500		BRAND	LG	ORIGIN	KOREA	SIZE	55 INCH 1228 x 765 x 57mm	RESOLUTION	4K RESOLUTION	NETWORK (WI-FI)	YES (802.11ac)		USB	USB 3.0/2.0	SUPPLIER	LG.COM.HK	OTHERS	ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR	<div></div> <div>SPECIFICATION AND DETAILS</div> <table><tr><td>MODEL NO.</td><td>75UH5C</td><td rowspan="5"></td></tr><tr><td>BRAND</td><td>LG</td></tr><tr><td>ORIGIN</td><td>KOREA</td></tr><tr><td>SIZE</td><td>75 INCH 1682 x 960.3 x 39.7mm</td></tr><tr><td>RESOLUTION</td><td></td></tr><tr><td>NETWORK (WI-FI)</td><td>YES (802.11n)</td><td rowspan="4"></td></tr><tr><td>USB</td><td></td></tr><tr><td>SUPPLIER</td><td>LG.COM.HK</td></tr><tr><td>OTHERS</td><td>ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR</td></tr></table>	MODEL NO.	75UH5C		BRAND	LG	ORIGIN	KOREA	SIZE	75 INCH 1682 x 960.3 x 39.7mm	RESOLUTION		NETWORK (WI-FI)	YES (802.11n)		USB		SUPPLIER	LG.COM.HK	OTHERS	ADJUSTABLE WALL MOUNT DEVICE TO BE PROVIDED BY MAIN CONTRACTOR
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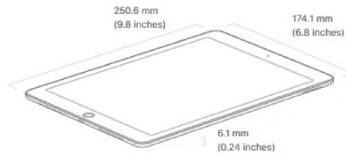
REV. DATE & DESCRIPTION DRN CHK APP

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E-04	
QUANTITY: 5	
<div></div>	
SPECIFICATION AND DETAILS	
MODEL NO.	IPAD PRO
BRAND	APPLE
ORIGIN	CALIFORNIA
SIZE	10.5 INCH 250.6 x 174.1 x 6.1mm
RESOLUTION	2224x1668 RESOLUTION AT 264 PIXELS PER INCH (PPI)
NETWORK (WI-FI)	YES (802.11n) DUAL BAND (2.4GHz & 5GHz); HT80 WITH MIMO BLUETOOTH 4.2 TECHNOLOGY
SUPPLIER	APPLE.COM/HK
OTHERS	CAPACITY: WI-FI / 256GB COLOUR: SPACE GRAY





TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dsa** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dsai.com.hk

CAD PATH: QUANTITY TAKE OFF FROM DRAWING OF BUILDING SERVICES ENGINEER - CIVIL  
STRUCTURAL ENGINEER/ARCHITECT/MECHANICAL ENGINEER/PLUMBING ENGINEER

SCALE: **A3 @ -**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**EQUIPMENT SCHEDULE  
(ELECTRONIC PRODUCT)**

DRAWING NO. <b>AT-05-53</b>	REV.
PROJECT NO. <b>DA17003</b>	

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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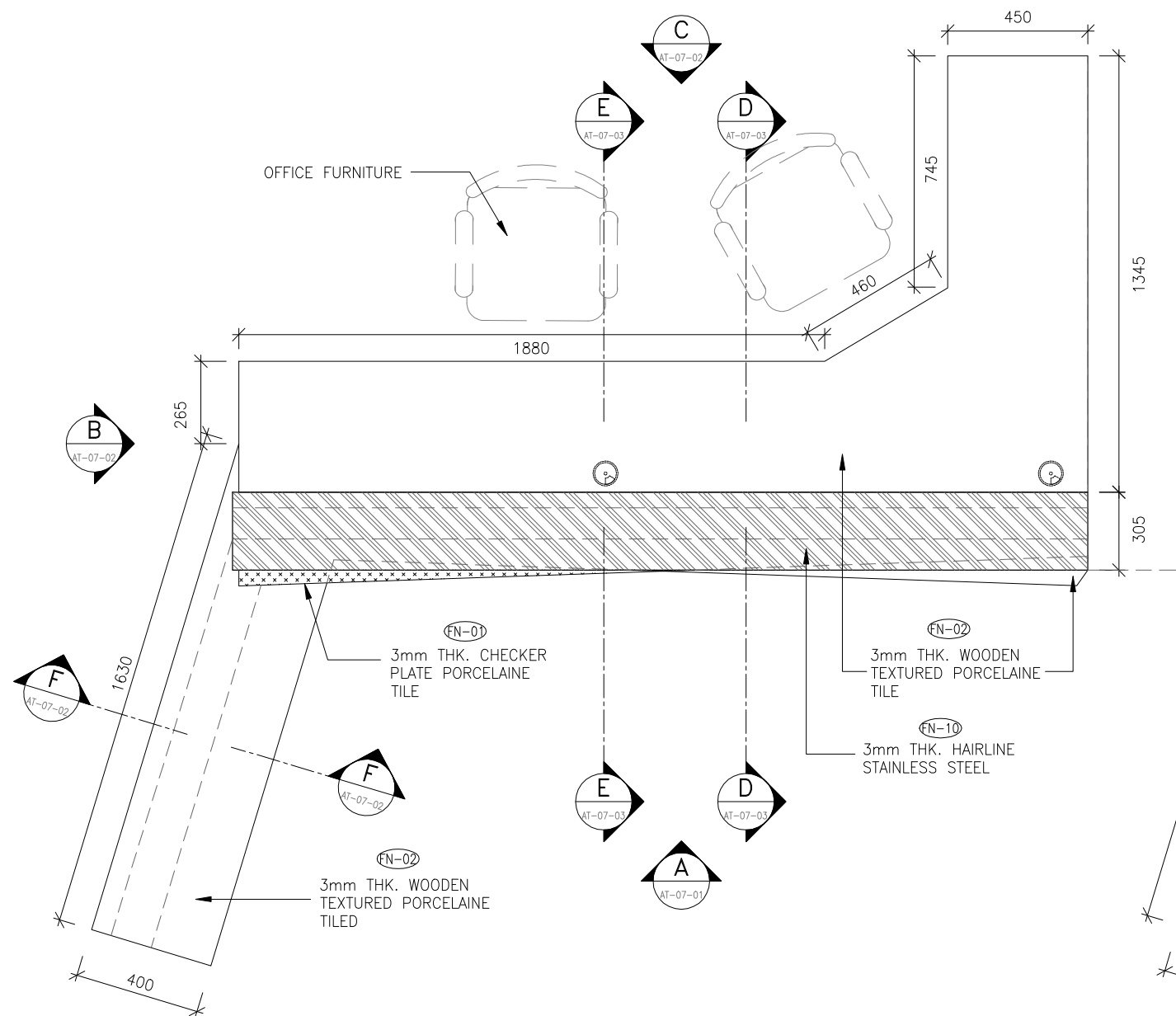
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REV. DATE & DESCRIPTION DRN CHK APP

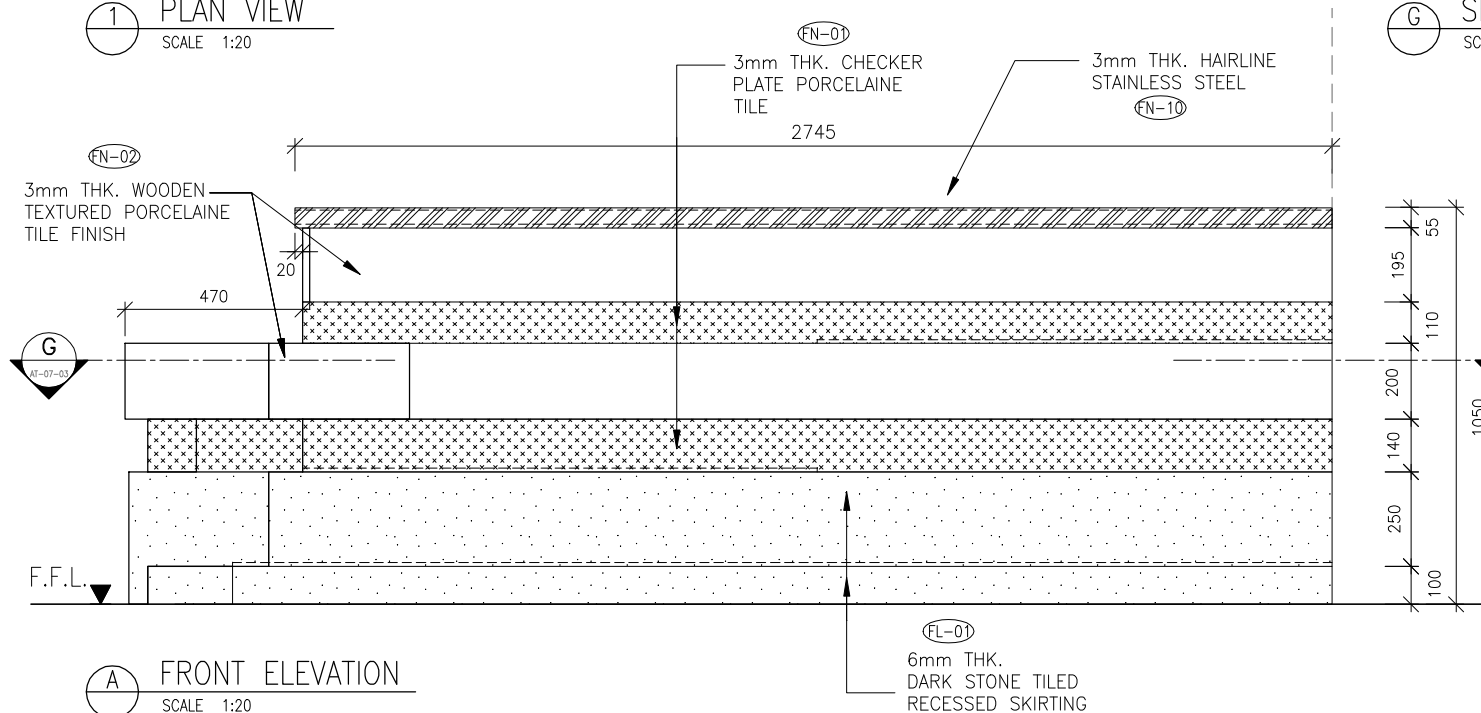
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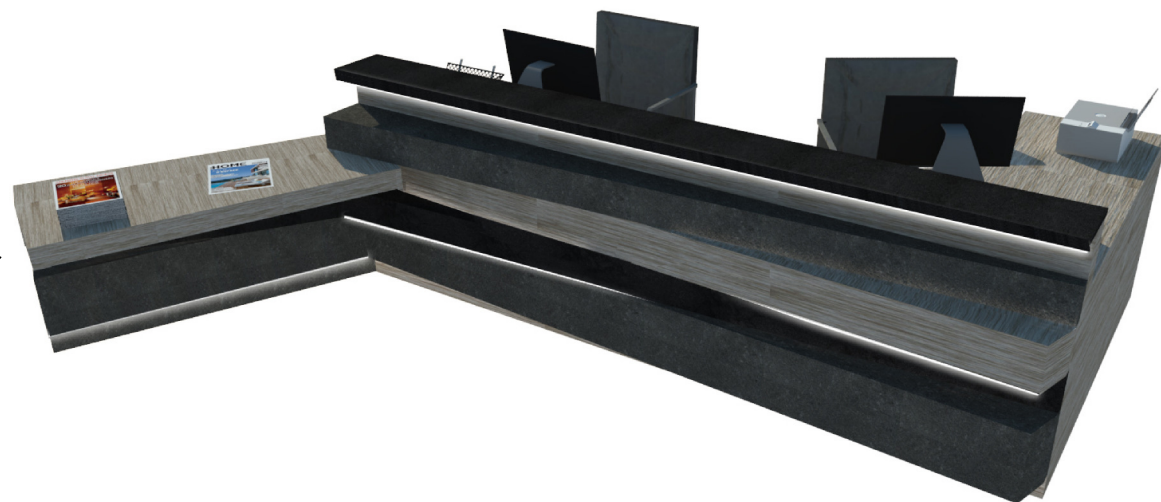
1 PLAN VIEW  
SCALE 1:20

G SECTION OF PLAN  
SCALE 1:20



A FRONT ELEVATION  
SCALE 1:20

2 PHOTO REFERENCE (FRONT VIEW)  
N/A



TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: QUANTITY SURVEYOR OF NEW CHINA SEC TRADING COMPANY - CIVIL  
CONSTRUCTION CONTRACT/WORKING-01 OF THE NEW CHINA SEC-01-01 RECEPTION COUNTER/1

SCALE A3 @ 1:20

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

RECEPTION COUNTER 1

DRAWING NO.

AT-07-01

PROJECT NO.

DA17003

REV.

DESIGN AND BUILD BY CONTRACTOR

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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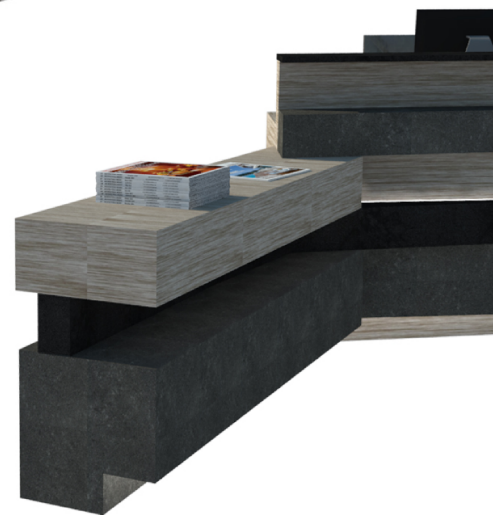
CLIENT



REV. DATE & DESCRIPTION DRN CHK APP

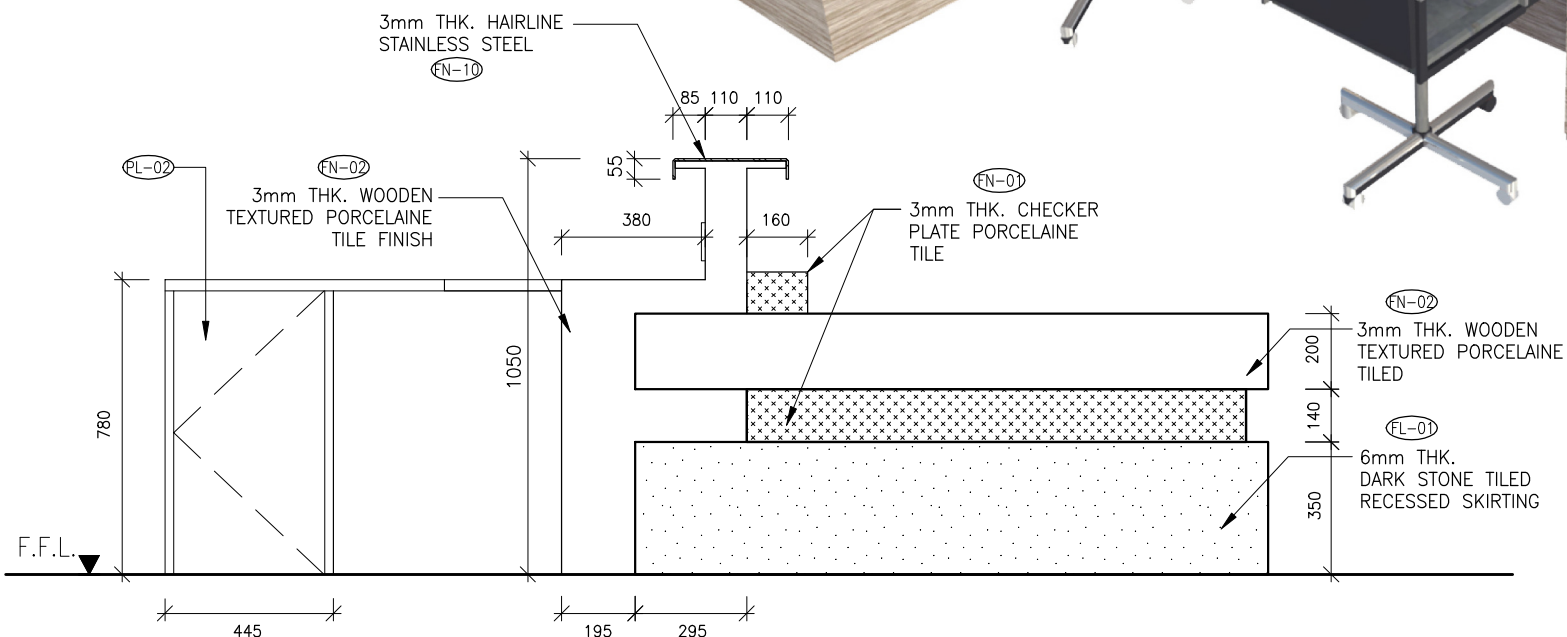
### 3 PHOTO REFERENCE (BACK & SIDE VIEW)

N/A



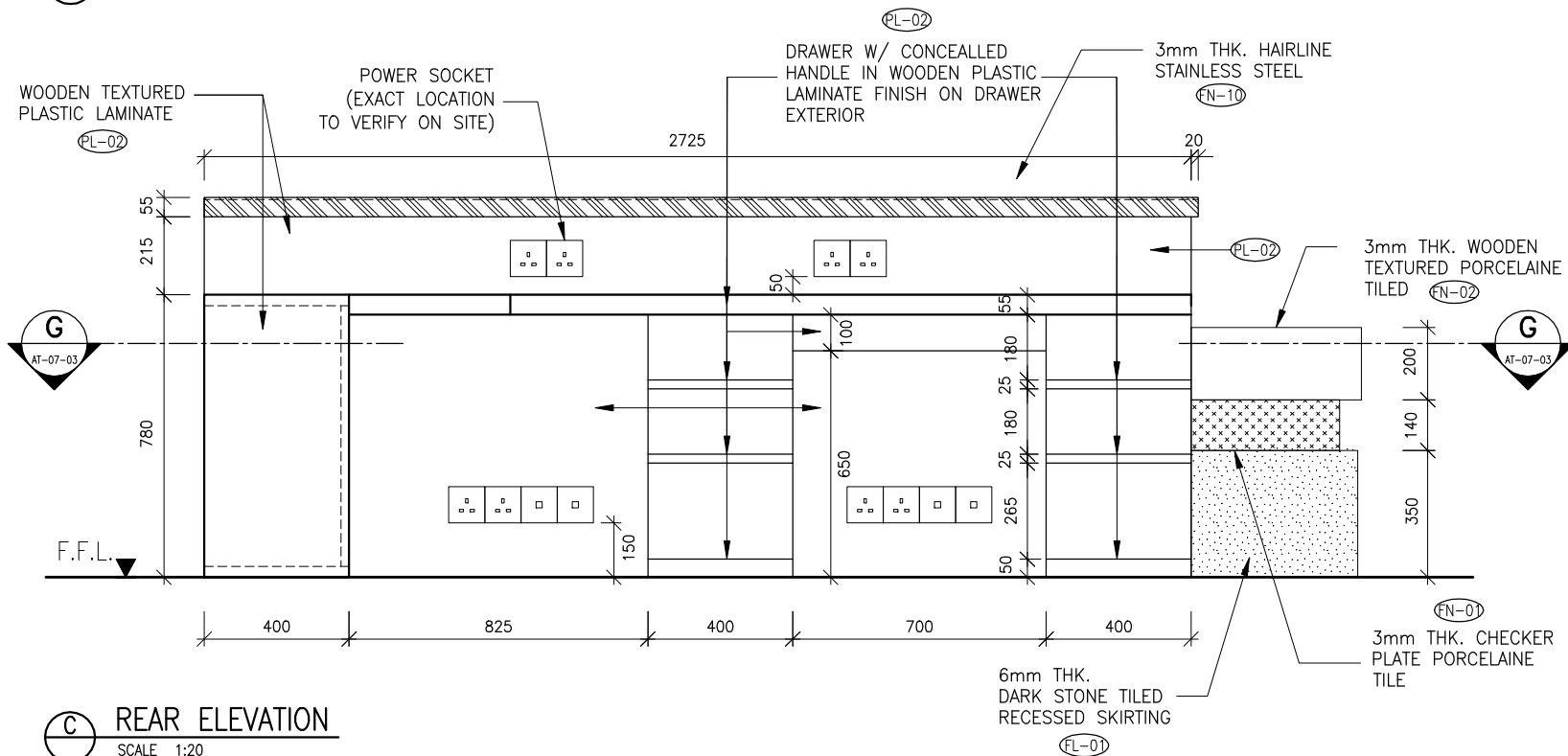
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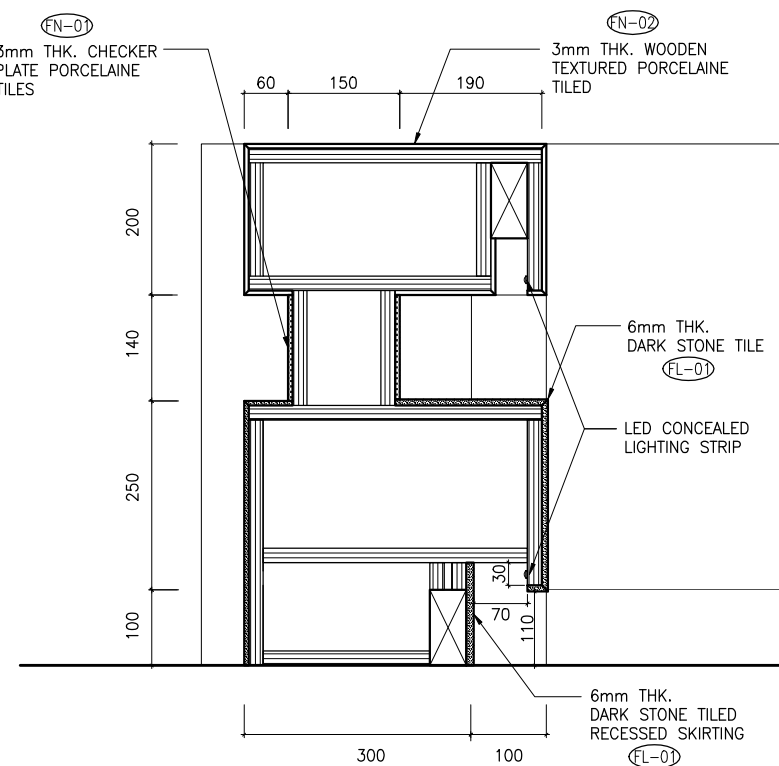
### B SIDE ELEVATION

SCALE 1:20



### C REAR ELEVATION

SCALE 1:20



### F SECTION F-F

SCALE 1:10

DESIGN AND BUILD BY CONTRACTOR

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: DRAWING SET UP AND CHECK OF DRAWING CONTENT - CH - TENDER DRAWING  
COUNTER BLOWING  
SCALE: A3 @ 1:20 & 1:10

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
RECEPTION COUNTER 2

DRAWING NO. AT-07-02  
PROJECT NO. DA17003  
REV.



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REV. DATE & DESCRIPTION DRN CHK APP

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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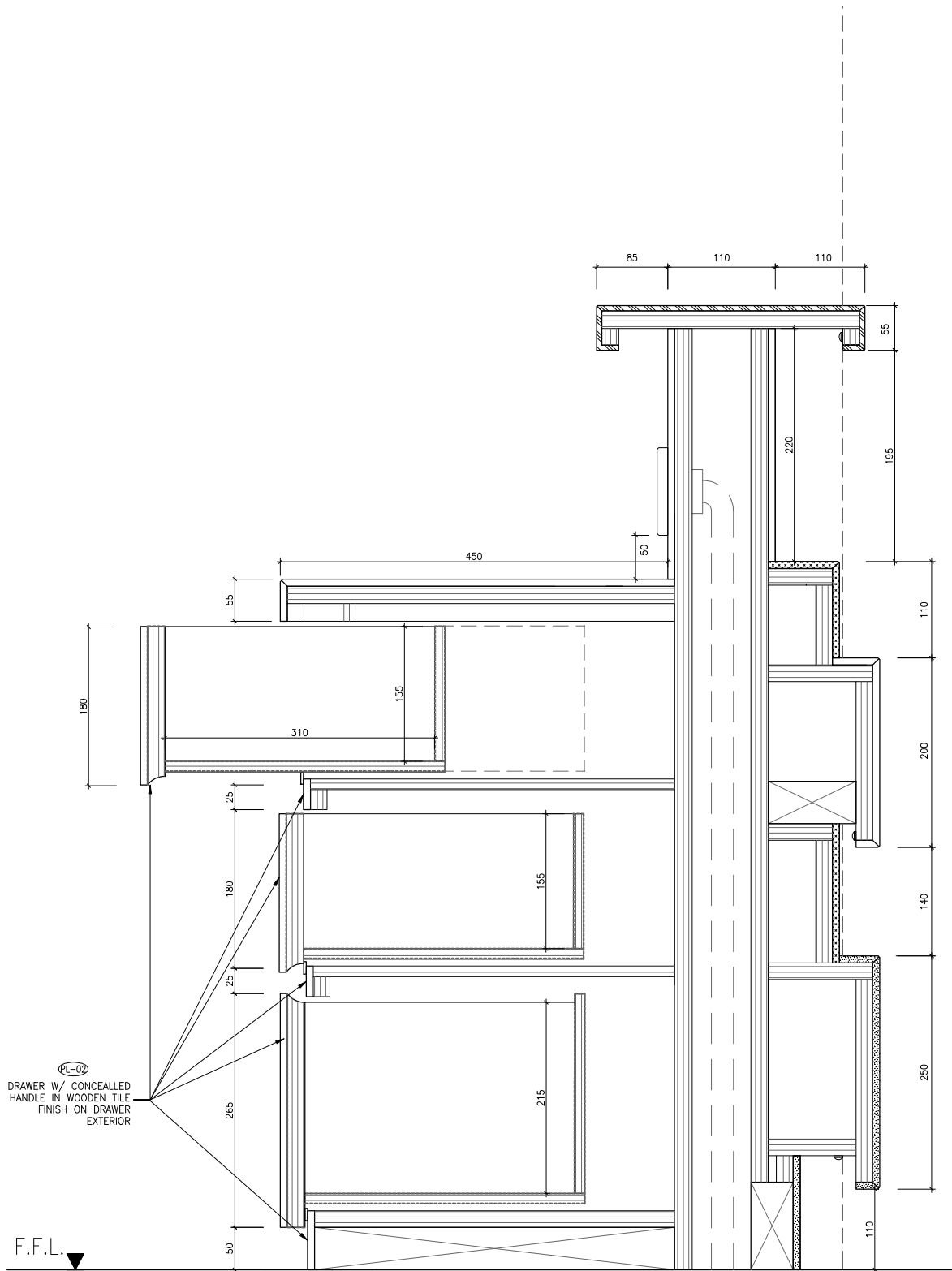
CAD PATH: PLANNING DEPT OF NEW CHINA SEC TRADING COMPANY - CIVIL  
CONSTRUCTION CONTRACT/WORKING DRAWING FOR THE RECEPTION COUNTER

SCALE **A3 @ 1:7**

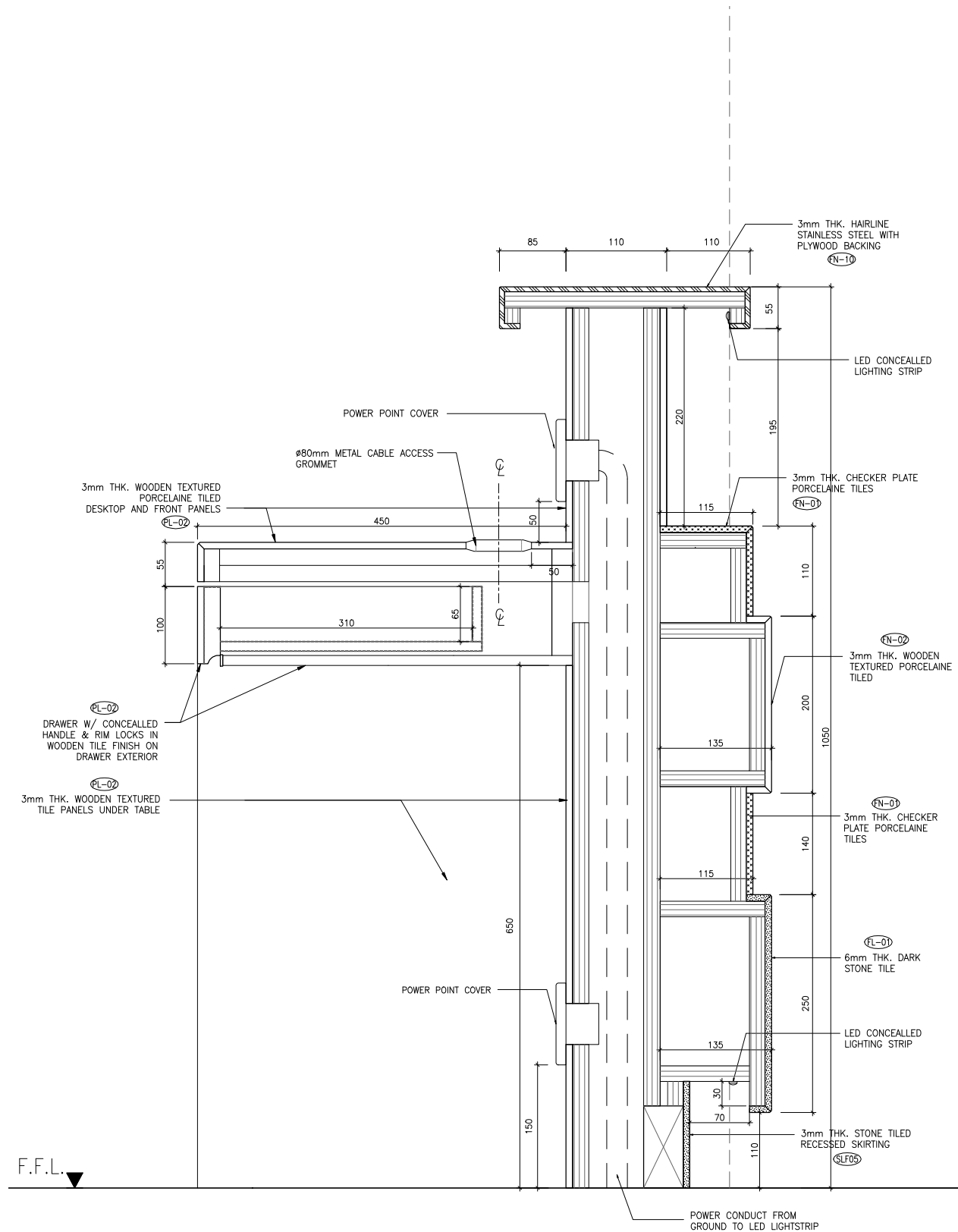
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**RECEPTION COUNTER 3**

DRAWING NO. <b>AT-07-03</b>	REV.
PROJECT NO. <b>DA17003</b>	



**D** SECTION D-D  
SCALE 1:7

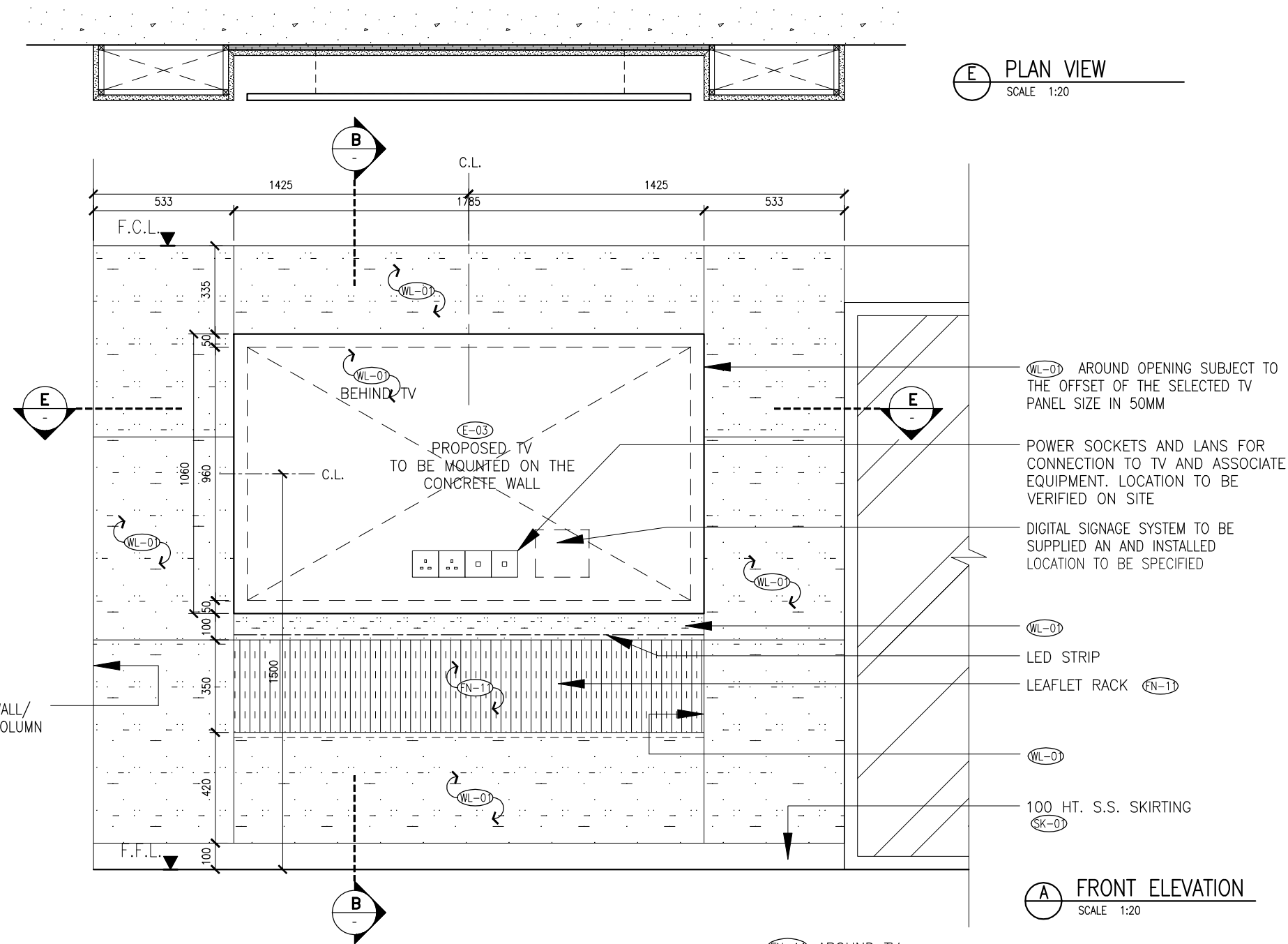
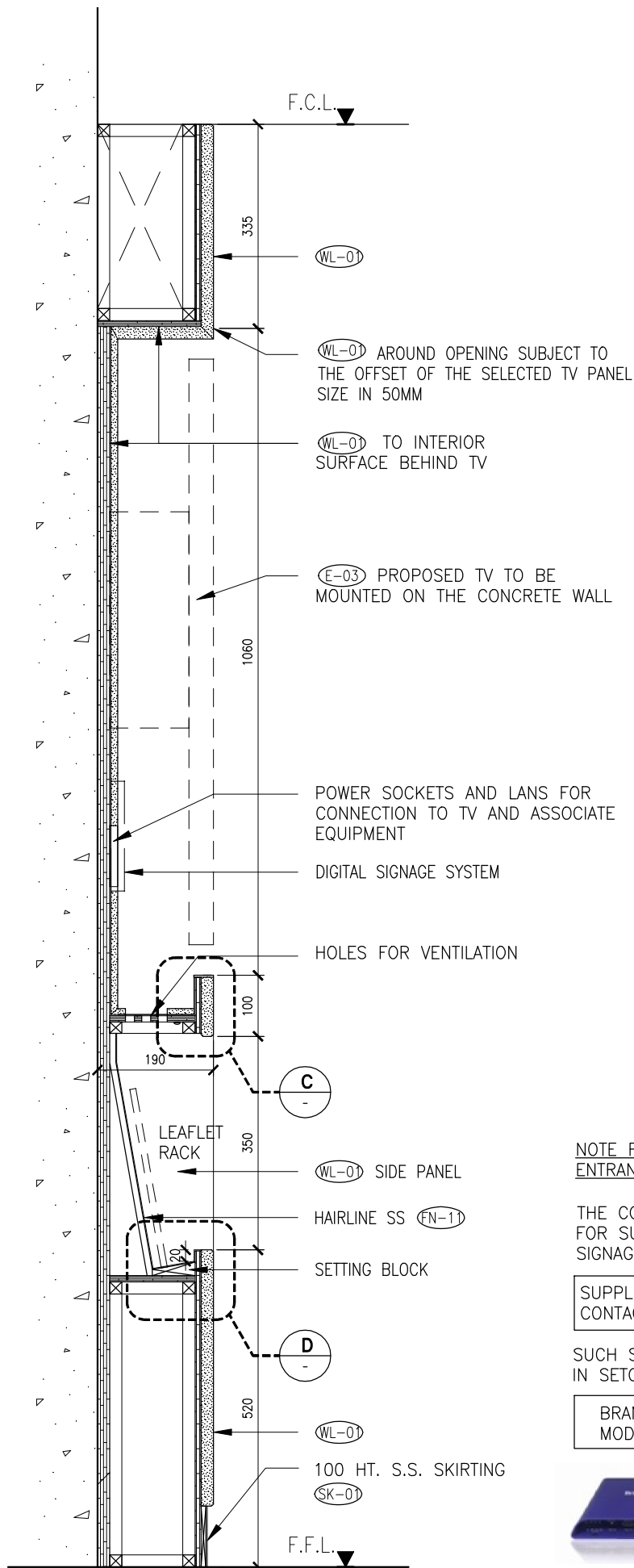


**E** SECTION E-E  
SCALE 1:7

#### NOTE:

- UNLESS OTHERWISE SPECIFIED, ALL INNER SIDES OF THE CABINET, DRAWER, ACCESS PANEL, AND ANY LOOSE FURNITURE SHALL RECEIVE PLASTIC LAMINATE FINISH.
- THE COLOUR SHALL MATCH TO THE OUTER SURFACE, PROVIDED THAT THE OUTER SURFACE IS ALSO LAMINATE FINISH.
- THE CONTRACTOR SHALL SUBMIT COLOUR CHART AND MATERIAL SUBMISSION FOR THE ARCHITECT/CIC'S APPROVAL BEFORE PROCEED OF WORKS.

DESIGN AND BUILD BY CONTRACTOR



**NOTE FOR SUPPLY AND INSTALLATION OF DIGITAL SIGNAGE SYSTEM IN THE ENTRANCE TV WALL:**

THE CONTRACTOR SHALL ENGAGE THE FOLLOWING SUPPLIER (OR EQUIVALENT) FOR SUPPLY, INSTALLATION AND TEST AND COMMISSIONING OF THE DIGITAL SIGNAGE SYSTEM:

SUPPLIER: PACIFIC DATACOM (HK) LTD.  
CONTACT NO.: EDDIE CHOY 2303 0018

SUCH SUPPLIER SHALL PROVIDE THE FOLLOWING DIGITAL SIGNAGE SYSTEM IN SETC:

BRAND: BRIGHTSIGN  
MODEL: XT1143

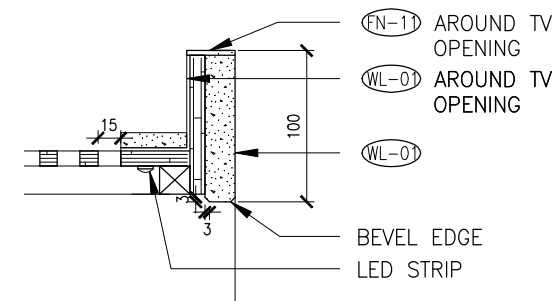


**BrightSign XT1143**

Expanded I/O Player

Includes all the features BrightSign XT243, plus serial, dual USB (type A and C) and Live TV playback via the HDMI 2.0a input to play content from any broadcast channel – even protected HDCP content.

THE CONTRACTOR AND HIS NAMED SUPPLIER SHALL FOLLOW THE MILESTONES AS STIPULATED IN PARTICULAR SPECIFICATION SECTION 26 (ANNEX 4) IN THE CONTRACT, TO REACH CIC / THE ARCHITECT'S SATISFACTION.

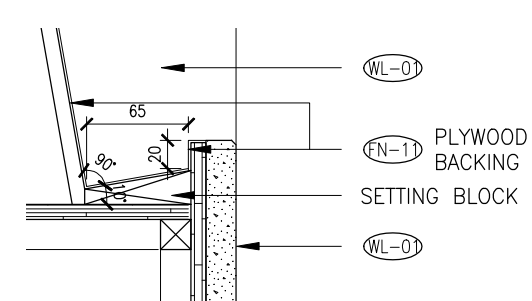


**DETAIL 1**  
SCALE 1:5

NOTE :

ALL TV PANEL AND ASSOCIATE EQUIPMENTS SHALL BE PROVIDED BY EMPLOYER'S DIRECT CONTRACTOR (VENDOR SUPPLIER), THE CONTRACTOR SHALL TAKE ATTENDANCE AND COORDINATE WITH THE VENDOR SUPPLIER FOR INSTALLATION OF TV PANEL AND ASSOCIATED EQUIPMENTS WITHIN THE CONSTRUCTION PERIOD.

THE DIMENSION SHOWN IN THE DRAWING ARE INTENT ONLY, THE SIZE OF S.S. COVER FOR TV, OPENING, POSITION OF THE TV COVER SHALL BE VARIED AND SUBJECT TO THE COORDINATION WITH VENDOR SUPPLIER.



**DETAIL 2**  
SCALE 1:5

DESIGN AND BUILD BY CONTRACTOR

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REV. DATE & DESCRIPTION DRN CHK APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

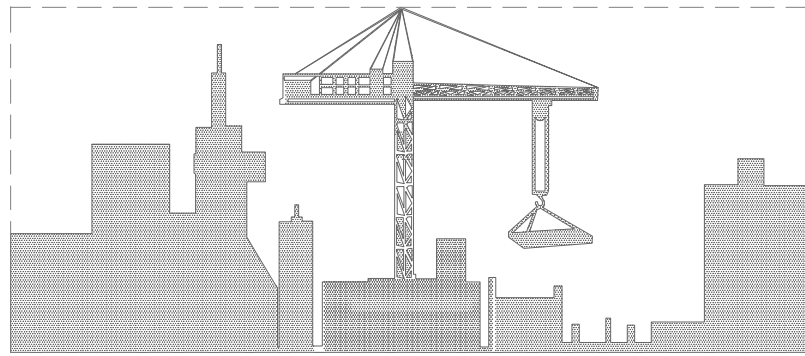
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15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.daa.com.hk

CAD PATH: PLANNING SITE OF KWA CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL - CIVIL  
SCALE: **A3 @ AS SHOWN**

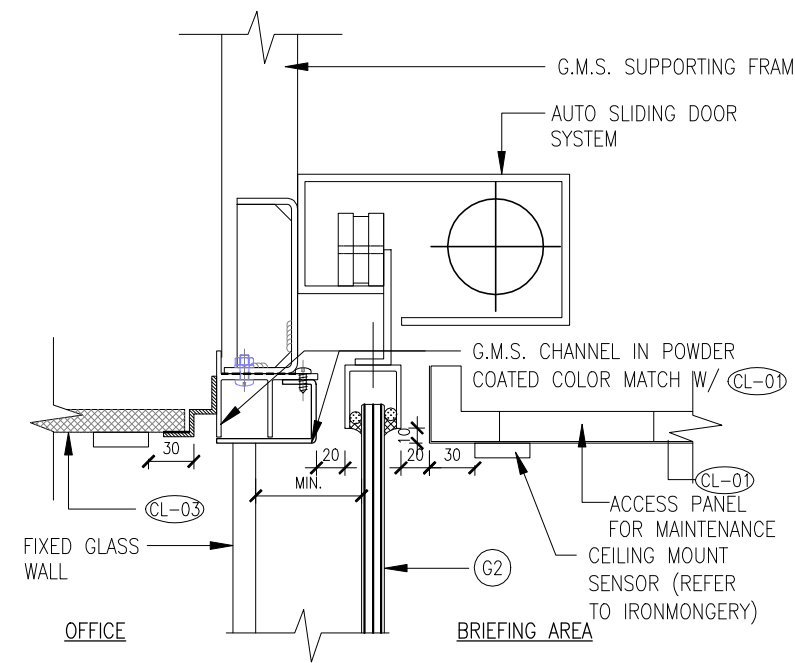
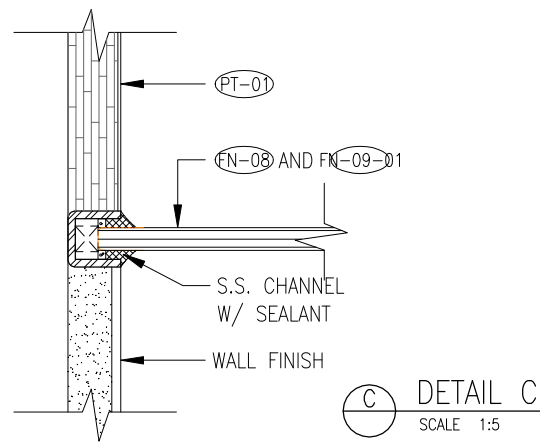
PROJECT: **RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE: **ENTRANCE TV WALL WITH LEAFLET**

DRAWING NO. **AT-07-04** REV.  
PROJECT NO. **DA17003**



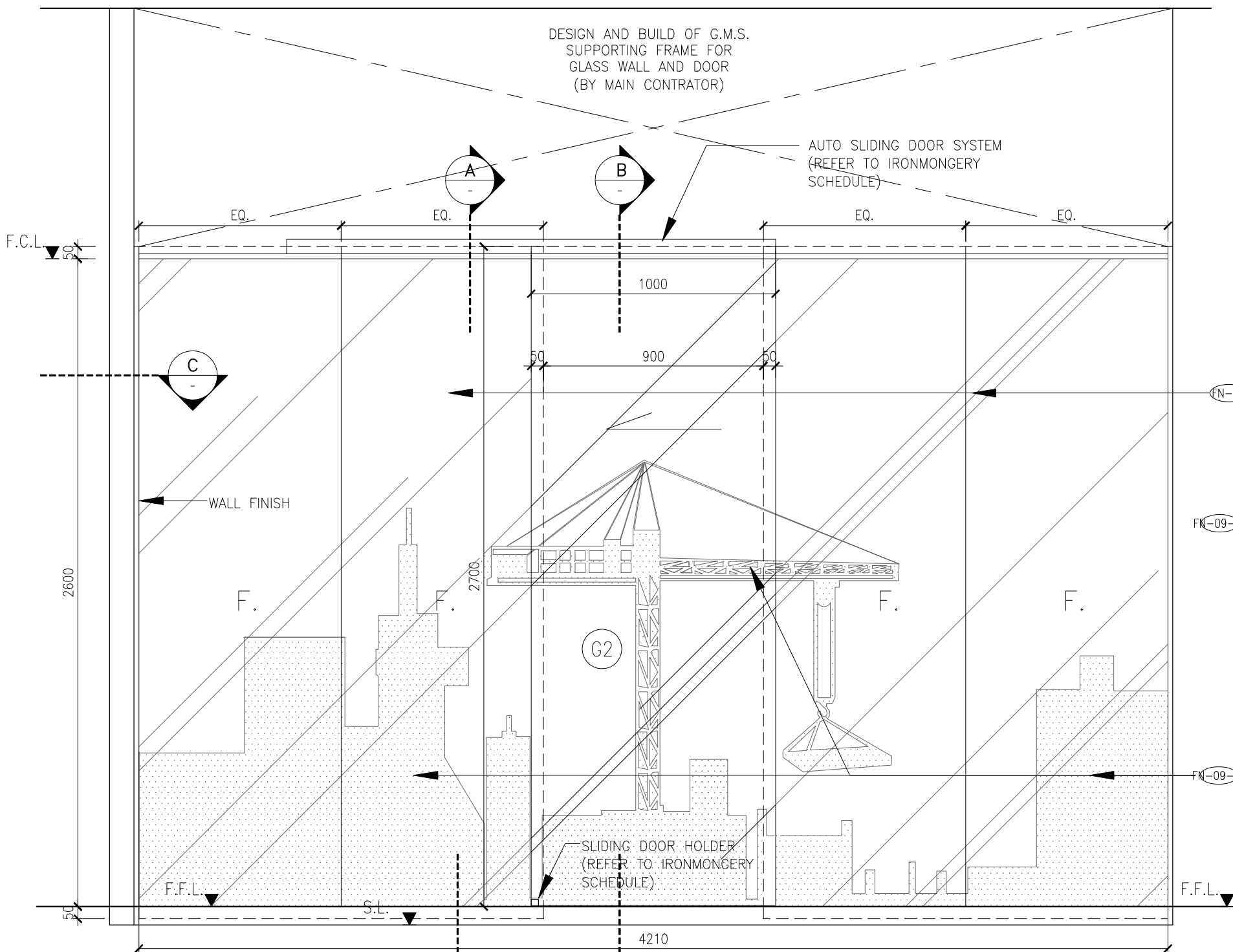
FN-09-01  
TENTATIVE  
GRAPHICS FOR 3M  
DECORATIVE FILM



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

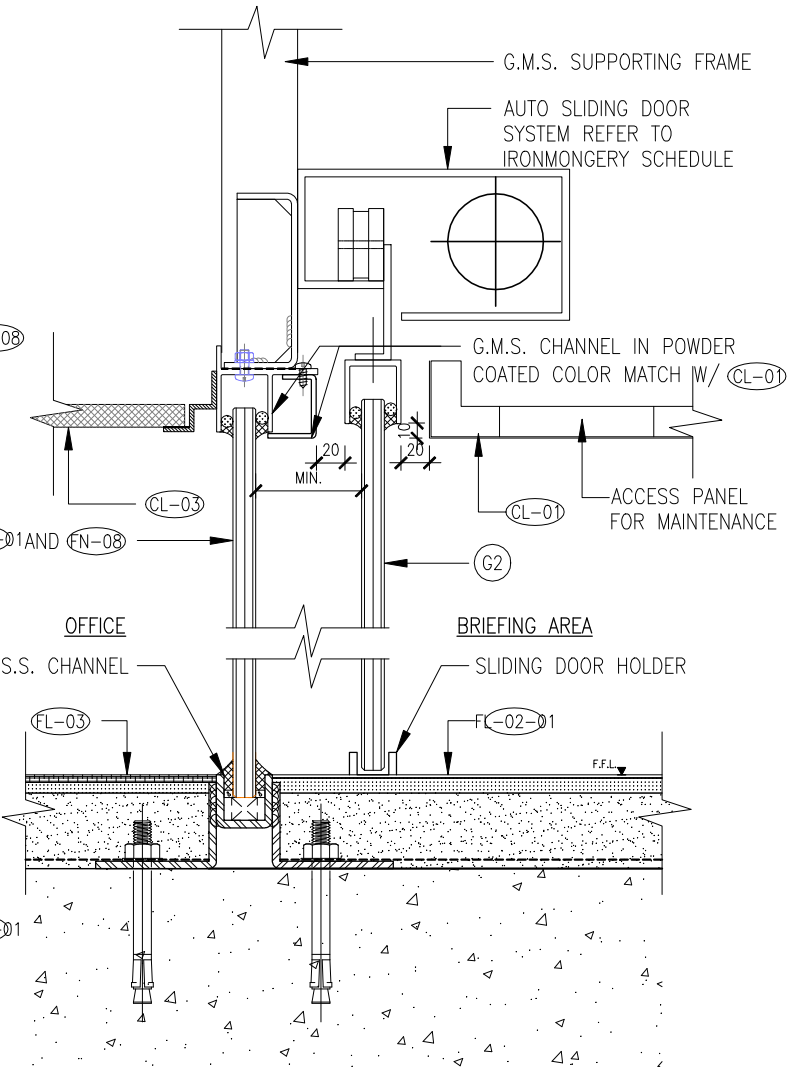


1 FRONT ELEVATION  
SCALE 1:20

NOTE: THE PROPOSED AUTO SLIDING DOOR SYSTEM SHALL ABLE TO CONTROL BY SMART ACCESS CARD SYSTEM. IN GENERAL THE DOOR SHOULD BE CLOSED AND LOCKED UNLESS SMART CARD ACCESS IS AUTHORIZED.

DESIGN AND BUILD BY CONTRACTOR

B SECTION B  
SCALE 1:5



A SECTION A  
SCALE 1:5

- NOTES:
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.daa.com.hk

CAD PATH: PLANNING SITE OF KWA CHUNG CAMPUS TRAINING CENTRE - CIVIL  
STRUCTURAL CONTRACT WORKS (A-01) TO THE CIVIL ENGINEERING OFFICE  
KWA CHUNG CAMPUS

SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWA CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
OFFICE GLASS WALL AND  
GLASS SLIDING DOOR DETAIL

DRAWING NO.	REV.
AT-07-05	
PROJECT NO.	DA17003



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

NOTES:

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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

CAD PATH

S:\DATA\2003\SEIC AT KIN CHUNG CC TRAINING CENTRE\1 - CHD\1C  
-TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-06-TV CH  
BLOCK WALL DETAIL.DWG

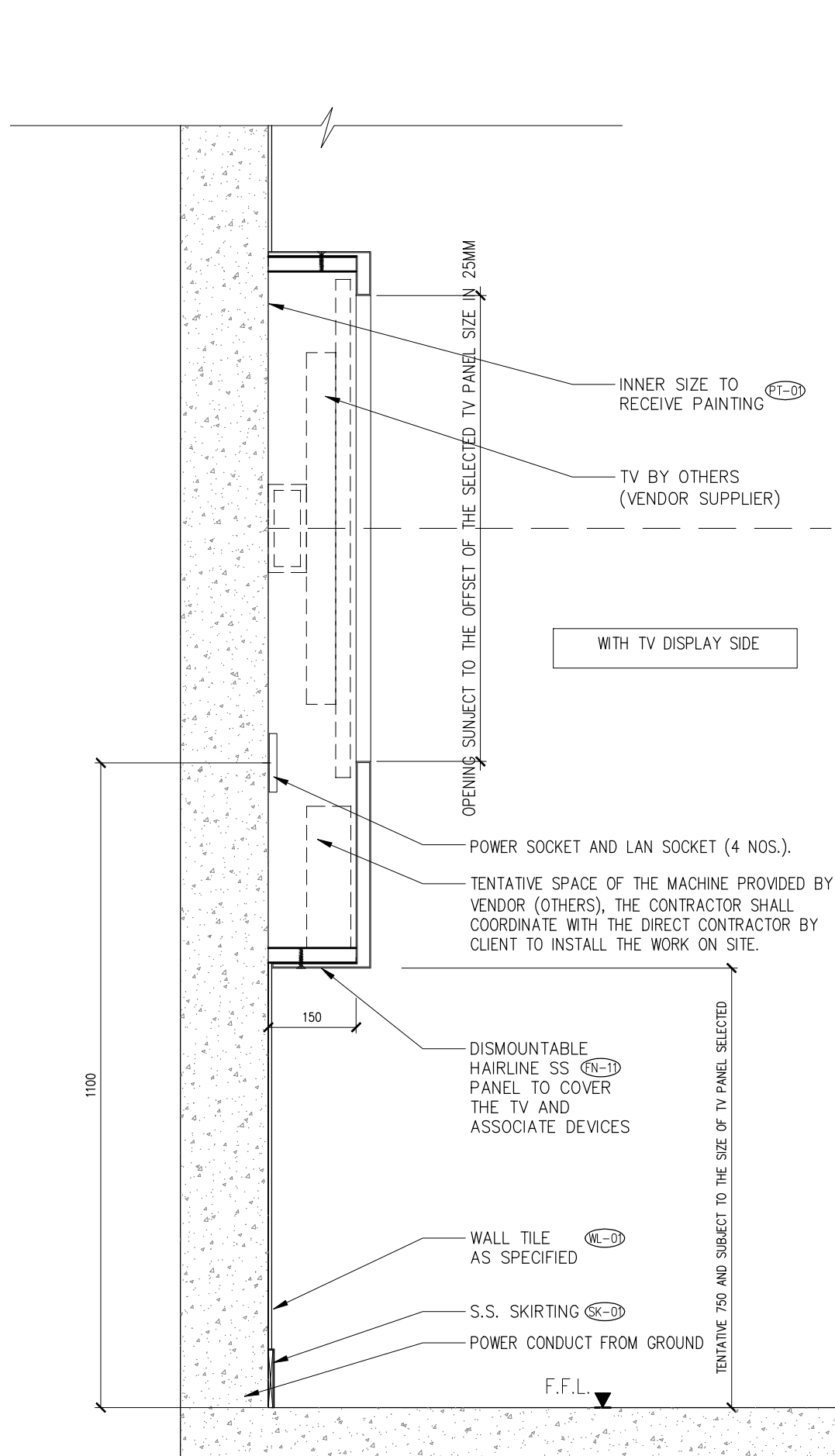
SCALE

**A3 @ AS SHOWN**

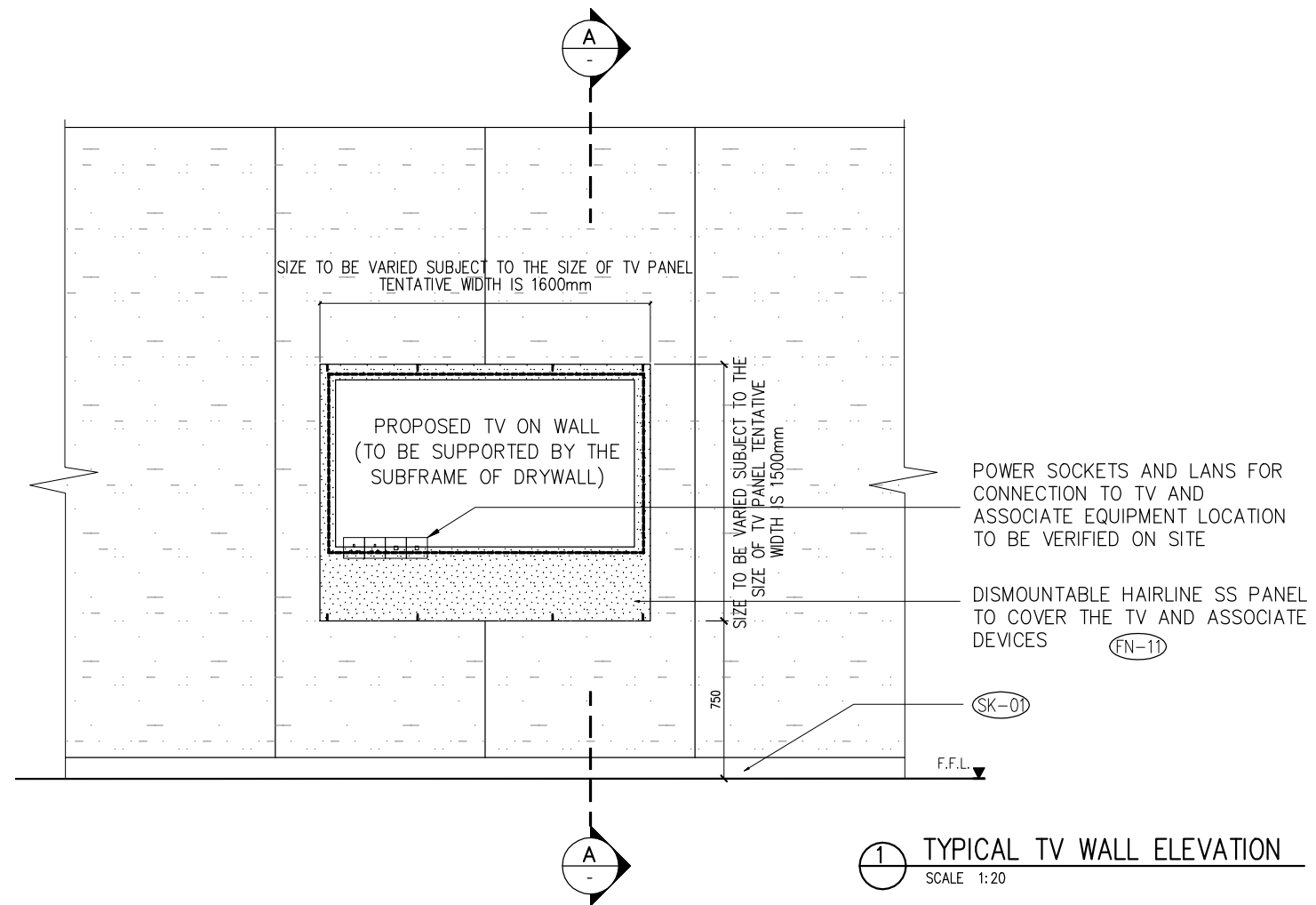
DRAWING TITLE

**TV DISPLAY ON BLOCK WALL**

DRAWING NO. <b>AT-07-06</b>	REV.
PROJECT NO. <b>DA17003</b>	



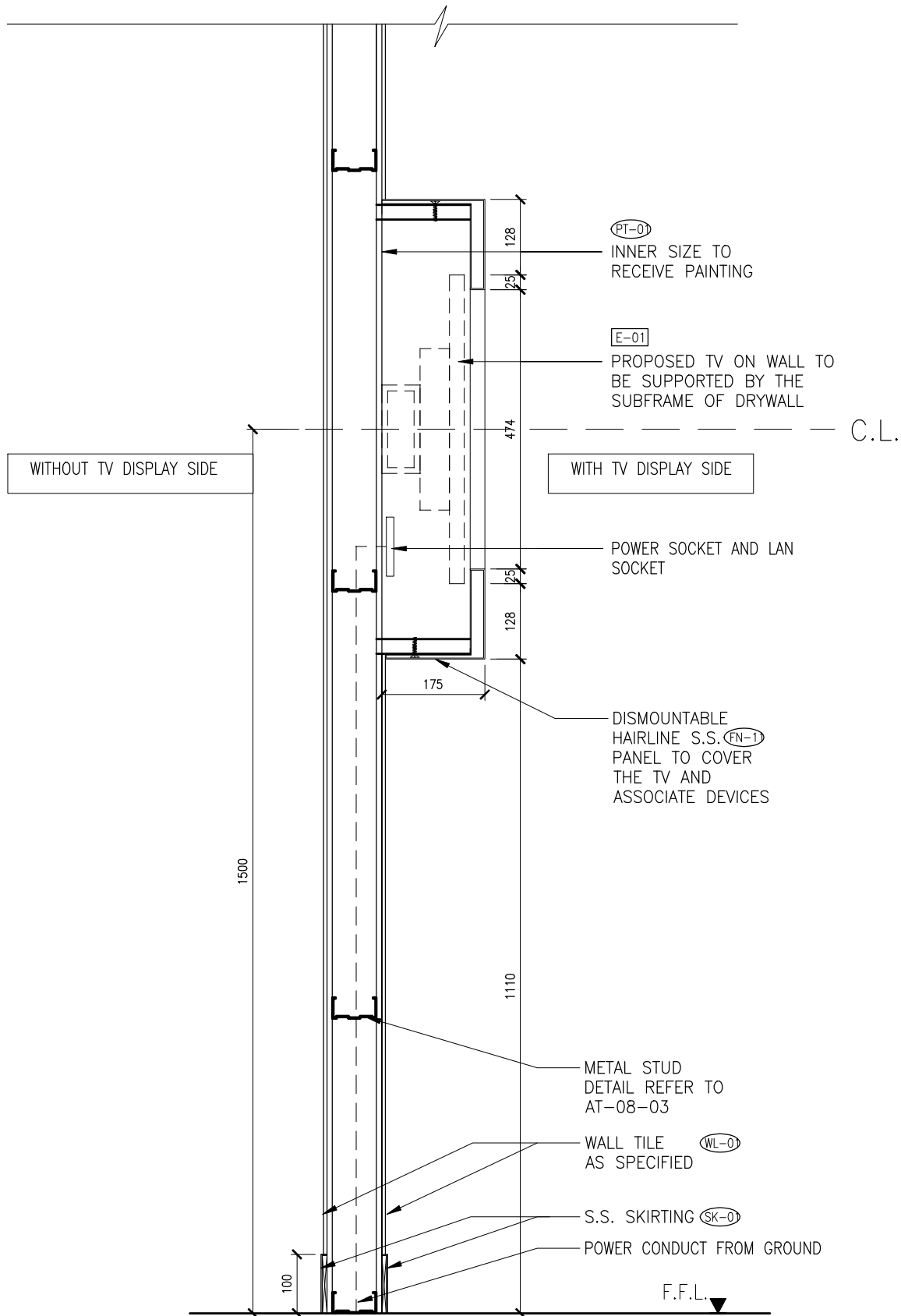
SECTION A-A (BOTTOM)  
SCALE 1:10



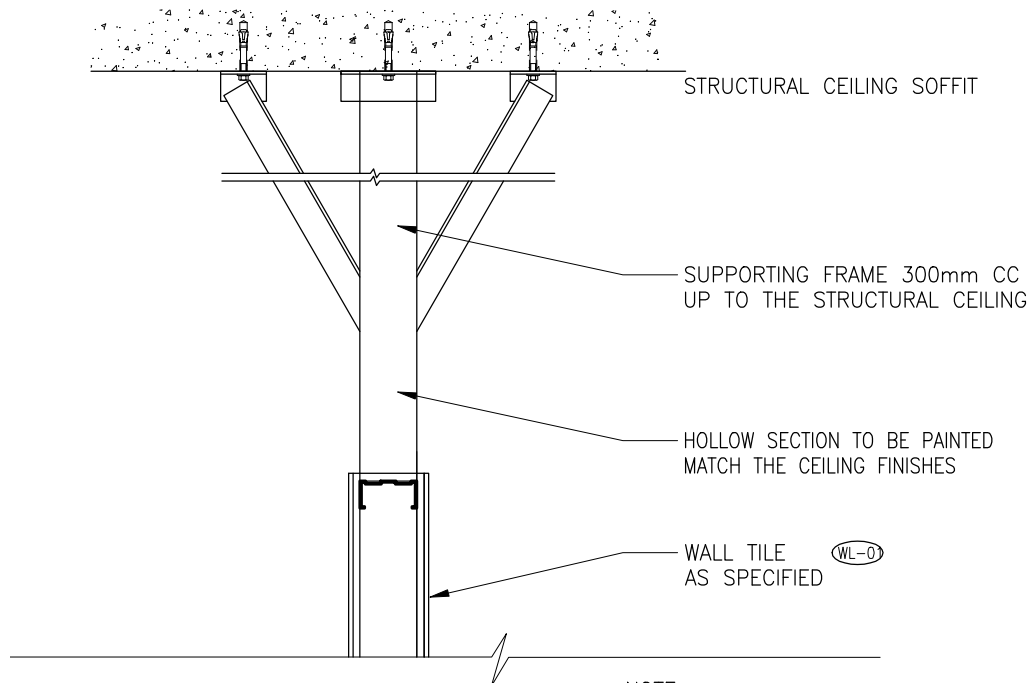
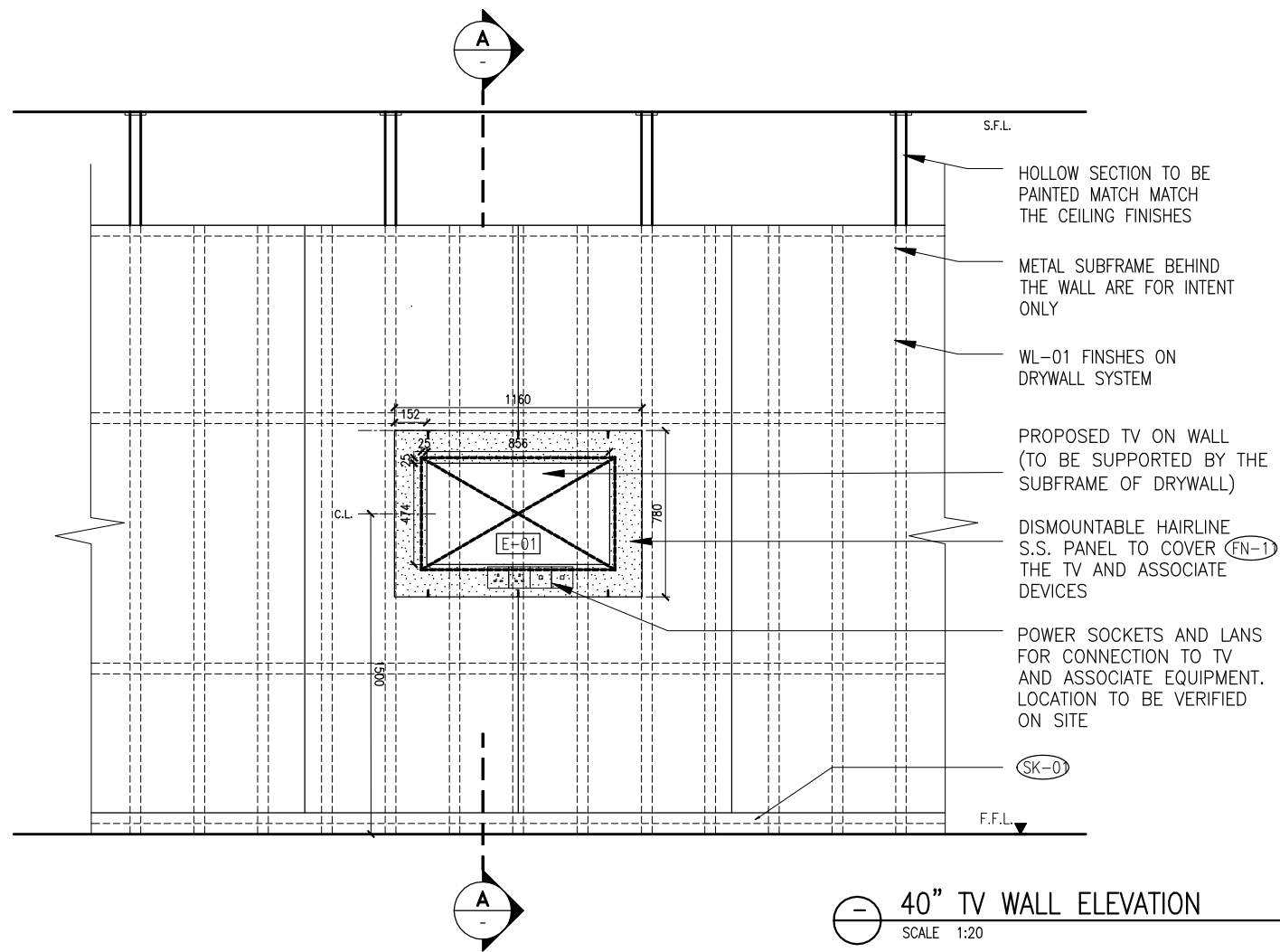
NOTE :  
ALL TV PANEL AND ASSOCIATE EQUIPMENTS SHALL BE PROVIDED BY  
EMPLOYER'S DIRECT CONTRACTOR (VENDOR SUPPLIER), THE CONTRACT  
SHALL TAKE ATTENTANCE AND COORDINATE WITH THE VENDER SUPPLIER  
FOR INSTALLATION OF TV PANEL AND ASSOCIATE EQUIPMENTS WITHIN THE  
CONSTRUCTION PERIOD.

THE DIMENSION SHOWN IN THE DRAWING ARE INTENT ONLY, THE SIZE OF S.S. COVER FOR TV, OPENING, POSITION OF THE TV COVER SHALL BE VARIED AND SUBJECT TO THE COORDINATION WITH VENDOR SUPPLIER.

## DESIGN AND BUILD BY CONTRACTOR



**A** SECTION A-A (BOTTOM)  
SCALE 1:10



**B** SECTION A-A (TOP)  
SCALE 1:10

NOTE :  
ALL TV PANEL AND ASSOCIATE EQUIPMENTS SHALL BE PROVIDED BY EMPLOYER'S DIRECT CONTRACTOR (VENDOR SUPPLIER), THE CONTRACTOR SHALL TAKE ATTENTANCE AND COORDINATE WITH THE VENDOR SUPPLIER FOR INSTALLATION OF TV PANEL AND ASSOCIATE EQUIPMENTS WITHIN THE CONSTRUCTION PERIOD.

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DESIGN AND BUILD BY CONTRACTOR

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REV. DATE & DESCRIPTION DRN CHK APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: C:\PROJECTS\AT-07-07\AT-07-07 TV DISPLAY.dwg  
SCALE: A3 @ AS SHOWN

PROJECT:  
**RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**TV DISPLAY ON DRYWALL - TYPE A (40 INCH SIZE TV)**

DRAWING NO. **AT-07-07** REV.  
PROJECT NO. **DA17003**





REV. DATE & DESCRIPTION DRN CHK APP

**NOTES:**

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

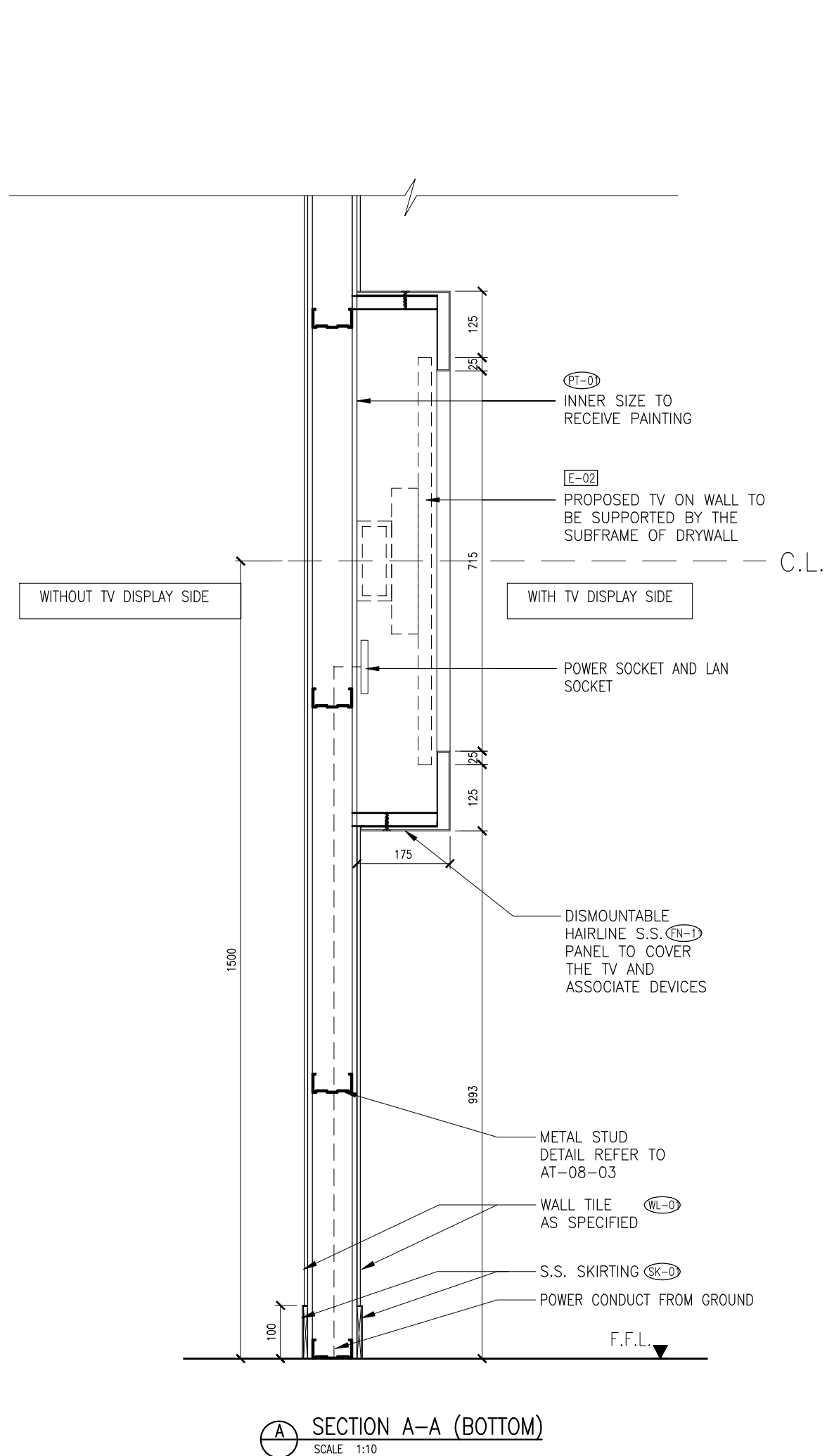
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DWG: TV WALL.dwg  
PLOT: TV WALL.dwg  
PLOT DATE: 2016/07/08

SCALE: **A3 @ AS SHOWN**

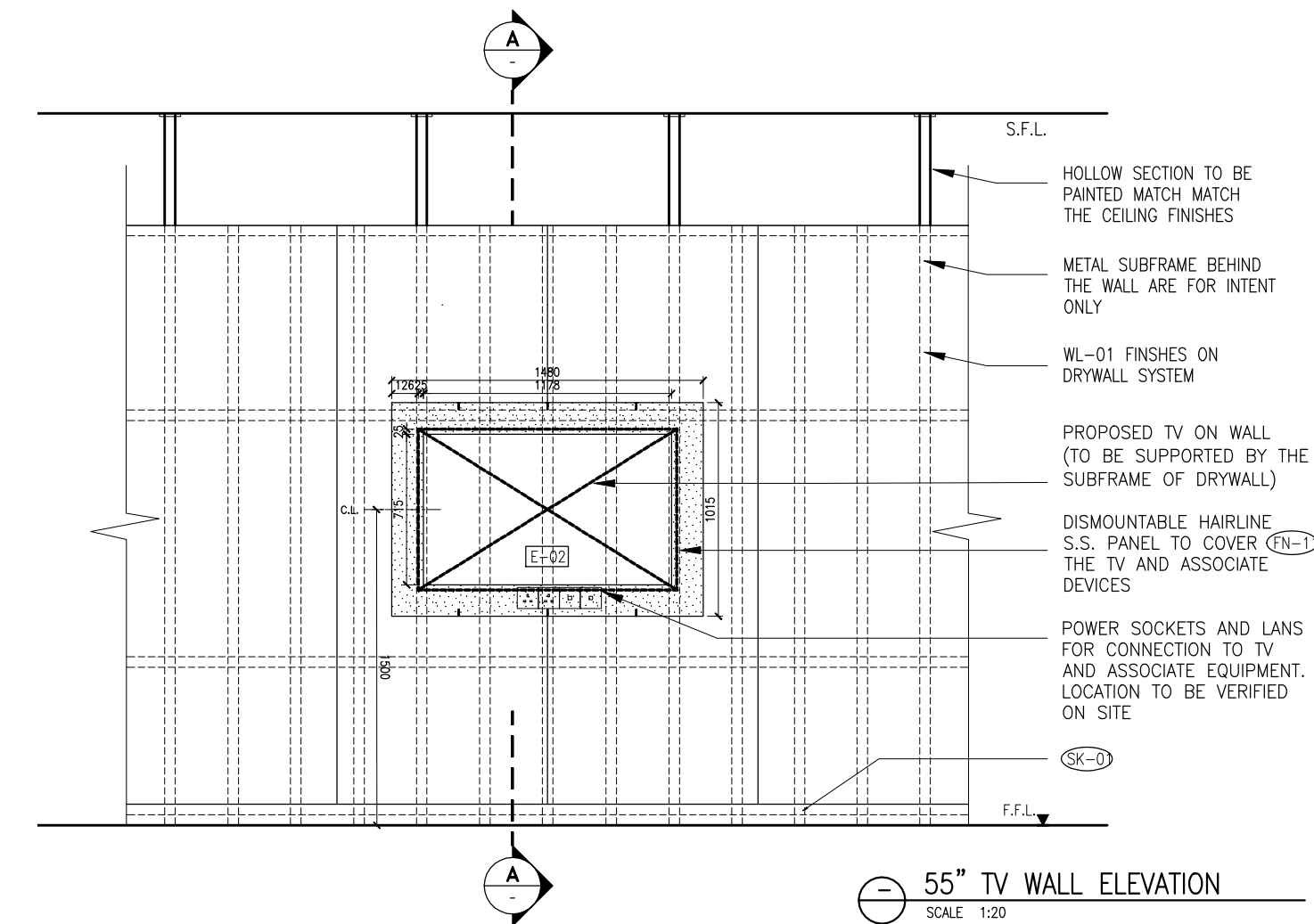
PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**TV DISPLAY ON DRYWALL -  
TYPE B (55 INCH SIZE TV)**

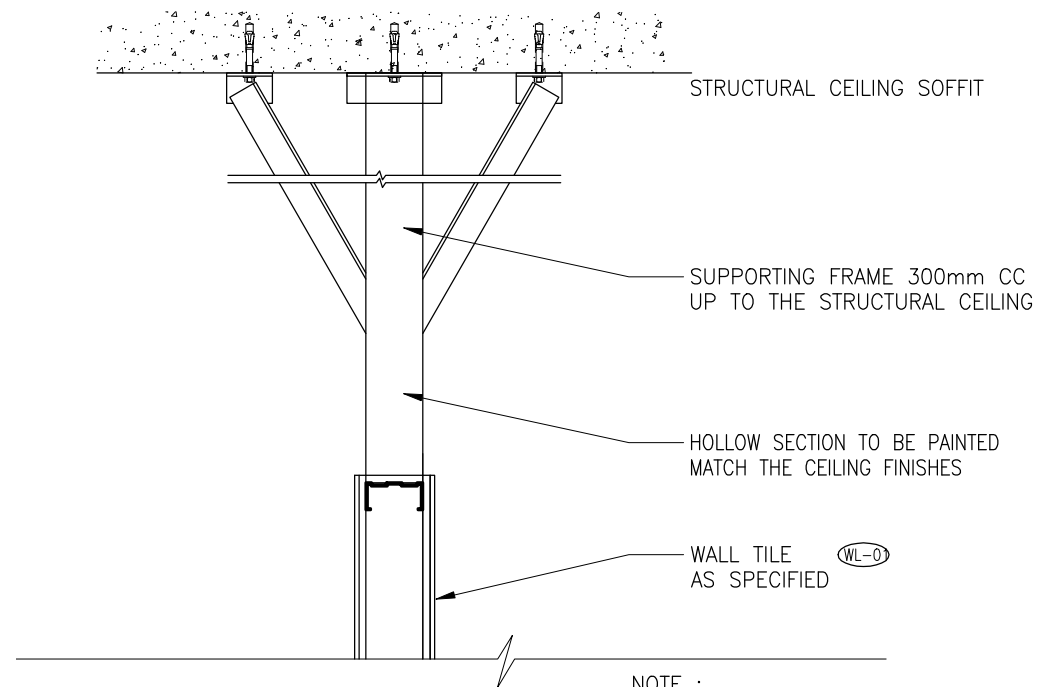
DRAWING NO.	REV.
<b>AT-07-08</b>	
PROJECT NO.	<b>DA17003</b>



**A SECTION A-A (BOTTOM)**  
SCALE 1:10



**55" TV WALL ELEVATION**  
SCALE 1:20



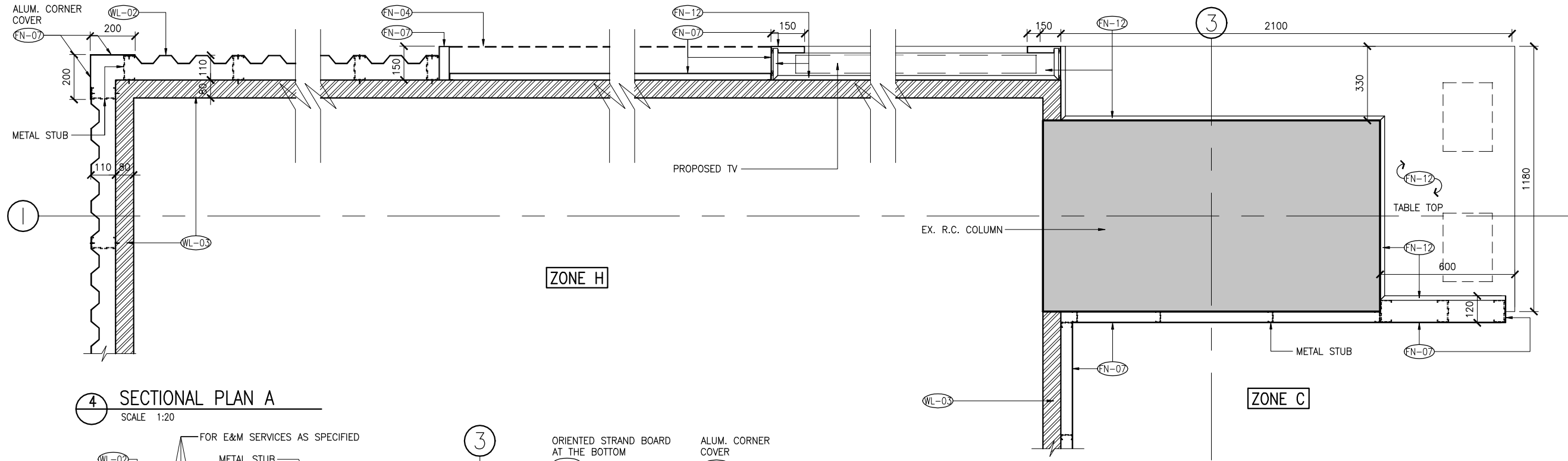
**B SECTION A-A (TOP)**  
SCALE 1:10

NOTE :  
ALL TV PANEL AND ASSOCIATE EQUIPMENTS SHALL BE PROVIDED BY EMPLOYER'S DIRECT CONTRACTOR (VENDOR SUPPLIER), THE CONTRACTOR SHALL TAKE ATTENTANCE AND COORDINATE WITH THE VENDOR SUPPLIER FOR INSTALLATION OF TV PANEL AND ASSOCIATE EQUIPMENTS WITHIN THE CONSTRUCTION PERIOD.

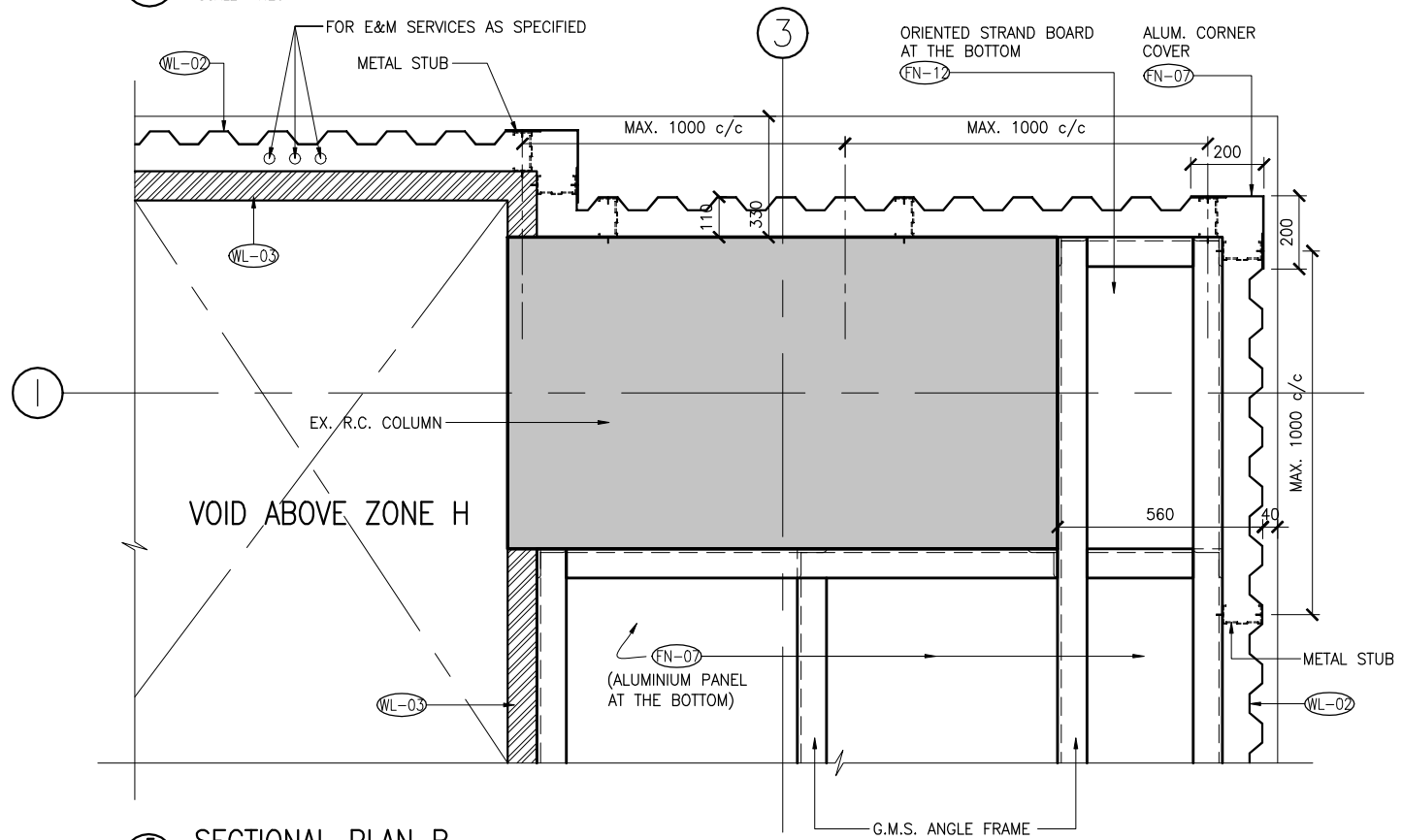
THE DIMENSION SHOWN IN THE DRAWING ARE INTENT ONLY, THE SIZE OF S.S. COVER FOR TV, OPENING, POSITION OF THE TV COVER SHALL BE VARIED AND SUBJECT TO THE COORDINATION WITH VENDOR SUPPLIER.

**DESIGN AND BUILD BY CONTRACTOR**

DRAWING NO. <b>AT-07-09</b>	REV.
PROJECT NO. <b>DA17003</b>	

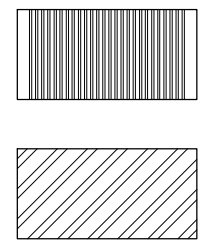


4 SECTIONAL PLAN A  
SCALE 1:20

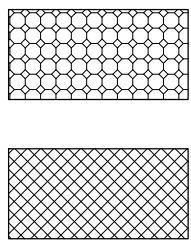


5 SECTIONAL PLAN B  
SCALE 1:20

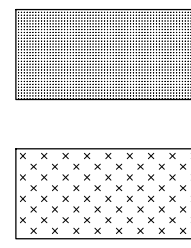
LEGENDS :



WL-02 CORRUGATED METAL SHEET  
WL-03 GYPSUM BLOCK WALL



FN-04 ALUMINIUM ALLOY CIRCLE CUT OUT MESH  
FN-07 ALUMINIUM PANEL



FN-12 ORIENTED STRAND BOARD  
WL-01 THIN CONCRETE PANEL SYSTEM

NOTES:

1. THE CONTRACTOR SHALL SUBMIT DETAIL SHOP DRAWING FOR ARCHITECTS' APPROVAL.

DESIGN AND BUILD BY CONTRACTOR

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH:   
SCALE: A3 @ 1:20

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE: FEATURE WALL SURROUNDING ZONE H (VR CAVE) 2

DRAWING NO.	REV.
AT-07-10	
PROJECT NO.	DA17003

**NOTES:**

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

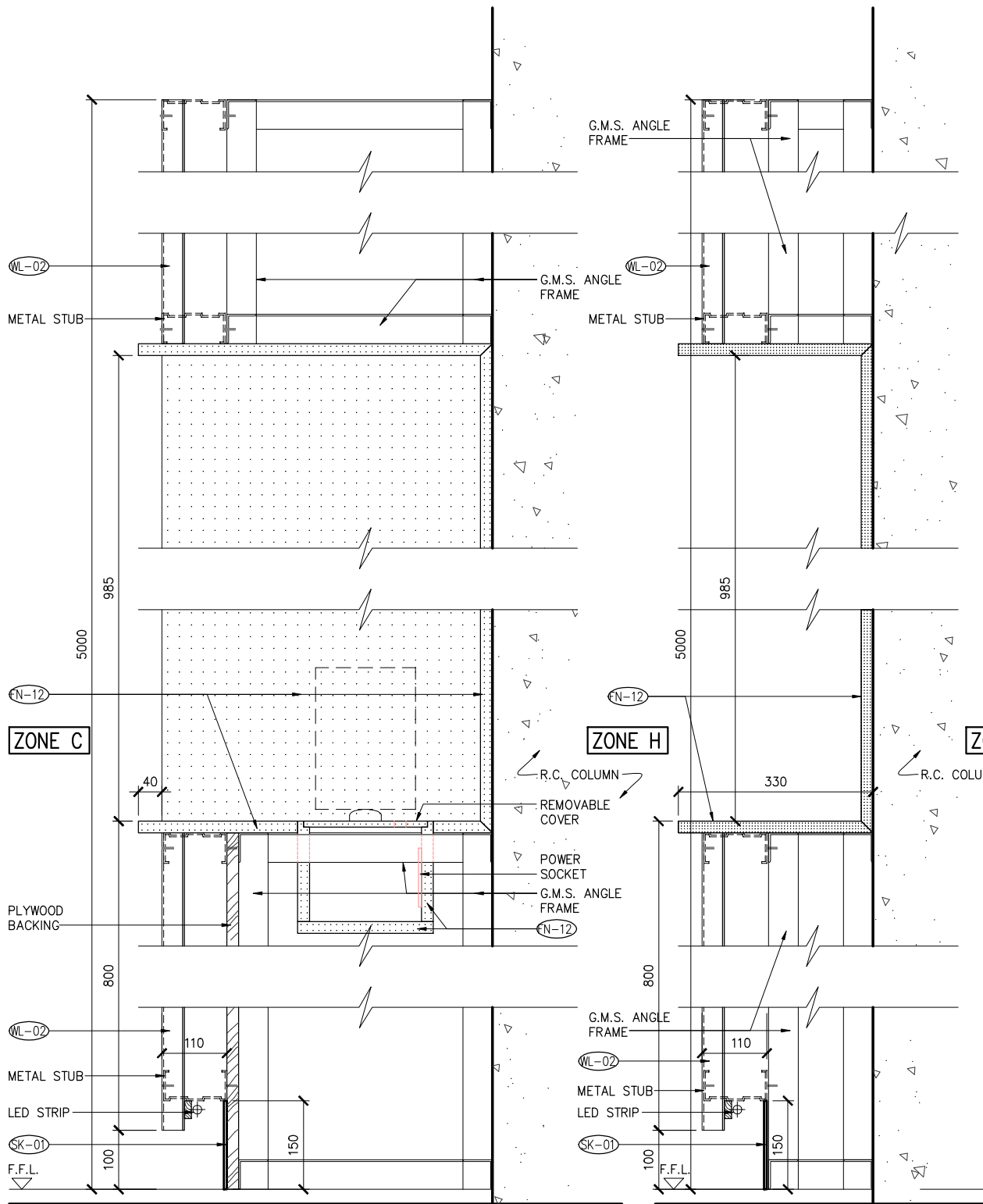
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: S:\PROJECTS\SETC AT KWAI CHUNG CAMPUS\DRAWING\A-07-11.DWG  
SCALE: **A3 @ 1:10**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

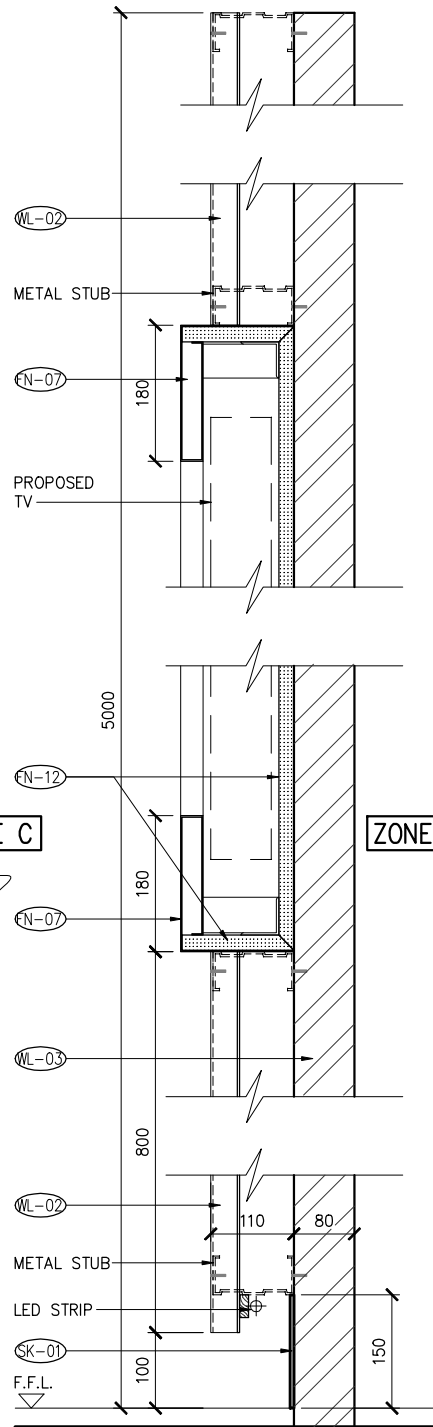
DRAWING TITLE  
**FEATURE WALL SURROUNDING  
ZONE H (VR CAVE) 3**

DRAWING NO. **AT-07-11**  
PROJECT NO. **DA17003**

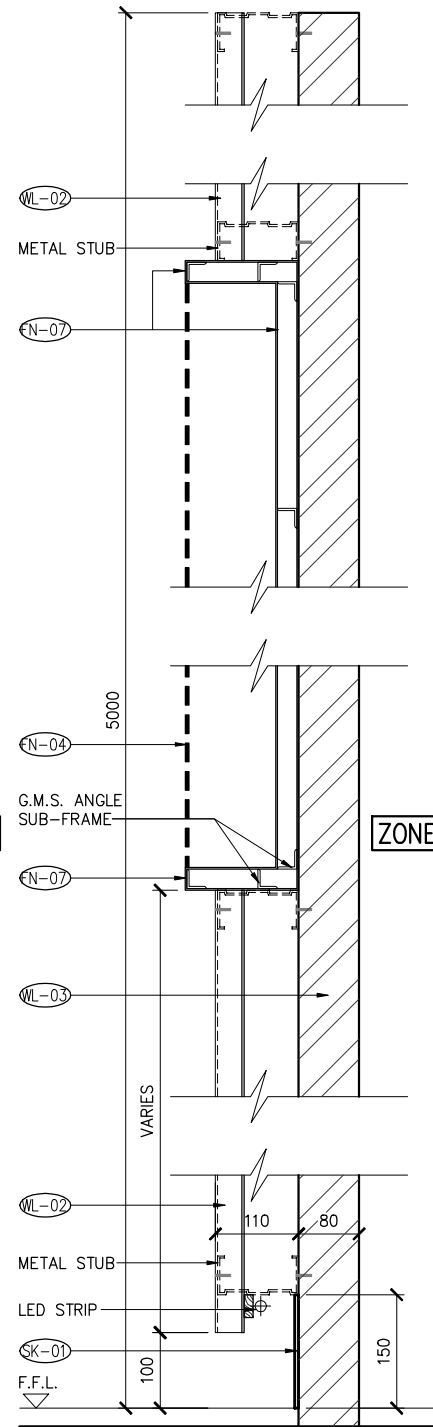


**6 SECTION C**  
SCALE 1:10

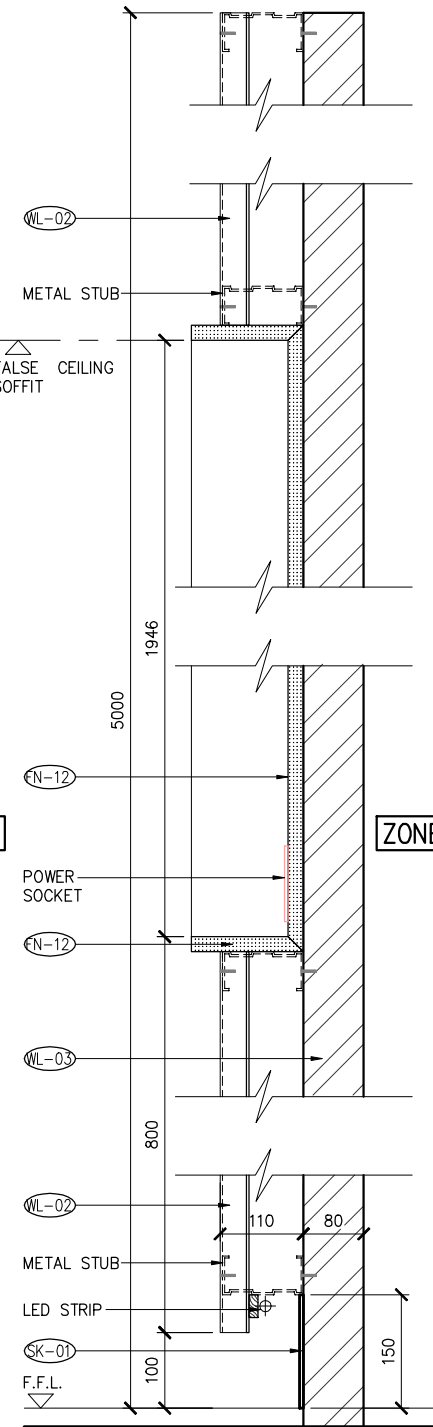
**7 SECTION D**  
SCALE 1:10



**8 SECTION E**  
SCALE 1:10

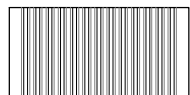


**9 SECTION F**  
SCALE 1:10

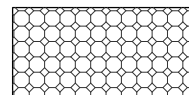


**10 SECTION G**  
SCALE 1:10

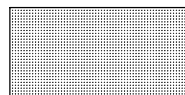
**LEGENDS :**



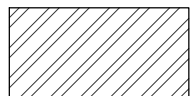
WL-02 CORRUGATED METAL SHEET



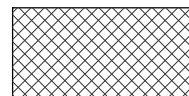
FN-04 ALUMINIUM ALLOY CIRCLE CUT OUT MESH



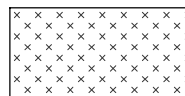
FN-12 ORIENTED STRAND BOARD



WL-03 GYPSUM BLOCK WALL



FN-07 ALUMINIUM PANEL



WL-01 THIN CONCRETE PANEL SYSTEM

**NOTES:**

1. THE CONTRACTOR SHALL SUBMIT DETAIL SHOP DRAWING FOR ARCHITECTS' APPROVAL.

DESIGN AND BUILD BY CONTRACTOR



**CONSTRUCTION  
INDUSTRY COUNCIL**  
建造業議會

**NOTES:**

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MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH

S:\017003\SETC AT KHM CHUNG OC TRAINING CENTRE\1 - CAD\C  
-TENDER\MAIN CONTRACT\BIDDING\A3-07 FIT OUT DETAILS\A3-07-09-12 WR  
CASE DETAILS.DWG

---

SCALE

**A3 @ 1:20**

# PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT WAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

**FEATURE WALL SURROUNDING  
ONE H (VR CAVE) 4**

DRAWING NO.	REV.
<b>AT-07-12</b>	
PROJECT NO.	<b>DA17003</b>

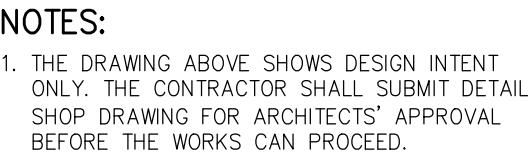


Figure 1 displays two examples of wall types used in the study:

- WL-02**: CORRUGATED METAL SHEET (represented by a vertical corrugated pattern).
- WL-03**: GYPSUM BLOCK WALL (represented by a diagonal hatched pattern).

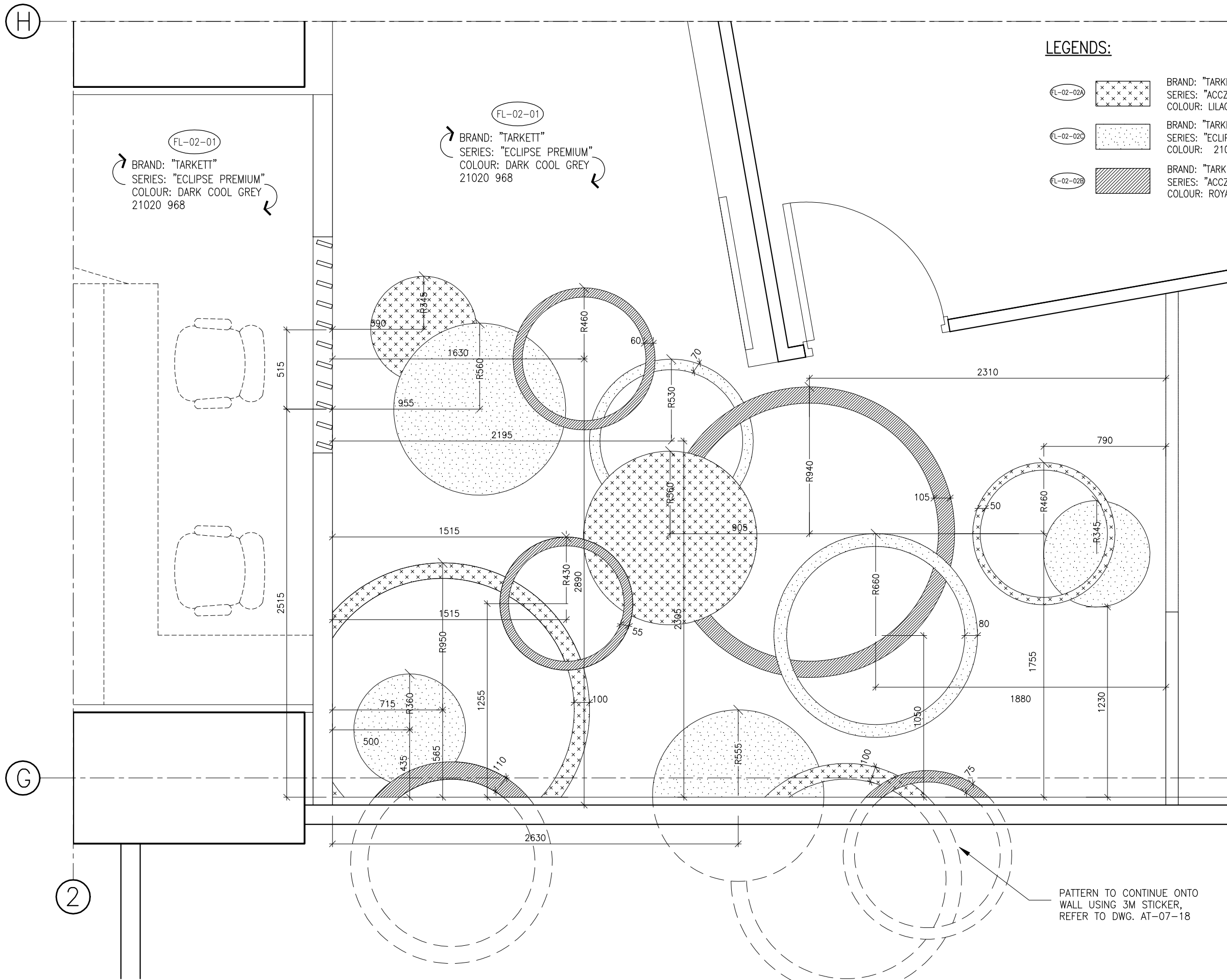
FN-07 ALUMINIUM PANEL

WL-01 ) THIN CONCRETE PANEL SYSTEM

## DESIGN AND BUILD BY CONTRACTOR

AT-07-12





NOTE: THE CONTRACTOR SHALL PROVIDE MOCK UP SAMPLES TO DEMONSTRATE THE WORKMANSHIP OF DIFFERENT VINYL PATTERN JOINING FOR ARCHITECT'S APPROVAL BEFORE THE WORKS TO BE PROCEEDED.

1 ZONE G VINYL FLOOR PATTERN  
SCALE 1:25

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \DRAWING\PROJECT\WORKING\AT-07-18\_VINYL\_FLOOR\_Pattern.dwg  
SCALE: A3 @ 1:25

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
VINYL FLOOR PATTERN -  
ZONE G

DRAWING NO. AT-07-13  
PROJECT NO. DA17003  
REV.

LIENT



1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

CAD PATH S:\017003 SETC AT KNU CHUNG CIG TRAINING CENTRE\1 - CRO/C  
-TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-14 VIBL  
FLOOR ZONE E.DWG

SCALE **A3 @ 1:25**

DRAWING TITLE

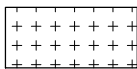
DRAWING NO.

\_\_\_\_\_

PROJECT NO. DA17003



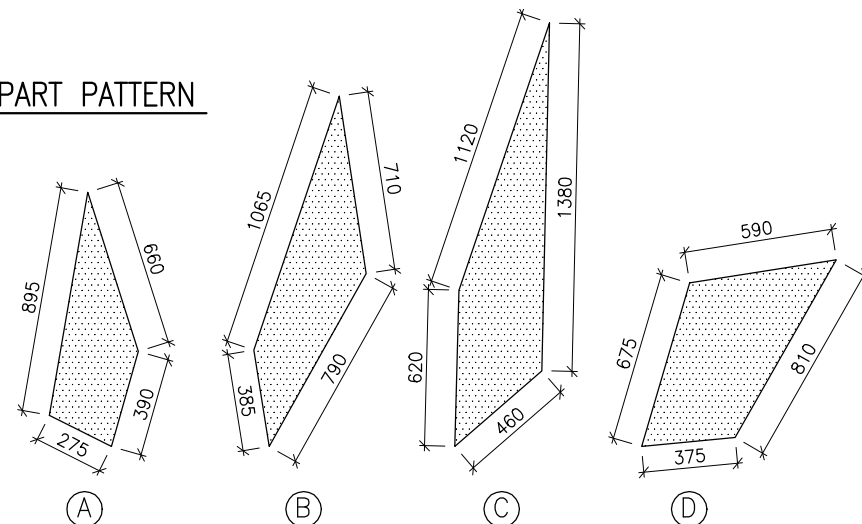
FL-02-03A



(FL-02-03B)



2 3M VINYL PART PATTERN  
SCALE 1:25



(A)

(B)

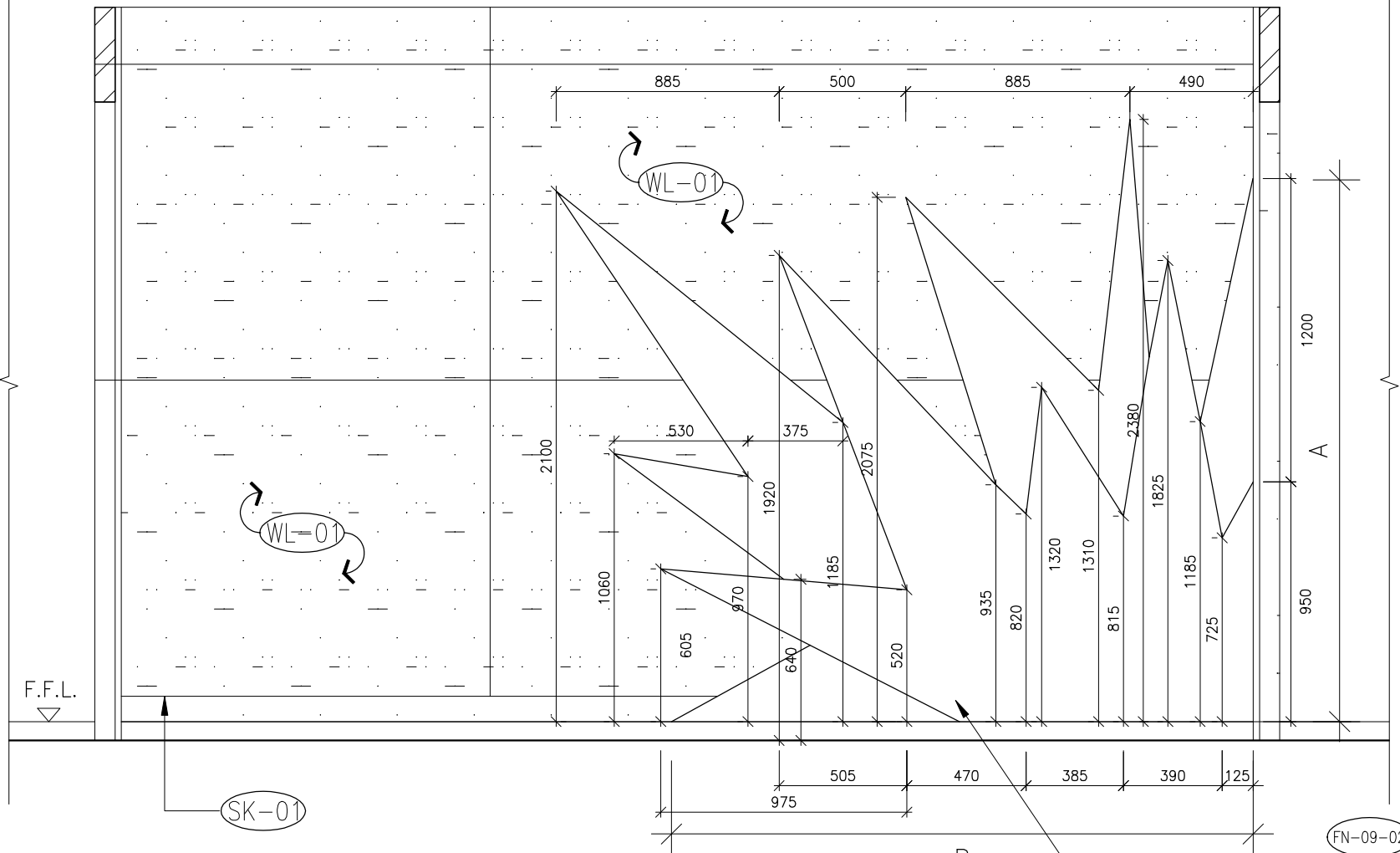
©

④

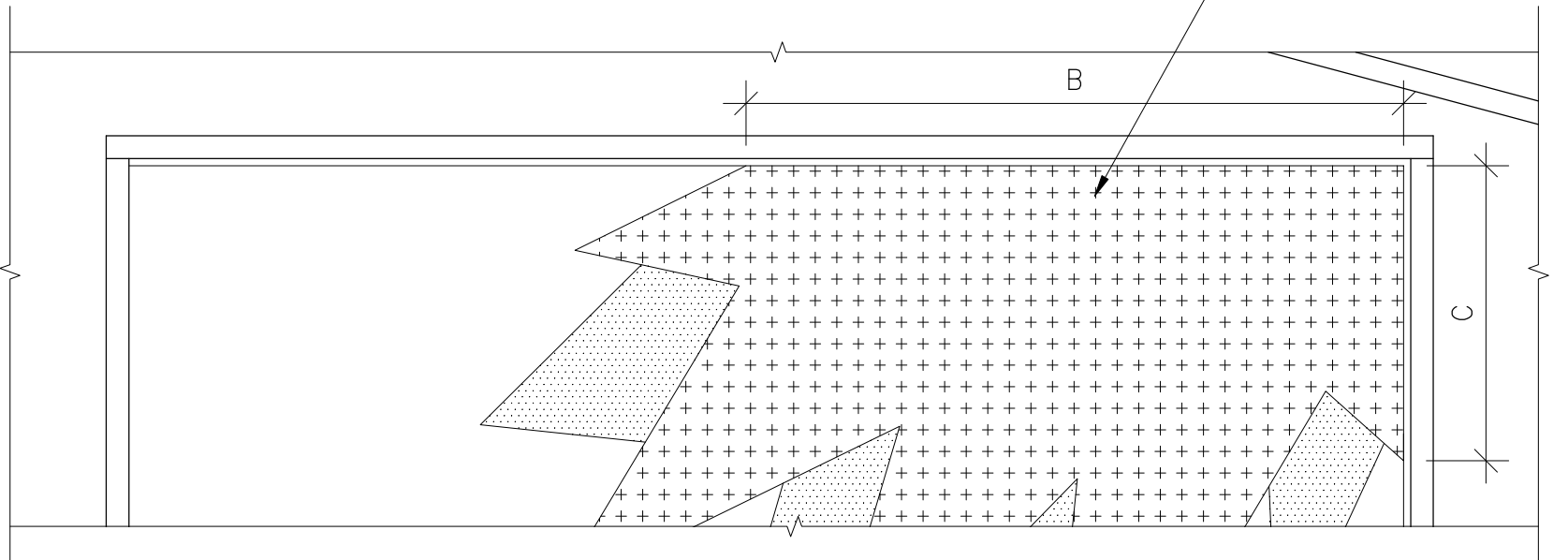




REFER TO DWG. AT-03-14 ELEVATION 2

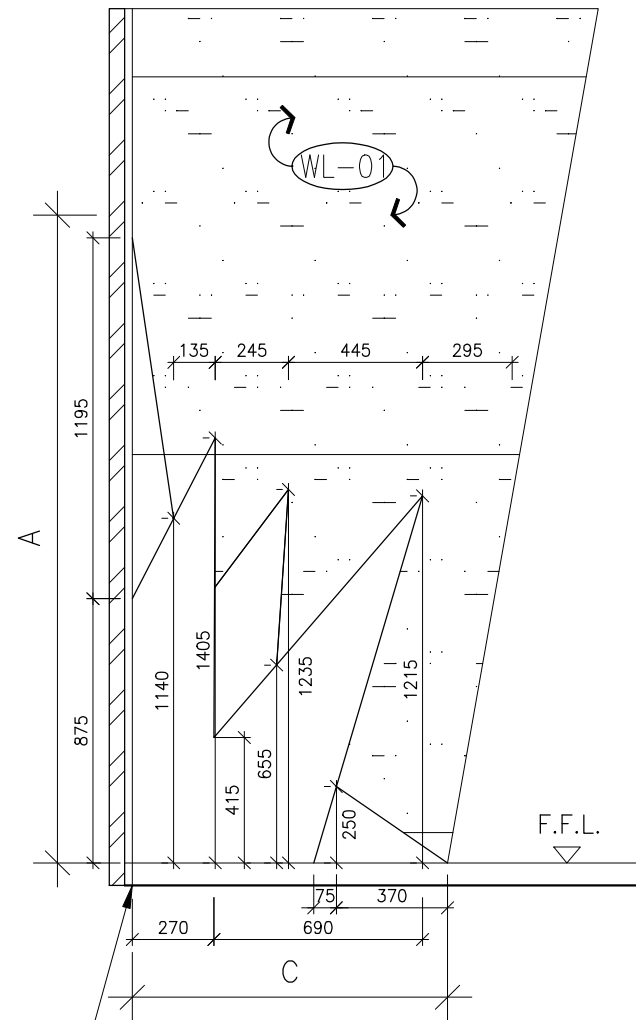


1 3M WALL DESIGN AT ZONE G  
SCALE 1:50



A PART PLAN OF VINYL FLOOR PATTERN  
SCALE 1:50 (REFER TO DWG. AT-07-14)

REFER TO DWG. AT-03-14 ELEVATION 2



2 3M WALL DESIGN AT ZONE G  
SCALE 1:50

### LEGENDS:

FL-02-03A		BRAND: "TARKETT" SERIES: "ACCZENT EXCELLENCE 70" COLOUR: ORANGE RED
FL-02-03B		BRAND: "TARKETT" SERIES: "ACCZENT EXCELLENCE 70" COLOUR: COGNAC

NOTES: THE COLOUR OF 3M FILM SHOULD MATCH THE RESPECTIVE VINYL FLOOR COLOUR AS SHOWN IN THIS DRAWING.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

### NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
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### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

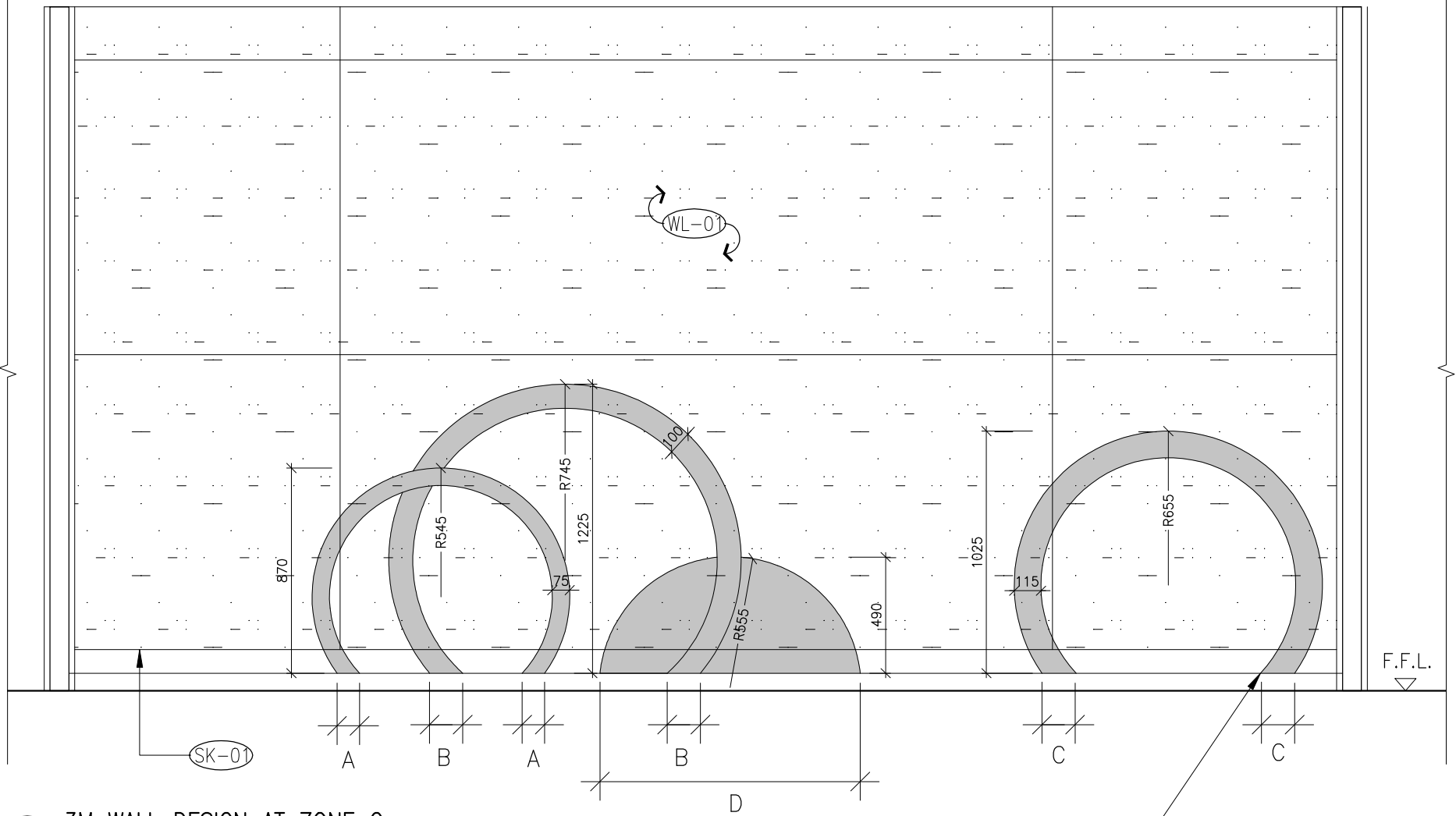
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: QUANTITIES SET BY KIM CHANG CO. TRADING COMPANY - CHINA  
CONSTRUCTION CONTRACT/WORKING DRAWING FOR THE NEW TRAINING CENTRE - ZONE E  
ZONE E.DWG  
SCALE: **A3 @ 1:25**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**3M PATTERN - ZONE E**

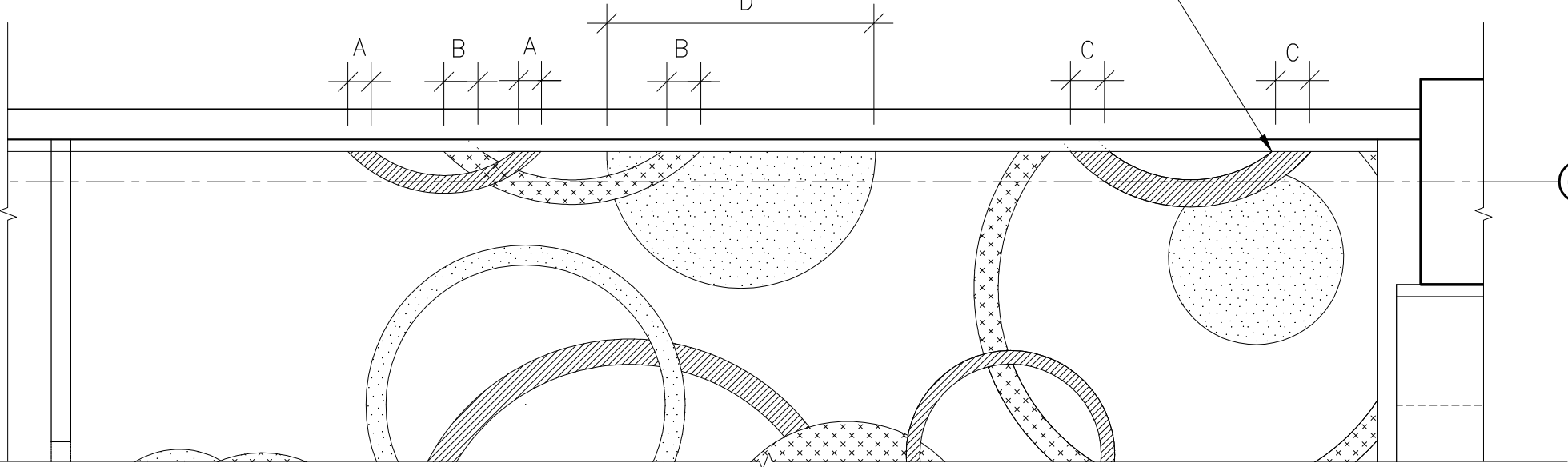
DRAWING NO.	REV.
<b>AT-07-17</b>	
PROJECT NO.	<b>DA17003</b>

REFER TO DWG. AT-03-17 ELEVATION 2



1 3M WALL DESIGN AT ZONE G  
SCALE 1:25

3M DECORATIVE FILM ON TOP OF WL-01  
WALL TILE TO ALIGN WITH VINYL FLOOR  
PATTERN. VINYL FLOOR TO REFER TO  
DWG. AT-07-13



2 PART PLAN OF VINYL FLOOR PATTERN  
SCALE 1:25 (REFER TO DWG. AT-07-13)

LEGENDS:

- FN-09-02 BRAND: "3M"  
SERIES: "SCOTCHCAL IJ8150 CLEAR  
VIEW GRAPHIC FILM"  
COLOUR: REFER TO NOTES
- FL-02-02A BRAND: "TARKETT"  
SERIES: "ACCZENT EXCELLENCE 70"  
COLOUR: "LILAC"
- FL-02-02C BRAND: "TARKETT"  
SERIES: "ECLIPSE PREMIUM"  
COLOUR: "21020 963 LIGHT PURE  
GREY"
- FL-02-02B BRAND: "TARKETT"  
SERIES: "ACCZENT EXCELLENCE 70"  
COLOUR: "ROYAL PURPLE"

USE FIGURED DIMENSIONS. READ THE DRAWING IN  
CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT  
SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY  
FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED &  
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REV. DATE & DESCRIPTION DRN CHK APP

NOTES:

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

DAVID S.K. AU &  
ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: QUANTITY SURVEYOR OF HONG KONG (C) TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/OF THE HONG KONG ARCHITECTS' REGISTRATION BOARD

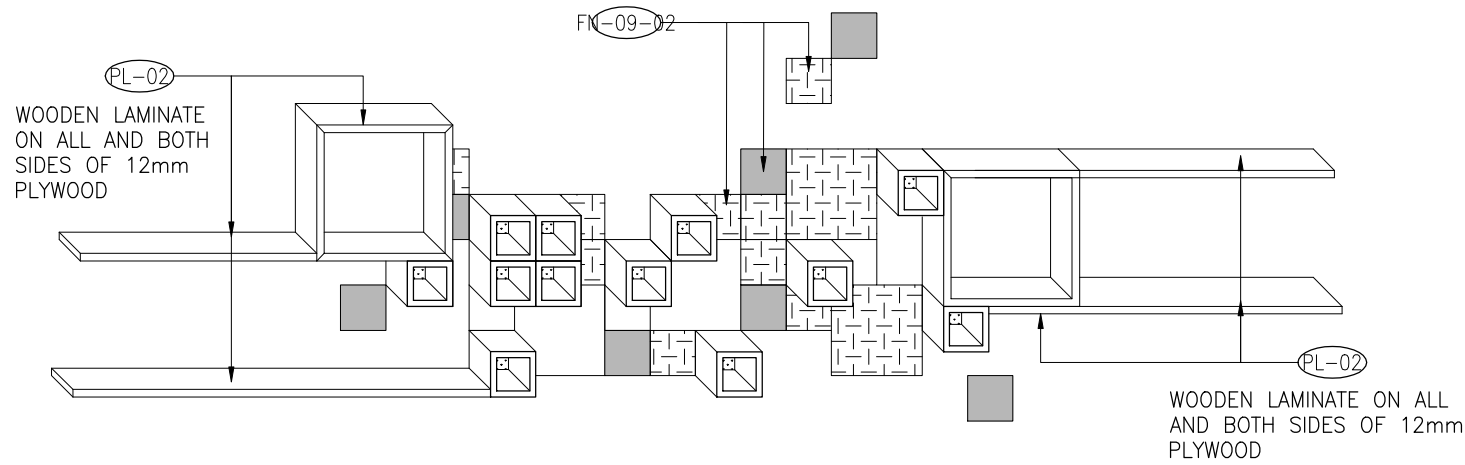
SCALE A3 @ 1:25

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
3M PATTERN - ZONE G

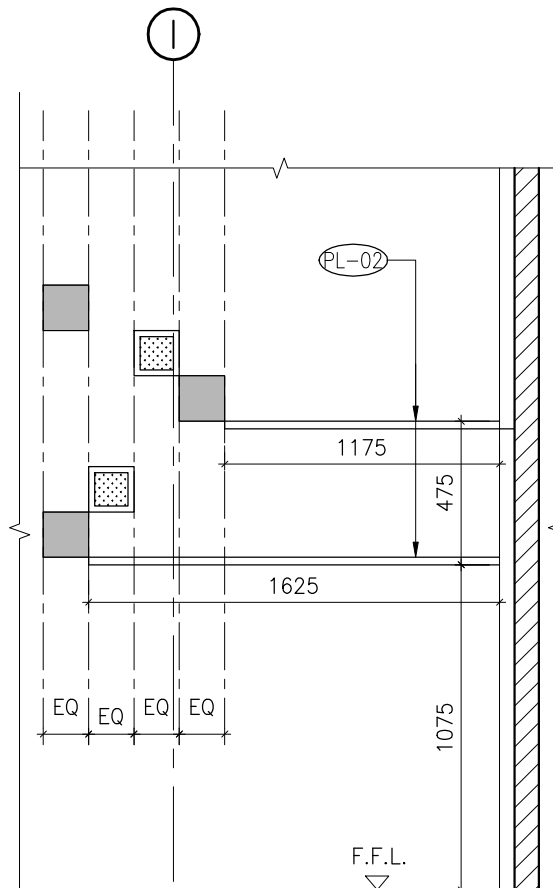
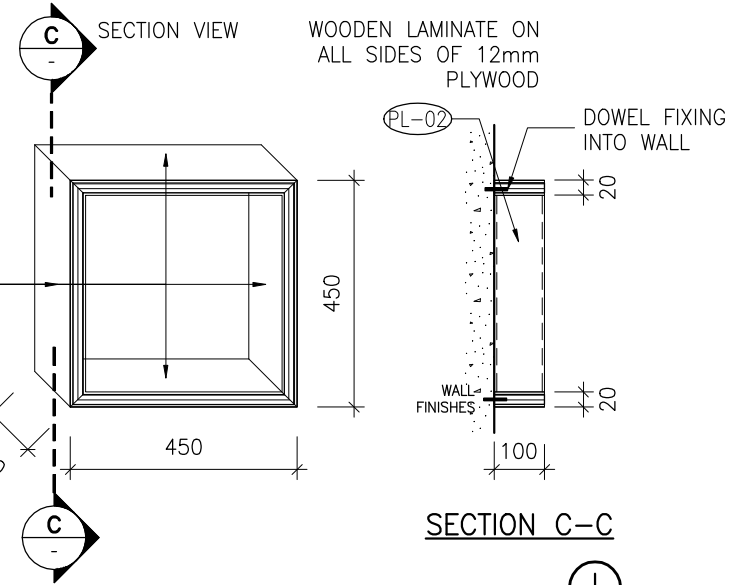
NOTES: THE COLOUR OF 3M FILM SHOULD MATCH THE  
RESPECTIVE VINYL FLOOR COLOUR AS SHOWN IN THIS  
DRAWING.

DRAWING NO. AT-07-18  
PROJECT NO. DA17003  
REV.

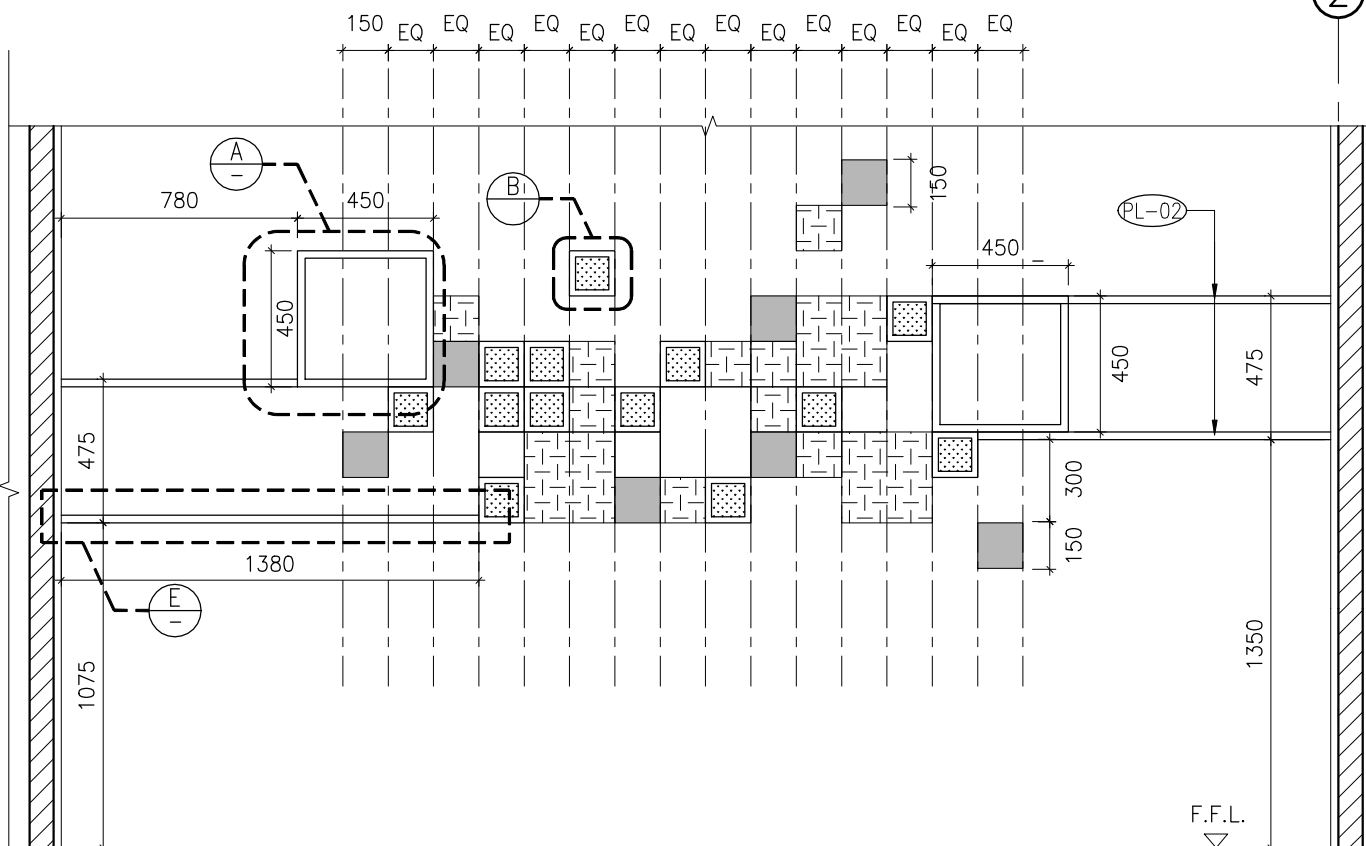


1 PERSPECTIVE OF SHELVING UNIT  
SCALE 1:20

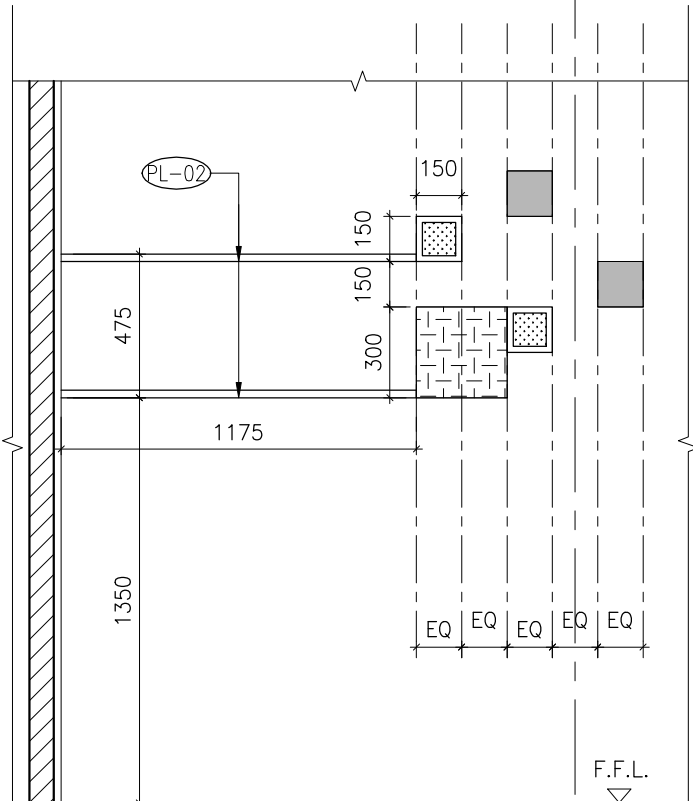
A DETAIL 'A'  
SCALE 1:15



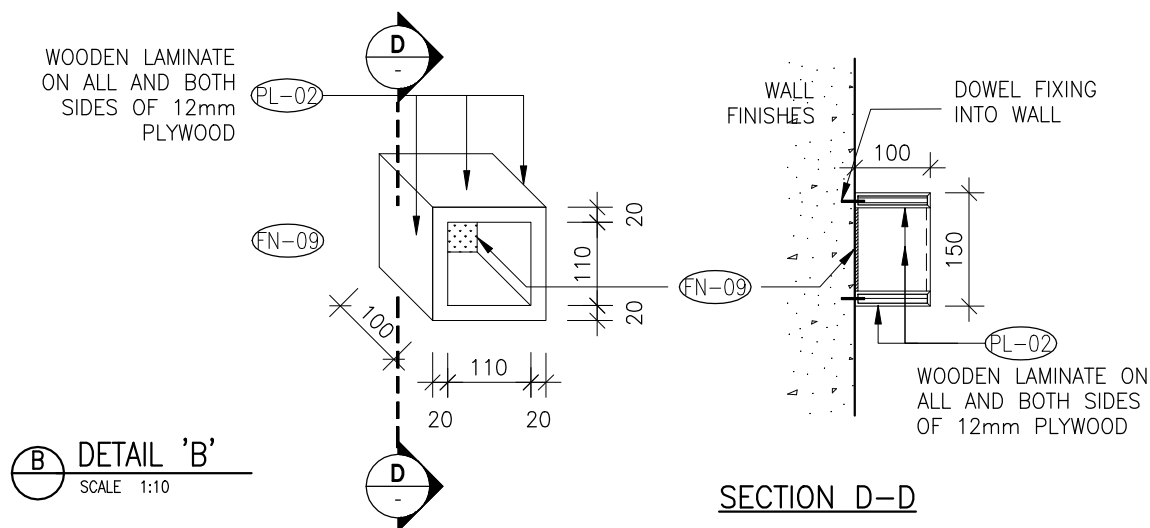
2 ELEVATION  
SCALE N.T.S. (REFER TO DWG. AT-03-08 ELEVATION 1)



3 ELEVATION  
SCALE 1:20 (REFER TO DWG. AT-03-08 ELEVATION 2)



4 ELEVATION  
SCALE 1:20 (REFER TO DWG. AT-03-08 ELEVATION 3)

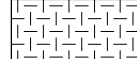


B DETAIL 'B'  
SCALE 1:10

SECTION D-D

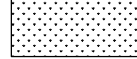
#### LEGENDS:

FN-09-02



BRAND: "3M"  
SERIES: "SCOTCHCAL IJ8150 CLEAR VIEW GRAPHIC FILM"  
COLOUR: CIC DARK GREY

FN-09-02



BRAND: "3M"  
SERIES: "SCOTCHCAL IJ8150 CLEAR VIEW GRAPHIC FILM"  
COLOUR: CIC GREEN

FN-09-02



BRAND: "3M"  
SERIES: "SCOTCHCAL IJ8150 CLEAR VIEW GRAPHIC FILM"  
COLOUR: CIC GREY

E FIXING DETAIL 'E'  
SCALE 1:10

DESIGN AND BUILD BY CONTRACTOR

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH: C:\PROJECTS\CONSTRUCTION\AT-07-19\AT-07-19.DWG  
SCALE: A3 @ AS SHOWN

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
SHELVING AT OFFICE

DRAWING NO. AT-07-19  
PROJECT NO. DA17003  
REV.

LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

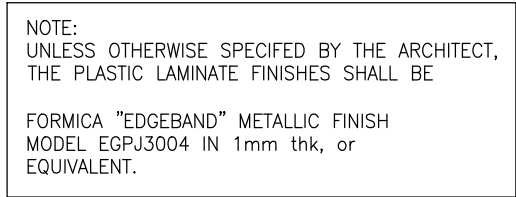
AD PATH S:\DA17003 SEIC AT KBN CHUNG CIG TRAINING CENTRE\1 - CIG\1  
-TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-20 HANGING  
FEATURE 01-01\01.DWG

# PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT T'WAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

**BUILT-IN HANGING FEATURE  
(I-BEAM)**

PROJECT NO. DA17003

V.



DESIGN AND BUILD BY CONTRACTOR



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

NOTES:

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
6TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
(852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.doad.com.hk](http://www.doad.com.hk)

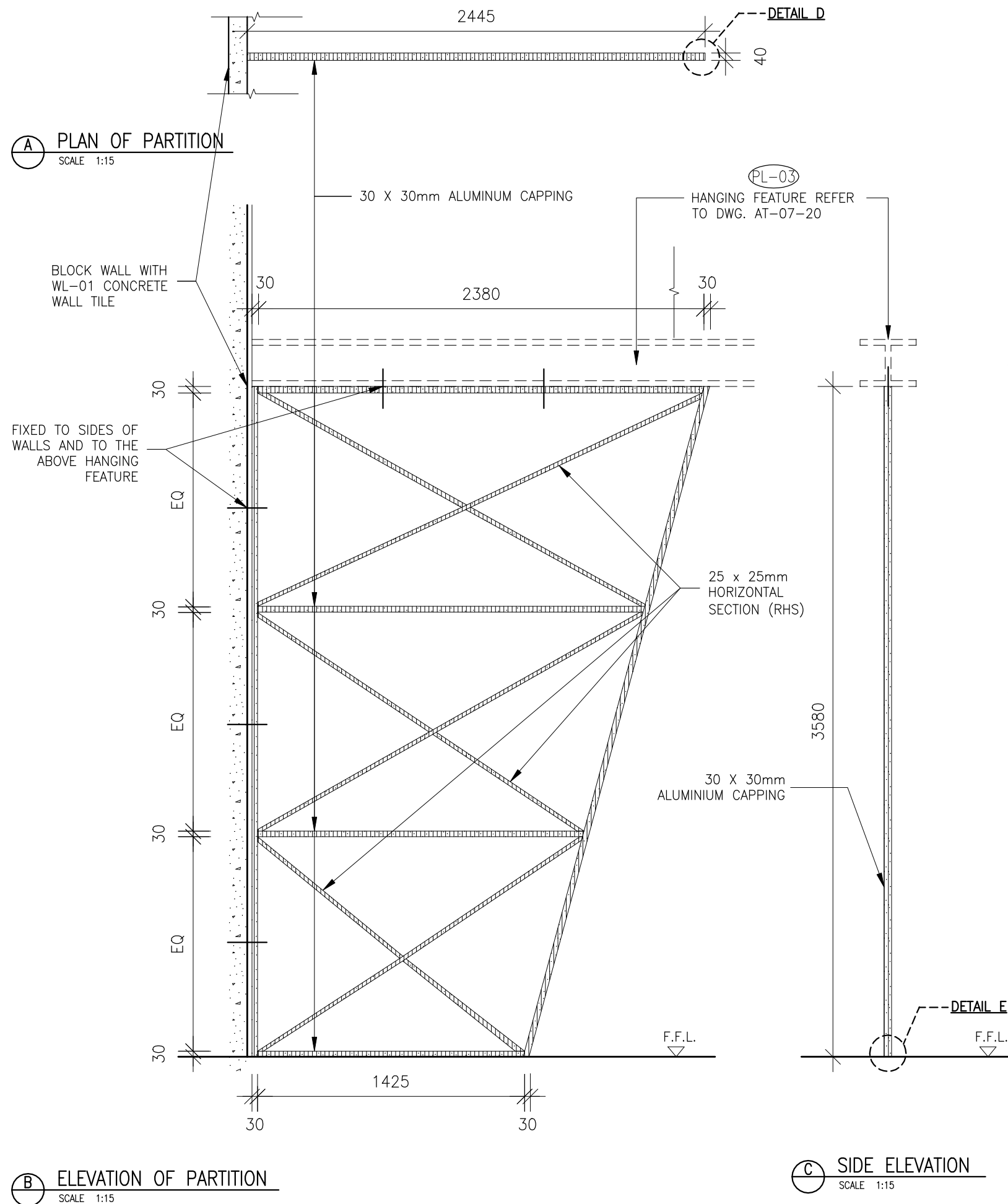
CALE **A3 @ 1:15 & 1:5**

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PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
WAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
PARTITION FEATURE BETWEEN  
ONE A & B

DRAWING NO. <b>AT-07-21</b>	REV.
PROJECT NO. <b>DA17003</b>	



CONTRACTOR TO PROPOSE THE CONNECTION METHOD FOR ALL TRUSS MEMBER, WHICH COULD BE COVERED BY ALUMINIUM CAPPING

CONTRACTOR TO PROPOSE THE CONNECTION METHOD FOR ALL TRUSS MEMBER, WHICH COULD BE COVERED BY ALUMINIUM CAPPING

NOTES: 25 x 25mm HORIZONTAL SECTION (RHS) AND 30 X 30mm ALUMINUM CAPPING TO RECEIVE PRIMER COATING AND TOP COAT RESIN PAINT AS SPECIFIED IN THE PARTICULAR SPECIFICATION. TENTATIVE COLOUR: MATT BLACK (CONTRACTOR TO SUBMIT COLOUR SAMPLE FOR ARCHITECT'S APPROVAL.)

## DESIGN AND BUILD BY CONTRACTOR

LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\DA17003 SETC AT KNN CHUNG CIG TRAINING CENTRE\1 - CAG\C  
-TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-22 DISPLAY

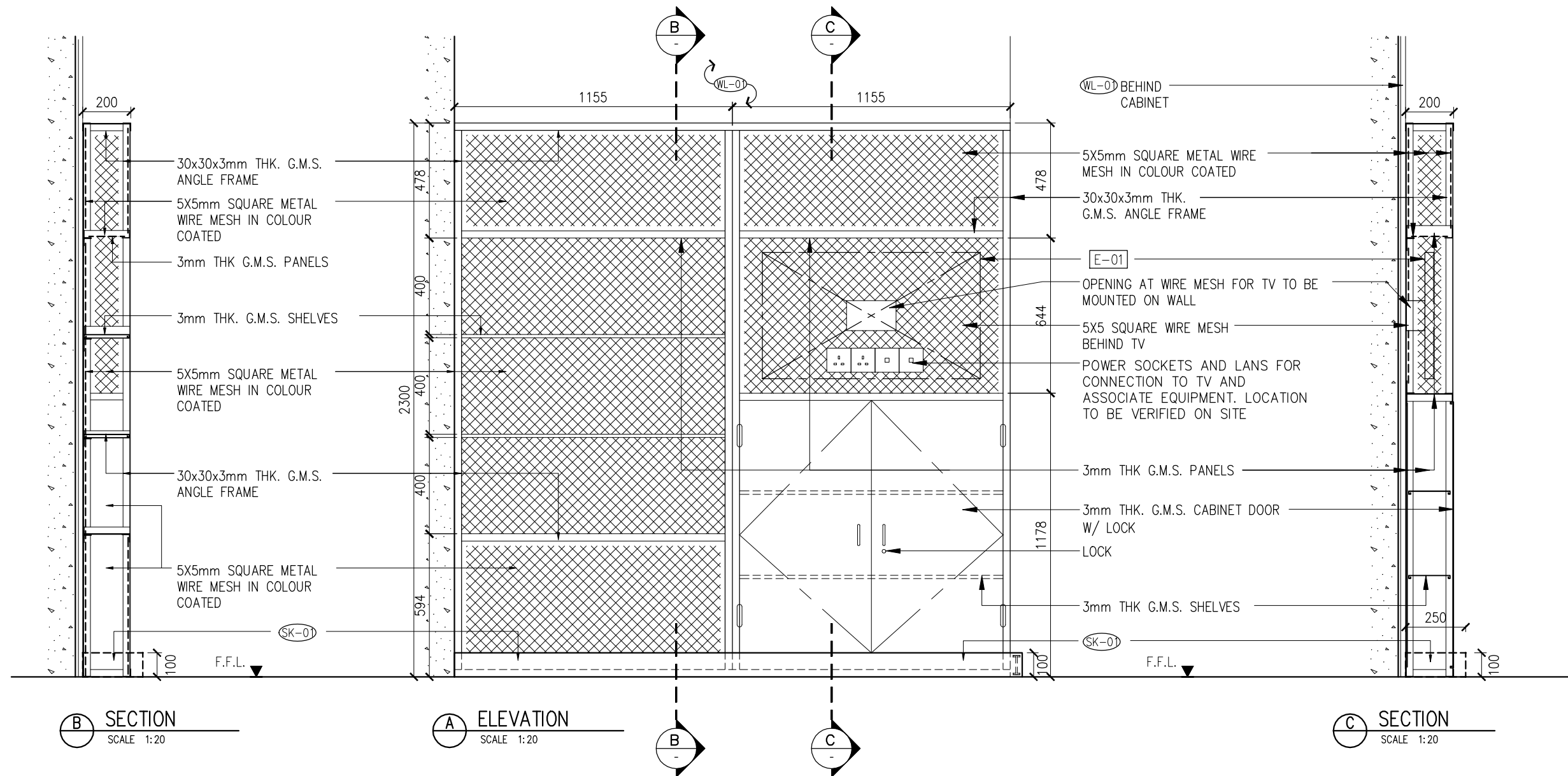
# PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT T'WAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

### NOTICE PANEL FOR ALL ZONES

\_\_\_\_\_







**NOTES:**

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dad.com.hk

CAD PATH: H:\QUANTITY SETS AT KWAI CHUNG DC TRAINING CENTRE\1 - CIVIL\1 - DISPLAY RACK FOR ZONE G\1 - 01.DWG  
DISPLAY RACK FOR ZONE G

SCALE: **A3 @ 1:20**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**DISPLAY RACK FOR ZONE G  
(MACHINERY)**

DRAWING NO. **AT-07-23** REV.  
PROJECT NO. **DA17003**

DESIGN AND BUILD BY CONTRACTOR

CLIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION  
WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED  
ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE  
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ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE  
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\DATA003 SETC AT KOWI CHUNG DC TRAINING CENTRE\1 - CAO\1  
- TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-24 TO 28  
DESCRIPTION, CEILING AND DOOR WALL DETAILS.DWG

SCALE **A3 @ AS SHOWN**

DRAWING TITLE

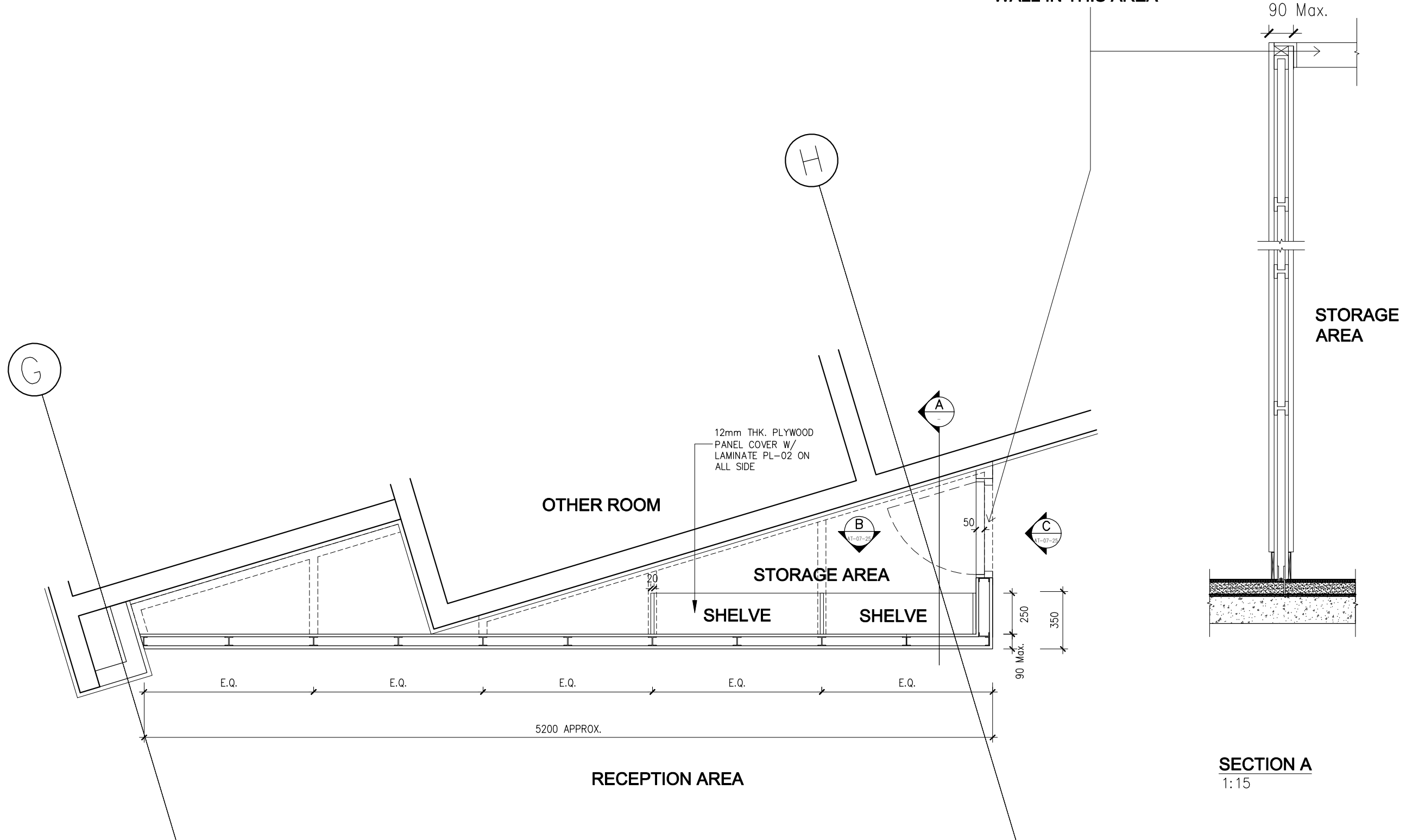
DRAWING NO.	REV.
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AT-07-24	
PROJECT NO.	DA17003

## SECTION A

1:15

## DESIGN AND BUILD BY CONTRACTOR







NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

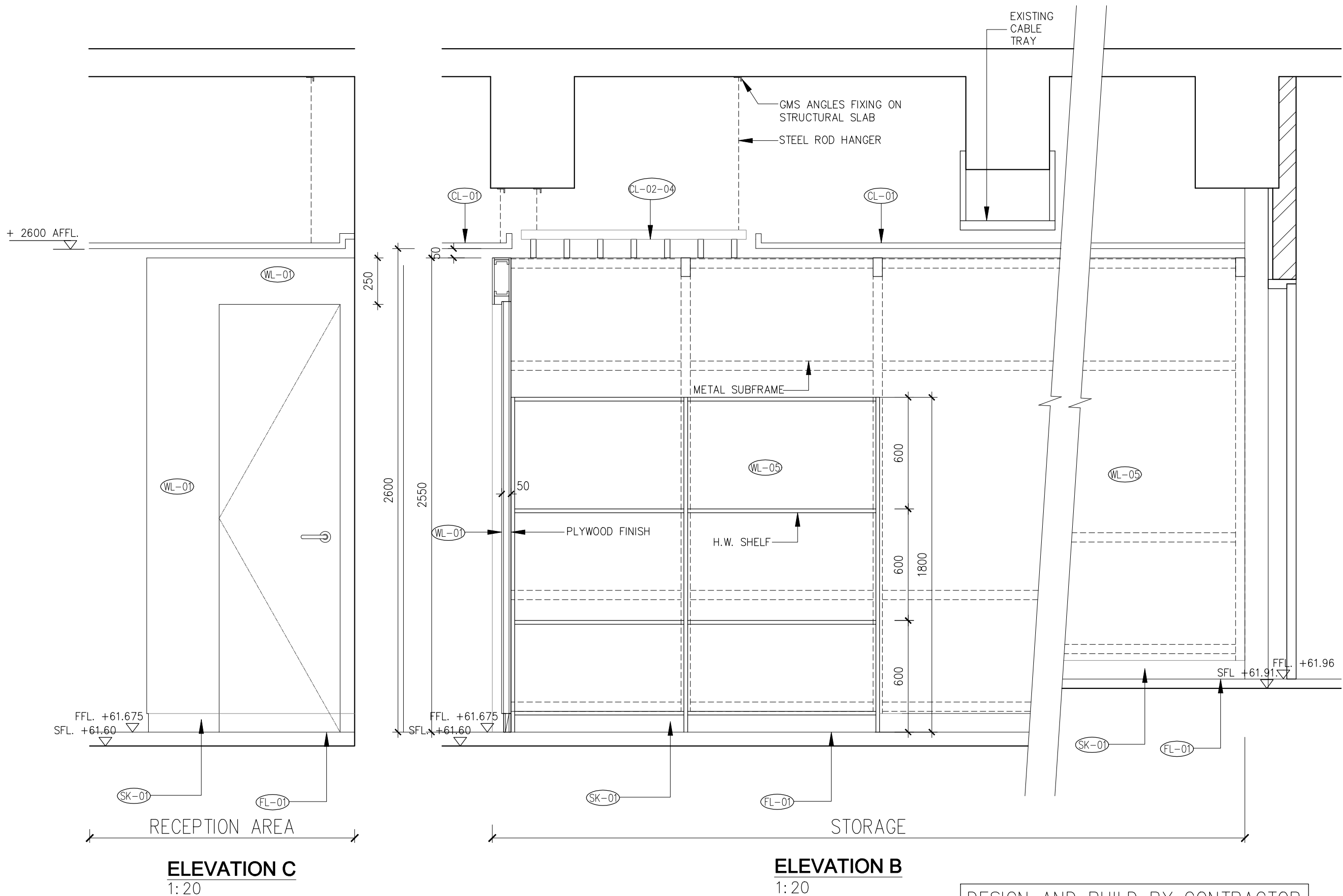
CAD PATH: S:\PROJECTS\SETC AT KWAI CHUNG CAMPUS\DRAWING\SETC AT KWAI CHUNG CAMPUS\DWG\RECEPTION CEILING AND ASSOCIATED WALL DETAIL.DWG

SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
FEATURE CEILING AND  
ASSOCIATED WALL AT  
RECEPTION AREA 2

DRAWING NO.	REV.
AT-07-25	
PROJECT NO.	DA17003



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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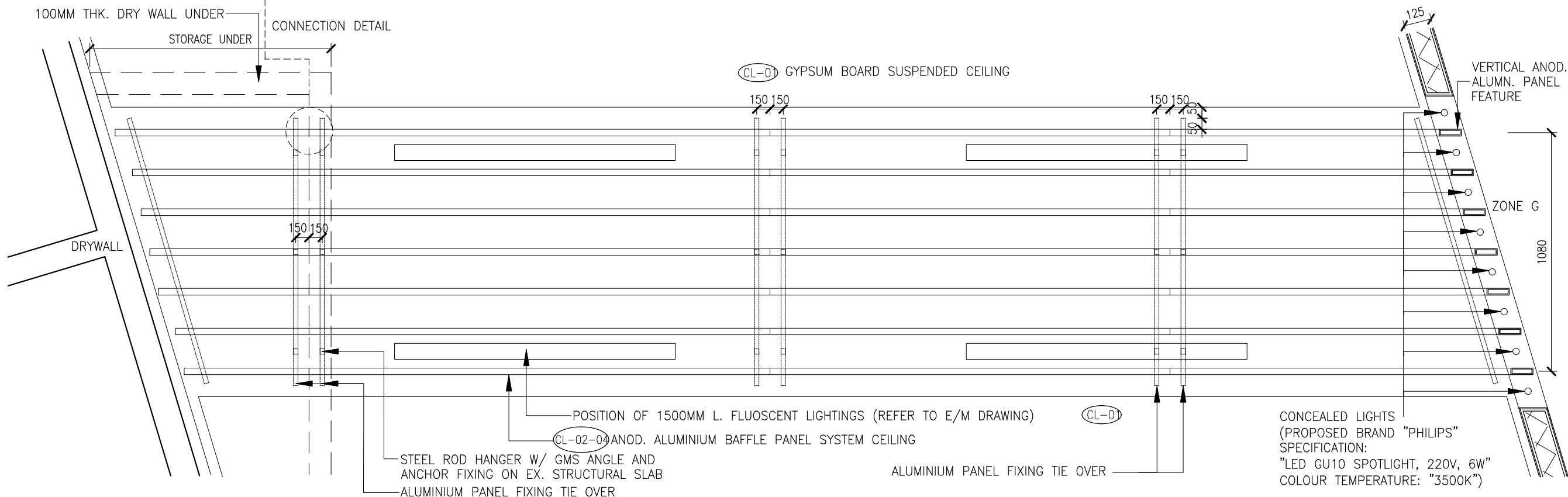
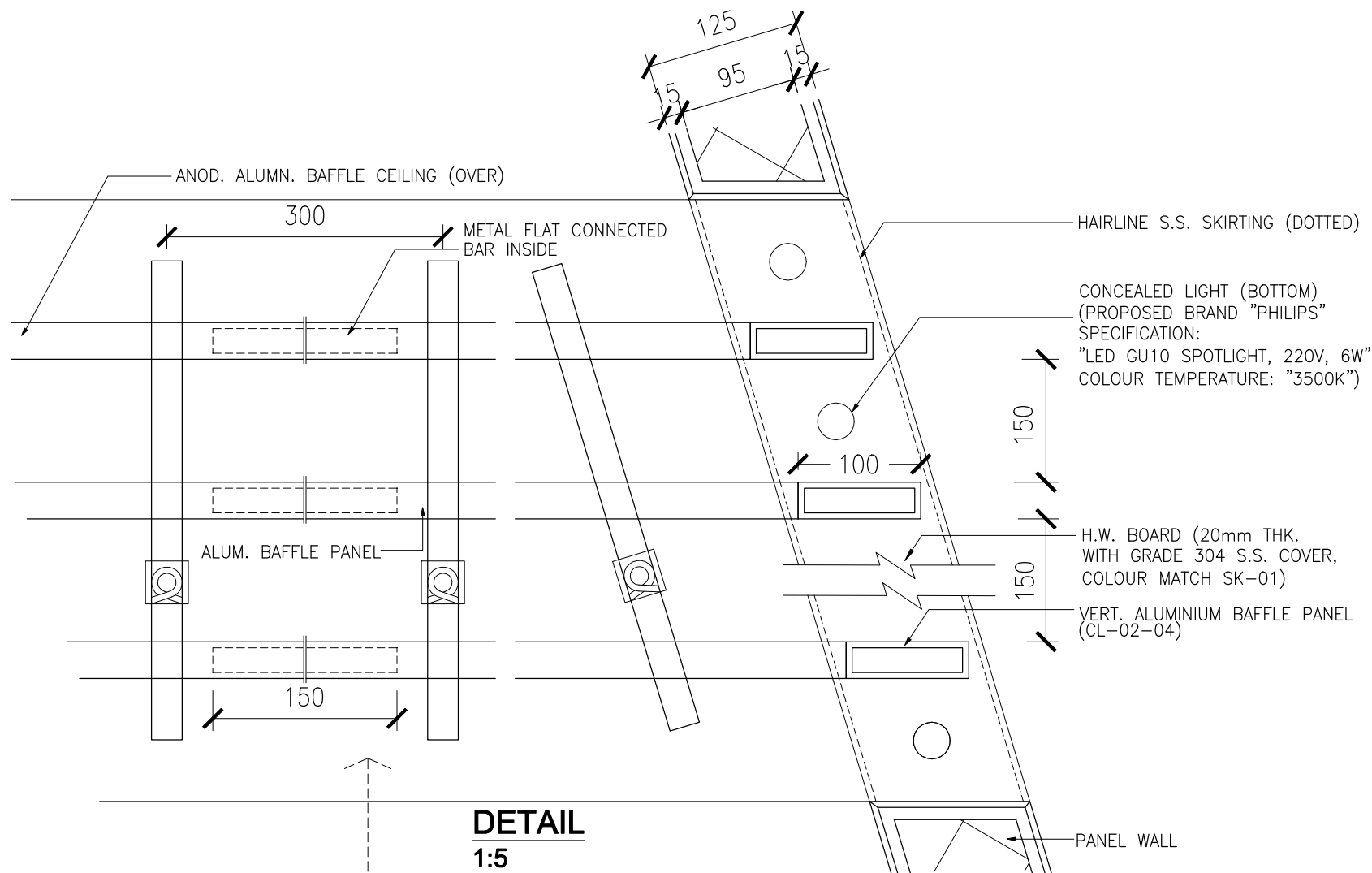
CLIENT



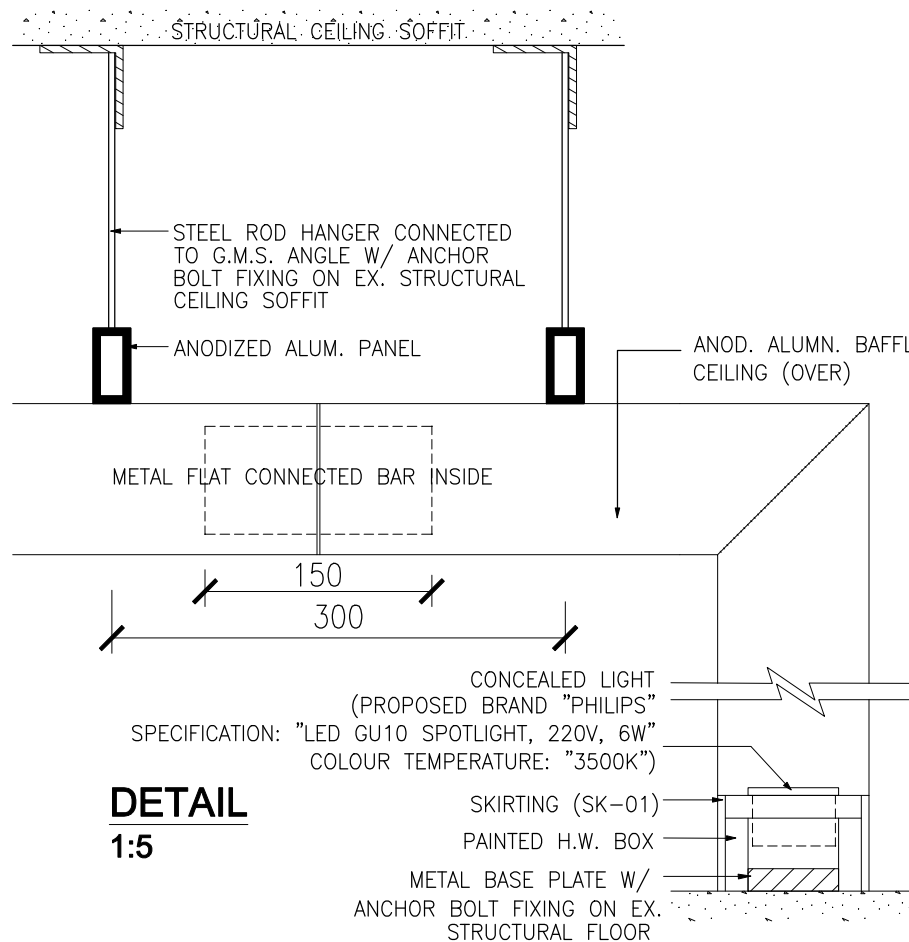
REV. DATE & DESCRIPTION DRN CHK APP

NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.



DETAIL SHOWING SUSPENDED ALUMINIUM BAFFLE PANEL CEILING  
1:20



DETAIL  
1:5

DESIGN AND BUILD BY CONTRACTOR

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: SUBMITTAL SET OF NEW CHANGE OF WORKING DRAWING - CIVIL - STRUCTURAL CONSTRUCTION WORKS OF THE SETC AT KWAI CHUNG CAMPUS AND DRY WALL DETAILING

SCALE: A3 @ AS SHOWN

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE: FEATURE CEILING AND ASSOCIATED WALL AT RECEPTION AREA 3

DRAWING NO. AT-07-26  
PROJECT NO. DA17003  
REV.

CLIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.

UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.

ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\017003 SETC AT KBN CHUNG OC TRAINING CENTRE\ - CIO\ - TENDER\MAIN CONTRACT\WORKING\AT-07 FIT OUT DETAILS\AT-07-24 TO 28 EXISTING CEILING AND FRY WALL DETAILS.DWG

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
WAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

### FEATURE CEILING AND ASSOCIATED WALL AT RECEPTION AREA 4

PROJECT NO.	DA17003
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\_\_\_\_\_

## DESIGN AND BUILD BY CONTRACTOR

CLIENT



1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

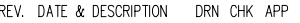
SCALE **A3 @ AS SHOWN**

DRAWING TITLE

DRAWING NO.	REV.
<b>AT-07-28</b>	
PROJECT NO.	<b>DA17003</b>



CLIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.

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ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\017003 SEIC AT KBN CHUNG OC TRAINING CENTRE\1 - CAO - TENDER\MAIN CONTRACTOR\KINGT-07 FIT OUT\DETAILS\T-07-29 TO 30 BUILT IN FEATURE AT ZONE C.DWG

# PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT T'WAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

BUILT-IN FEATURE AT ZONE C  
(LIFTING AND RIGGING PLANT) 1

PROJECT NO. DA17003



DESIGN AND BUILD BY CONTRACTOR

SECTIONAL PLAN

**C** DETAIL OF BASE FIXING  
SCALE 1:7

PLAN VIEW

DETAIL E  
SCALE 1:10

CROSS SECTION 'F-F'

SECTION VIEW 'G'

DETAIL D  
SCALE 1:10

NOTE: THIS DRAWING SHOWS DESIGN INTENT ONLY,  
 – CONTRACTOR TO SUBMIT STRUCTURAL CALCULATIONS TO  
 STRUCTURAL ENGINEER TO CONFIRM ITS STABILITY.  
 – THE COLOUR OF TRUSS TO BE APPROVED BY ARCHITECT.

DESIGN AND BUILD BY CONTRACTOR

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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NOTES:

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## TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER



CAD PATH S:\017003 SETC AT KBN CHUNG OC TRAINING CENTRE\1 - CAD - TENDER\MAIN  
CONTRACTOR\KINGST-07 FIT OUT DETAIL\ST-07-29 TO 30 BUILT  
IN FEATURE AT ZONE C.DWG

SCALE A3 @ AS SHOWN

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**BUILT-IN FEATURE AT ZONE C  
(LIFTING AND RIGGING PLANT)**

DRAWING NO. <b>AT-07-30</b>	REV.
PROJECT NO. <b>DA17003</b>	



CLIENT



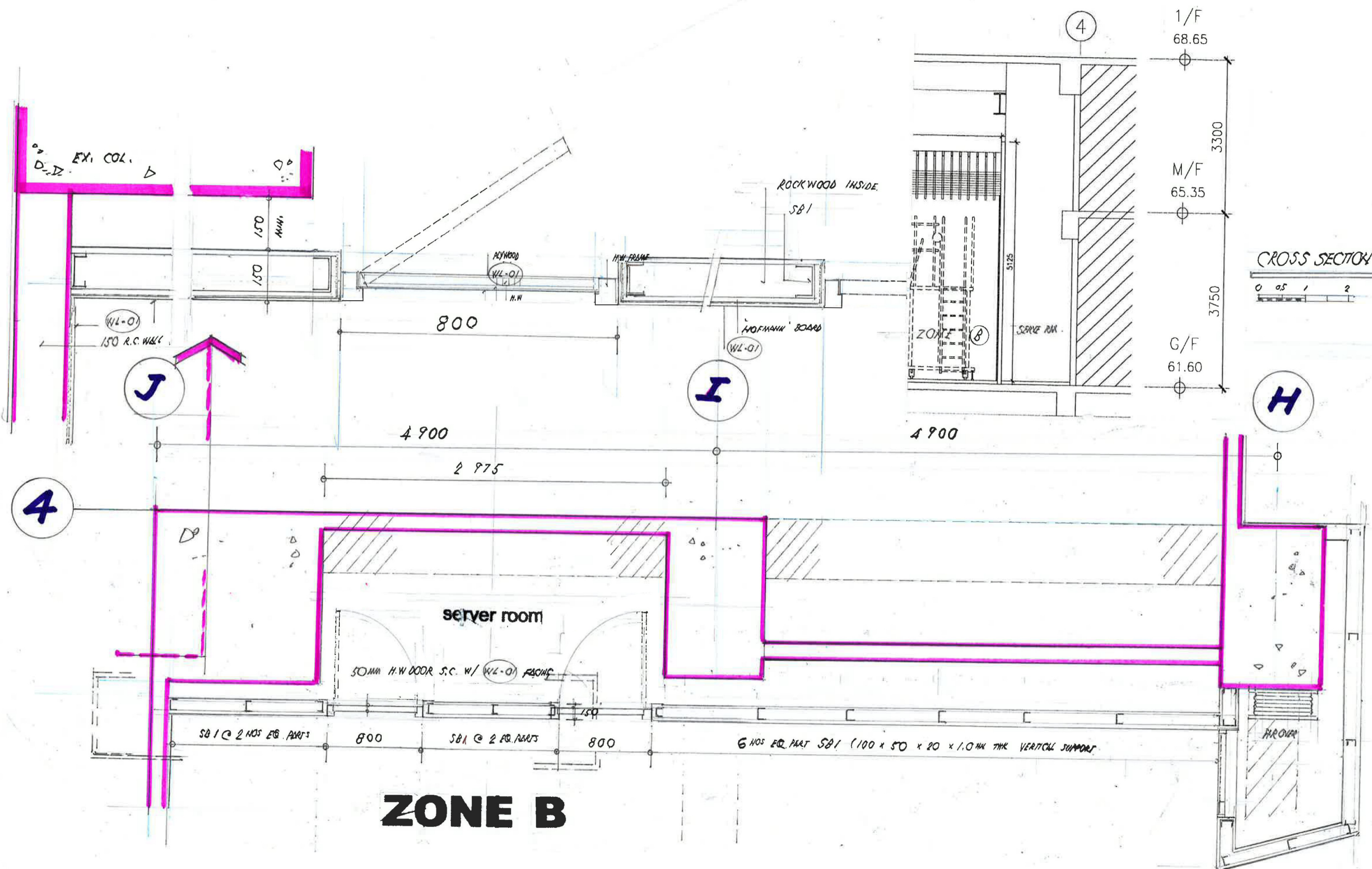
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

SCALE A3 @ AS SHOWN

DRAWING TITLE  
**DRYWALL AT SERVER ROOM**

DRAWING NO.	REV.
<b>AT-07-31</b>	
PROJECT NO.	<b>DA17003</b>



SCALE 1:30

DESIGN AND BUILD BY CONTRACTOR



**NOTES:**

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

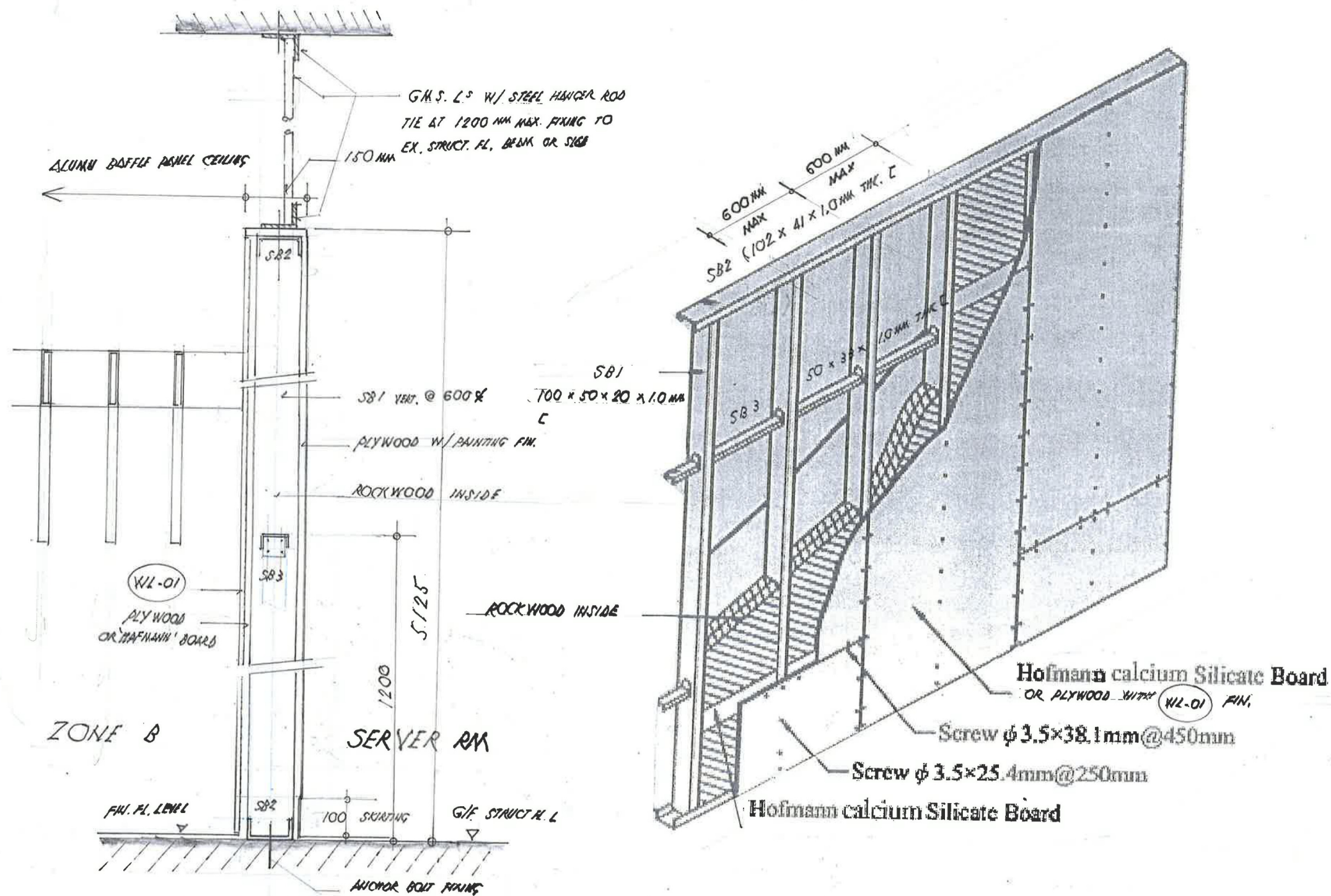
CAD PATH: QUANTITY SURVEYOR OF NEW CHINESE TRAINING CENTRE - CIVIL  
SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
**DRYWALL DETAIL**

DESIGN AND BUILD BY CONTRACTOR

DRAWING NO. **AT-07-32** REV.  
PROJECT NO. **DA17003**



**WL-05** — **VERTICAL DETAIL OF DRYWALL SYSTEM**





CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會

NOTES:

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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

CAD PATH S:\DA17003 SETC AT KHA CHUNG C/C TRAINING CENTRE\1 - CAD\1  
-RENDER\MAIN CONNECT\WORKING\AT-07 Fit OUT DETAILS\AT-33 DISPLAY  
CABINET FOR TABLETING

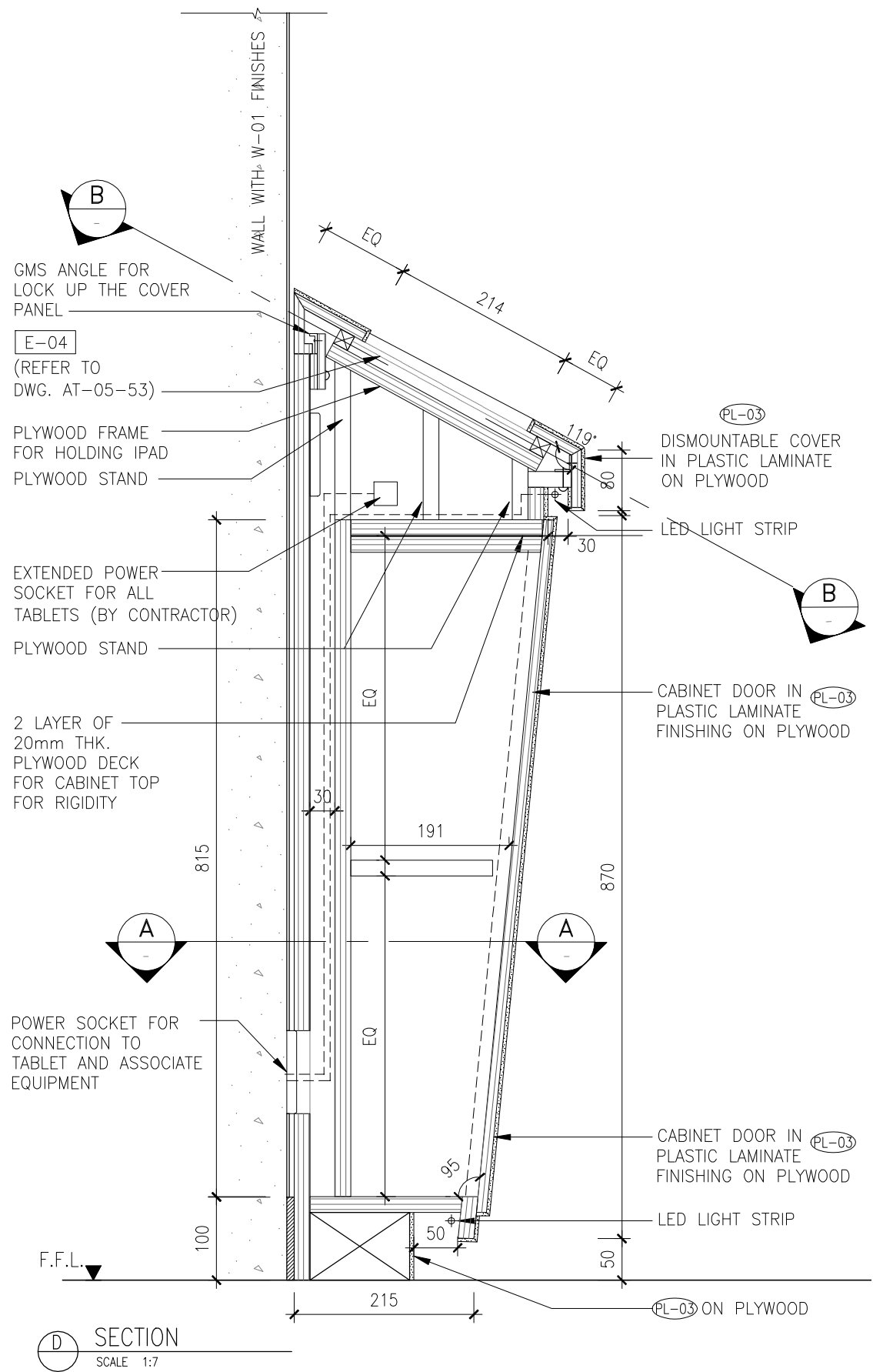
SCALE **A3 @ AS SHOWN**

## PROJECT RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

**DISPLAY CABINET FOR TABLET**

DRAWING NO.	REV.
<b>AT-07-33</b>	
PROJECT NO.	<b>DA17003</b>



- UNLESS OTHERWISE SPECIFIED, ALL INNER SIDES OF THE CABINET, DRAWER, ACCESS PANEL, AND ANY LOOSE FURNITURE SHALL RECEIVE PLASTIC LAMINATE FINISH.
- THE COLOUR SHALL MATCH TO THE OUTER SURFACE, PROVIDED THAT THE OUTER SURFACE IS ALSO LAMINATE FINISH.
- THE CONTRACTOR SHALL SUBMIT COLOUR CHART AND MATERIAL SUBMISSION FOR THE ARCHITECT/CIC'S APPROVAL BEFORE PROCEED OF WORKS.

DESIGN AND BUILD BY CONTRACTOR



CONSTRUCTION  
INDUSTRY COUNCIL  
建造業議會




NOTES:

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TO FENCE OFF THE WORK SITE FROM AREA IN USE.
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INCLUDED IN THE CONTRACT.

REMARKS:

- TYPICAL DETAIL OF BAFFLE CEILING REFER TO DWG.  
NO. AT-08-07.

### LEGEND

 CL-02-01  
 CL-02-02  
 CL-02-03

## TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
 4TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
 TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dsal.com.hk](http://www.dsal.com.hk)

ND PATH S:\DATA7003 SEIC AT KKHU CHUNG CIG TRAINING CENTRE\1 - CHU/C  
-TENDER\MAIN CONTRACT\BIDDING\AT-07 FIT OUT DETAILS\AT-07-34-35 BAFFLE  
FALSE CEILING DETAILS.DWG

A3 @ 1:50

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
WAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

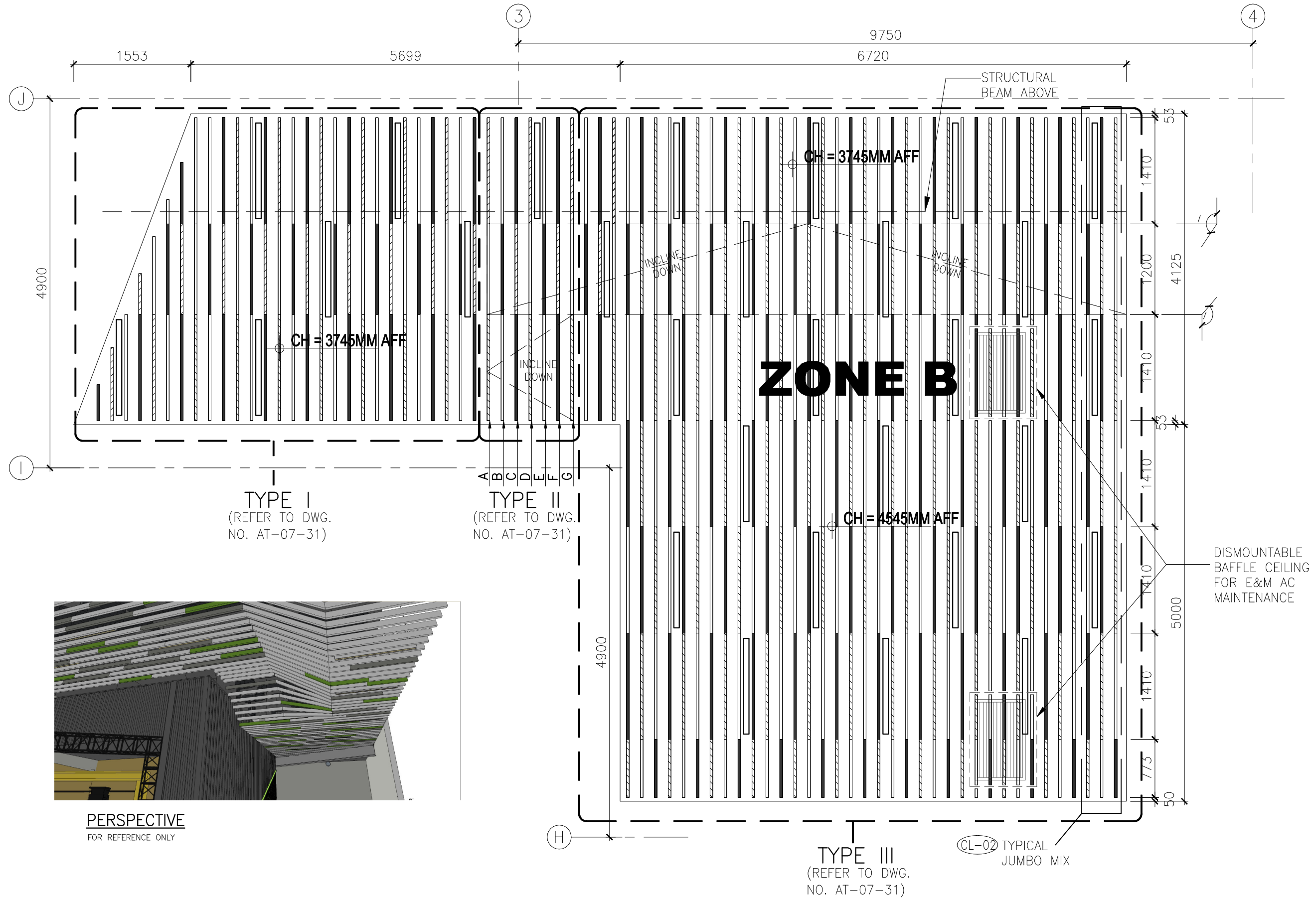
DRAWING TITLE

**REFLECTED CEILING PLAN OF  
AFFLE CEILING**

DRAWING NO.

AT-07-34

PROJECT NO.	DA17003
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REFLECTED CEILING PLAN OF ZONE B

1:50

DESIGN AND BUILD BY CONTRACTOR

\_\_\_\_\_

LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION  
WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED  
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ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE  
INCLUDED IN THE CONTRACT.

TYPICAL DETAIL OF BAFFLE CEILING REFER TO DWG.  
NO. AT-08-07.

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

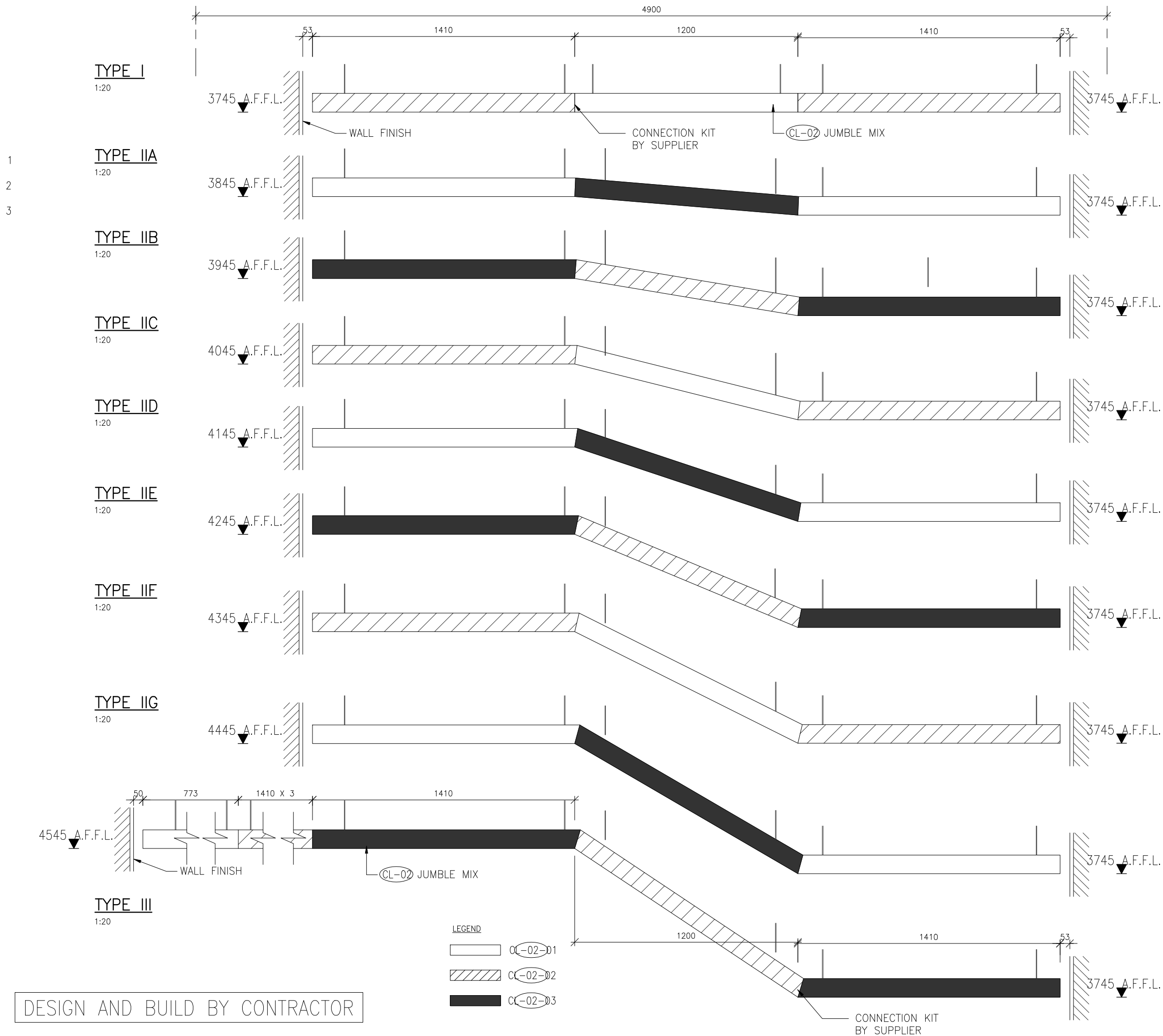
AD PATH

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SCALE **A3 @ 1:20**

### ELEVATION OF BAFFLE CEILING

DRAWING NO.	REV.
<b>AT-07-35</b>	
PROJECT NO.	<b>DA17003</b>

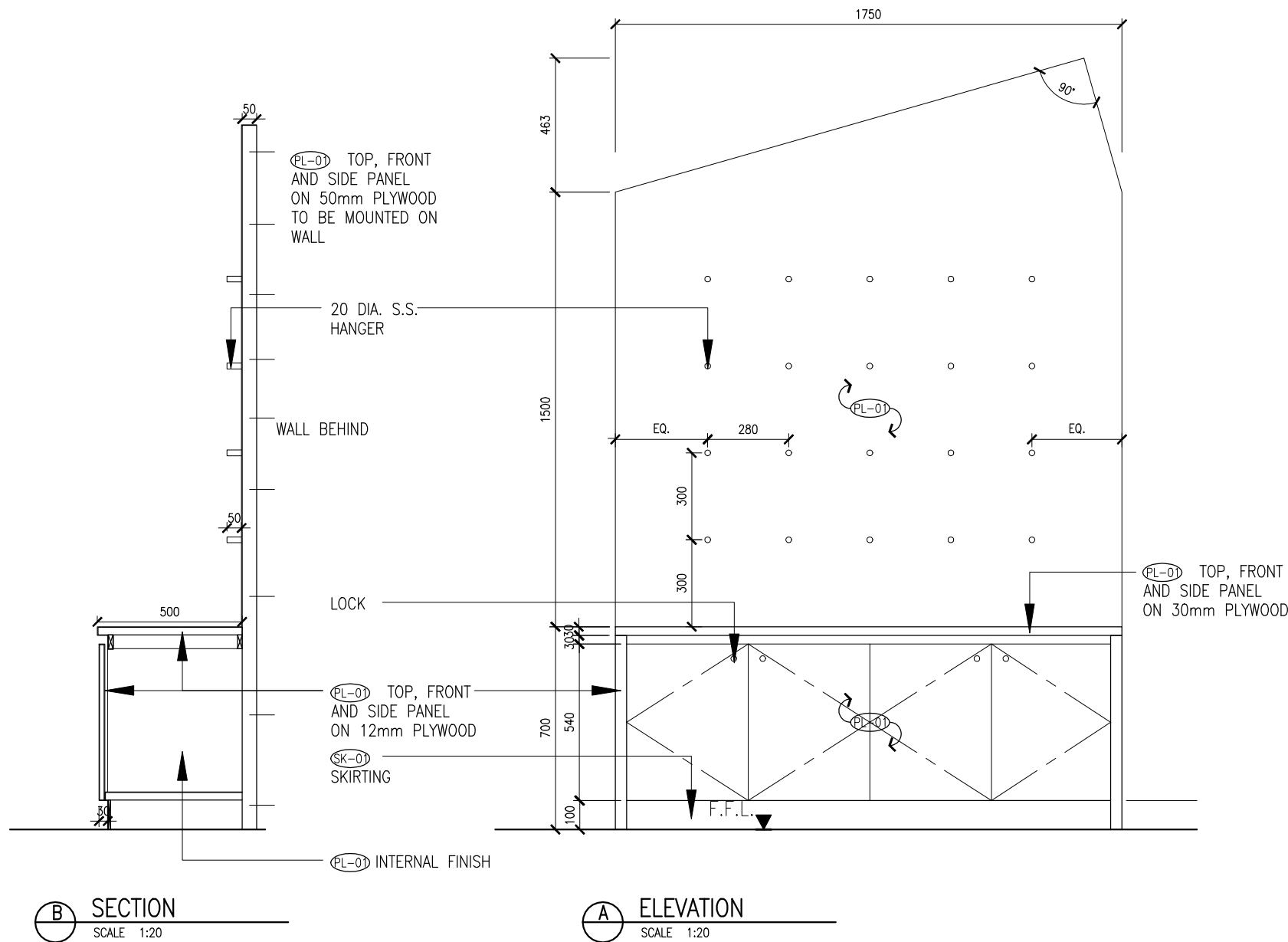




REV.	DATE & DESCRIPTION	DRN	CHK	APP
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NOTES:

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REMARKS

QUANTITY: 2 NOS

- UNLESS OTHERWISE SPECIFIED, ALL INNER SIDES OF THE CABINET, DRAWER, ACCESS PANEL, AND ANY LOOSE FURNITURE SHALL RECEIVE PLASTIC LAMINATE FINISH.
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DESIGN AND BUILD BY CONTRACTOR

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: PLANNING SITE OF KWA CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)  
DRAWING NO. AT-07-36

SCALE: A3 @ AS SHOWN

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

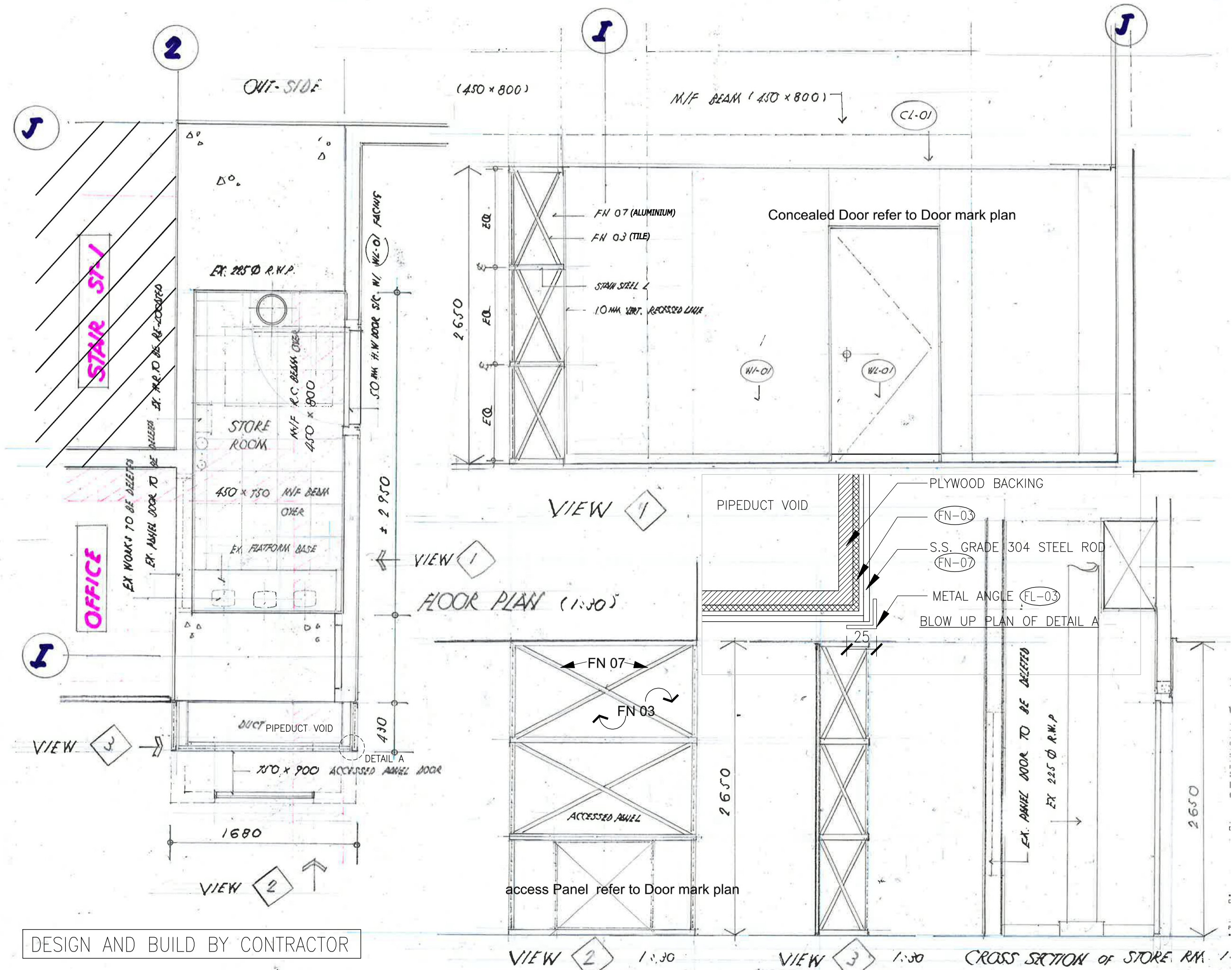
DISPLAY TOOL BOARD AT ZONE F

DRAWING NO.	REV.
AT-07-36	
PROJECT NO.	DA17003



**NOTES:**

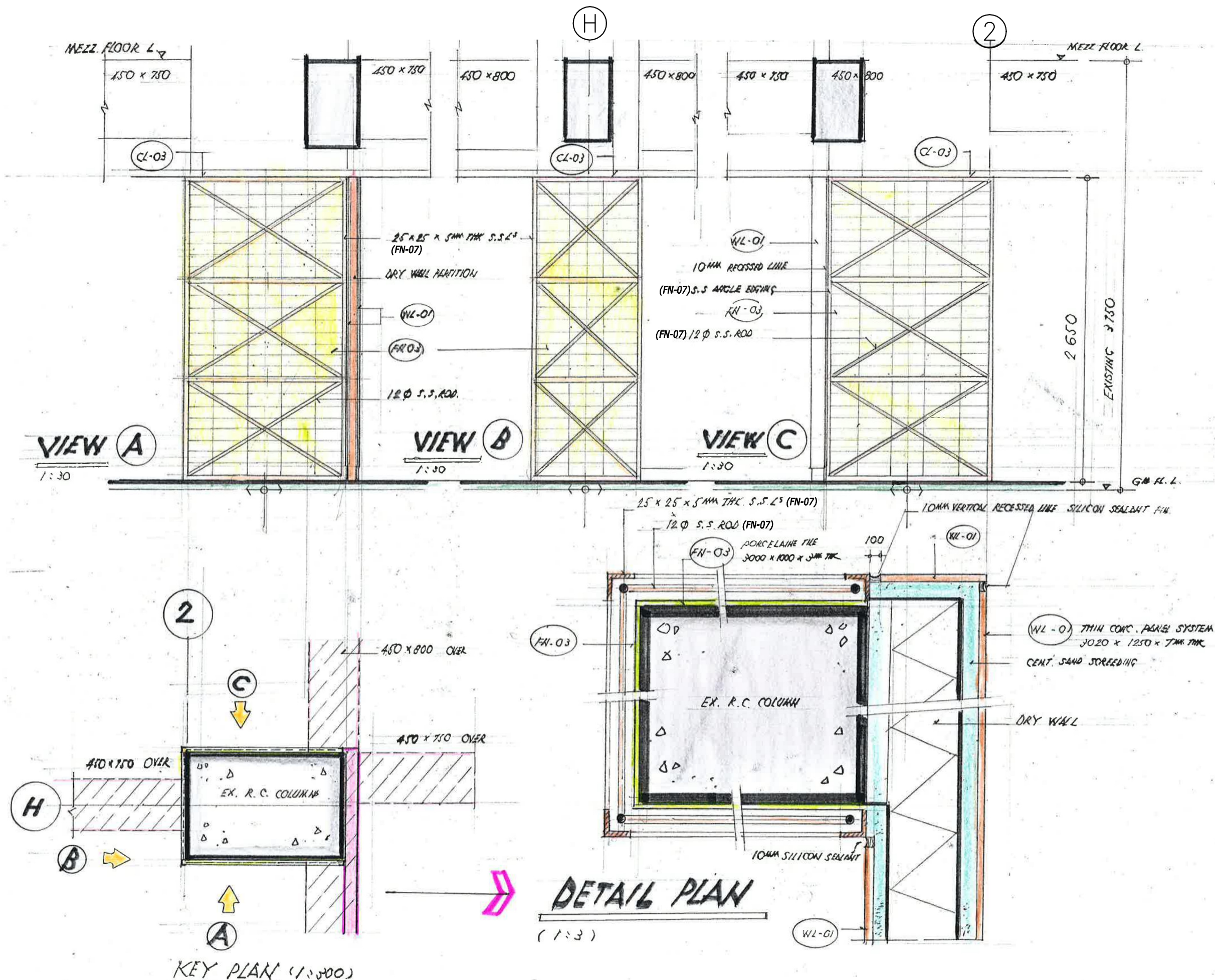
1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: QUANTITIES SET BY KIM CHANG CO. TRADING COMPANY - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/AT 100 000 000000-01-01 10 43  
FEATURE COLUMN AT BRIEFING AREA

SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE:  
**FEATURE COLUMN AT BRIEFING  
AREA 2**

DRAWING NO.	REV.
AT-07-42	
PROJECT NO.	DA17003



**NOTES:**

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2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

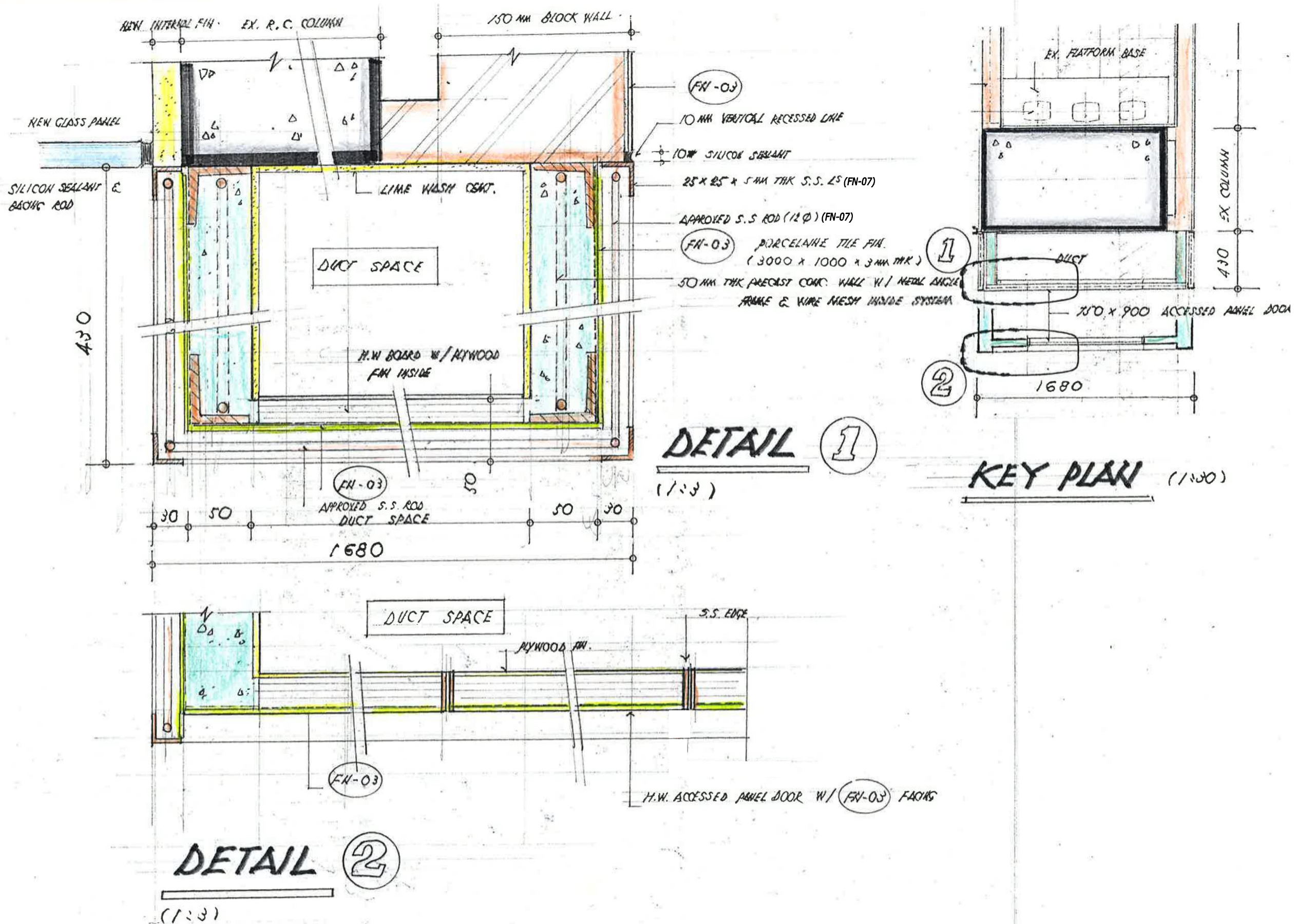
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk  
CAD PATH: QUANTITIES SET BY HON CHANG CHAI TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/AT 11/11/16 10:43  
FEATURE COLUMN AT BRIEFING AREA 3

SCALE **A3 @ AS SHOWN**

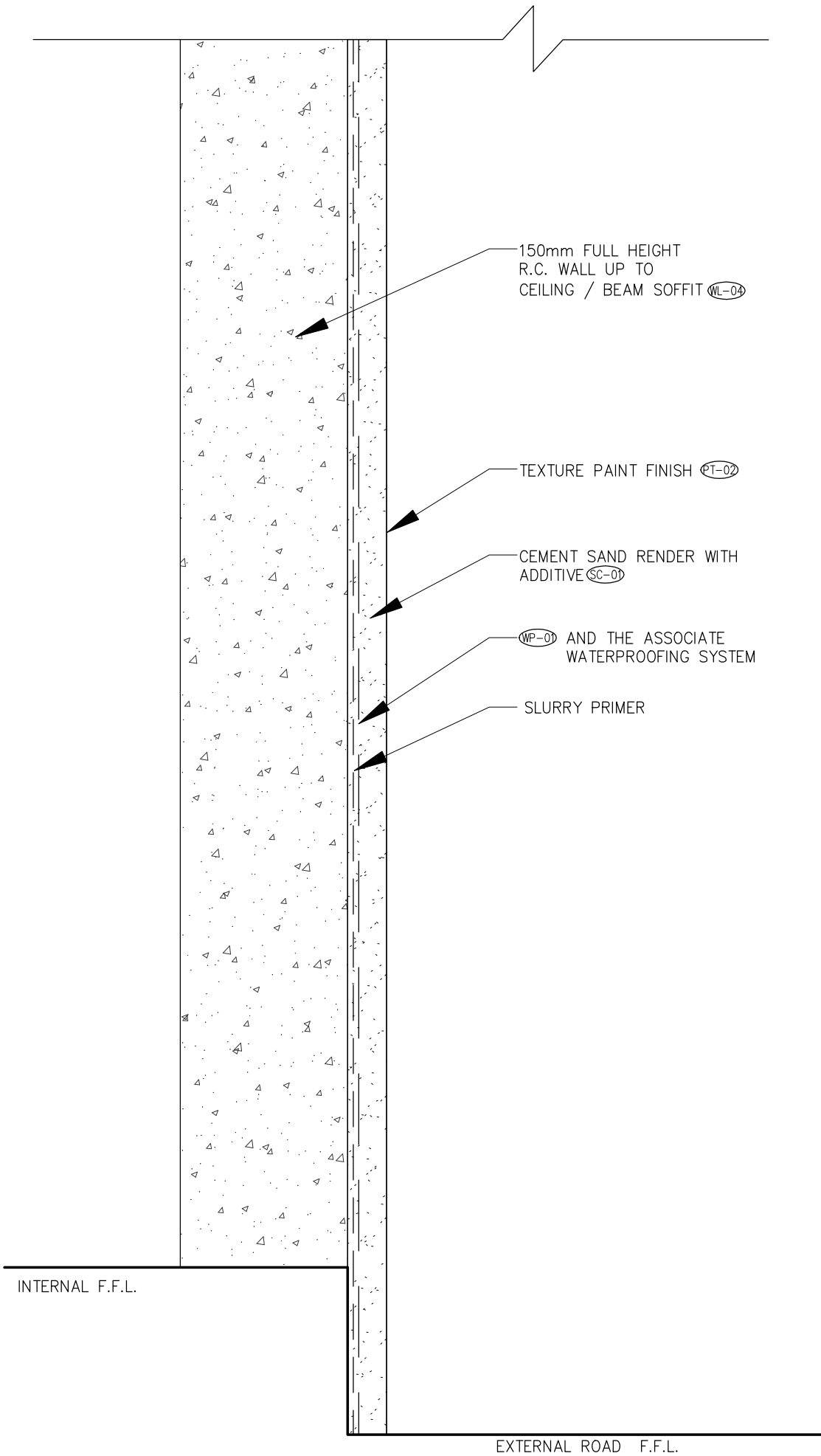
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**FEATURE COLUMN AT BRIEFING  
AREA 3**

DRAWING NO.	REV.
<b>AT-07-43</b>	
PROJECT NO.	<b>DA17003</b>



DESIGN AND BUILD BY CONTRACTOR



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
COPYRIGHT © 2016 DAVID S.K. AU & ASSOCIATES LTD.

CLIENT



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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#### NOTES:

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#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: S:\DRAWING SETS\AT\NEW DRAWING SETS\DRAWING SETS - CAD\AT-08-01\AT-08-01\WATERPROOFING DETAIL FOR EXTERNAL WALL.DWG

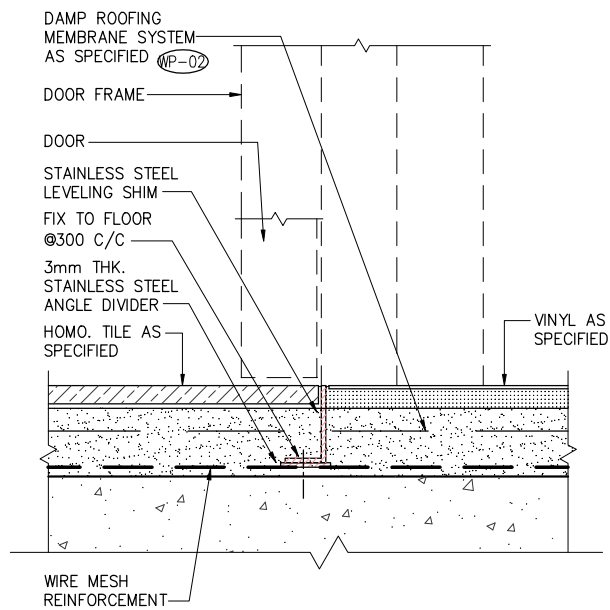
SCALE: A3 @ AS SHOWN

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**TYPICAL EXTERNAL WALL  
DETAIL WITH WATERPROOFING**

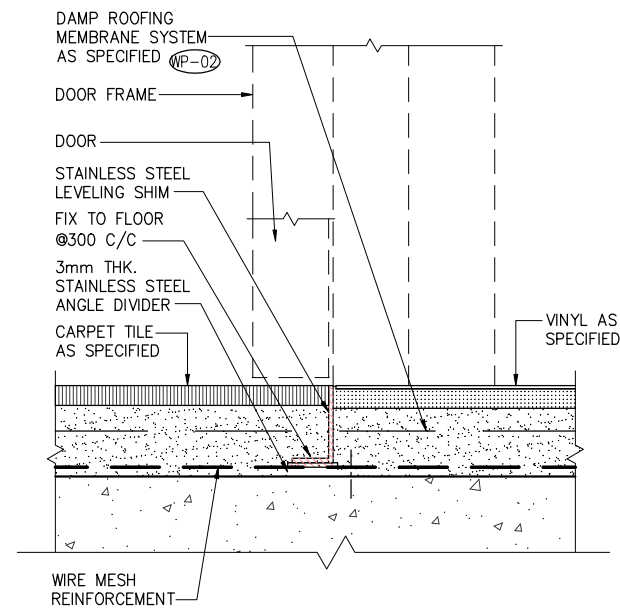
DRAWING NO. <b>AT-08-01</b>	REV.
PROJECT NO. <b>DA17003</b>	





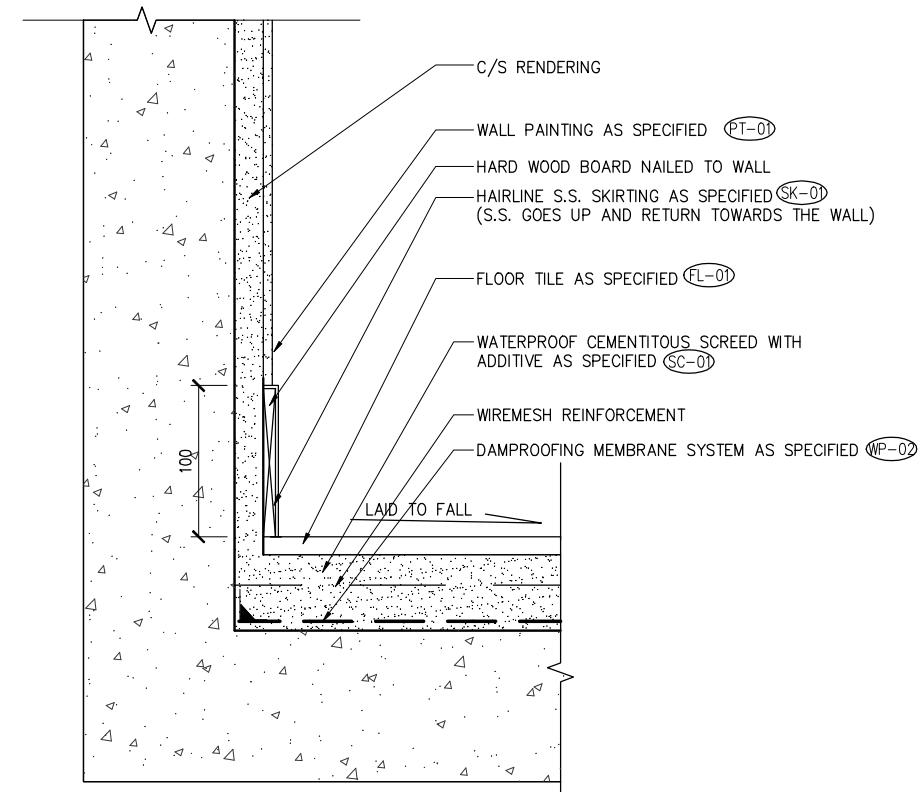
**C** TRANSITION - HOMO. TILE TO VINYL

SCALE 1:5 0 50 100



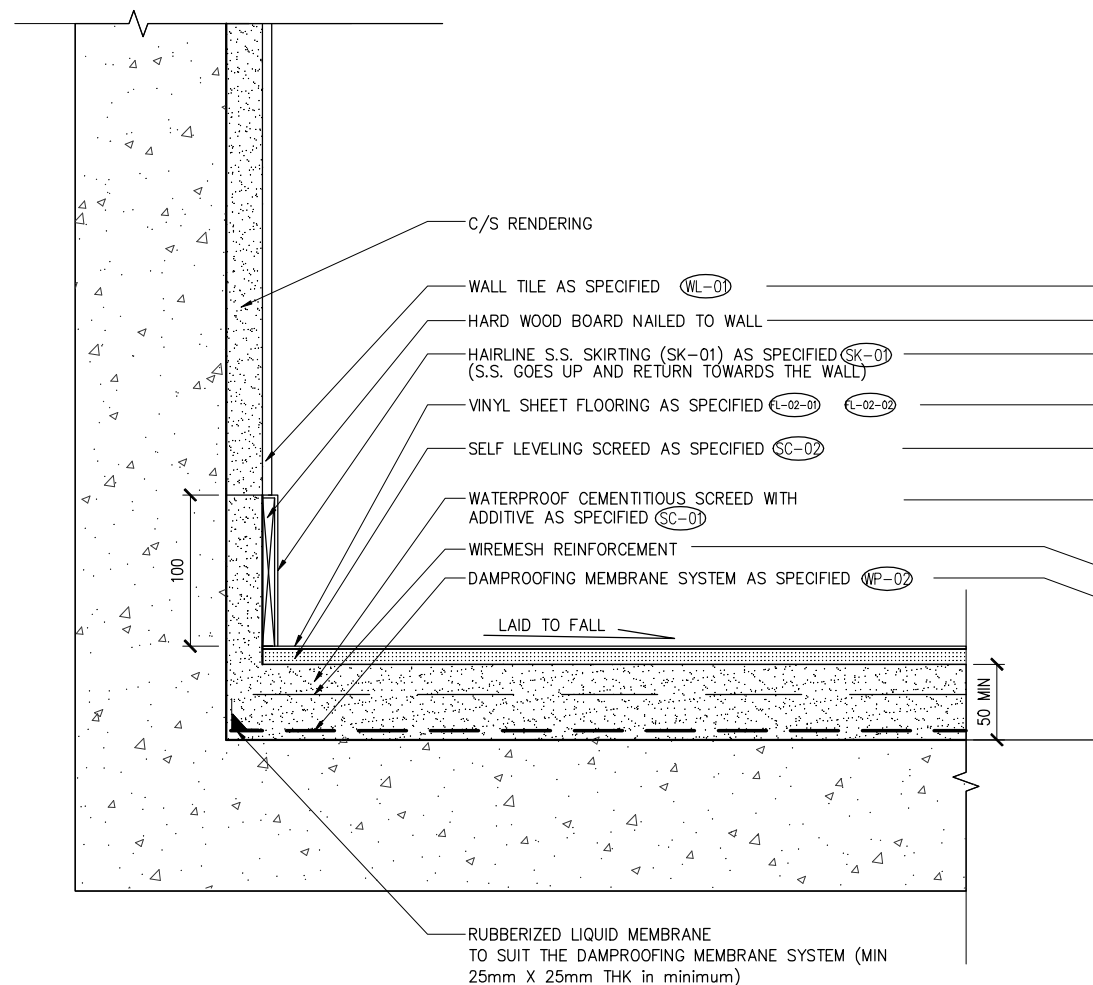
**D** TRANSITION - CARPET TO VINYL

SCALE 1:5 0 50 100



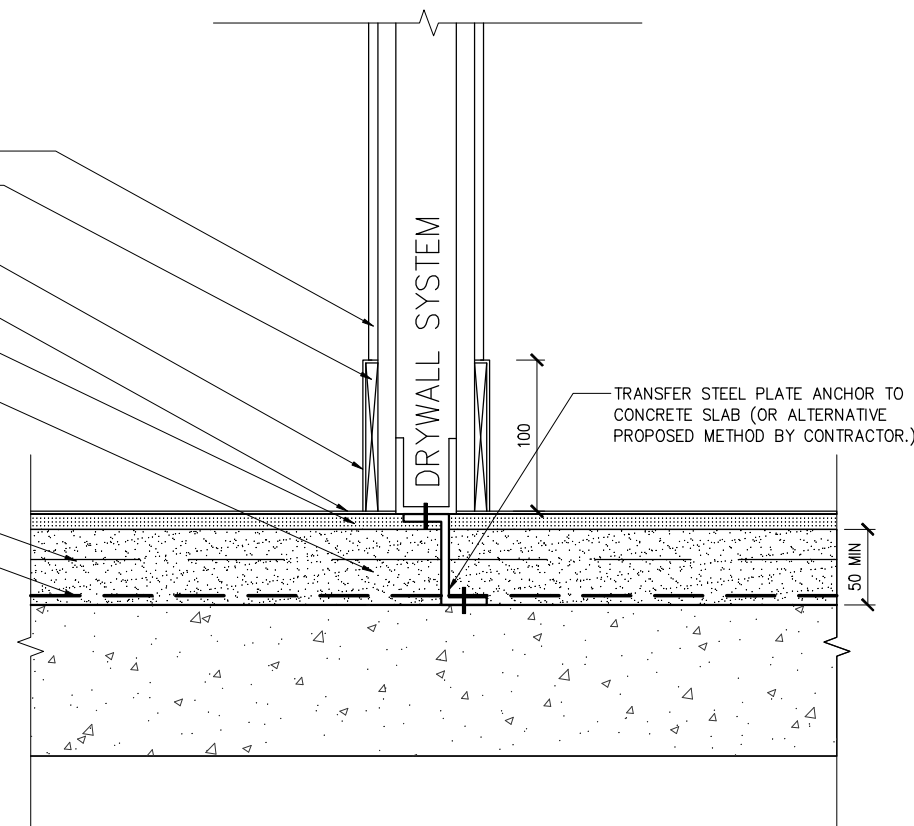
**C** TYPICAL FLOOR TO WALL DETAIL (FLOOR TILE TO WALL PAINTING)

SCALE 1:5 0 50 100



**A** TYPICAL FLOOR TO WALL DETAIL

SCALE 1:5 0 50 100



**B** TYPICAL FLOOR TO DRYWALL SYSTEM DETAIL

SCALE 1:5 0 50 100

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

#### NOTES:

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#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \DRAWINGS\SETC\AT\NEW\DAVID S.K. AU & ASSOCIATES LTD.\16-08-16\FLOOR DETAIL WITH WALL.DWG

SCALE **A3 @ AS SHOWN**

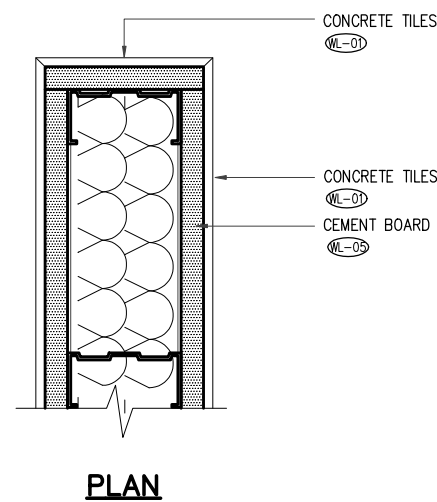
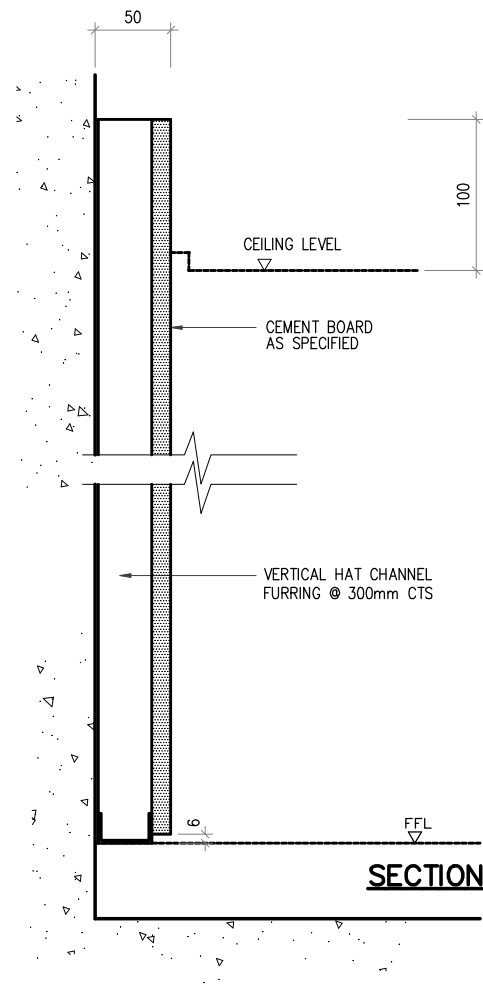
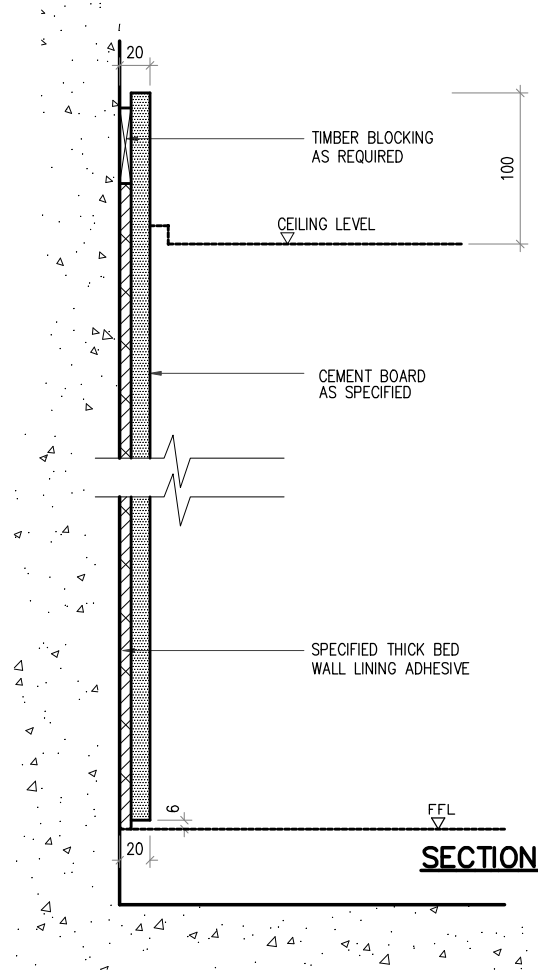
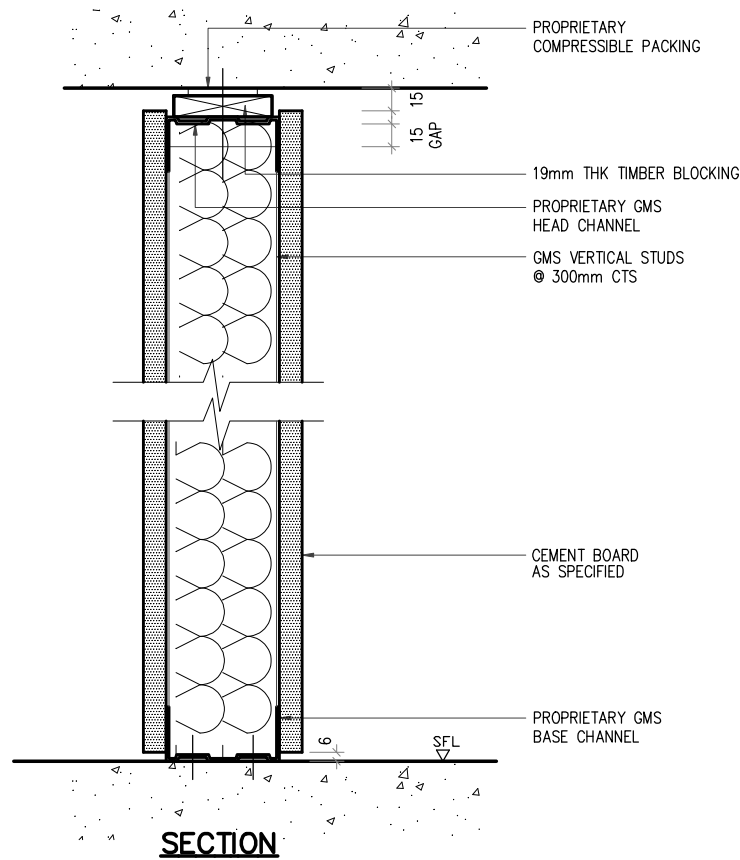
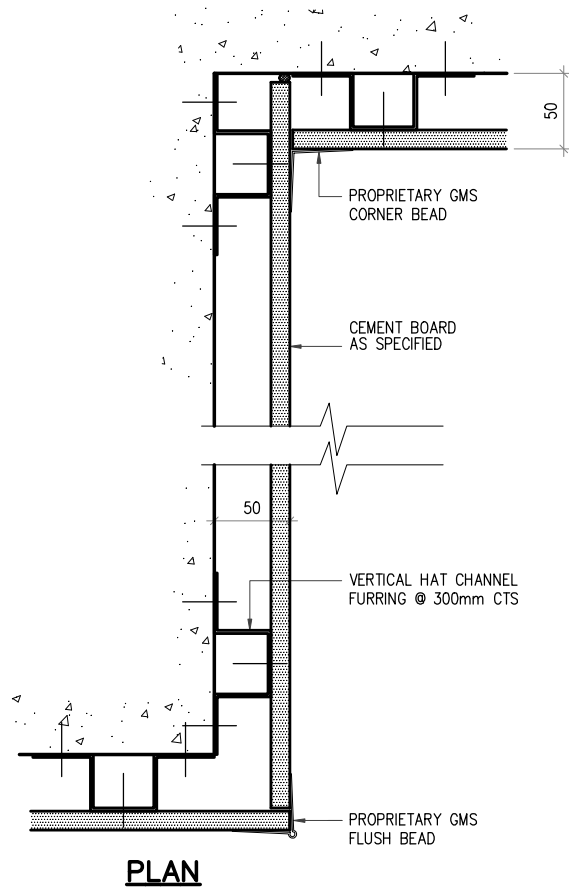
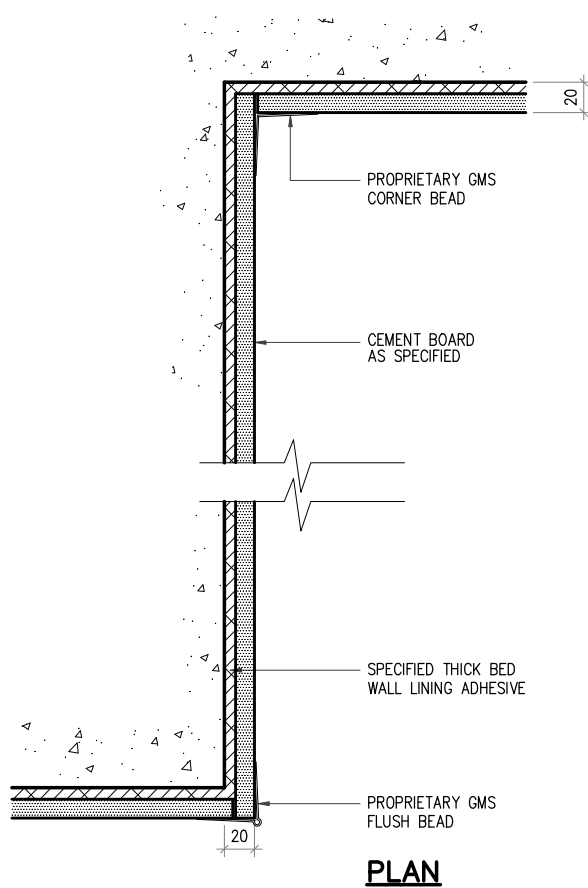
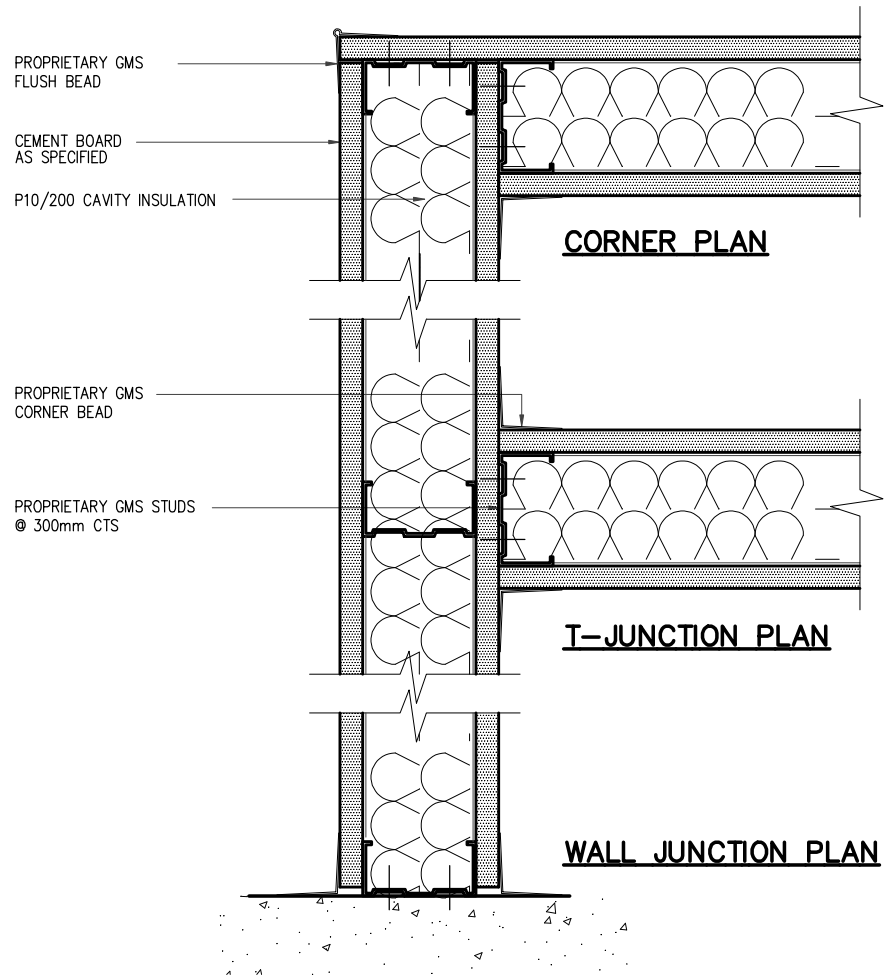
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**TYPICAL FLOOR AND WALL  
DETAIL**

DRAWING NO. <b>AT-08-02</b>	REV.
PROJECT NO. <b>DA17003</b>	

**NOTES:**

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**DETAIL OF DRYWALL WITH  
THIN CONCRETE PANEL WL-01**

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

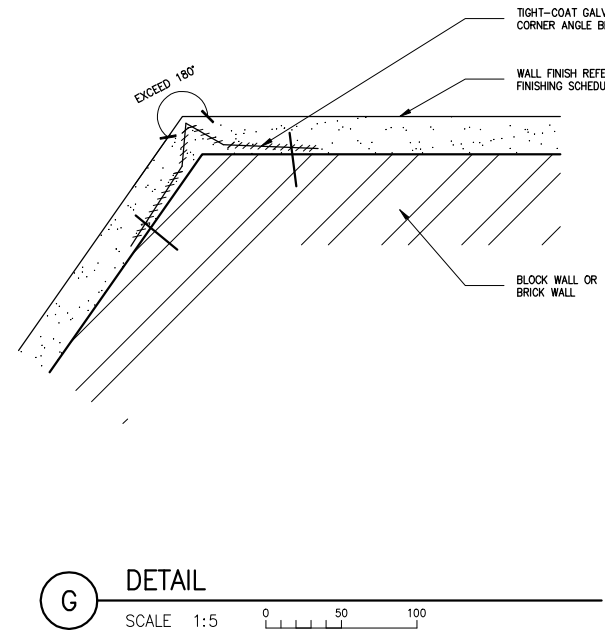
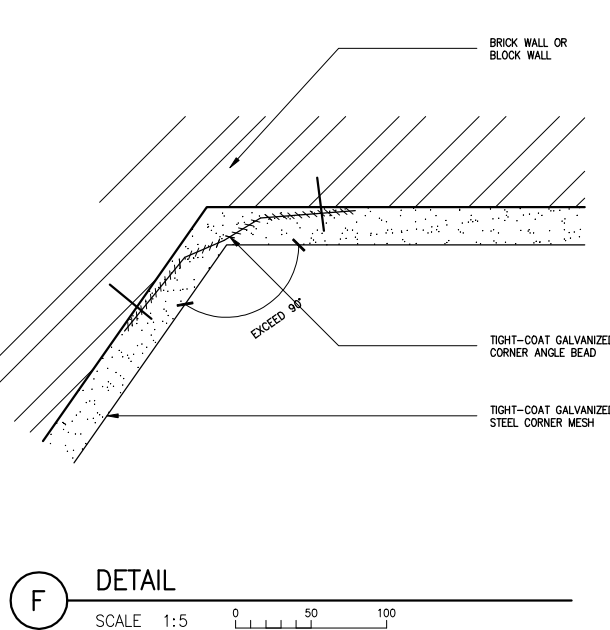
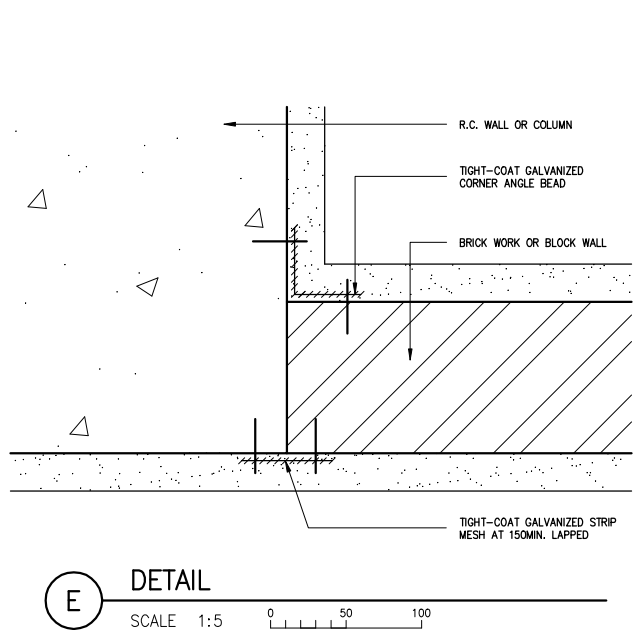
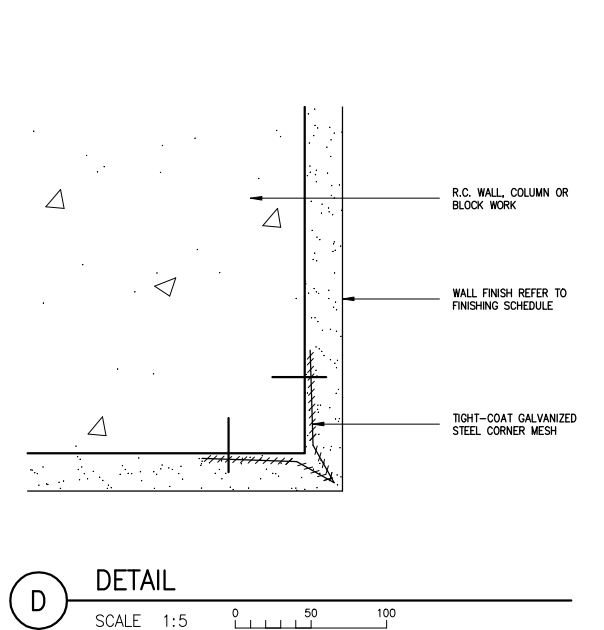
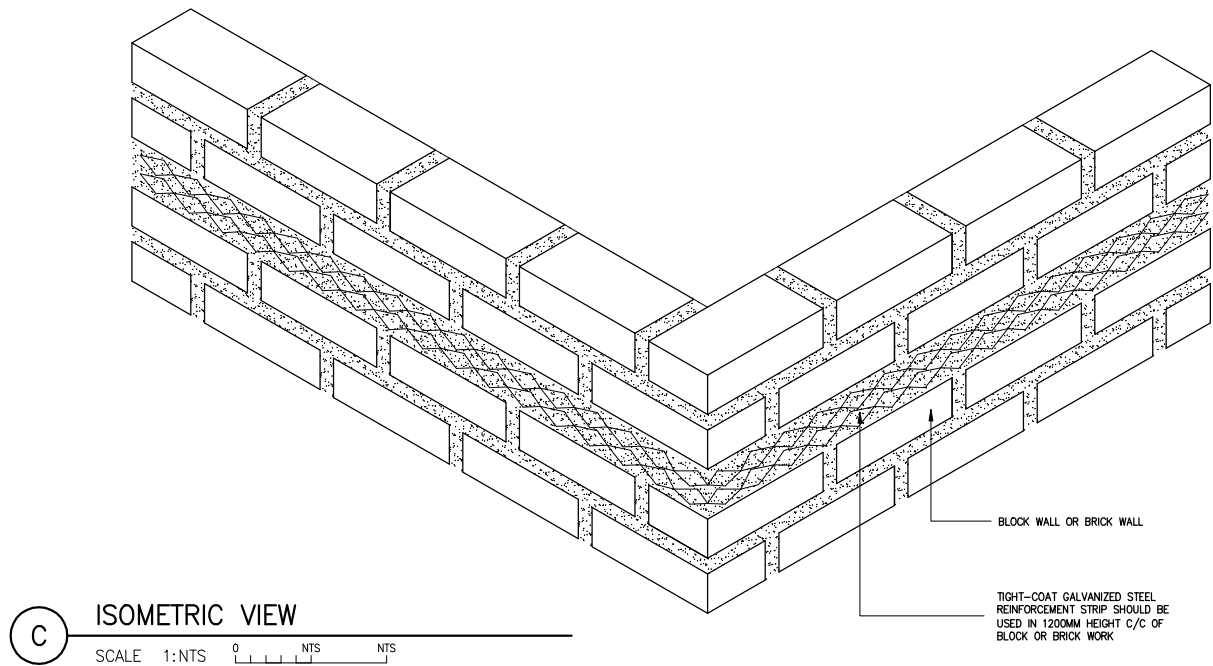
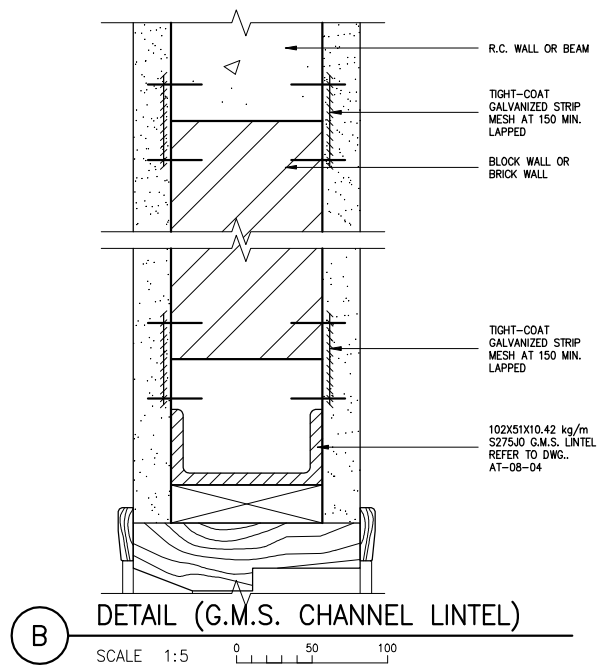
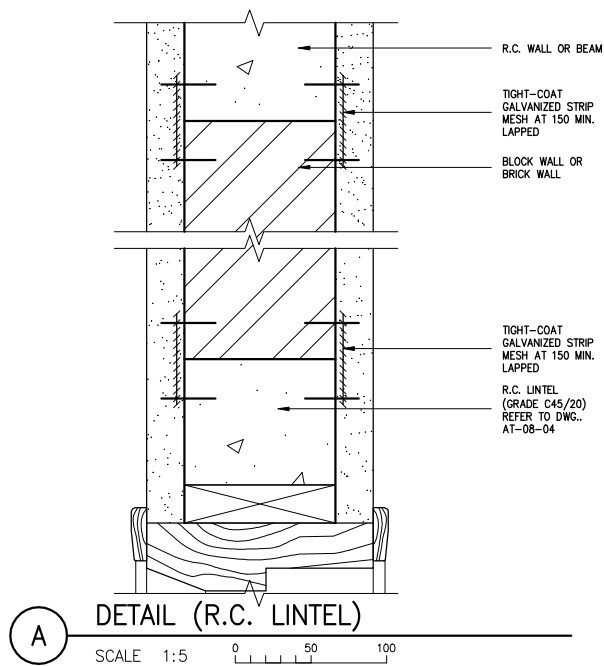
**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dadl.com.hk

CAD PATH: 15 LAYERS SET: 1/15 DRAWING NO: DA17003 - 01/01  
DETAIL: 01/01

SCALE: A3 @ 1:5

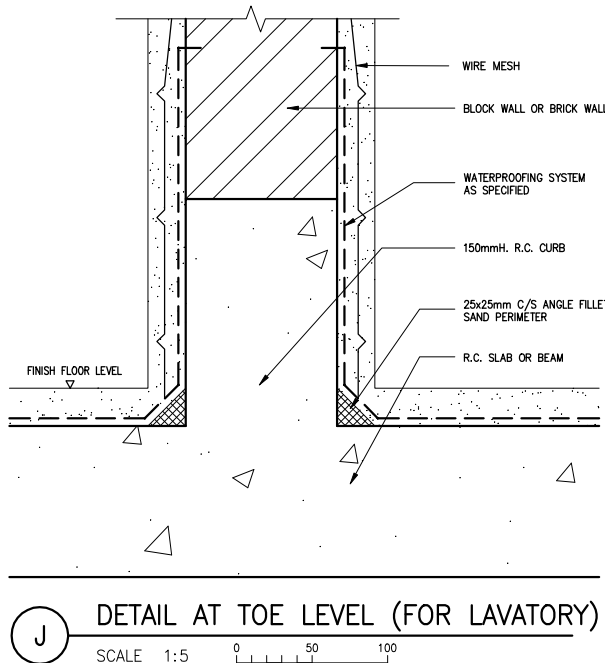
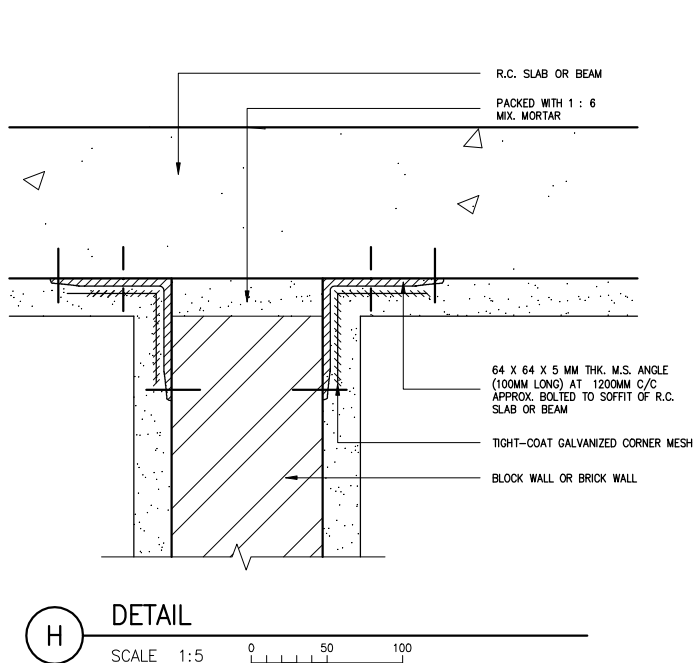
PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE:  
TYPICAL DRYWALL FIXING DETAIL



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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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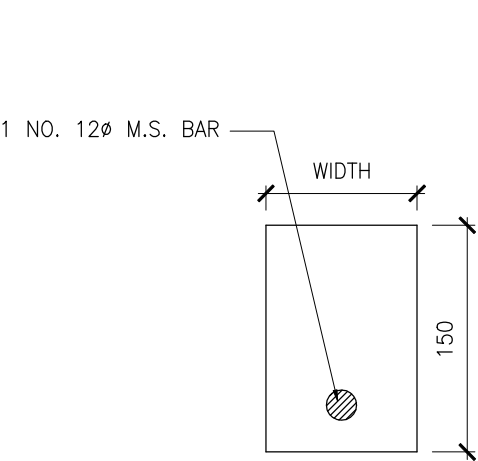
CAD PATH: QUANTIFIED SETS OF NEW CHINESE TRAINING COURSE - CIVIL ENGINEERING CONSTRUCTION DRAWING - CONCRETE BLOCK WALL DETAILS

SCALE **A3 @ 1:5**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

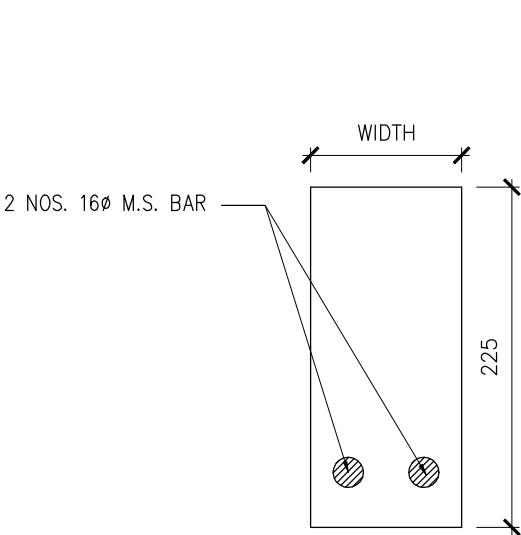
DRAWING TITLE  
**CONCRETE BLOCK WALL  
DETAILS 1 (Y-TONG)**

DRAWING NO. <b>AT-08-04</b>	REV.
PROJECT NO. <b>DA17003</b>	



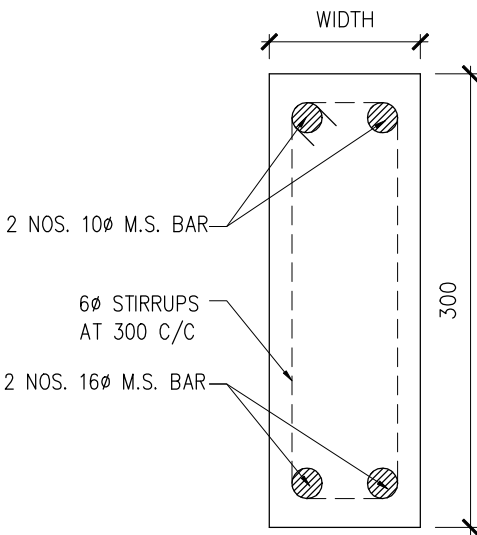
**A** R.C. LINTEL  
FOR SPAN UP TO 1000

SCALE 1:5 0 50 100



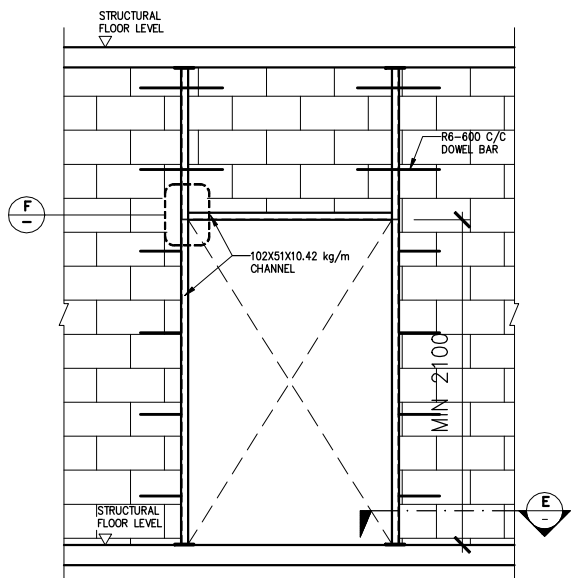
**B** R.C. LINTEL  
FOR SPAN BTW. 1000 TO 2000

SCALE 1:5 0 50 100



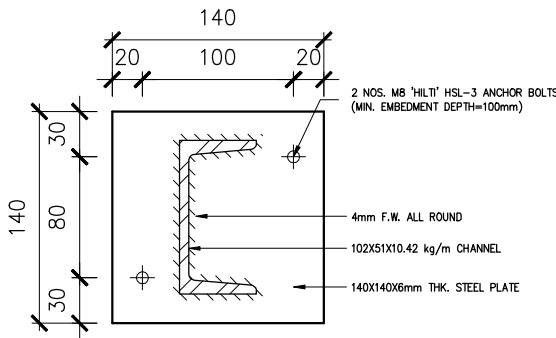
**C** R.C. LINTEL  
FOR SPAN BTW. 2000 TO 3000

SCALE 1:5 0 50 100



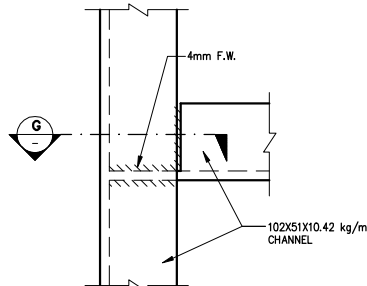
**D** CONCRETE BLOCK WALL W/ OPENING

SCALE 1:NTS 0 NTS NTS



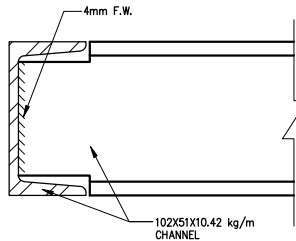
**E** SECTION E-E

SCALE 1:5 0 50 100



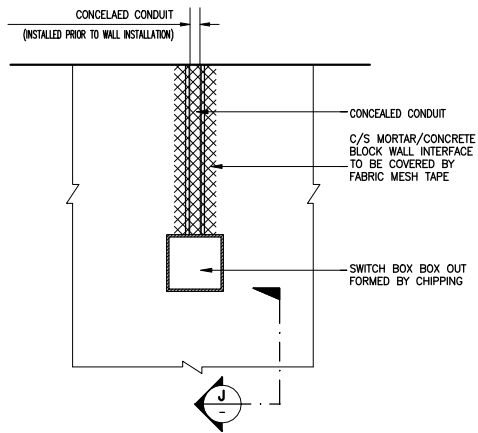
**F** DETAIL "2" (ELEVATION)

SCALE 1:5 0 50 100



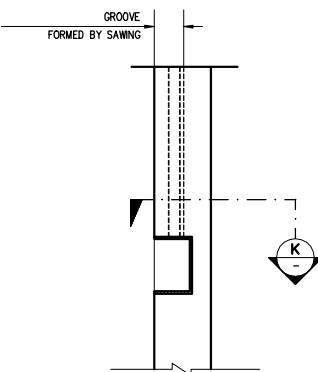
**G** SECTION G-G (PLAN)

SCALE 1:5 0 50 100



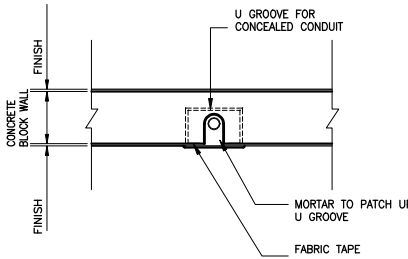
**H** INTERNAL WALL CONDUIT (ELEVATION)

SCALE 1:5 0 50 100



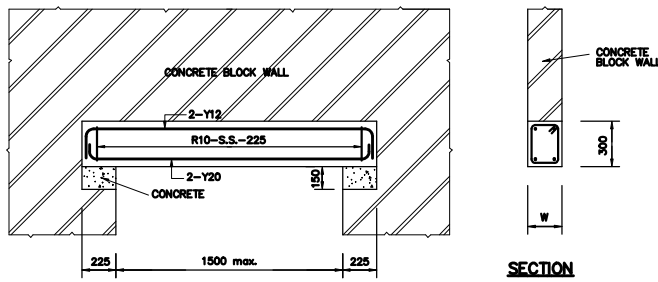
**J** INTERNAL WALL CONDUIT (ELEVATION)

SCALE 1:5 0 50 100



**K** INTERNAL WALL CONDUIT (PLAN)

SCALE 1:5 0 50 100



**L** TYPICAL DETAILS OF R.C. LINTEL

SCALE 1:NTS 0 50 100

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

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**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: QUANTITY SURVEYOR OF NEW CHINESE TRAINING CENTRE - CIVIL  
CONCRETE BLOCK WALL DETAILS (2)

SCALE **A3 @ 1:5**

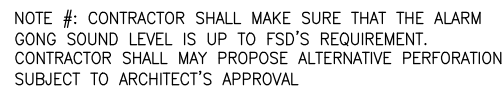
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**CONCRETE BLOCK WALL  
DETAILS 2 (Y-TONG)**

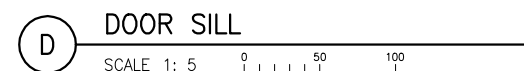
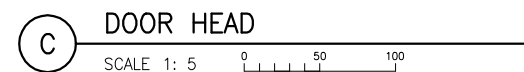
DRAWING NO.	REV.
<b>AT-08-05</b>	
PROJECT NO.	<b>DA17003</b>



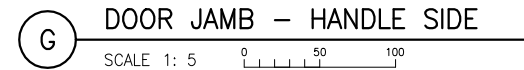
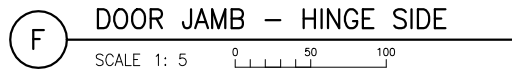
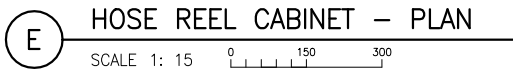
1. ALL STEEL WORKS MUST BE BONDED TO THE EARTHING TERMINAL AT THE DISTRIBUTION BOARD WITH COPPER CONDUCTOR NOT LESS THAN 6 sq.mm.



SCALE 1: SCALE 0 100 200



SCALE 1: 10



CLIENT



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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER



CAD PATH S:\DA17703 SETC AT KIN CHUNG CIC TRAINING CENTRE\1 - CIO\2  
-TENDER\MAIN CONTRACT\WORKING\AT-08 DETAILS\AT-08-06 HOSE REEL CABINET

SCALE **A3 @**

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

### HOSE REEL CABINET DETAILS

DRAWING NO.

**AT-08-06**

PROJECT NO. **DA17003**

•



- 1) CHECK THE SPLIT TYPE AC UNITS AS SPECIFIED IN THE E/M DRAWING, DESIGN THE AC RACKING TO SUIT THE E/M, STATUTORY AND STRUCTURAL REQUIREMENT, PREPARE SHOP DRAWINGS AND MATERIAL SUBMISSION FOR ARCHITECT'S APPROVAL.
- 2) PREPARE RELEVANT STRUCTURAL CALCULATION FOR ARCHITECT'S AND ENGINEER'S REVIEW.
- 3) PREPARE THE MINOR WORKS SUBMISSION TO BUILDINGS DEPARTMENT UNDER HIS OWN BEFORE CARRY OUT THE WORKS ON SITE AND REPORT COMPLETION TO BD.



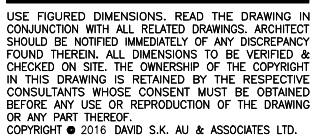
DESIGN AND BUILD BY CONTRACTOR

REV.

Unless otherwise specified, the proposed material for baffle ceiling system shall be the specification below or equivalent, further detail refer to particular specification.

The contractor shall install the metal baffle ceiling system to the area as indicated in the tender drawing. The baffle panels are cuboid in squared edges, in 100mm high and 25mm width, made of 1mm thickness of aluminum alloy with electrostatics powder coating in wood-look pattern, non-perforated. The baffle panels are suspended by the perforated L-angle main runners made by galvanized steel painted in black color with runner clamps. The runner should be directly fixed to the sub-frame (the details of the sub-frame should be proposed by the contractor according to the requirements of the KAP). The distance between each runner is about 1200-1500mm. The baffle panels are directly fix to the runner by screws, and the distance could be adjusted from difference center to center. All of the suspension units are made by galvanized steel. Installation of the ceiling system shall be in accordance with manufacturer's recommendation.

Brand	: Bradfon
Country of Origin	: Denmark (production line in China)
Pattern	: Non-Perforated
Material	: Aluminum Alloy
Baffle Size	: 100mm high, 25mm wide
Thickness	: 1.0mm
System	: Baffle Ceiling System
Coating	: Polyester PE Powder Coating
Pattern / Color	: Wood-Look Pattern (to be confirmed by the architect)
Moisture Resistance	: 100%
Fire Safety	: The suspended ceiling shall meet Class 1 Surface spread of Flame to BS 476: Part 7: 1997 and Fire Propagation Test to BS 476: Part 6: 1989. Class 0 as defined by Building Regulations.
Demounting Ability	: The ceiling tiles shall be fully demountable and should withstand frequent, and handling without deterioration.
Exclusive Distributor	: Vertex Building Materials Ltd. – Wade Luk (wadeluk@vertexbm.com / 2317 6612)



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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ASSOCIATES LTD.

15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dcaol.com.hk](http://www.dcaol.com.hk)

CAD PATH

SCALE **A3 @**

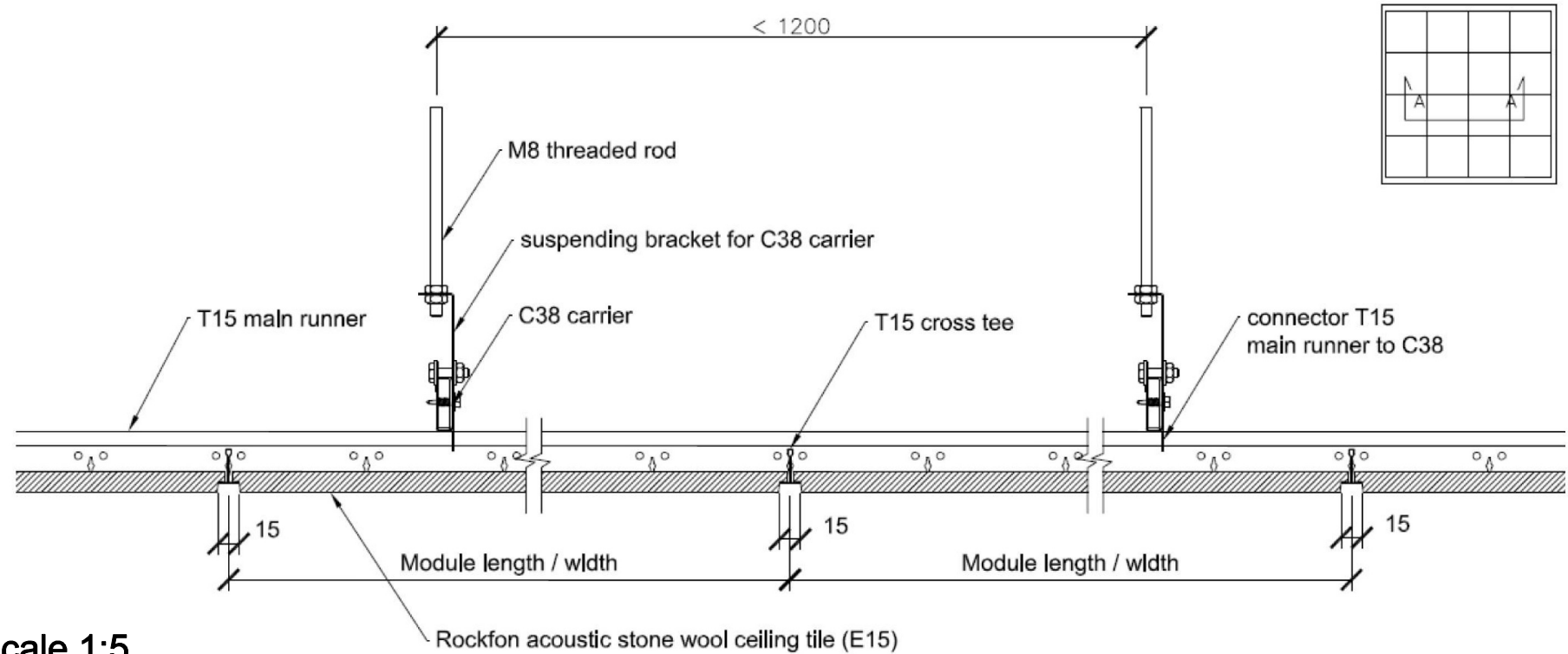
PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**FALSE CEILING DETAIL  
(BAFFLE CEILING)**

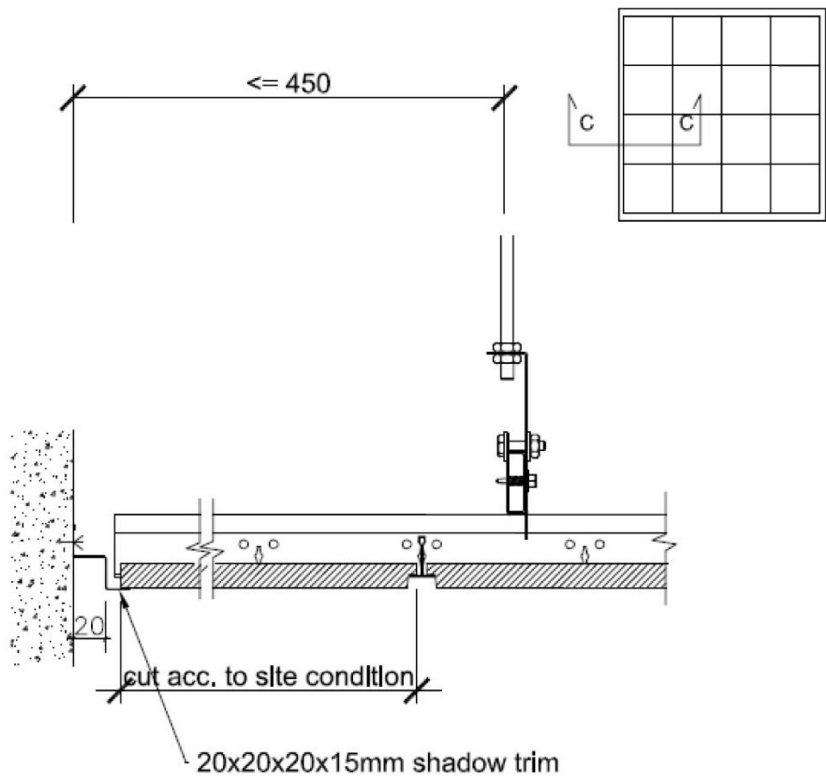
DRAWING NO. <b>AT-08-08</b>	REV.
PROJECT NO. <b>DA17003</b>	





Scale 1:5

Brand	Rockfon®		
Item	KORAL™ E15S8		
Description	Suspended Acoustic Rockwool Ceiling Tiles		
Raw Materials	Rockwool – 100% inorganic raw materials		
Origin	Poland		
Surface	Micro-textured white painted fleece surface		
Dimension	600x600mm	Thickness	15mm
Weight	Light weight 2.5 Kg/m²	Colour	Standard White
Edge	Tegular edge mounted with 15mm profiles		
Grid System	Rockfon Recessed Ceiling Grid System T15 A/E, all details in accordance with manufacturer instruction.		
Demounting Ability	All ceiling tiles shall be fully demountable.		



Scale 1:5

### Detail for CL-03 series -

Unless otherwise specified, the proposed material for suspended acoustic rockwool ceiling tile shall be the above specification or equivalent, further detail refer to particular specification.

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5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

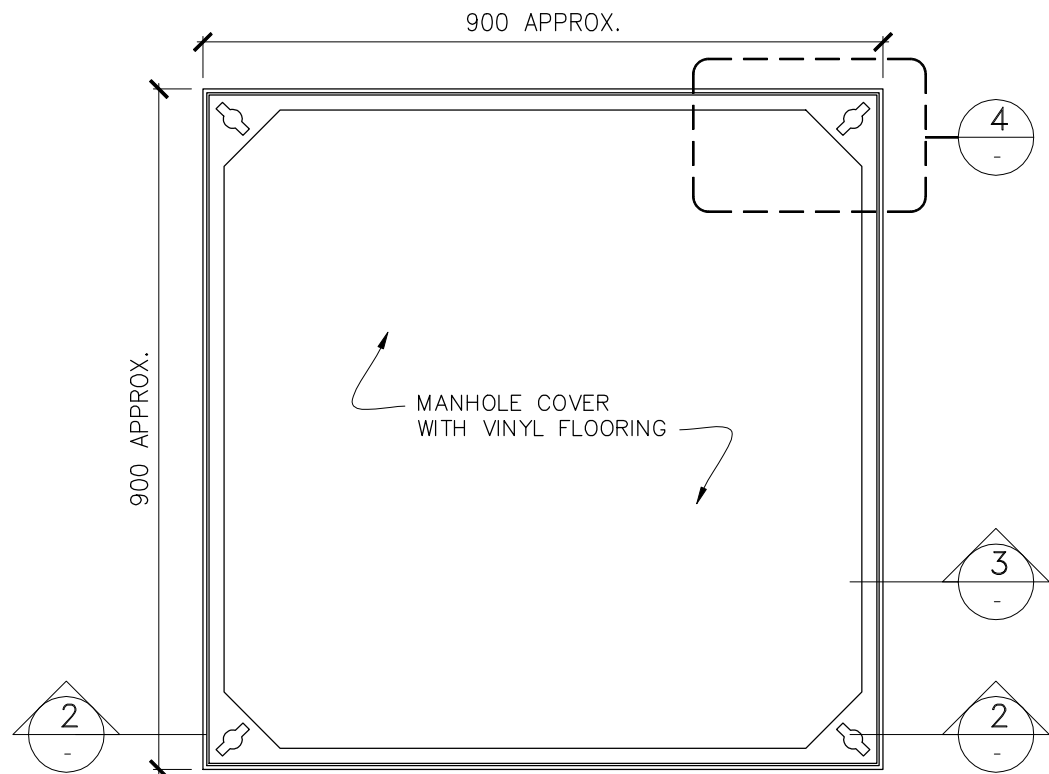
CAD PATH: QUANTITY SURVEYOR OF WORKS OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)  
SCALE: **A3 @**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**FALSE CEILING DETAIL  
(SUSPENDED ACOUSTIC  
ROCKWOOL CEILING TILE)**

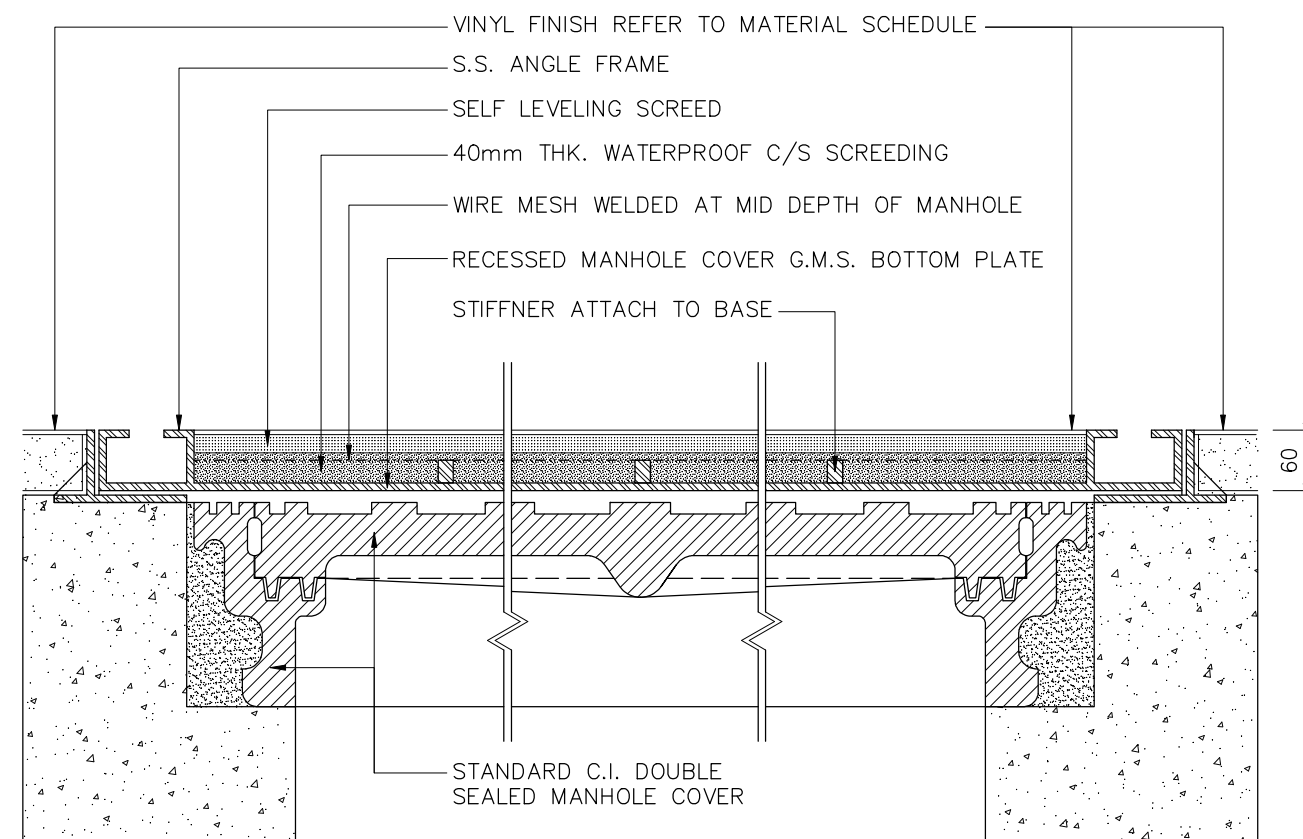
DRAWING NO.	REV.
<b>AT-08-09</b>	
PROJECT NO.	<b>DA17003</b>



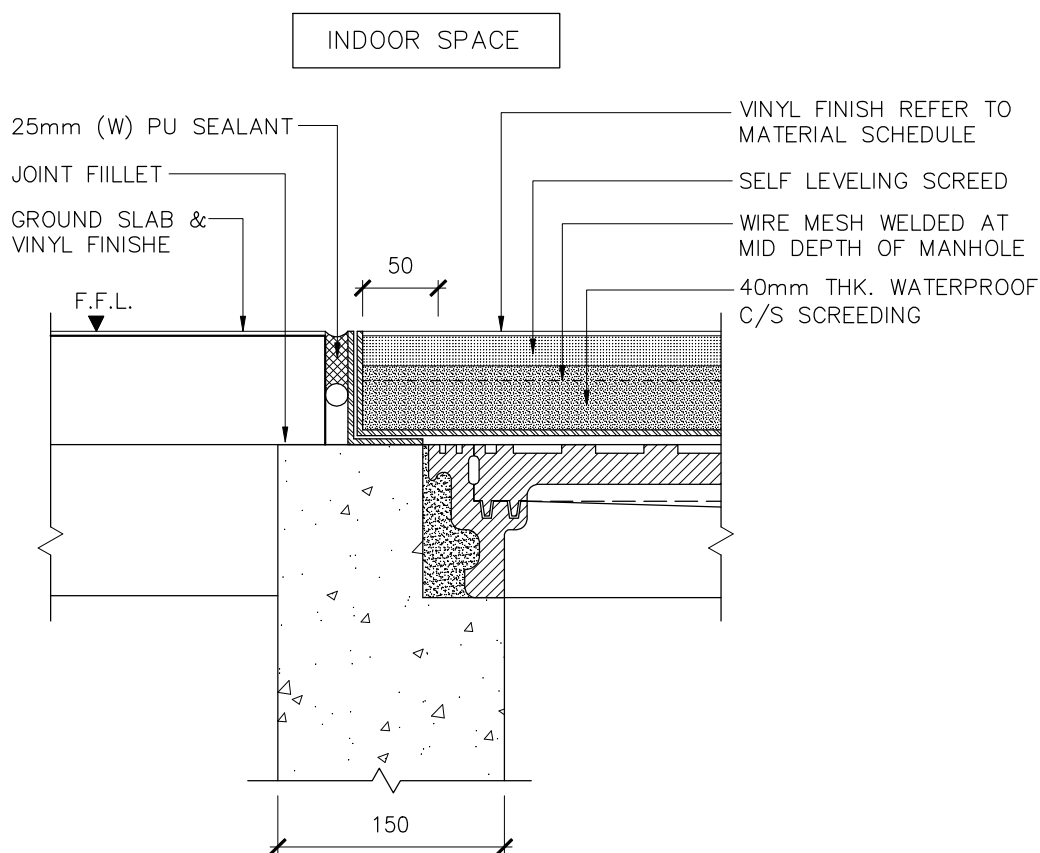


PLAN OF MANHOLE COVER  
(FOR INDOOR ONLY)

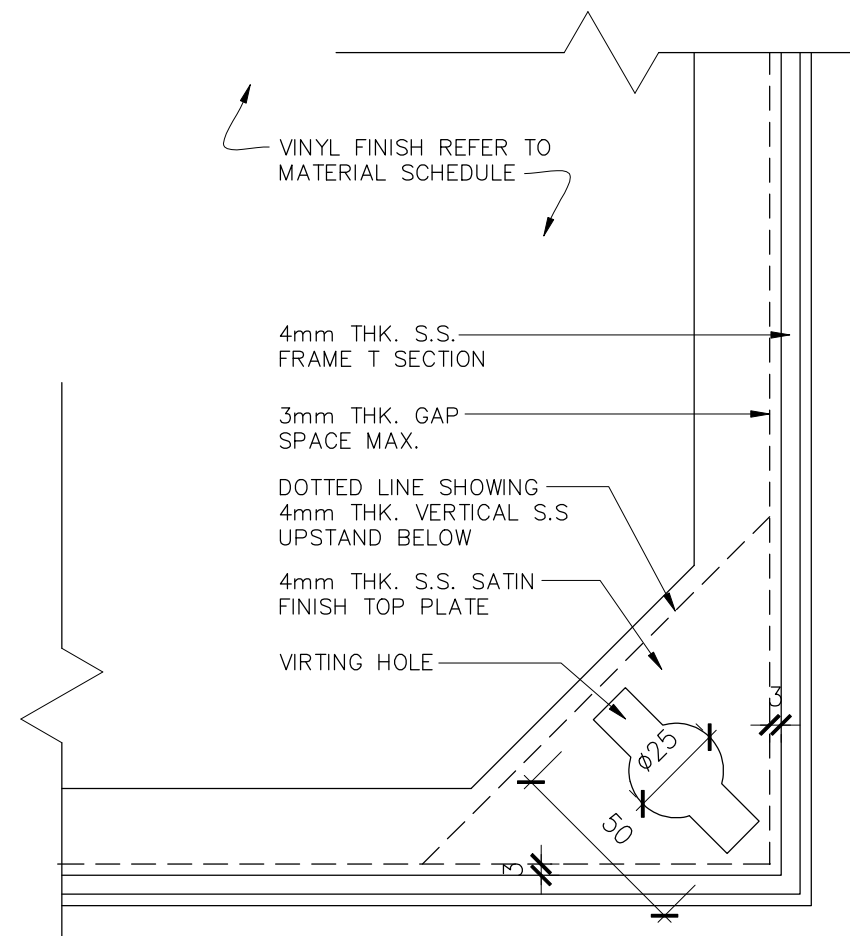
1  
-  
1 : 10



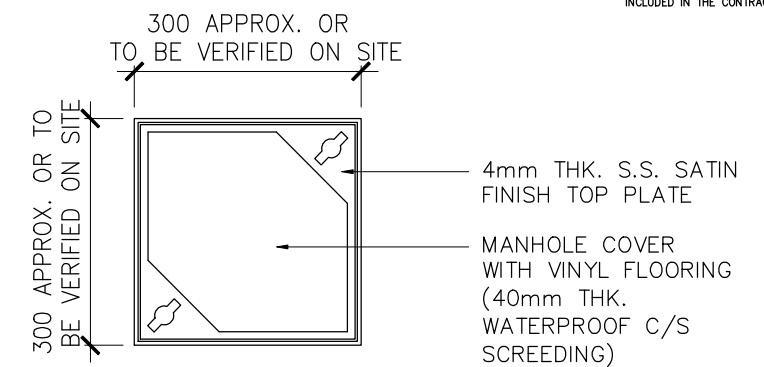
2 SECTION  
-  
1 : 5



3 SECTION  
-  
1 : 5



4 ENLARGE PLAN  
-  
1 : 2



S.S. COVER WITH VINYL FLOORING  
APPLY FOR ALL OTHER COVERING  
FOUND ON SITE OTHER THAN  
MANHOLE

SCALE 1:10

NOTE:  
THE CONTRACTOR SHALL CARRY OUT A DETAIL SITE  
SURVEY TO IDENTIFY ALL UTILITES, COVERING AND SETTING  
OUT.

USE FIGURED DIMENSIONS. READ THE DRAWING IN  
CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT  
SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY  
FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED &  
CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT  
IN THIS DRAWING IS RETAINED BY THE RESPECTIVE  
CONSULTANTS WHOSE CONSENT MUST BE OBTAINED  
BEFORE ANY USE OR REPRODUCTION OF THE DRAWING  
OR ANY PART THEREOF.  
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CLIENT



REV. DATE & DESCRIPTION DRN CHK APP

#### NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

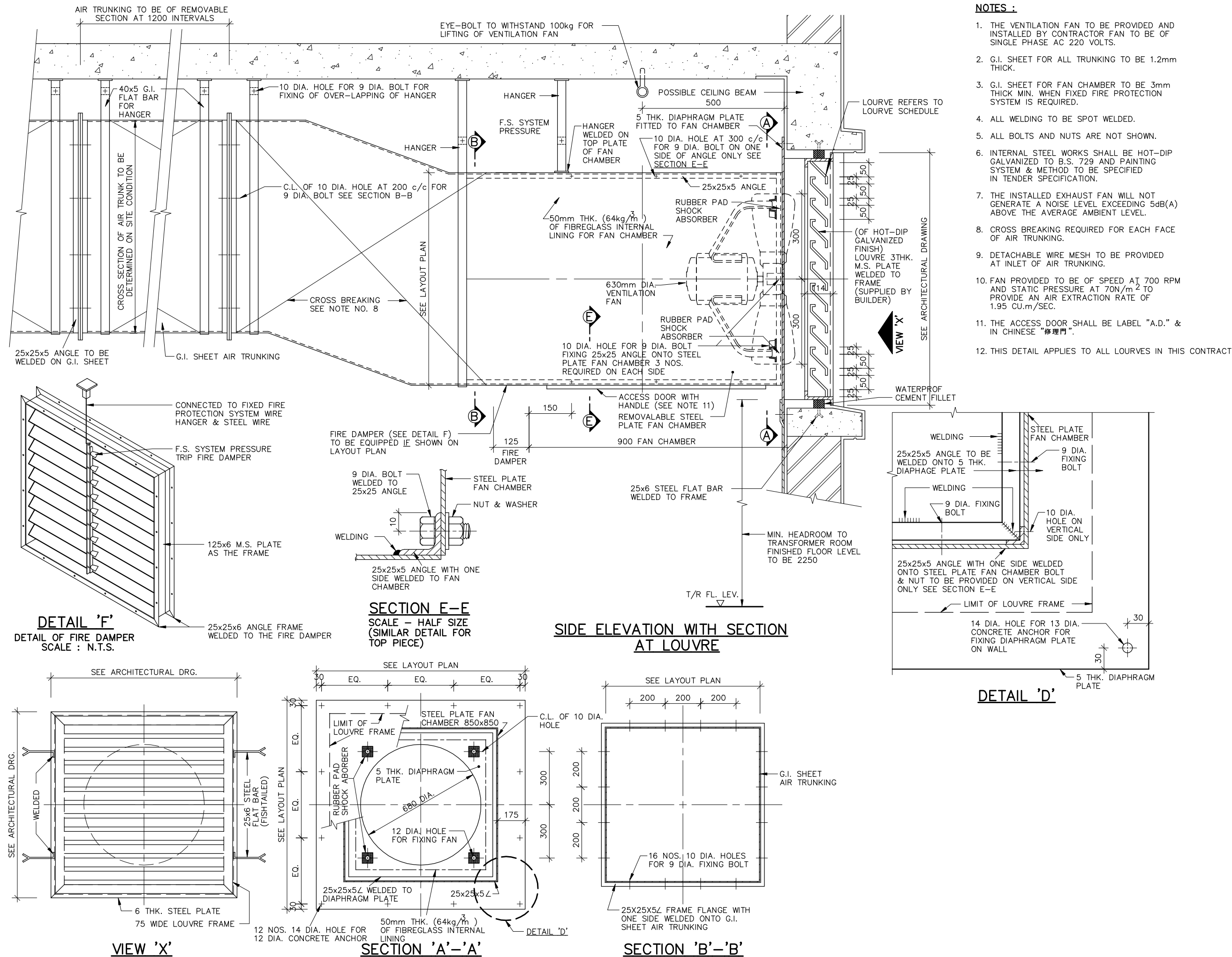
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: PLANNING DEPT. OF NEW CHINA SEC. TRAINING CENTRE - CIVIL  
SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
INDOOR MANHOLE MATCHING  
COVER DETAIL

DRAWING NO. AT-08-10  
PROJECT NO. DA17003  
REV.



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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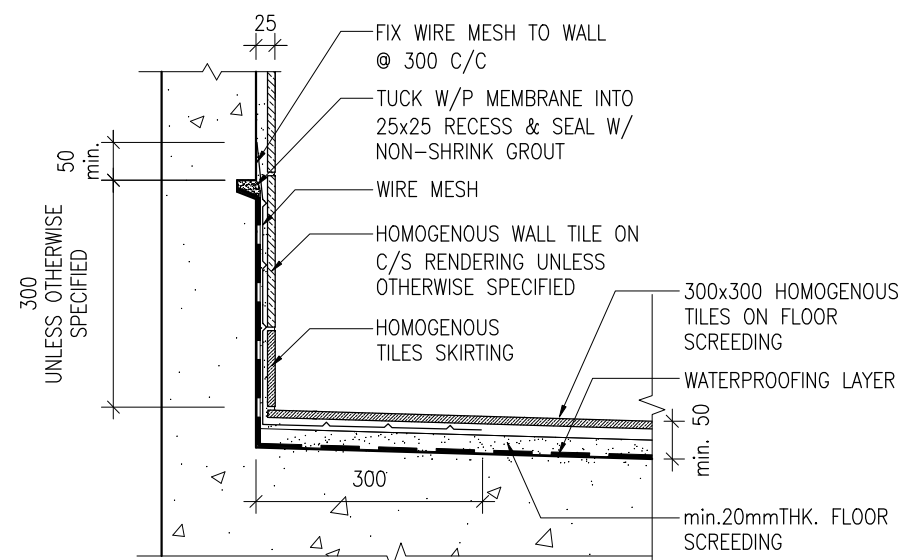
REV. DATE & DESCRIPTION DRN CHK APP

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

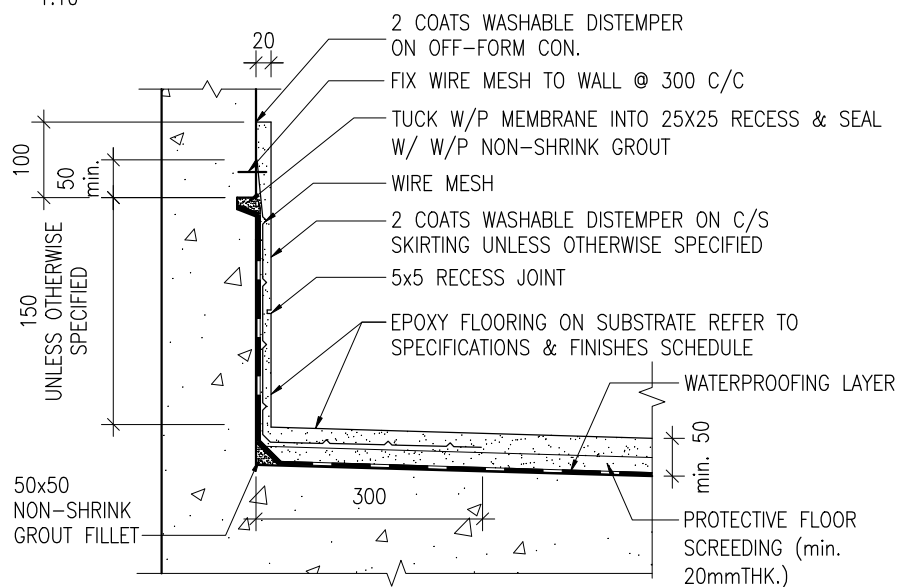
**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: PLANT/PROJECT/WORKING/01-02-03/04-05-06-07-08-09-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1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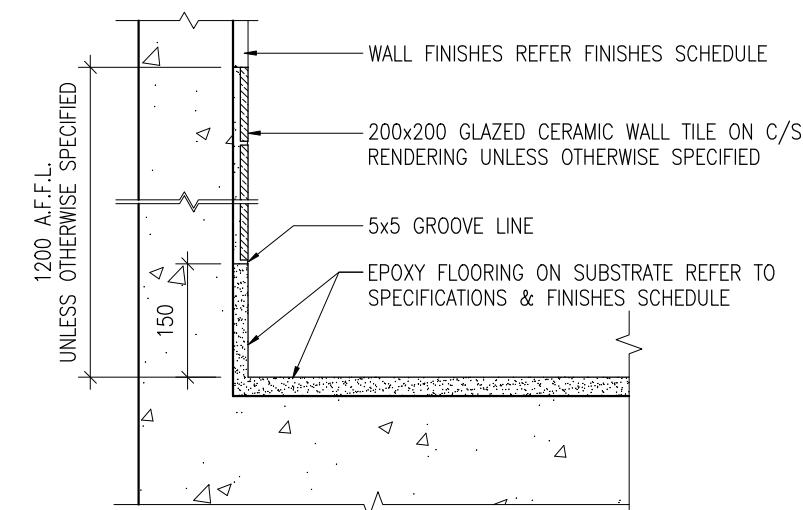
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ON SLAB W/ STRUCTURAL FALL

1:10



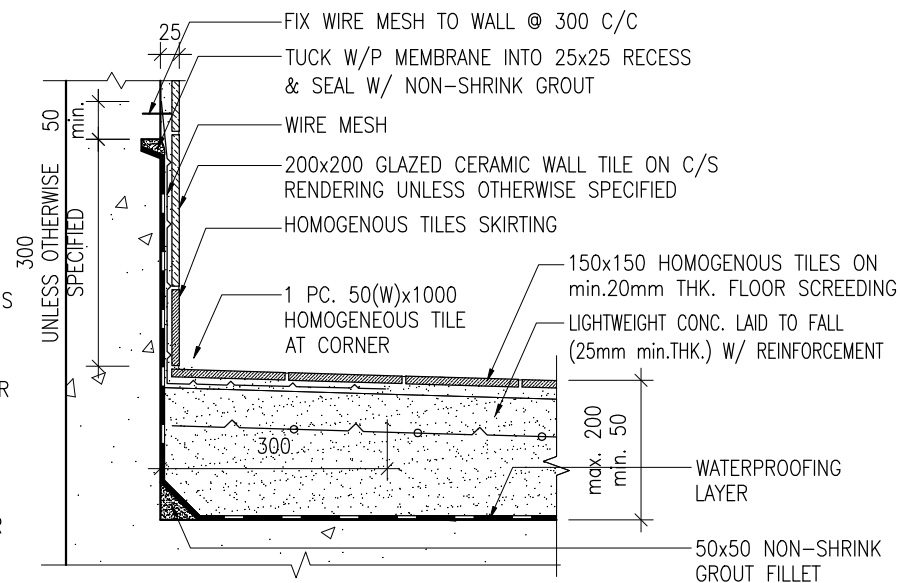
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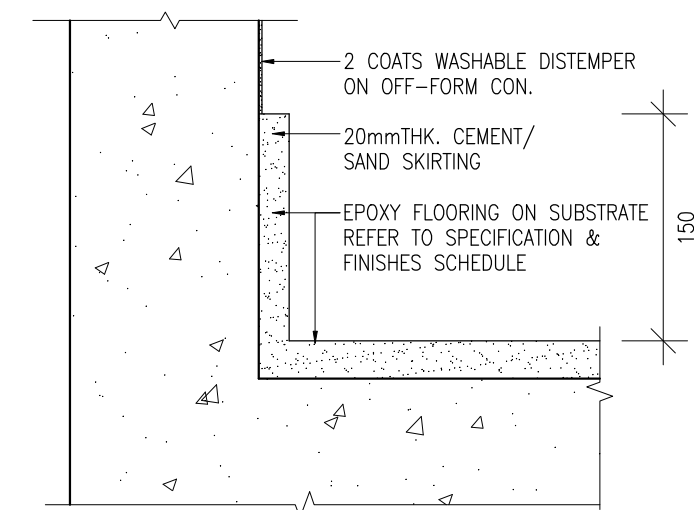
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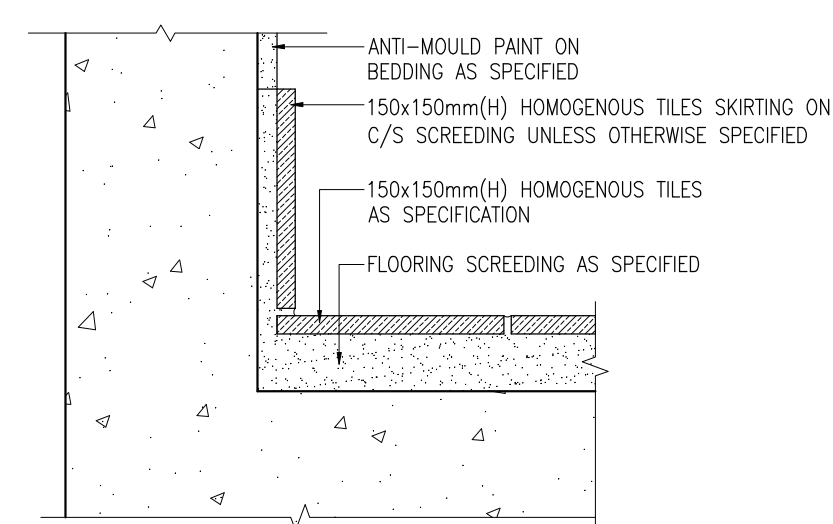
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W/ LIGHTWEIGHT CONC. BASE

1:10



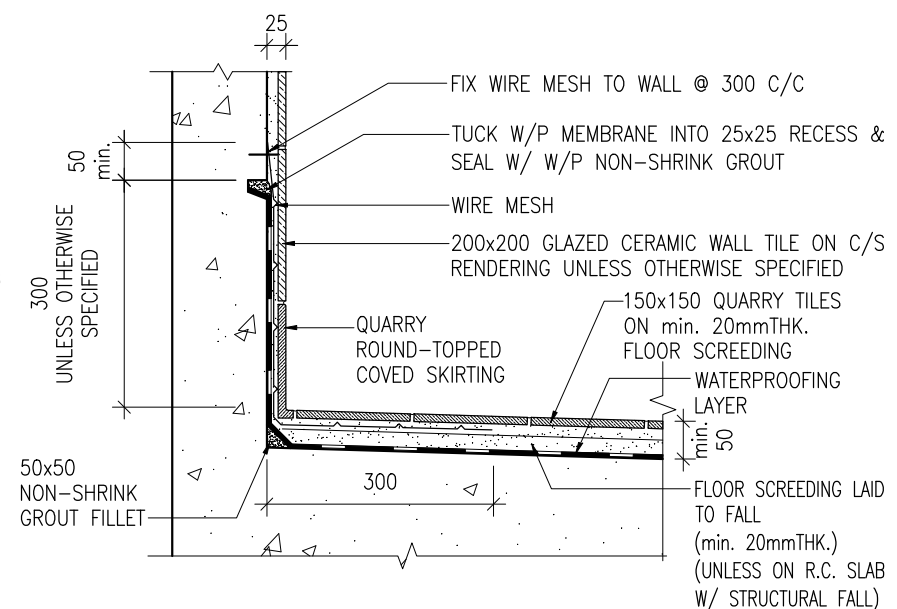
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1:5



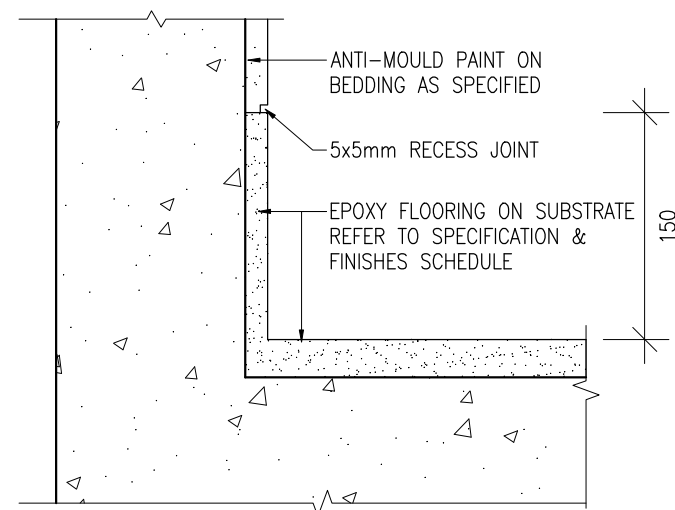
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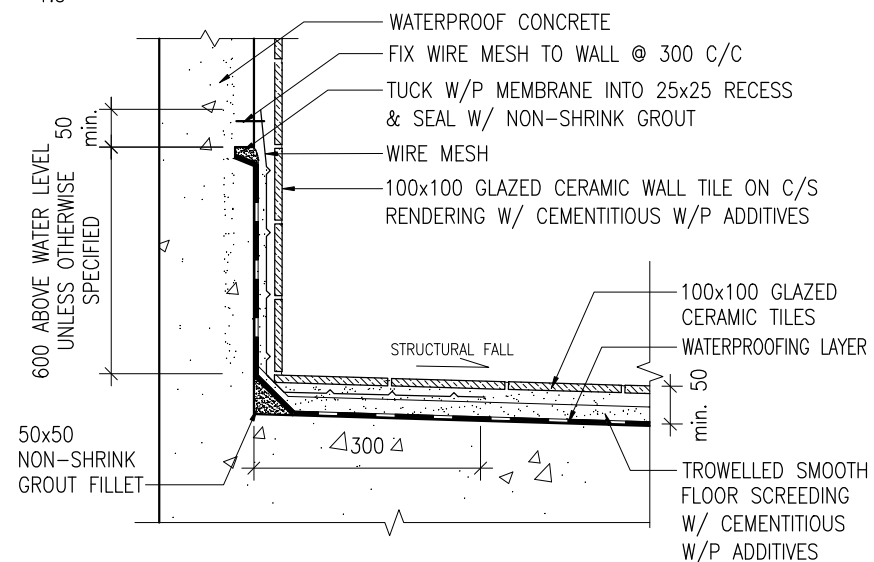
QUARRY FLOOR TILE / CERAMIC WALL TILE

1:10



EPOXY FLOOR / WALL PAINT

1:5



## CERAMIC FLOOR TILE / CERAMIC WALL TILE IN WATER TANKS

1:10

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.

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CLIENT



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

## TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

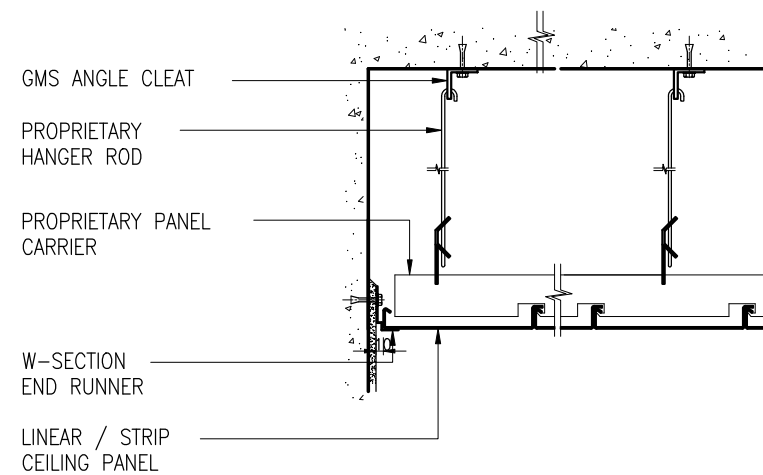
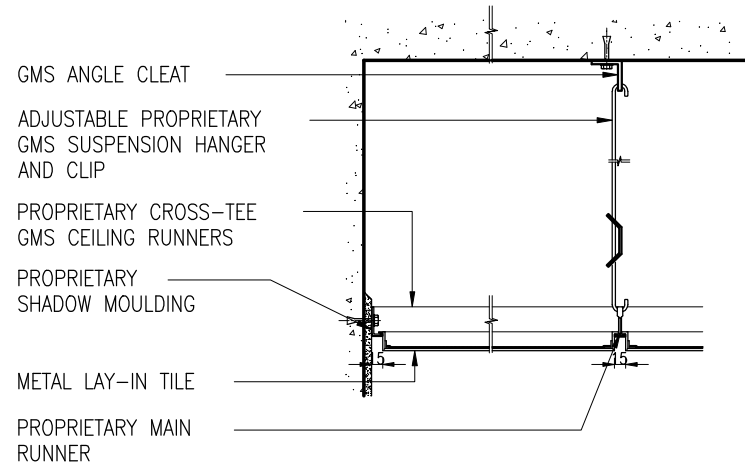
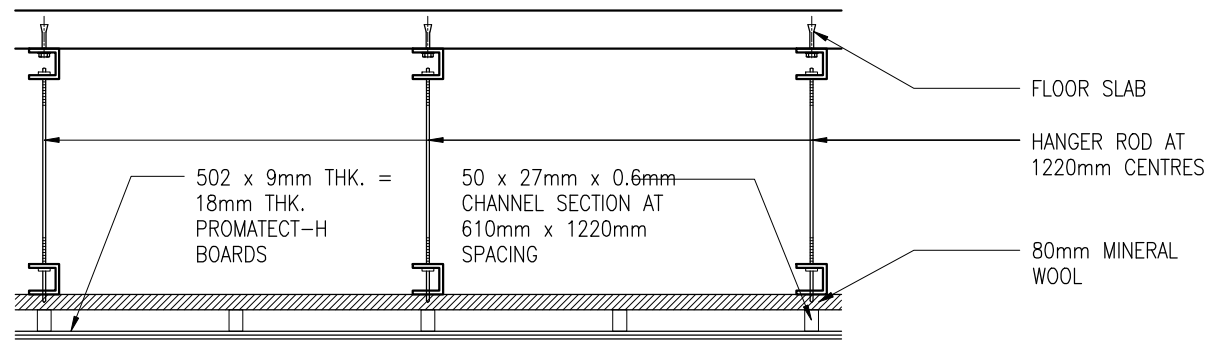
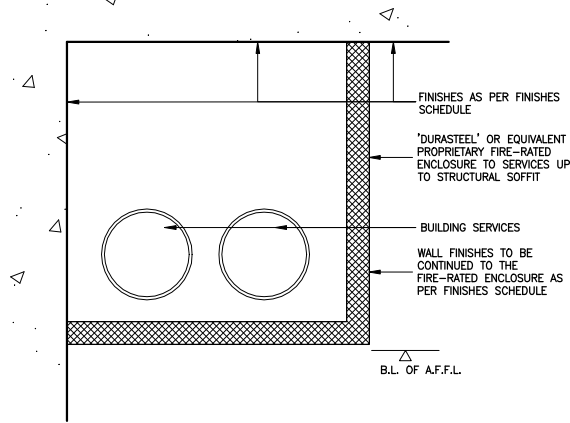
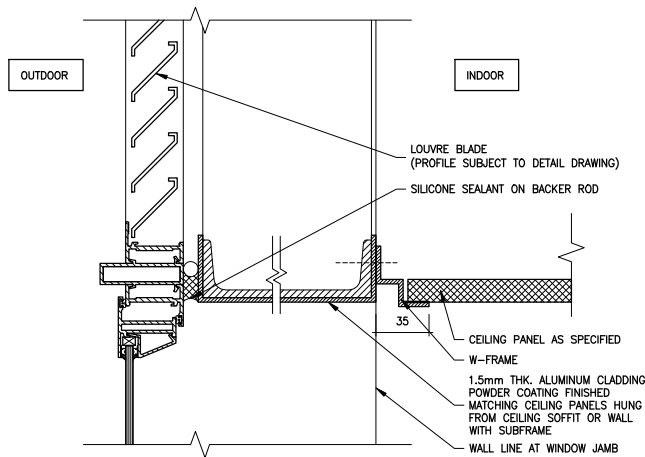
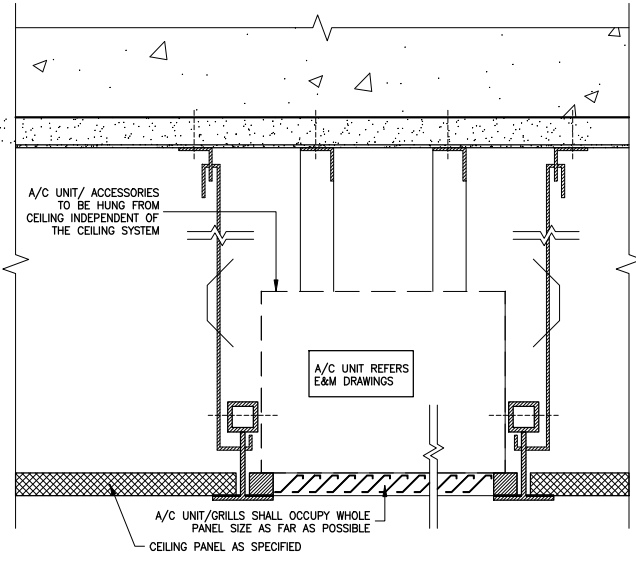
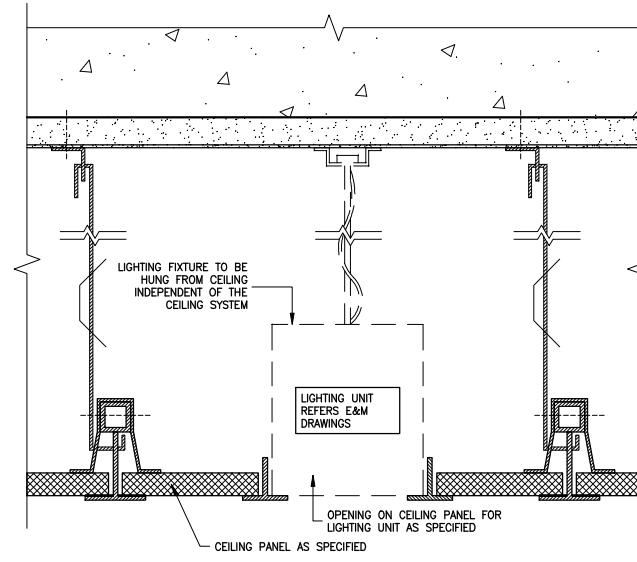
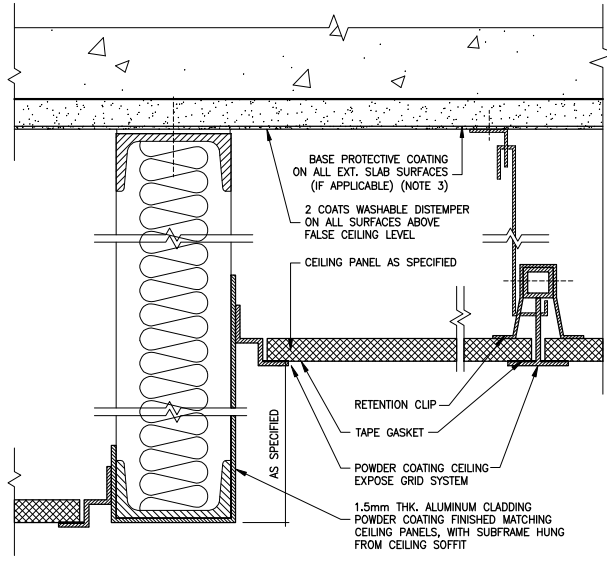
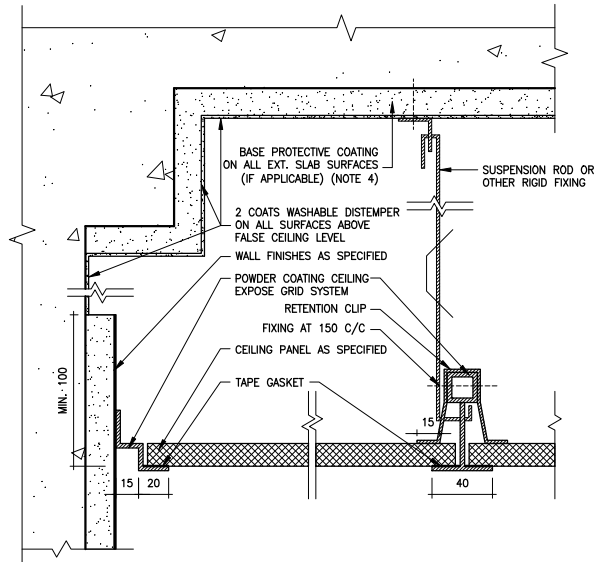
SCALE **A3 @**

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**TYPICAL FINISHES DETAIL 1  
(FLOOR )**

DRAWING NO.	REV.
<b>AT-08-12</b>	
PROJECT NO.	<b>DA17003</b>





USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV. DATE & DESCRIPTION DRN CHK APP

#### NOTES:

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2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

#### LEGEND:

FT - FLOOR TILE  
WT - WALL TILE  
FL - FLOORING SYSTEM  
WP - WALL PAINT  
W/P - WATERPROOFING  
C/C - CENTRE TO CENTRE

#### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: QUANTITIES SET BY HON CHANG LEE TRAINING CENTRE - CIVIL  
STRUCTURAL CONSULTING/ENGINEERING/ARCHITECTURE/INTERIOR DESIGN/MECHANICAL/PLUMBING/ELECTRICAL/PAINTING/IRONWORK/ROOFING/CLADDING/CLIMATE CONTROL/MECHANICAL/PLUMBING/ELECTRICAL/PAINTING/IRONWORK/ROOFING/CLADDING/CLIMATE CONTROL  
SCALE: **A3 @ 1:5**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**TYPICAL FINISHES DETAIL 2  
(CEILING)**

DRAWING NO. **AT-08-13** REV.  
PROJECT NO. **DA17003**



NOTES:

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

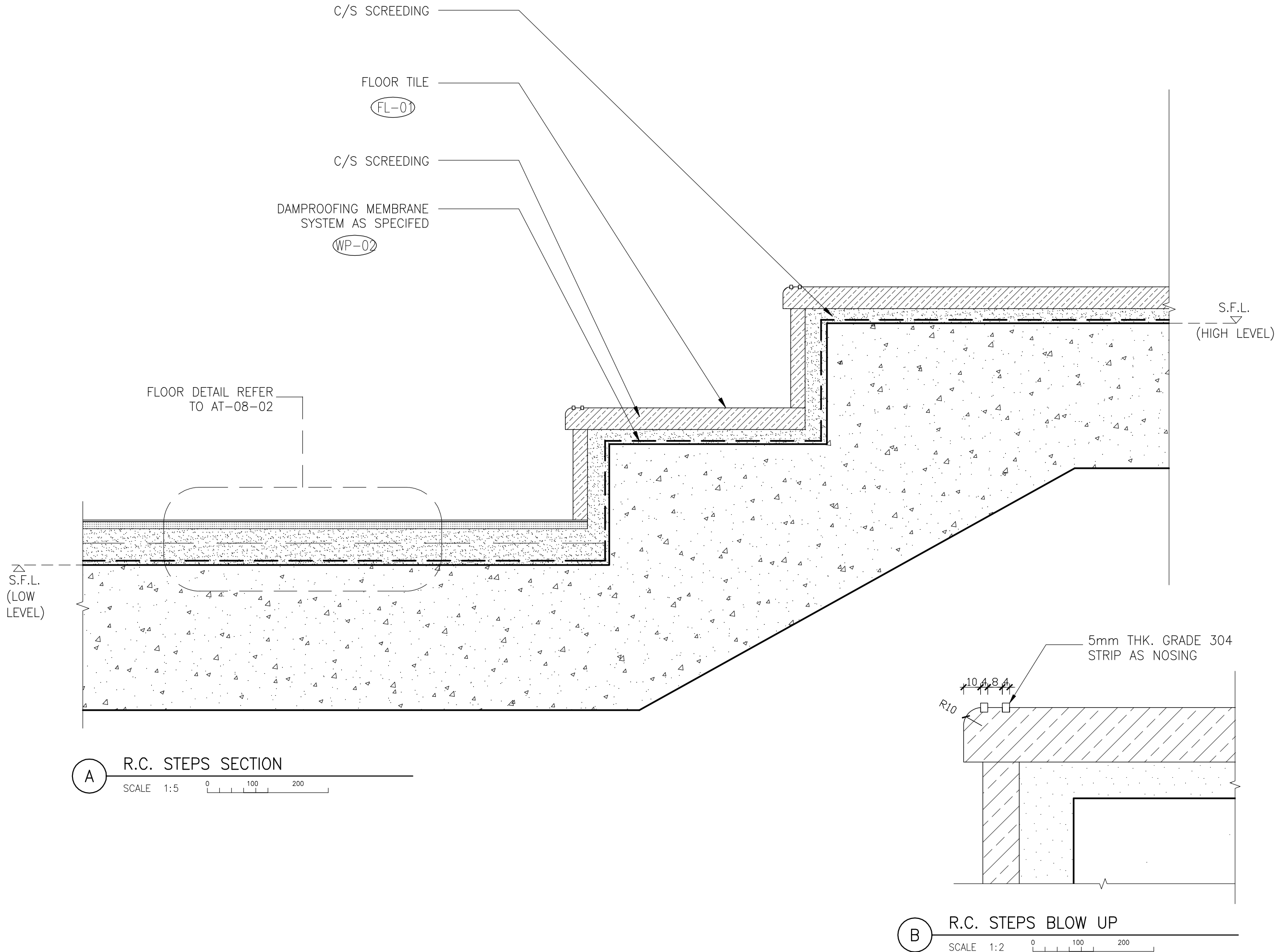
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH: QUANTITIES SET BY KIM CHANG CO. DRAWING GENERATED BY CAD/CAM SOFTWARE. CONTRACT NUMBER: AT-08-15. 15.10.16. 16.10.16. 16.10.16.  
SCALE: **A3 @ AS SHOWN**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

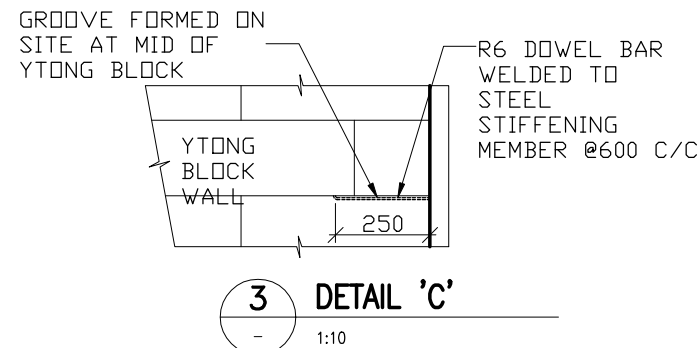
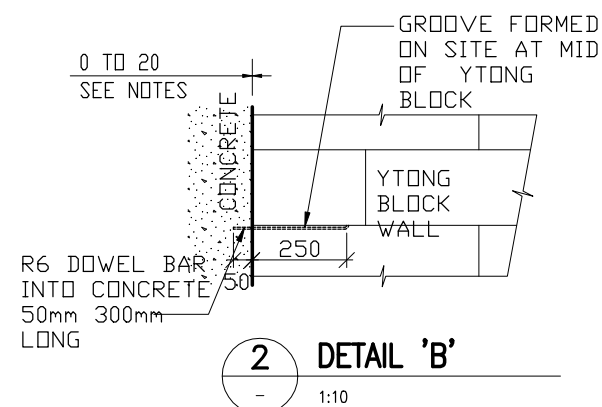
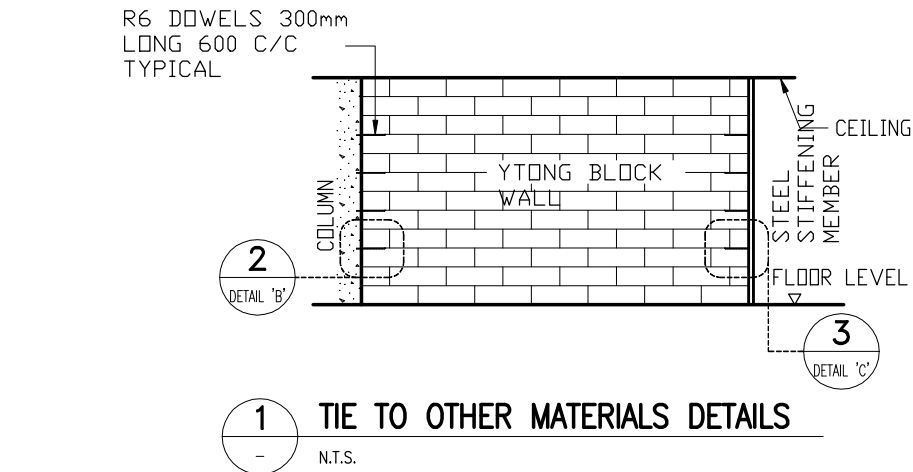
**RC STEPS DETAILS (AT  
ENTRANCE)**

DRAWING NO.	REV.
<b>AT-08-15</b>	
PROJECT NO.	<b>DA17003</b>

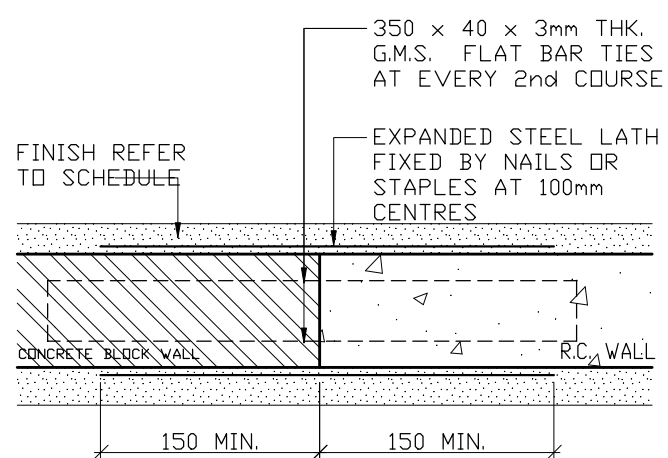
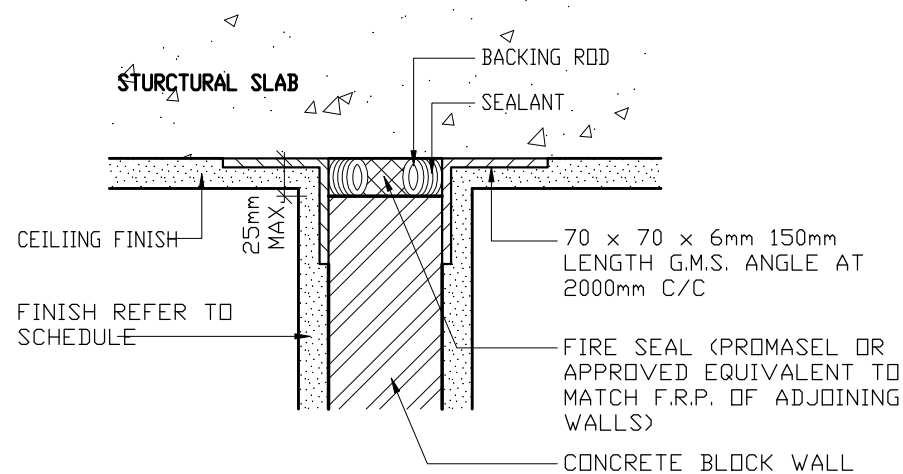


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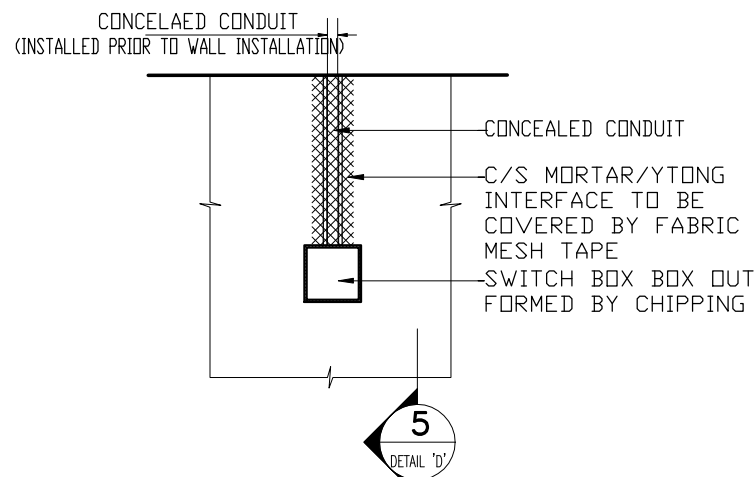


**INTERNAL WALL CONNECTION  
TO OTHER MATERIAL DETAILS**

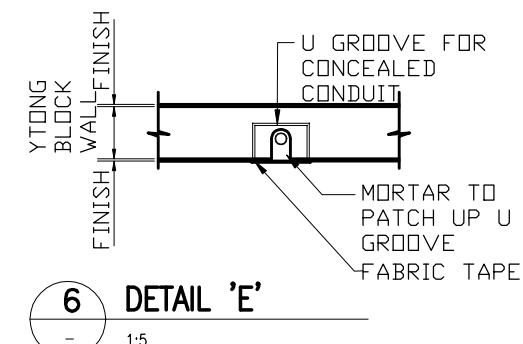
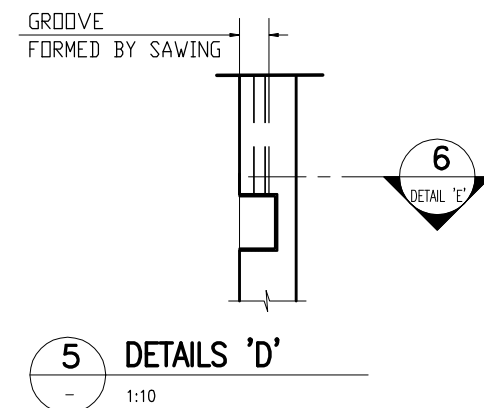


**DETAILS AT JUNCTION OF PARTITION  
WALLS OF DISSIMILAR MATERIALS**

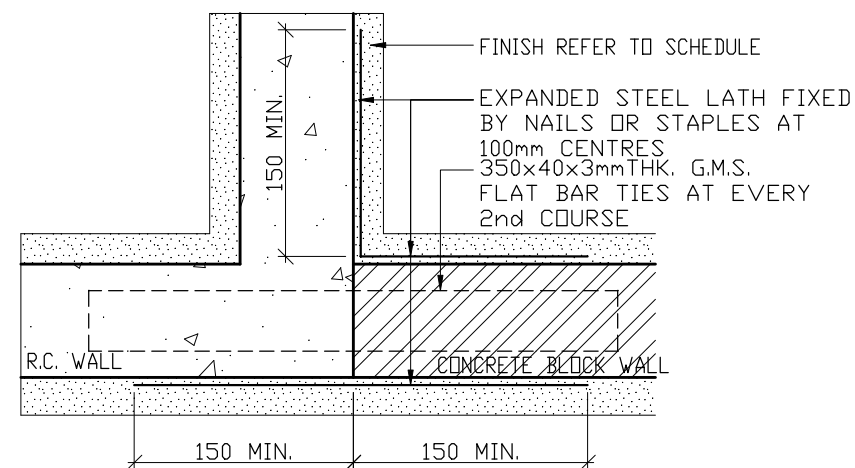
8  
- 1:25



4 TYPICAL ELEVATION  
- 1:5



**INTERNAL WALL CONDUIT DETAILS**



**TENDER DRAWING**

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CAD PATH: C:\PROJECTS\CONSTRUCTION\DRAWING\08-16-16\RC JUNCTION WITH BLOCK WALLS

SCALE: A3 @ AS SHOWN

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**RC JUNCTION WITH BLOCK  
WALL DETAILS**

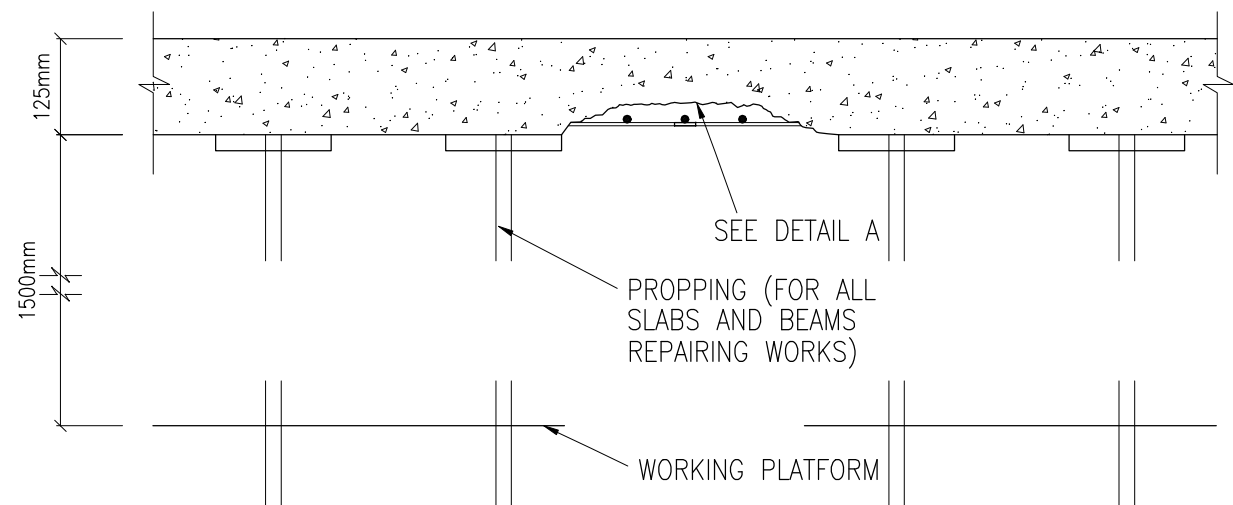
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**AT-08-16**

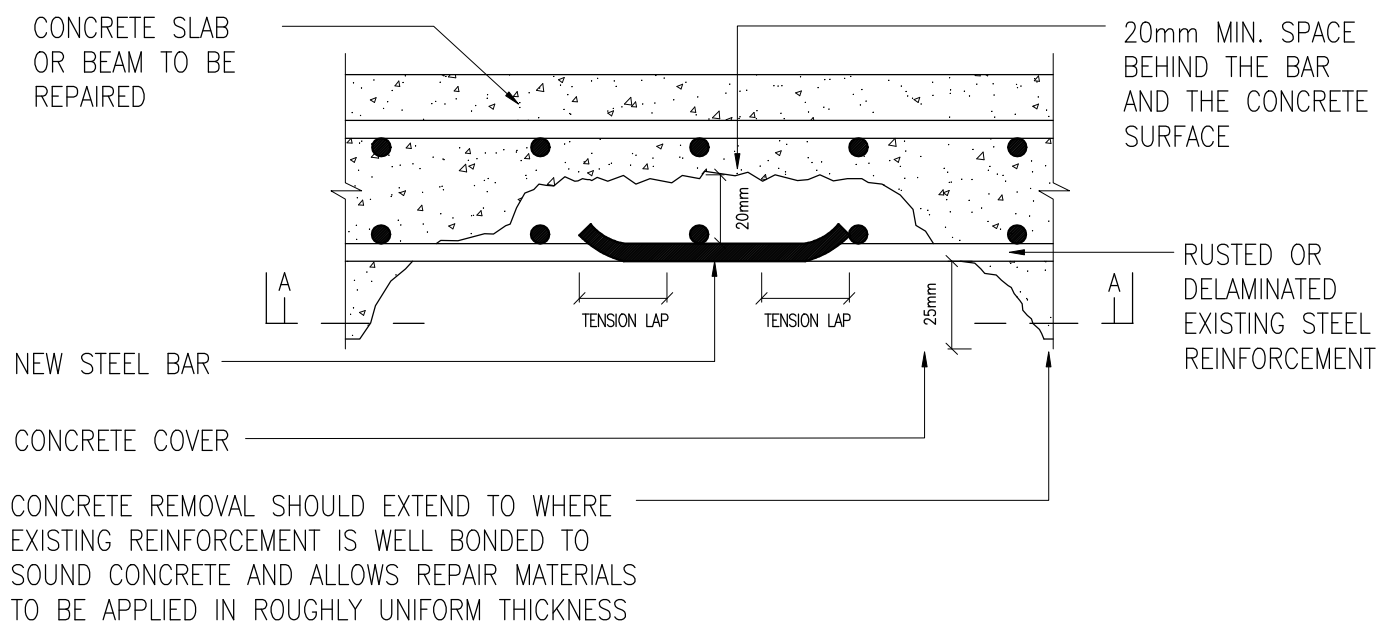
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**DA17003**

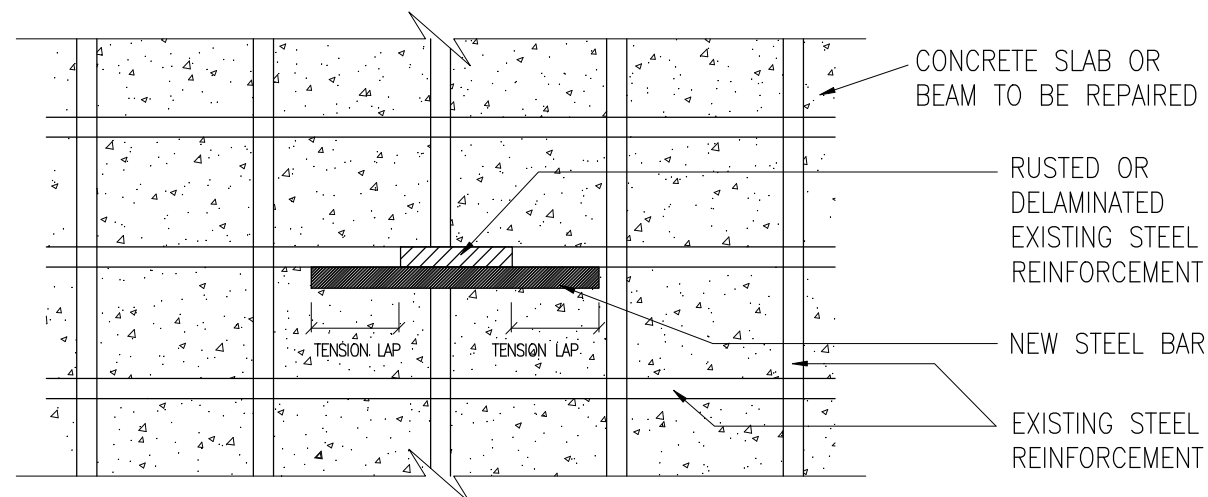
REV.



## REPAIR OF A SLAB OR BEAM



## DETAIL A – CONCRETE SLAB OR BEAM TO BE REPAIRED



## SECTION A-A

### GENERAL NOTES:

1. THE WORKS CARRIED OUT SHALL COMPLY WITH THE BUILDINGS ORDINANCE AND THE PROVISIONS OF OTHER ENACTMENT. (REFERENCE CAN BE MADE TO THE EXAMPLES LISTED IN SECTIONS 3 AND 10 OF THE GUIDELINES.)
2. ALL WORKS SHALL COMPLY WITH THE FOLLOWING COP/ STANDARDS:
  - BUILDING (CONSTRUCTION) REGULATIONS
  - CODE OF PRACTICE FOR STRUCTURAL USE OF CONCRETE 2004 (2ND EDITION)
  - CODE OF PRACTICE FOR FIRE RESISTING CONSTRUCTION 1996
  - CONCRETE SHALL COMPLY WITH CS1: 1990
  - BS 5975 CODE OF PRACTICE FOR FALSEWORK

### PREPARATION WORKS:

1. OBTAIN THE EXISTING DESIGN DRAWINGS/ INFORMATION FOR REFERENCE OF FRP, CONCRETE COVER, CONCRETE STRENGTH, STEEL BAR DIMENSION & ETC. PRIOR TO THE COMMENCEMENT OF WORKS.
2. CARRY OUT CONDITION SURVEY OF THE PARENT STRUCTURE/ EXISTING CONDITION PRIOR TO THE COMMENCEMENT OF WORKS.
3. ALL PROPS SHOULD BE ADEQUATELY SUPPORTED. POINTS OF CONTACT BETWEEN PROPS AND UNDERLYING STRUCTURAL SLABS/ BEAMS SHOULD COMPROMISE OF THE BASE PLATES RESTING ON DISTRIBUTING MEMBERS TO ENSURE NOT EXCEEDING THEIR DESIGN CAPACITIES.

### SAFETY AND PRECAUTIONARY MEASURES:

1. FENCE-OFF THE WORKING AREA FROM THE PUBLIC. DIVERSION ARRANGEMENT SHALL BE TAKEN IF NECESSARY.
2. ERECT PROPPING SYSTEM ACCORDING TO THE SUPPLIER'S INSTRUCTION TO THE BEAM/ SLAB TO BE REPAIRED.
3. WORKING PLATFORM DETAILS SHALL REFER TO THE DRAWING NO. GN-2.

### WORKING PROCEDURES:

1. HACK OFF FINISHES/ CONCRETE AT THE REPAIR AREA BY HAND HELD MECHANICAL TOOLS TO EXPOSE THE STEEL BAR AND SOUND CONCRETE SUBSTRATE.
2. REMOVE RUST ON STEEL BAR AND APPLY PRIMER TO STEEL BAR. IF THE CORRODED STEEL BAR IS FOUND SUBSTANTIALLY LESS THAN ITS ORIGINAL SIZE AFTER DERUSTING, REPLACEMENT OF THE STEEL BAR SHALL BE DEPENDENT ON THE TYPE OF REPAIR MORTAR ADOPTED AND SHALL BE IN ACCORDANCE WITH SUPPLIER'S INSTRUCTIONS.
3. APPLY PROPRIETARY REPAIR MORTAR SYSTEM ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
4. FORMWORKS MAY BE USED WHERE NECESSARY.
5. REMOVE THE FORMWORKS AFTER THE PERIOD SPECIFIED BY THE SUPPLIER OF REPAIR MORTAR.
6. REMOVE THE PROPPINGS AND WORKING PLATFORM AND CLEAN THE SITE.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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### TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dsa** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dsa.com.hk

CAD PATH: \DRAWING\CONSTRUCTION\AT-08\SPALLING CONCRETE REPAIR.DWG

SCALE: A3 @ AS SHOWN

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**SPALLING CONCRETE REPAIR**

DRAWING NO. <b>AT-08-17</b>	REV.
PROJECT NO. <b>DA17003</b>	



LIENT



THE DRAWINGS SHOULD BE READ IN CONJUNCTION  
WITH OTHER DRAWINGS.

MEASUREMENTS TO EXISTING WORKS TO BE CHECKED  
ON SITE BY CONTRACTOR.

UNLESS OTHERWISE INDICATED ALL LEVELS ARE  
RELATIVE TO HONG KONG PRINCIPAL DATUM.

UNLESS OTHER DRAWINGS EXTRACT FROM THE  
ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR  
EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.

ADEQUATE TEMPORARY MEASURES TO BE PROVIDED  
TO FENCE OFF THE WORK SITE FROM AREA IN USE.

ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE  
INCLUDED IN THE CONTRACT.

## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

AD PATH S:\DA17003 SETC AT KPM CHUNG CIO TRAINING CENTRE\1 - CAD\1  
-TENDER\MAIN CONTRACT\WORKING\AT-08 DETAILS\AT-08-21 TO 2X GYPSUM  
BLOCK WALLING

SCALE **A3 @ AS SHOWN**

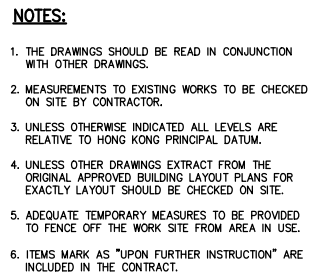
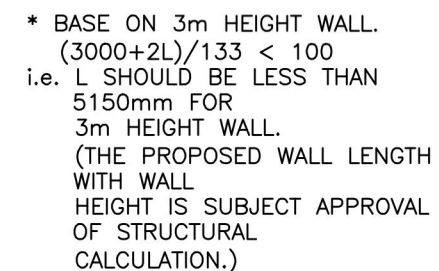
PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
WAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

**DRAWING TITLE**  
**TYPICAL DETAIL FOR ACOUSTIC**  
**GYPSUM BLOCK WALL 1**

DRAWING NO.	REV.
<b>AT-08-21</b>	
PROJECT NO.	<b>DA17003</b>







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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dca.com.hk](http://www.dca.com.hk)

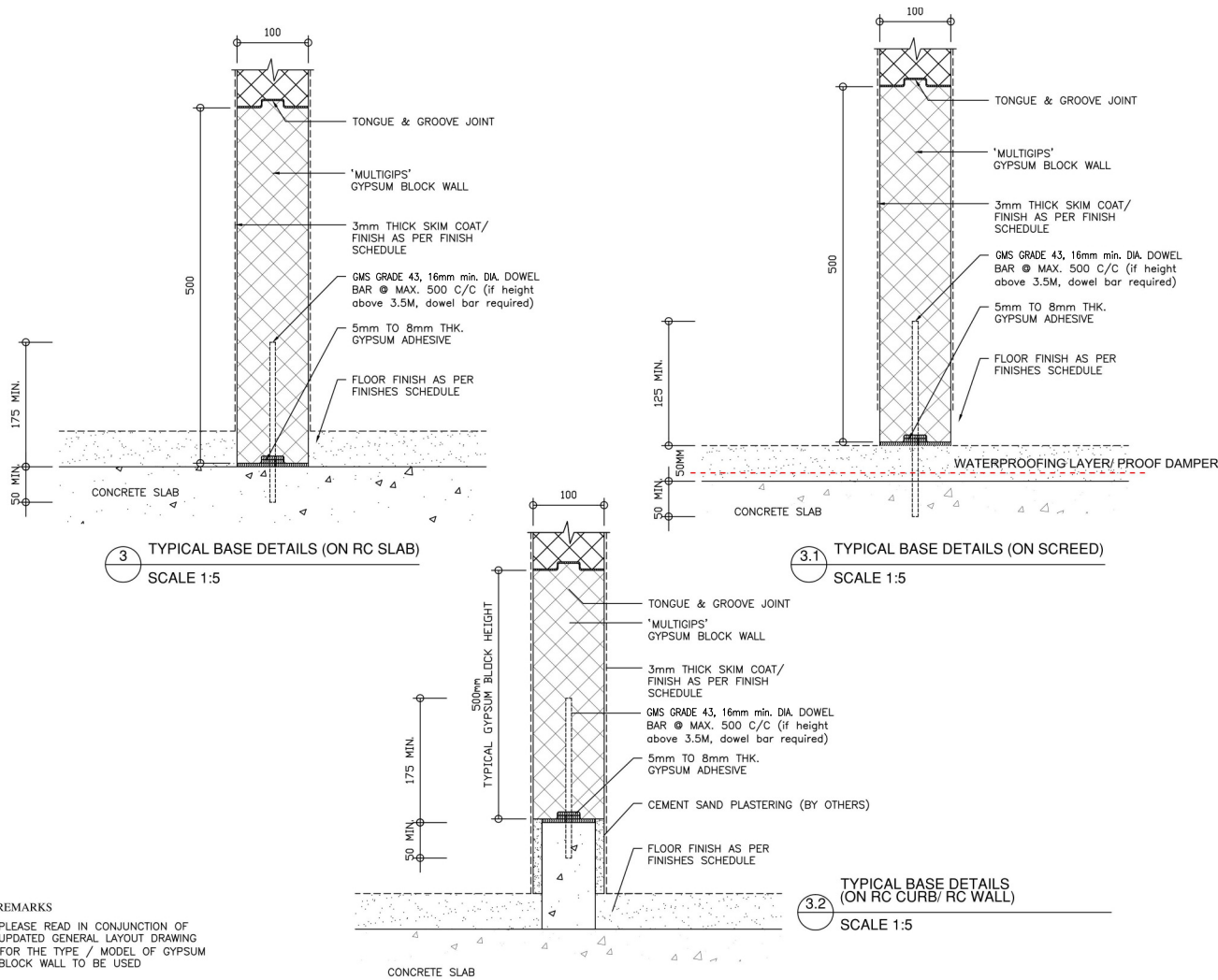
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-TENDER\MAIN CONTRACT\WORKING\AT-08 DETAILS\AT-08-21 TO 2X GYPSUM  
BLOCK WALLING

SCALE A3 @ AS SHOWN

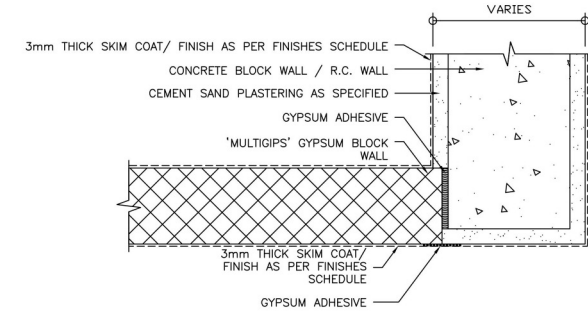
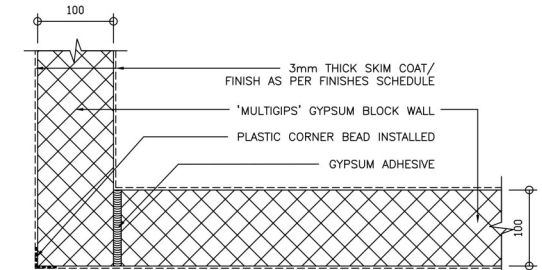
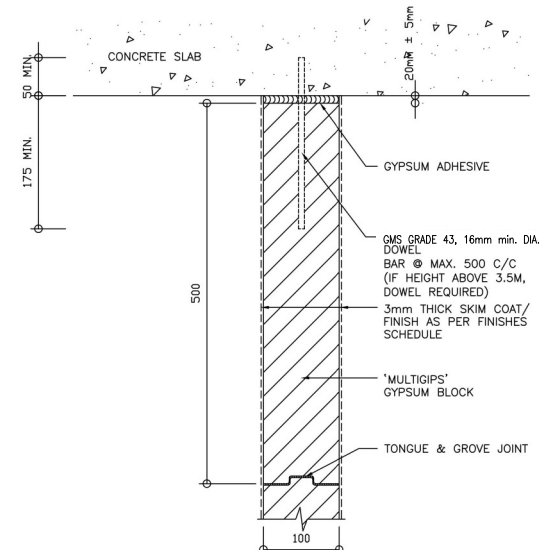
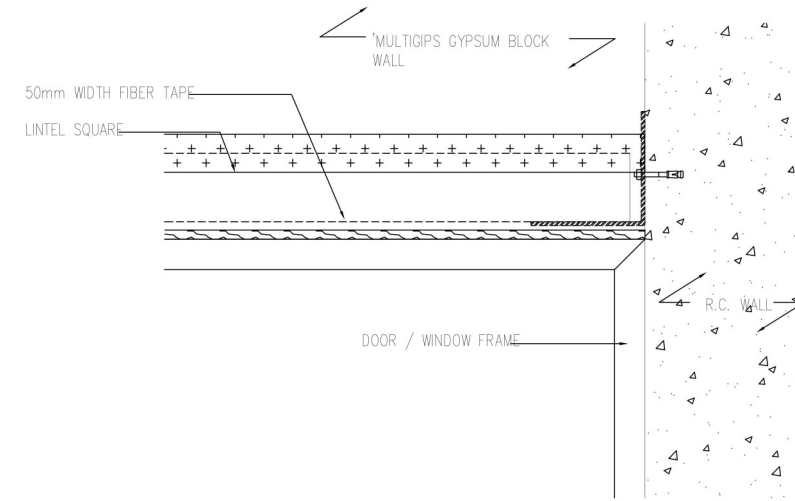
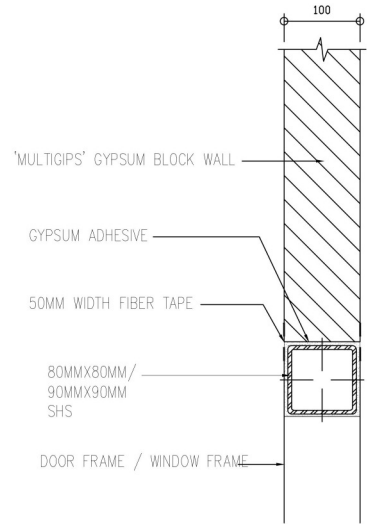
**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**TYPICAL DETAIL FOR ACOUSTIC  
GYPSUM BLOCK WALL 2**

DRAWING NO. <b>AT-08-22</b>	REV.
PROJECT NO. <b>DA17003</b>	



REMARKS  
PLEASE READ IN CONJUNCTION OF  
UPDATED GENERAL LAYOUT DRAWING  
FOR THE TYPE / MODEL OF GYPSUM  
BLOCK WALL TO BE USED



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REV.	DATE & DESCRIPTION	DRN	CHK	APP
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## TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: SUBMITTAL SETS OF NEW CHANGE TO DRAWING CURRENTLY - GMS2  
CONSTRUCTION CONTRACT/WORKING-AT-OR DETAIL/AT-OR-21 TO 25.00MM BLOCK WALLING

SCALE: **A3 @ AS SHOWN**

PROJECT  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE  
**TYPICAL DETAIL FOR ACOUSTIC  
GYPSUM BLOCK WALL 3**

DRAWING NO.	REV.
<b>AT-08-23</b>	
PROJECT NO.	<b>DA17003</b>

**NOTES:**

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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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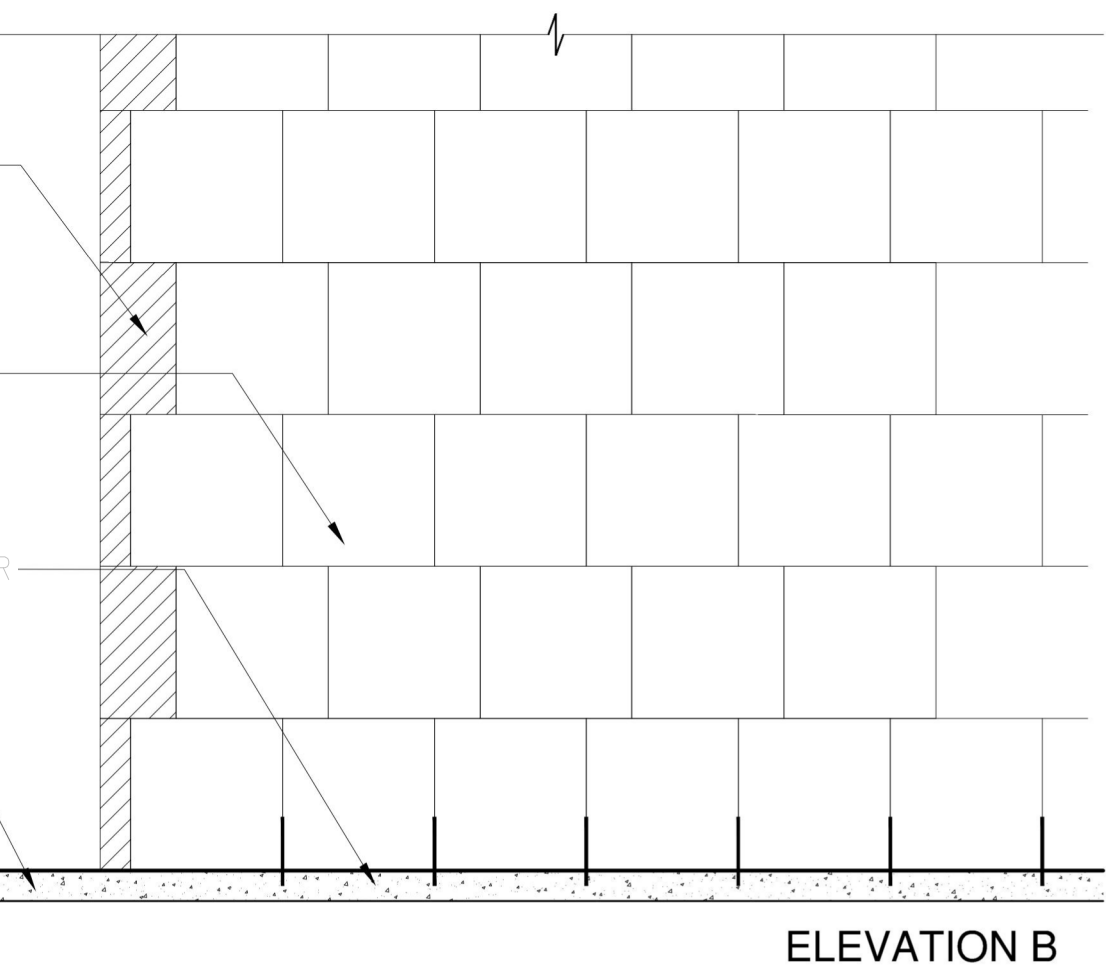
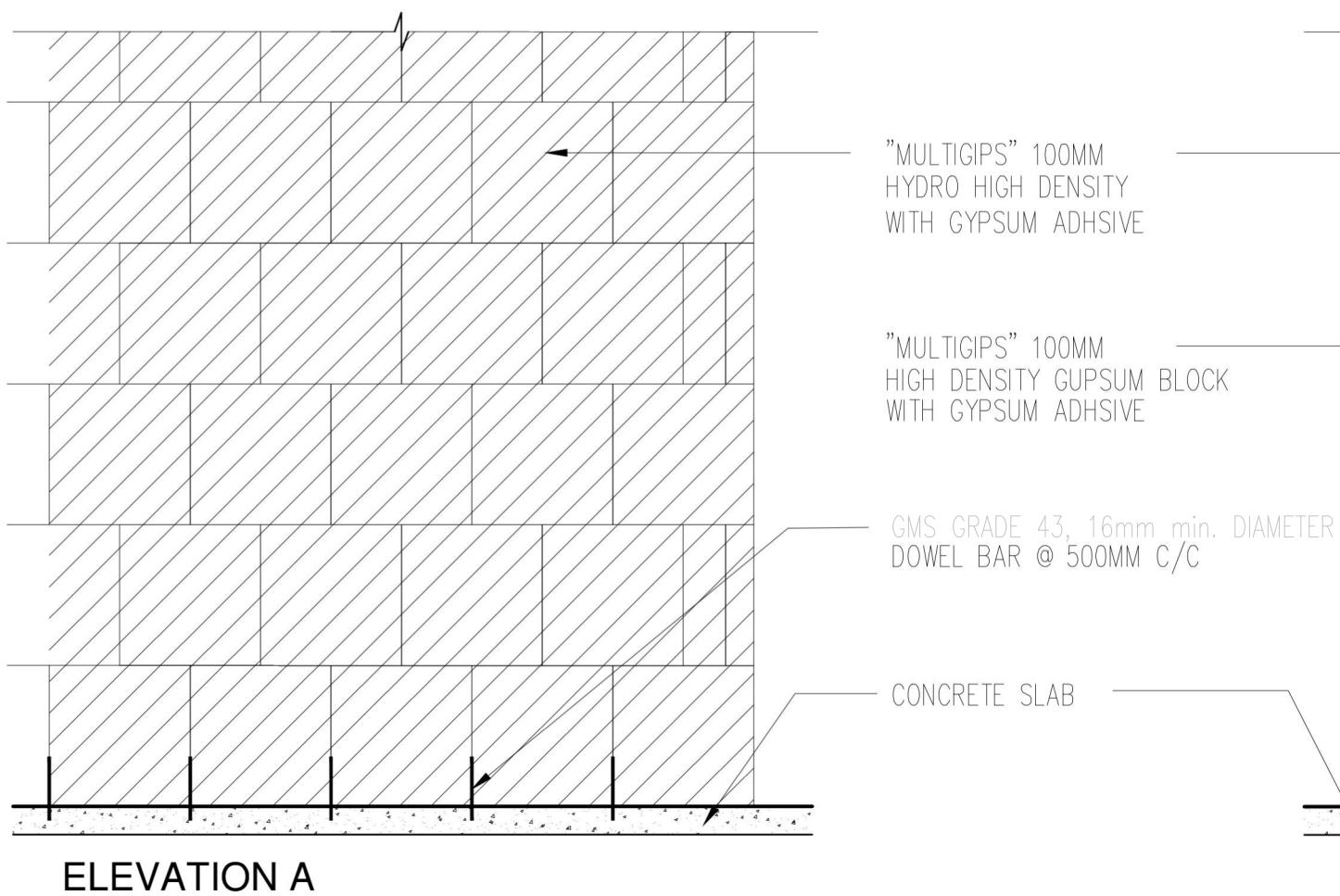
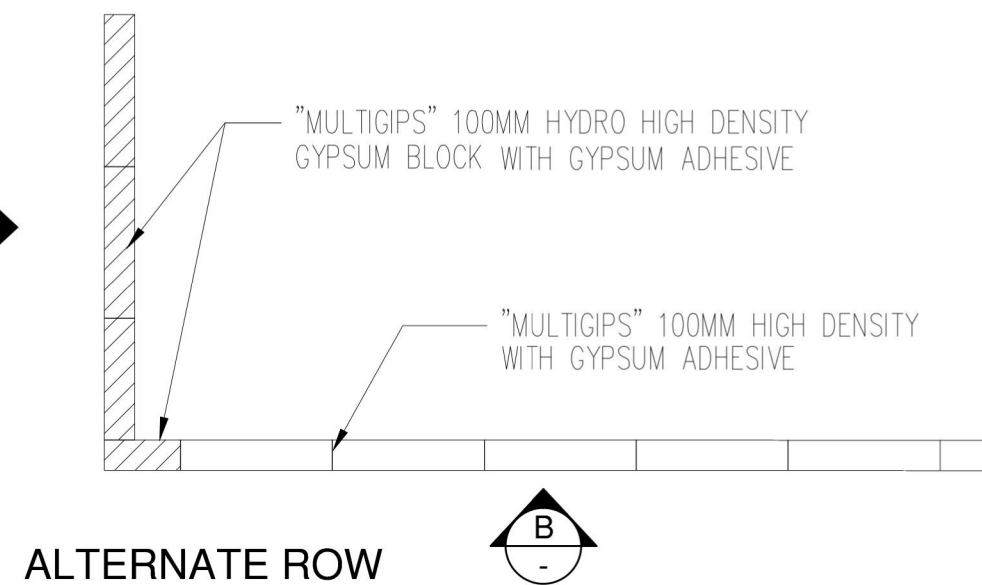
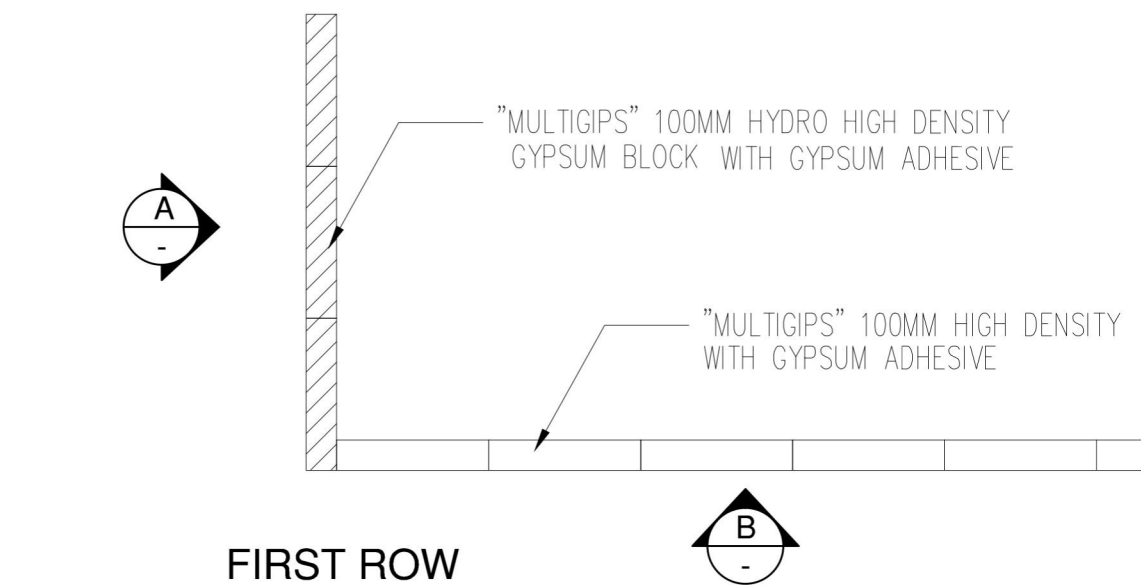
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SCALE: A3 @ AS SHOWN

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
**TYPICAL DETAIL FOR ACOUSTIC  
GYPSUM BLOCK WALL 4**

DRAWING NO. <b>AT-08-24</b>	REV.
PROJECT NO. <b>DA17003</b>	



1 TYPICAL CORNER FOR MULTIGIPS HYDRO HIGH DENSITY GYPSUM BLOCK  
JUNCTION WITH HIGH DENSITY GYPSUM BLCOK

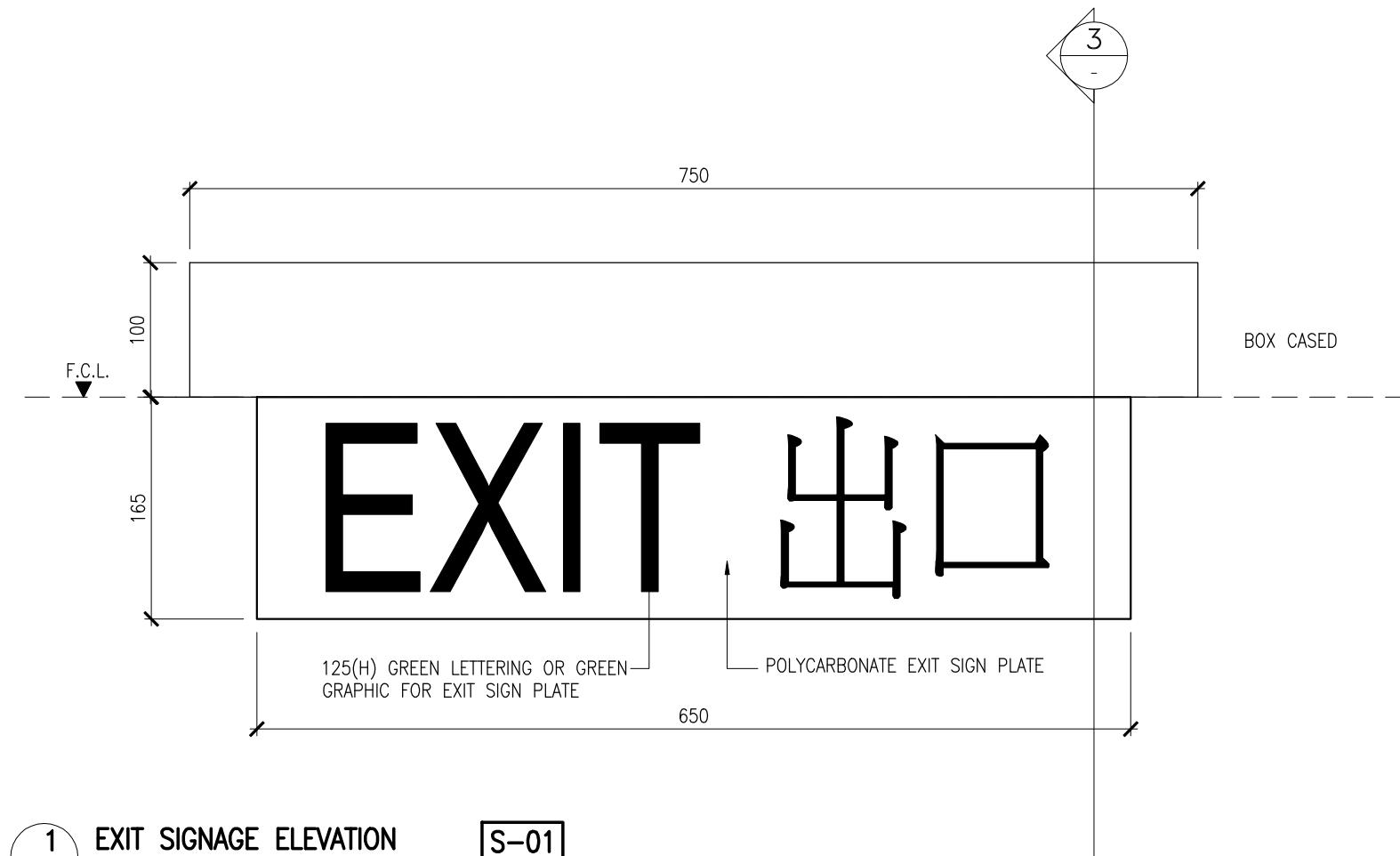


**REMARKS:**

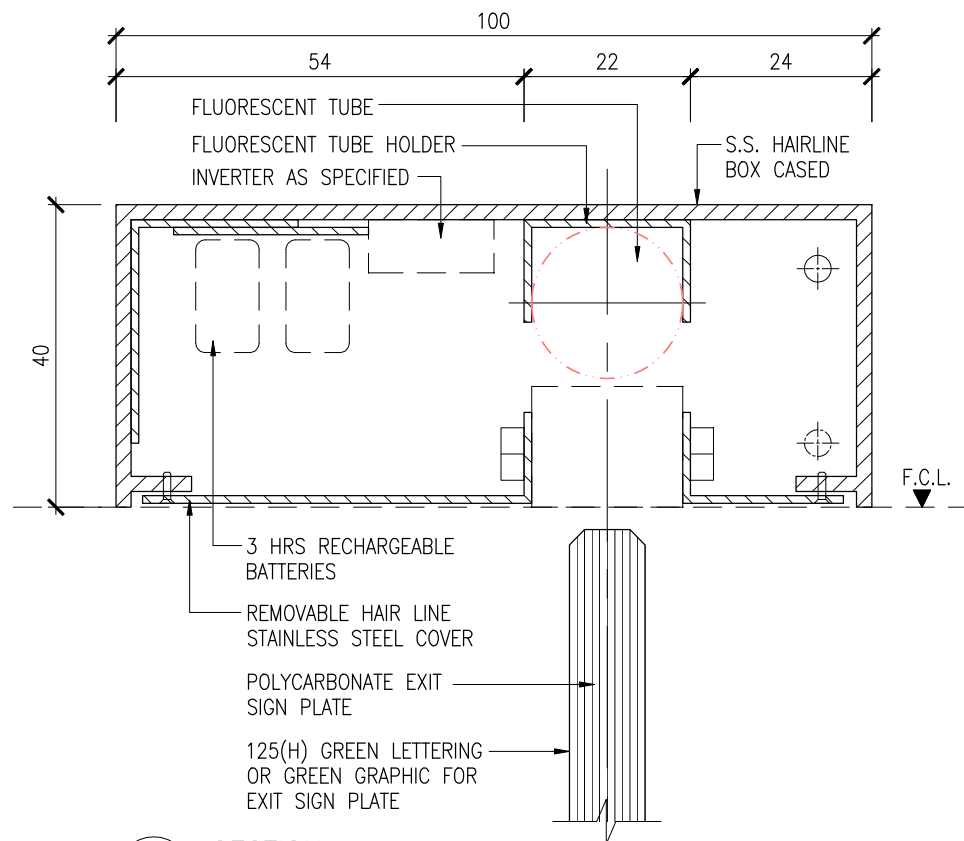
1. LOCATION OF REQUIRED SIGN AND THE HEIGHT OF WORDS AND CHARACTERS SHALL COMPLY WITH STATUTORY REQUIREMENT.
2. THE SIGNAGE SHALL REFER TO BS ISO 3864-1:2011 (BSI STANDARD PUBLICATION - GRAPHICAL SYMBOLS - SAFETY COLOURS AND SAFETY SIGNS AND ISO 7001.

**NOTES:**

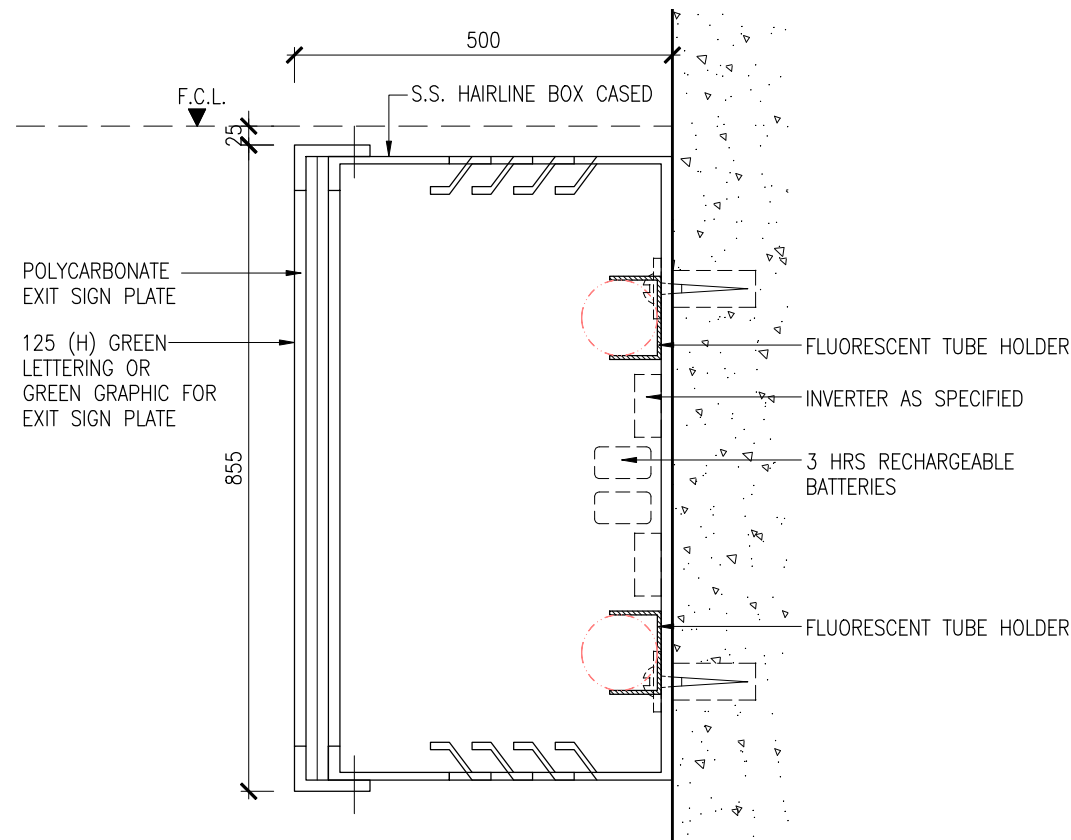
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**1 EXIT SIGNAGE ELEVATION** **S-01**  
1 : 5



**2 SECTION**  
1 : 1



**3 EXIT SIGNAGE DETAIL (ON WALL)**  
1 : 2

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** **DAVID S.K. AU & ASSOCIATES LTD.**  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: \DRAWINGS\PROJECTS\DAVID S.K. AU & ASSOCIATES LTD.\DAVID S.K. AU & ASSOCIATES LTD.

SCALE: **A3 @ AS SHOWN**

PROJECT:  
**RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG TRAINING CENTRE (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE:  
**EXIT SIGN DETAIL (S-01)**

DRAWING NO.	REV.
<b>AT-09-01</b>	
PROJECT NO.	<b>DA17003</b>



<div><div>LETTERING W/ ENGLISH LETTERING AND CHINESE CHARACTERS CUT TO SHAPE</div><div><div>200</div><div>100</div><div>25</div><div>35</div><div>STORE ROOM</div><div>儲物房</div></div></div> <div>NOTE: ALL CHINESE AND ENGLISH CHARACTER TO BE PROVIDED IN ACID ETCHED PRINT WITH PAINT FINISH. COLOUR TO BE CONFIRMED WITH CLIENT. INDICATION OF "STORE ROOM" ARE FOR REFERENCE ONLY.</div>		<div><div>220</div><div>220</div><div><div><div>8</div><div></div></div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div>No Smoking</div><div>嚴禁吸煙</div></div></div>		<div><div>LETTERING W/ ENGLISH LETTERING AND CHINESE CHARACTERS CUT TO SHAPE</div><div><div>15</div><div>10</div><div>9</div><div>7</div><div>15</div><div>5</div><div>6</div><div>6</div><div>80</div><div>80</div><div>FIRE DOOR TO BE KEPT CLOSED</div><div>防火門 應常關</div></div></div>		<div><div>220</div><div>330</div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div>For First Aid, call 2100-9054 如需急救,致電 2100-9054</div></div>	
S-02	DOOR SIGN PLATE (N.T.S.)	S-03	NO SMOKING SIGN (N.T.S.)	S-04	SIGNAGE FOR F.R.P. DOOR (TYPE II) (N.T.S.)	S-05	FIRST AID SIGN (N.T.S.)
<div><div>LETTERING W/ ENGLISH LETTERING AND CHINESE CHARACTERS CUT TO SHAPE</div><div><div>200</div><div>100</div><div>25</div><div>35</div><div>SERVER ROOM</div><div>伺服器機房</div></div></div> <div>NOTE: ALL CHINESE AND ENGLISH CHARACTER TO BE PROVIDED IN ACID ETCHED PRINT WITH PAINT FINISH. COLOUR TO BE CONFIRMED WITH CLIENT. INDICATION OF "SERVER ROOM" ARE FOR REFERENCE ONLY.</div>		<div><div>100</div><div>100</div><div>PULL</div><div>拉</div></div> <div>REMARKS: PULL SIGNS SHALL BE APPLIED TO ALL EXIT DOORS.</div>		<div><div>100</div><div>100</div><div>PUSH</div><div>推</div></div> <div>REMARKS: PUSH SIGNS SHALL BE APPLIED TO ALL EXIT DOORS.</div>			
S-06	DOOR SIGN PLATE (N.T.S.)	PULL SIGN LABEL (N.T.S.)		PUSH SIGN LABEL (N.T.S.)			

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL SIGNAGE SHALL BE 1.5MM THICK GRADE 304 HAIRLINE STAINLESS WITH TEXT OR GRAPHIC PRINTING, BY ETCHING (蝕刻).
2. SHOP DRAWINGS SHALL SUBMITTED BY CONTRACTOR FOR ARCHITECT /CIC 'S APPROVAL PRIOR TO ANY MATERIAL ORDERING AND INSTALLATION.
3. THE SIGNAGE SHALL REFER TO BS ISO 3864-1:2011 (BSI STANDARD PUBLICATION – GRAPHICAL SYMBOLS – SAFETY COLOURS AND SAFETY SIGNS AND ISO 7001.
4. CONTRACTOR TO COORDINATE THE LOCATION OF ALL SIGNS WITH ARCHITECT AND CIC PRIOR TO PLACEMENT.
5. THE CIC / ARCHITECT SHALL PROVIDE THE ARTWORK TO THE CONTRACTOR FOR THOSE SIGNAGE WITH THE CIC LOGO UPON PRODUCTION OF THE WORKS.
6. LOCATION OF REQUIRED SIGN AND THE HEIGHT OF WORDS AND CHARACTERS SHALL COMPLY WITH STATUTORY REQUIREMENT (IF ANY).

NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

da

DAVID S. K. AU & ASSOCIATES LTD.

15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.daa.com.hk

CAD PATH 

ISLANDS SITE AT NEW CHINA DISCOVERY CENTRE - CHANG  
CONSTRUCTION CONTRACT/PROJECT/AT-09-02/01-01-01 TYPICAL DETAILS OF  
DRAWING TITLE

SCALE 

A3 @ AS SHOWN

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

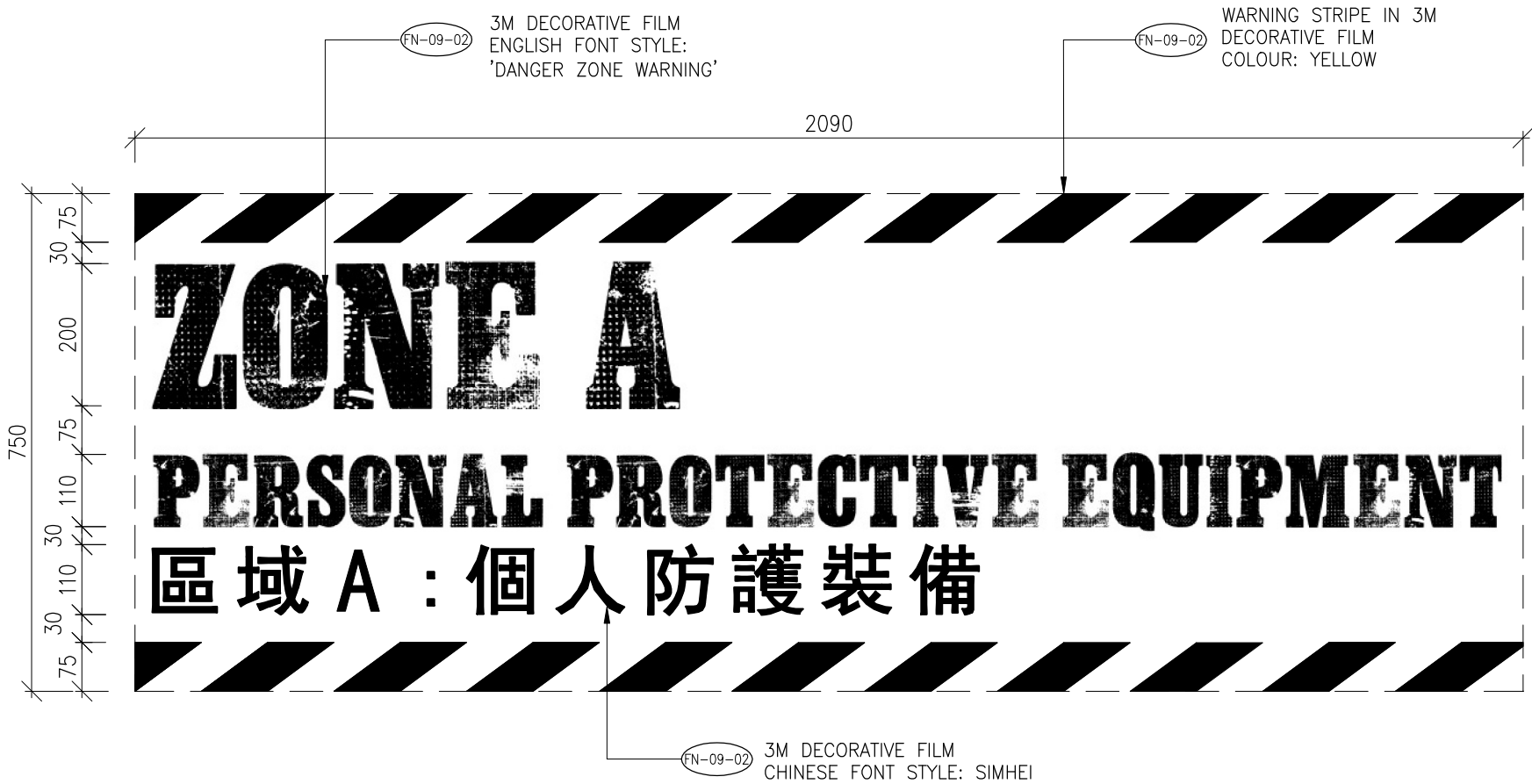
DRAWING TITLE  
TYPICAL SIGNAGES DETAIL

DRAWING NO.	REV.
AT-09-02	
PROJECT NO.	DA17003

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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CLIENT





1 TYPICAL ZONE SIGNAGE  
SCALE 1:10

ENGLISH		CHINESE	
ZONE A	PERSONAL PROTECTIVE EQUIPMENT	區域 A	個人防護裝備
ZONE B	WORKING AT HEIGHT	區域 B	離地工作安全訓練
ZONE C	LIFTING & RIGGING PLANT	區域 C	起重吊運設備
ZONE D	FIRE SAFETY	區域 D	消防安全
ZONE E	CHEMICAL AND ELECTRICAL SAEFTY	區域 E	安全使用化學物品及電力
ZONE F	GOOD HOUSE KEEPING	區域 F	良好工地整理
ZONE G	MACHINERY & TRAPPING HAZARD	區域 G	機械操作及切割夾捲危害
ZONE H	VR CAVE	區域 H	虛擬實境訓練

TYPICAL SIGNAGE TO APPLY TO ALL ZONES BUT USING ITS RESPECTIVE TITLE AS SHOWN ABOVE WITHIN EACH ZONE, REFER TO DWG. AT-01-01 FOR ZONING.

2 ZONE TITLES

NOTES:  
THE COLOUR TO BE APPROVED BY THE ARCHITECT

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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CLIENT



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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- NOTES:
- THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  - MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  - UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  - UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  - ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  - ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

DAVID S.K. AU & ASSOCIATES LTD.  
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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk

CAD PATH: \DRAWINGS\SETC\TRAINING\SETC-01\SETC-01-01.TIF

SCALE: A3 @ 1:10

PROJECT:  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE:  
GRAPHIC SIGN DETAILS (S-09)

DRAWING NO.	REV.
AT-09-03	
PROJECT NO.	DA17003





USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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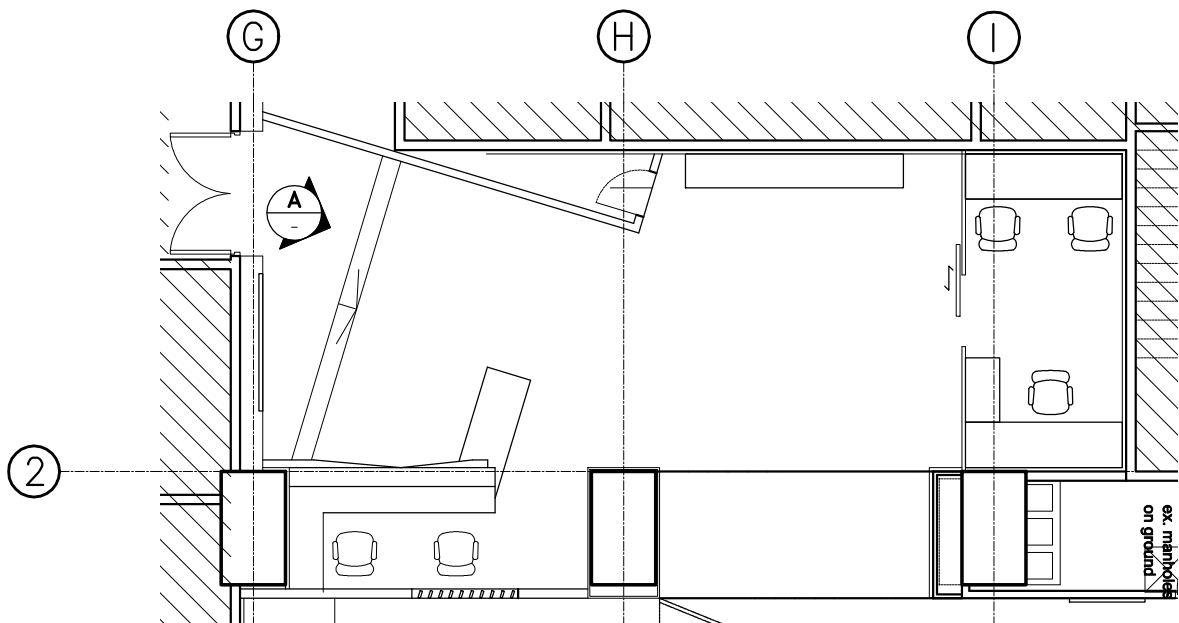
CLIENT



REV. DATE & DESCRIPTION DRN CHK APP

NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.



REFERENCE IMAGE (RECEPTION)  
SCALE N.T.S.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH: QUANTITIES SET BY KIM CHANG CEE (TRAINING CENTRE) - CIVIL  
STRUCTURAL CONSULTANT/ENGINEER/ARCHITECT/ON-SITE REFERENCE NAME  
1.000

SCALE A3 @

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
REFERENCE PERSPECTIVE 1

DRAWING NO.	REV.
AT-09-21	
PROJECT NO.	DA17003





USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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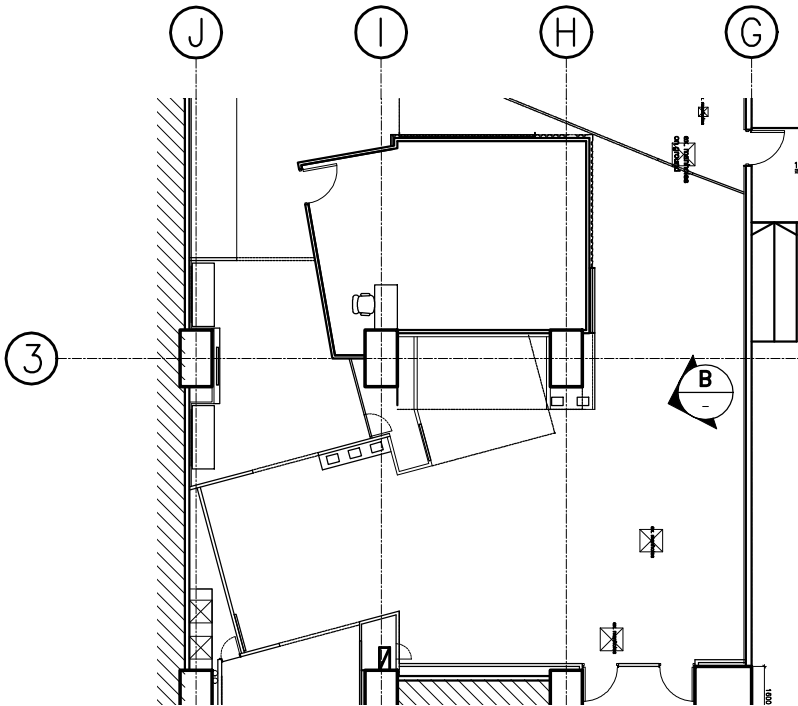
CLIENT



REV. DATE & DESCRIPTION DRN CHK APP

**NOTES:**

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
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**B** REFERENCE IMAGE (ZONE B-C)  
SCALE N.T.S

**TENDER DRAWING**

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: \PROJECTS\2016\DAVID S.K. AU & ASSOCIATES LTD.\AT-09-22\REFERENCE IMAGE

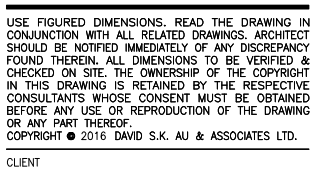
SCALE: A3 @

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
**REFERENCE PERSPECTIVE 2**

DRAWING NO. <b>AT-09-22</b>	REV.
PROJECT NO. <b>DA17003</b>	





1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU &  
ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: [www.dca.com.hk](http://www.dca.com.hk)

CAD PATH S:\DA17003 SETC AT KINW CHUNG C/C TRAINING CENTRE\1 - CAD\1 - TENDER\MAIN CONTRACT\WORKING\AT-09 MSC\AT-09-23 REFERENCE IMAGE 3\_RECOVER.DWG

SCALE A3@

**PROJECT**  
**RENOVATION WORKS OF**  
**SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT**  
**KWAI CHUNG CAMPUS (KCC) OF THE**  
**CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**REFERENCE PERSPECTIVE 3**

DRAWING NO.	REV.
<b>AT-09-23</b>	
PROJECT NO.	<b>DA17003</b>



AU Shiu Kin  
15<sup>th</sup> Floor  
633 King's Road  
North Point  
Hong Kong

62  
72

22 December 2017

Dear Sir,

**7-11 Kwai Hop Street, Kwai Chung, N.T. –  
K.C.T.L. 381**

I refer to your application dated received on 27 October 2017 for approval of proposals in respect of Building and Structural (Alterations & Additions).

2. Your submission of plans has been checked under the curtailed check system announced in Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers ADM-19. On this basis, I am satisfied that your submission is fundamentally acceptable and may be approved.
3. You are reminded that the curtailed check system covers only the fundamental issues of a building proposal. Although non-fundamental issues will not be raised as reasons for disapproving a submission, I expect that all contraventions of the Buildings Ordinance and its subsidiary legislation are rectified as and when they are discovered and in any event, before completion of the works is certified. In this connection, I ask you to note that the Building Authority attaches great importance to the proper assumption of duties and responsibilities by authorized persons and registered structural engineers.
4. In accordance with the provisions of regulation 30(1) of the Building (Administration) Regulations, this is to notify that the above - mentioned plans submitted with your application dated received on 27 October 2017 are hereby approved. One set of the said plans, on which I have signified my approval, is enclosed. Your client has been sent a copy of this letter but I would request that you ensure that the contents are understood by him.
5. This approval should not be deemed to confer any title to land or to act as a waiver of any term in any lease or licence. This approval does **NOT** authorize the commencement or the carrying out of any works shown in the approved plans. Section 14(2) of the Buildings Ordinance refers.
6. This approval is confined to the coloured portions as shown on the plans, and should not be construed as approval of the uncoloured portions of the plans and the existing building works on site.

/7. ...

Our Ref.: BD 2-3/9039/81/7

7. The approval is subject to the conditions and requirements given in Appendices I to VI attached.
8. Under Item 6 in Section 17(1) of the Buildings ordinance, you are required to submit further structural appraisal report showing the condition of the affected reinforced concrete members of the existing building supporting the proposed works and verifying the in-situ concrete strength of these members.
9. Consent to the commencement and carrying out of the alteration and addition works now approved will not be given until the report specified in paragraph 8 has been submitted and found satisfactory. Section 16(3)(ba) of the Buildings Ordinance refers.
10. It is noted that comments from the Director of Fire Services of the Fire Services Department (contact officer: Mr. LO Hin-fan at tel. no. 2733 7528) dated 5 December 2017 have been sent to you direct.
11. Comments from District Planning Officer/Tsuen Wan and Kowloon West of the Planning Department will be conveyed to you upon receipt. Your attention is drawn to Buildings Ordinance section 4(3) in case any amendments are required.
12. It is noted that comments from the District Lands Officer/ TW&KT of the Lands Department (contact officer: MS. H. Y. LAM at tel. no. 2402 1022) dated 7 December 2017 have been sent to you direct.
13. You have made amendment on the submitted plans. In this regard, you are required to provide a copy of the approved plans to the relevant departments directly for record and further comment, if any.

Yours faithfully,

**c.c. Construction Industry Council**  
38/F, COS Centre  
56 Tsun Yip Street  
Kwun Tong  
Kowloon

RSE (same as the AP)

D of FS  
DPO/TWK  
DLO/TW&KT

( AU Wing-hung )  
Chief Building Surveyor  
for Building Authority

Reg. No.: R1477546			
Rec'd Date: 8 JAN 2016			
Project No.: DAC 7003			
Action No.:			
	Act	Inf	Issued
DA			
YSL			
BK			
CYY			
KHI			
LCH			
FP			
SC			
VW			
A/C/S			
Filed by			

Ref : BD 23/9039/81/7

Address : 7-11 Kwai Hop Street, Kwai Chung NT.

Appendix I to approval dated 22-Dec-2017

### **Reinforced Concrete Works**

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Sampling and testing of steel reinforcing bars should be carried out in accordance with CS2:2012. Testing should be carried out by a laboratory\* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the particular test concerned. Test results<sup>@</sup> should be submitted within 60 days of the delivery of the steel reinforcing bars to the site<sup>^</sup>. The test reports should be appended with a statement signed by the Registered Structural Engineer to confirm the following:
  - (i) All steel reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the approved plans.
  - (ii) Sampling and testing of steel reinforcing bars used have been carried out in accordance with CS2:2012.
  - (iii) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.
  - (iv) All steel reinforcing bars tests have been carried out by a laboratory\* accredited under the HOKLAS.
- (b) Sampling of concrete and compression testing of concrete test cubes should be carried out in accordance with the methods specified in CS1:2010. Testing should be carried out by a laboratory\* accredited under the HOKLAS for the particular test concerned. Test results<sup>@</sup> should be submitted within 21 days after testing. The test reports should be appended with a summary which contains information on locations of concerned structural elements, concrete grades and dates of cast. The summary should also include previous summary information of concrete cube test reports in chronological order. The test reports should also be appended with a statement signed by the Registered Structural Engineer to confirm the following:
  - (i) All concrete used for the construction and concrete cubes covered by the test reports are in accordance with the concrete grades shown in the approved plans.
  - (ii) Concrete cube sizes, rates of sampling fresh concrete for testing and acceptance criteria for compressive strength set out in Building (Construction) Regulations have been complied with.

(iii) All concrete cube tests have been carried out by a laboratory\* accredited under the HOKLAS and in accordance with the methods specified in CS1:2010.

(c) Concrete should be obtained from concrete suppliers certified under the Quality Scheme for the Production and Supply of Concrete except for those exceptional projects permitted under clause 11.7.1 of the Code of Practice for Structural Use of Concrete 2013 where documents should be submitted by the Registered Structural Engineer at least one week prior to commencement of the works to prove that the concrete supplier is operating under an approved quality system.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of the reinforced concrete works, including sampling of concrete and steel reinforcing bars and making and curing of test cubes, by experienced and competent persons as defined in 2(b) and 2(c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3 under the Registered Structural Engineer's stream, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor/Registered Specialist Contractor should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the Technically Competent Person of grade T1 under the Registered General Building Contractor's/Registered Specialist Contractor's stream, as stipulated in the Code of Practice for Site Supervision 2009.
- (d) The names and qualifications of the supervisory personnel representing the Registered Structural Engineer and the Registered General Building Contractor/Registered Specialist Contractor respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department.

3. Where steel reinforcing bar (rebar) products such as cut and bent rebars, reinforcement cages and the like are fabricated off-site in a prefabrication yard, the following conditions in respect of qualified supervision of *off-site rebar prefabrication works* (referred hereafter as "Prefabrication Works"<sup>+</sup>) are imposed under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of the Prefabrication Works<sup>+</sup>, including sampling of steel reinforcing bars, by experienced and competent persons as defined in 2(b) and 2(c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The names and qualifications of the supervisory personnel representing the Registered Structural Engineer and the Registered General Building Contractor/Registered Specialist Contractor respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept in the prefabrication yard and a copy of it should be kept on site for inspection by representatives of the Buildings Department.

\* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.info.gov.hk/itc/hkas/>.

@ The test carried out by an accredited laboratory should be within its scope of accreditation. To ensure this, test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS.

^ The 'site' refers to the prefabrication yard for cases covered by paragraph 3 above.

+ Prefabrication Works refer to the fabrication works of steel rebar products, such as cut and bent rebars, reinforcement cages and the like, covered by this approval of plans carried out in the prefabrication yard.

Ref : BD 2-3/0039/81/7

Address : 7-11 Kwai Hop Street, Kwai Chung, N.T.

Appendix II to approval dated \_\_\_\_\_

### Structural Steel Works

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance:

- (a) For welding of structural steel works, welding procedures and welders should be assessed/tested in accordance with the appropriate provisions of the Annex A to the Code of Practice for the Structural Use of Steel 2011.
- (b) Non-destructive testing of welds should be carried out in accordance with the appropriate provisions of the Code of Practice for the Structural Use of Steel 2011 and by a laboratory\* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS for the particular test concerned. The test reports<sup>@</sup> shall be endorsed by Registered Structural Engineer and kept on site for inspection by representatives of the Buildings Department.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of the structural steel works, including fabrication, erection and examination of the structural elements, by experienced and competent persons as defined in (b) and (c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor/Registered Specialist Contractor should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the Technically Competent Person of grade T1, as stipulated in the Code of Practice for Site Supervision 2009.
- (d) The names and qualifications of the supervisory personnel representing the Registered Structural Engineer and the Registered General Building



Contractor/Registered Specialist Contractor respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department.

3. Under Building (Administration) Regulation 10, the following documents are required to be submitted for structural steel of Classes 1, 2 or 1H classified in accordance with the Code of Practice for the Structural Use of Steel 2011:

A copy of mill certificates of the structural steel used, which should be submitted within 60 days of the delivery of the structural steel to the site and appended with a statement signed by the Registered Structural Engineer to confirm that the requirements of chemical composition and mechanical properties appropriate to the class and grade of steel have been complied with and the structural steel used is produced from a manufacturer with an acceptable Quality Assurance system.

- \* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.info.gov.hk/itc/hkas/>.

- @ The test carried out by an accredited laboratory should be within its scope of accreditation. Test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS.

Ref : BD 2-3/2039/2117

Address : 7-11 Kwai Hop Street, Kwai Chung, NT.

Appendix II to approval dated 22-Dec-2017

**Drilled-in Anchors used for Works other than  
Cantilevered Structure/Hanger/Curtain Wall Remedial Works**

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Strength tests on a representative number of the drilled-in anchors should be carried out as directed by the Registered Structural Engineer to verify the performance and workmanship of the as-built anchors. Sampling rate should be at least 1% or 5 numbers, whichever is more, of each type and size of the anchors installed. The strength tests should be carried out by a recognized laboratory independent of the contractor.
- (b) Each representative anchor should be tested for tensile load by pull out test and/or shear load by shear load test as appropriate to demonstrate that its load carrying capacity is not less than 1.5 times the recommended load as specified by the anchor manufacturer. The tested anchor should not show any signs of separation, plastic deformation or deleterious effect. The reports of the above-mentioned tests shall be endorsed by Registered Structural Engineer and kept on site for inspection by representatives of the Buildings Department.
- (c) A method statement on the anchor tests mentioned above is required to be submitted at least one week prior to the actual commencement of the drilled-in anchor works.

2. The following condition in respect of qualified supervision of works is imposed under item 6 in section 17(1) of the Buildings Ordinances:

- (a) Qualified site supervision of the drilled-in anchor works, by experienced and competent persons as defined in (b) and (c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the

quality control co-ordinator is to be the same as the Technically Competent Person of grade T1, as stipulated in the Code of Practice for Site Supervision 2009.

- (d) The names and qualifications of the supervisory personnel representing the Registered Structural Engineer and the Registered General Building Contractor respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department.

3. Reference may be made to British Standard 5080: Parts 1 & 2 for the testing procedures for drilled-in anchors including apparatus set-up, load application and results presentation.

Ref : BD 2-3/9039/81/7

Address : 7-11 Kwai Hop Street, Kwai Chung, N.T.

Appendix IV to approval dated 22-Dec-2017

**Cementitious or Polymer Based  
Grouted Bolts/Dowels/Reinforcing Bars Works**

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Strength tests on a representative number of the grouted bolts/dowels/reinforcing bars should be carried out as directed by the Registered Structural Engineer to verify the performance and workmanship of the grouted bolts/dowels/reinforcing bars. Sampling rate should be at least 1% or 5 numbers, whichever is more, of each type, size and embedment of the grouted bolts/dowels/reinforcing bars installed. The strength tests should be carried out by a recognized laboratory independent of the contractor.
- (b) Each representative grouted bolts/dowel/reinforcing bar should be tested for tensile load by pull out test and/or shear load by shear load test as appropriate to demonstrate that its load carrying capacity is not less than 1.5 times the recommended load as specified by the manufacturer. The tested grouted bolts/dowels/reinforcing bars should not show any signs of separation, plastic deformation or deleterious effect. The reports of the strength tests should be submitted within 21 days upon completion of the tests and appended with a statement signed by the Registered Structural Engineer to confirm the following matters:
  - (i) All bolts/dowels/reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of bolts/dowels/reinforcing bars shown in the approved plans.
  - (ii) The acceptance criteria appropriate to each type and grade of bolts/dowels/reinforcing bars used have been complied with.
  - (iii) Tests for all bolts/dowels/reinforcing bars have been carried out by a recognized laboratory independent of the contractor.
- (c) A method statement on the tests of grouted bolts/dowels/reinforcing bars mentioned above is required to be submitted at least one week prior to the actual commencement of the grouted bolts/dowels/reinforcing bars works.

2. The following condition in respect of qualified supervision of works is imposed under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of the grouted bolts/dowels/reinforcing bars works, by experienced and competent persons as defined in (b) and (c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the Technically Competent Person of grade T1, as stipulated in the Code of Practice for Site Supervision 2009.
- (d) The names and qualifications of the supervisory personnel representing the Registered Structural Engineer and the Registered General Building Contractor respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department.

3. Reference may be made to British Standard 5080: Parts 1 & 2 for general testing procedures for grouted bolts/dowels/reinforcing bars including apparatus set-up, load application and results presentation.

4. Under Building (Administration) Regulation 10, a copy of mill certificates of the bolts/dowels/reinforcing bars used, is required to be submitted within 60 days of the delivery of the bolts/dowels/reinforcing bars to the site and appended with a statement signed by the Registered Structural Engineer to confirm that the requirements of chemical composition and mechanical properties appropriate to the type/grade of steel have been complied with.

Ref : BD 2-3/9039/817

Address : 7-11 Kumi Glop Street, Kumi Champ. N.T.

Appendix V to approval dated 22 Dec. 2017

### **Demolition Works**

In giving this approval of plans, your attention is drawn to the following conditions:

- (a) Site supervision of the demolition works by a team of supervisors shall be provided each by the Authorized Person, the Registered Structural Engineer, the Registered General Building Contractor / Registered Specialist Contractor in accordance with the Technical Memorandum for Supervision Plans 2009 and the Code of Practice for Site Supervision 2009 to ensure that the works are carried out in accordance with the plans approved and in such a manner as not to render inadequate the margin of safety of, or impair the stability of, or cause danger to any building, structure, land, street or services.

2. In connection with paragraph 1, supervision plan showing details of site supervision of the demolition works shall be submitted prior to or at the time of application for consent to the commencement of the demolition works.

Ref: BD 2-3/9039/81/7

Address: 7-11 Kwai Hop Street, Kwai Chung, NT.

Appendix VI to approval dated 22 DEC 2017

### **Building(Alteration and Addition) Works**

In giving this approval of plans, your attention is drawn to the following conditions:

Site supervision of the Building(Alteration and Addition) works by a team of supervisors shall be provided each by the Authorized Person, Registered Structural Engineer, #Registered Geotechnical Engineer and Registered General Building Contractor/Registered Specialist Contractor in accordance with the Technical Memorandum for Supervision Plans 2009 and the Code of Practice for Site Supervision 2009 to ensure that the works are carried out in accordance with the approved plans and in such a manner as not to render inadequate the margin of safety of, or impair the stability of, or cause danger to any building, structure, land, street or services.

2. In connection with paragraph 1 above, details of site supervision for the above works shall be included in the supervision plan and submitted prior to or at the time of application for consent to the commencement of the works.



## GENERAL NOTES:

- ALTERATION & ADDITION WORKS ARE HIGHLIGHTED.
- ALL DIMENSIONS SHOWN ON ALL DRAWINGS ARE STRUCTURAL AND IN (mm) UNLESS OTHERWISE SPECIFIED.
- ALL BLOCK WORKS ARE TO BE BUILT IN 1:3 CEMENT MORTAR.
- NO WORK TO START UNTIL THE CONSENT FOR COMMENCEMENT OF BUILDING WORKS HAS BEEN OBTAINED FROM BUILDING AUTHORITY.
- ALL LEVELS GIVEN ARE STRUCTURAL LEVELS AND IN METERS ABOVE P.D.
- THE PROPOSED WORKS SHOULD BE NO IMPLICATION TO THE FOLLOWING ASPECT:
  - GROSS FLOOR AREA AND SITE COVERAGE;
  - BUILDING HEIGHT;
  - COMPARTMENT;
  - USABLE FLOOR AREA
  - SANITARY FITMENTS
- THE LATEST VERSION OF THE RECORD PLAN OF THE BUILDING IS FILED UNDER BD REF.: 2/9039/81(P) 327 DATED 12 AUG 1982.

## DOOR MARKS:

- WOODEN DOOR W/ VISION PANEL
- 120/120 F.F.R. SELF-CLOSING GLASS W/ SMOKE SEAL
- METAL DOOR

## COLOUR INDICATION:

- LIGHT WEIGHT PORTLAND CEMENT CONCRETE (THICKNESS = 100mm, HEIGHT = 2625mm)
- CONCRETE WORK
- GLASS
- METAL
- WOOD
- LIGHT WEIGHT CONCRETE FILL (DENSITY = 1100 kg/m<sup>3</sup>)
- RENDERING (THICKNESS = 10mm, HEIGHT = 2625mm)
- BLOCK WALL
- H.R. HOSE REEL
- EXIT EXIT SIGN

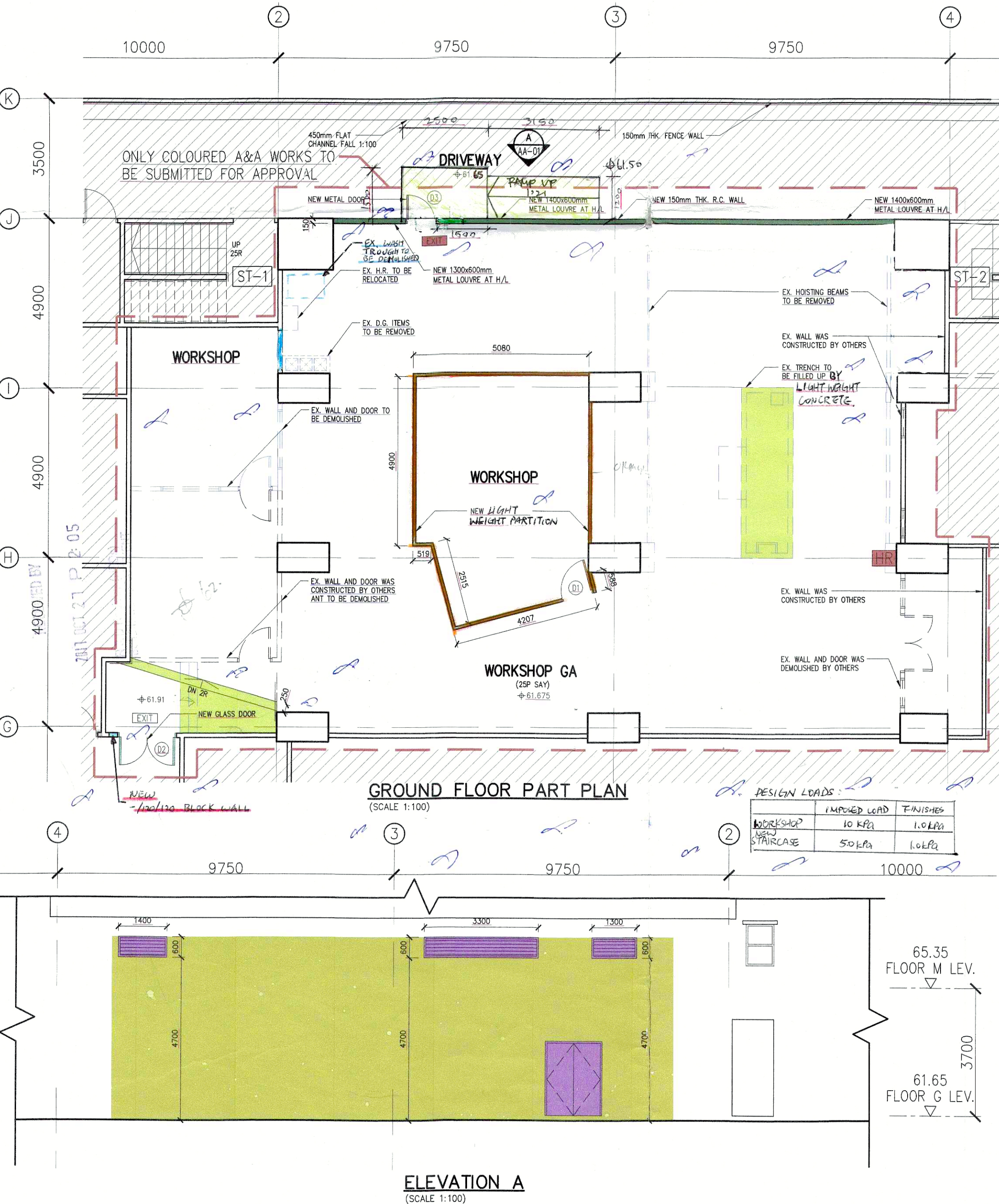
## LEGEND:

- H.R. HOSE REEL
- EXIT EXIT SIGN

## SCHEDULE OF REQUIREMENT OF EXIT DOORS AND EXIT ROUTES

LOCATION	USE	U.F.A. (m <sup>2</sup> )	FACTOR (m <sup>2</sup> /PER PERSON)	CAPACITY OF ROOM	MIN. NO OF EX. DOORS OR EXIT ROUTES	MIN. TOTAL WIDTH OF		MIN. WIDTH OF EACH	
						REQ'D	PROVD	REQ'D	PROVD
G/F	WORKSHOP GA	NO CHANGE	-	25 (SAY) (NO CHANGE)	1	2	850	1200	750

\* DATA FROM SCHEDULE OF POPULATION DISTRIBUTION IN APPROVED BUILDING PLANS ON BD REF.: 2/9039/81(P) 327 DATED 12 AUG 1982



GROUND FLOOR PART PLAN (SCALE 1:100)

ELEVATION A (SCALE 1:100)

## F.S. NOTES:

- ALL REQUIREMENTS OF FIRE SERVICES DEPARTMENT TO BE FULLY COMPLIED WITH.
- UNLESS OTHERWISE SPECIFIED, ALL EXISTING F.S. INSTALLATION SHALL REMAIN UNCHANGED.
- THE EXISTING SPRINKLER LAYOUT IN THE A&A AREA SHALL BE RE-LAYED TO SUIT THE LATEST ARCHITECTURAL LAYOUTS ACCORDINGLY.
- THE NEW HOSE REEL SET CONNECTING FROM THE EXISTING FH/HR SYSTEM SHALL BE ADDED FOR PROVIDING FOR THE A&A AREA SUCH THAT EVERY PART OF THE A&A AREA CAN BE REACHED BY A HOSE REEL TUBE OF A LENGTH OF NOT MORE THAN 30m.
- VISUAL FIRE ALARM SYSTEM SHALL BE PROVIDED FOR THE A&A AREA THAT SHALL BE ACCESSIBLE BY THE PUBLIC COMPLYING BS5839: PART 1.
- THE NEW MANUAL CALL POINT OF THE NEW HOSE REEL SET CONNECTING TO THE EXISTING MANUAL FIRE ALARM SYSTEM WHEREAS THE EXISTING MANUAL FIRE ALARM SYSTEM INCORPORATED TO THE EXISTING FH/HR SYSTEM SHALL REMAIN UNCHANGED.
- SUFFICIENT EMERGENCY LIGHTING AND EXIT SIGNS WITH BATTERY BACK-UP SHALL BE PROVIDED FOR ALL EXIT ROUTES WITHIN A&A AREA COMPLYING WITH BS5266: PART 1.
- WITHIN A&A AREA, ALL LININGS OR ACOUSTIC AND THERMAL INSULATION PURPOSED IN DUCTING AND CONCEALED LOCATIONS SHALL BE OF CLASS 1 OR 2 RATE OF SURFACE SPREAD OF FRAME AS PER BS476: PART 7 OF ITS INTERNATIONAL EQUIVALENT, OR BE BROUGHT UP TO THAT STANDARD BY USE OF AN APPROVED FIRE RETARDANT PRODUCT.
- WITHIN A&A AREA, ALL LININGS FOR ACOUSTIC AND THERMAL INSULATION AND DECORATIVE PURPOSE WITHIN PROTECTED MEANS OF ESCAPE SHALL BE OF CLASS 1 OR 2 RATE OF SURFACE SPREAD OF FRAME AS PER BS476: PART 7 OF ITS INTERNATIONAL EQUIVALENT, OR BE BROUGHT UP TO THAT STANDARD BY USE OF AN APPROVED FIRE RETARDANT PRODUCT.

## GENERAL NOTES FOR STRUCTURE:

- ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL AND BUILDING SERVICE DRAWINGS. THE CONTRACTOR SHALL INFORM THE ENGINEER ANY DISCREPANCY WHICH MAY BE FOUND ON THESE DRAWINGS.
- ALL LEVELS ARE REFERENCED IN METERS ABOVE THE HONG KONG PRINCIPAL DATUM (mPD).
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
- ALL DESIGN & CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
  - THE HONG KONG BUILDING (CONSTRUCTION) REGULATIONS (CAP 123B)
  - THE HONG KONG BUILDING (CONSTRUCTION) WORKS REGULATIONS (CAP 123C)
  - CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
  - CODE OF PRACTICE FOR THE STRUCTURAL USE OF CONCRETE 2013.
  - CODE OF PRACTICE FOR DEMOLITION OF BUILDINGS 2004.
  - CODE OF PRACTICE FOR DEAD AND IMPOSED LOADS 2011.
- ABBREVIATION:
 

THK. = THICKNESS	APP. = APPROXIMATE
MIN. = MINIMUM	T = TOP REINFORCEMENT
LL. = LIVE LOAD	B = BOTTOM REINFORCEMENT
EX. = EXISTING	T1 = FIRST LAYER OF TOP REINFORCEMENT
REIN. = REINFORCEMENT	T2 = SECOND LAYER OF TOP REINFORCEMENT
R.C. = REINFORCED CONCRETE	B1 = FIRST LAYER OF BOTTOM REINFORCEMENT
F.W. = FILLET WELD	B2 = SECOND LAYER OF BOTTOM REINFORCEMENT
F.S.B.W. = FULL STRENGTH BUTT WELD	S.B. = SIDE BAR
U.N.O. = UNLESS NOTED OTHERWISE	D.B. = DISTRIBUTION BAR

## GENERAL NOTES FOR EXISTING STRUCTURE:

- THE STRUCTURAL DESIGN IS IN ACCORDANCE WITH BRITISH STANDARD CODE OF PRACTICE CP 114:1969.
- IF ANY DISCREPANCY BETWEEN THE EXISTING BUILDING AND THE INFORMATION SHOWN ON THE DRAWING IS FOUND, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
- ALL INFORMATION ON THIS SET OF DRAWINGS REGARDING THE EXISTING STRUCTURE IS GIVEN IN GOOD FAITH AND NO GUARANTEE CAN BE GIVEN NOR RESPONSIBILITY TAKEN FOR ITS ACCURACY.
- ALL DIMENSIONS ARE TO BE READ IN mm AND LEVELS IN METERS UNLESS OTHERWISE STATED.
- ALL LEVELS INDICATED ON PLANS ARE STRUCTURAL FLOOR LEVELS.
- BEAMS SIZE IS SHOWN AS: BREATH X DEPTH
- MIN. COVER FOR MAIN REINFORCEMENT OF EXISTING STRUCTURE WERE (OR BAR DIAMETER WHICHEVER IS THE GREATER):
  - 15mm FOR SLABS AND STAIRCASES
  - 50mm FOR BEAMS AND COLUMNS
- CONCRETE GRADE WERE GRADE 31 SPECIAL MIX IN COLUMN (SPECIFIED MIN. 31 N/mm<sup>2</sup> CUBE STRENGTH AT 28 DAYS) AND GRADE 26 SPECIAL MIX IN BEAMS, SLABS AND STAIRCASES (SPECIFIED MIN. 26 N/mm<sup>2</sup> CUBE STRENGTH AT 28 DAYS).
- REINFORCEMENT:
  - HIGH YIELD STEEL (B) f<sub>yk</sub> = 210 N/mm<sup>2</sup>, f<sub>sc</sub> = 155 N/mm<sup>2</sup>
  - MILD STEEL (B) f<sub>yk</sub> = 140 N/mm<sup>2</sup>, f<sub>sc</sub> = 125 N/mm<sup>2</sup>
- ALL MAIN REINFORCEMENT IN BEAMS, STAIRCASES, SLABS, COLUMNS AND STIRRUPS IN BEAMS (EXCEPT NOMINAL STIRRUPS) TO BE HIGH TENSILE STEEL THOSE MARKED #
- REINFORCEMENT OF CONCRETE WALLS BINDERS IN COLUMNS DISTRIBUTION BARS OF SLABS, STAIRCASES, AND NOMINAL STIRRUPS IN BEAMS TO BE MILD STEEL EXCEPT THOSE MARKED #.

## NOTES FOR NEW REINFORCED CONCRETE STRUCTURE:

- THE EQUIVALENT SODIUM OXIDE IN CONCRETE MIX SHALL NOT EXCEED 3.0 kg/m<sup>3</sup> OF CONCRETE COMPLYING WITH BS EN 12607:2006 CORRESPONDING TEST CERTIFICATES ON ALKALI CONTENT IN CEMENT, AGGREGATE, ETC., ISSUED BY A HOKLAS LABORATORY AND CALCULATION OF THE EQUIVALENT SODIUM OXIDE SHOULD BE SUBMITTED TO THE RSE QUARTERLY.
- CONCRETE CUBES SHALL BE MADE AND TESTED WITH TEST REPORT IN ACCORDANCE WITH THE PROVISIONS OF THE HONG KONG BUILDING (CONSTRUCTION) REGULATIONS AND THE CONSTRUCTION STANDARD CS: 2010, EXCEPT SECTION 7.1.
- STEEL REINFORCEMENTS FOR CONCRETE SHALL COMPLY WITH THE CONSTRUCTION STANDARD CS: 2012 MINIMUM CHARACTERISTIC STRENGTH OF: 500MPa FOR HIGH YIELD STEEL BAR, 250MPa FOR MILD STEEL BAR.
- STEEL REINFORCEMENTS ARE SHOWN IN THE ORDER OF:
  - NUMBER OF BAR (IF ANY), BAR TYPE & DIAMETER - BAR SPACING (IF ANY).
  - (I.E. FOR EXAMPLE: 15T20-150 DENOTES 15 NUMBERS, HIGH YIELD STEEL BAR, 20mm DIAMETER, AT 150mm CENTER.) R - DENOTES MILD STEEL BAR, T - DENOTES HIGH YIELD STEEL BAR.
- ALL REINFORCEMENTS SHALL BE CHECKED AT THE SITE BY THE REGISTERED STRUCTURAL ENGINEER OR HIS REPRESENTATIVE AFTER FIXING AND BEFORE CONCRETING.
- MINIMUM BOND / LAP LENGTH OF REINFORCEMENT FOR ALL STRUCTURAL ELEMENTS SHALL BE AS SPECIFIED IN THE FOLLOWING SCHEDULE AND COMPLY WITH CODE OF PRACTICE FOR STRUCTURAL USE OF CONCRETE 2013, CL 4.9.5 AND CL 4.9.3.

## SCHEDULE OF LAP & ANCHORAGE LENGTH

DIAMETER OF BAR	FOR HIGH YIELD BARS	
	TL	CL
10	38 x Dia.	30 x Dia.
16	380	300

## LEGEND:

- TL = LAP OR ANCHORAGE LENGTH UNDER TENSION OR LAP LENGTH UNDER COMPRESSION
- CL = ANCHORAGE LENGTH UNDER COMPRESSION
- NO SPLICING OF REINFORCEMENT OTHER THAN THOSE SHOWN ON THE DRAWING IS ALLOWED UNLESS OTHERWISE APPROVED BY THE ENGINEER AND TL SHALL BE PROVIDED.
- NOMINAL LAP AND ANCHORAGE FOR DISTRIBUTION BARS TO BE 300mm OR XL WHICHEVER THE GREATER, FOR THE FOLLOWING PROVISIONS a) OR b) APPLY, THE LAP LENGTH SHOULD BE INCREASED BY A FACTOR OF 1.4:
  - WHERE A LAP OCCURS AT THE TOP OF A SECTION AS CAST AND THE MINIMUM COVER IS LESS THAN TWICE THE SIZE OF THE LAPPED REINFORCEMENT.
  - WHERE A LAP OCCURS AT THE BOTTOM OF A SECTION AND THE MINIMUM COVER TO EITHER FACE IS LESS THAN TWICE THE SIZE OF THE LAPPED REINFORCEMENT, OR WHERE THE CLEAR DISTANCE BETWEEN ADJACENT LAPS IS LESS THAN 75mm OR SIX TIMES THE SIZE OF THE LAPPED REINFORCEMENT, WHICHEVER IS THE GREATER.
 IF BOTH PART a) & b) CONDITION APPLY, THE LAP LENGTH SHOULD BE INCREASED BY A FACTOR OF 2.0.
- ALL NOMINAL LAPS OF DISTRIBUTION BAR FOR SLABS AND WALLS SHALL BE 300mm MINIMUM UNLESS OTHERWISE SPECIFIED.
- CONCRETE COVER TO REINFORCEMENT SHALL BE 30mm FOR R.C. WALL.
- ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN mPD EXCEPT SHOWN OTHERWISE. (LEGEND: 17.50 STRUCTURE FLOOR LEVEL AT 17.50mPD.)
- ALL Y-TONG BLOCK IS IN COMPLIANCE WITH BS6673:PART 1:1991 AND BS5826:PART 1:2005.
- SIZE OF CONCRETE ELEMENTS DOES NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- ALL BENT TO STEEL REINFORCEMENT SHALL COMPLY WITH BS 8666:2000
- CONCRETE TO BE DESIGNED MIX CONCRETE AS SPECIFIED IN THE FOLLOWING SCHEDULE TO CS:2010 AND THE GRADE DESIGNATIONS GIVEN ARE THE CHARACTERISTIC CUBE STRENGTH AT 28 DAYS AND THE MAXIMUM AGGREGATE SIZE 20mm. UNLESS OTHERWISE STATED ON THE DRAWINGS.

MEMBER	GRADE
WALLS	C35/20

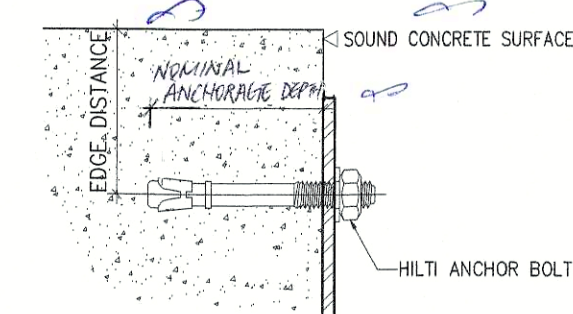
## NOTES FOR STRUCTURAL STEEL WORK:

- ALL STRUCTURAL STEELWORKS TO BE CLASS 1 COMPLYING WITH CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011. STEEL HOLLOW SECTION TO BE GRADE S355 JO AS SPECIFIED IN BS EN 10210:2006 WITH MIN. YIELD STRENGTH OF 355 MPa. STEEL PLATE AND STEEL CHANNEL SECTIONS TO BE GRADE S275JO AS SPECIFIED IN BS EN 10025:2004 WITH MIN. YIELD STRENGTH OF 275 MPa U.N.O.
- ALL WELDING WORKS SHALL BE CARRIED OUT BY QUALIFIED WELDERS COMPLYING WITH CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL STEEL WORKS TO BE IN ELECTRIC ARE WELDING CONSTRUCTION WITH FULLY CONTINUOUS FILLET WELD COMPLY WITH BS EN 1011(PART1:2008) HAVING A MINIMUM WELD STRENGTH OF 220N/mm<sup>2</sup> U.N.O.
- ALL WELDING ELECTRODES SHALL BE E43 TYPE AND COMPLY WITH BS EN ISO 2560 AND TESTED TO COP FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL STRUCTURAL STEEL SHALL BE CLEARED AND FREE OF SCALE AND RUST BEFORE WELDING AND GALVANIZATION.
- ALL STRUCTURAL STEELWORK SHALL BE HOT DIP GALVANIZED TO BS EN ISO 1461:2009 WITH MINIMUM THICKNESS OF 85 μm. DAMAGED AREA OF GALVANIZATION DUE TO SITE WELDING SHALL BE GROUND TO BARE METAL AND ONE COAT OF ZINC-RICH PRIMER AND 2 COATS OF ZINC CHROMATE PAINT SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S SPECIFICATION.
- CUTTING WELD BY PERFORMED BY GAS CUTTING, SHEARED OR HAND FLAME CUT EDGE IS NOT ALLOWED UNLESS APPROVED BY THE ENGINEER.
- ALL GALVANIZED STEEL SURFACE AREAS DAMAGED BY SITE WELDING OR OTHERWISE DUE TO SITE WELDING SHALL BE GROUND TO BARE METAL AND ONE COAT OF ZINC-RICH PRIMER TO BS 4552:1995.

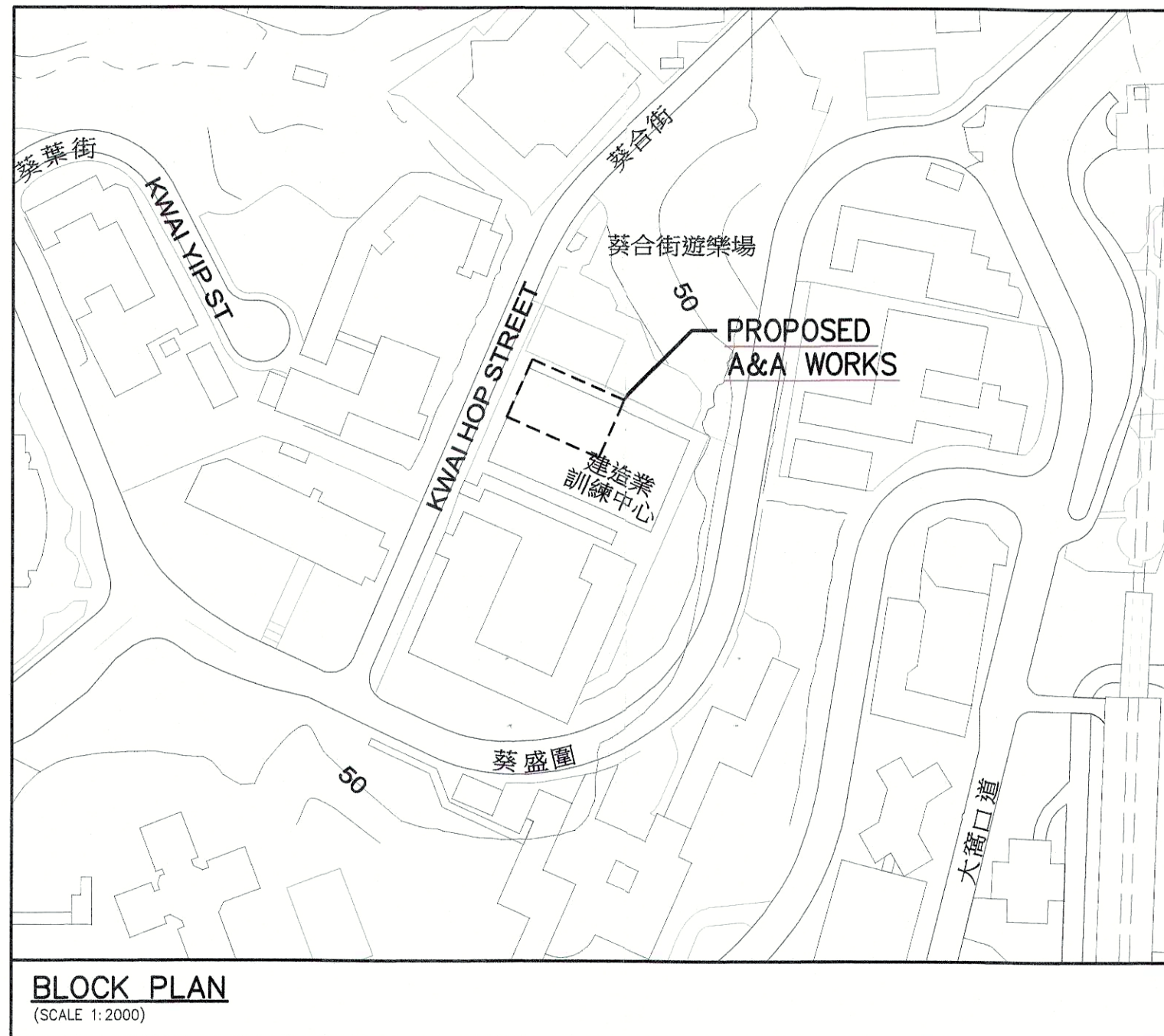
## NOTES ON HILTI ANCHOR BOLTS:

- ALL HILTI ANCHOR BOLTS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION.
- EMBEDMENT DEPTH OF HILTI ANCHOR BOLTS SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S SPECIFICATION WITH MINIMUM FACTOR OF SAFETY > 3.0. ALL DEPTH SHALL BE MEASURED FROM SOUND CONCRETE SURFACE.
- BEFORE DRILLING, EXACT LOCATION OF EXISTING REINFORCEMENT SHALL BE IDENTIFIED WITH A "COVERMETER" OR THE CONTRACTOR SHALL EXPOSED CONCRETE SURFACE TO LOCATE EXISTING REINFORCEMENT. DRILL HOLES SHALL AVOID EXISTING REINFORCEMENT.

TYPES	CLEARANCE (mm)	MIN. ANCHORAGE DEPTH (mm)	EFFECTIVE ANCHORAGE DEPTH (mm)	MINIMUM SPACING (mm)	MINIMUM EDGE DISTANCE (mm)	(CRACKED)			BD REF.
						TENSION (kN)	SHEAR (kN)	TENSION (kN)	
HST3-R M16	12	98	85	180	85	45.66	23.25	14.29	BD-AF 148



TYPICAL ANCHOR BOLT DETAIL (N.T.S.)



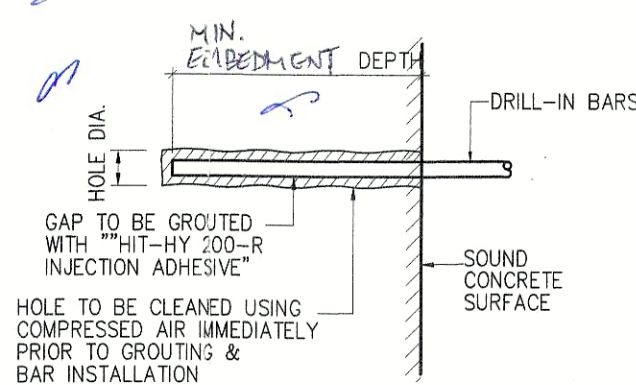
BLOCK PLAN (SCALE 1:2000)

## NOTES ON DRILLING IN AND GROUTING OF BAR:

- BEFORE DRILLING, EXACT LOCATION OF EXISTING REINFORCEMENT SHALL BE IDENTIFIED WITH A "COVERMETER" OR THE CONTRACTOR SHALL EXPOSED CONCRETE SURFACE TO LOCATE EXISTING REINFORCEMENT AND THIS SHALL BE INSPECTED BY THE ARCHITECT. DRILL HOLES SHALL AVOID EXISTING REINFORCEMENT.
- HOLES SHALL BE DRILLED WITH ROTARY PERCUSSION DRILL AND THEN WASHED AND FLUSHED CLEAN BY COMPRESSED AIR.
- GROUT SHALL BE HIT-HY 200-R AND BE USED IN STRICT COMPLIANCE WITH THE SUPPLIER'S SPECIFICATION.
- FOR VERTICAL HOLE: POUR GROUT INTO HOLE. INSERT BAR. MOVE THE BAR UP AND DOWN TO ENSURE THAT NO AIR IS TRAPPED.
- PRIOR TO THE GROUTING OF FURTHER REINFORCEMENT ONE BAR OF EACH DIAMETER SHALL BE INSTALLED AND PROOF LOAD TESTED TO THE LOAD AS SPECIFIED BY THE MANUFACTURER.
- ALL DEPTH SHALL BE MEASURED FROM SOUND CONCRETE SURFACE.

## DRILL IN REBAR SPECIFICATION WITH HIT-HY 200-R (BD-AF 154) (FOR CRACKED CONCRETE)

BAR DIA.	HOLE DIA.	MIN. EMBEDMENT DEPTH (mm)	MIN. EMBEDMENT DEPTH (mm)	WORKING LOAD (kN)	ULTIMATE LOAD & TEST LOAD (kN)
10	12	40	40	12.5	12.9
16	20	40	40	12.5	12.9



DRILL-IN BAR DETAILS (N.T.S.)

## NOTES FOR DEMOLITION:

- GENERAL DEMOLITION PROCEDURES:
  - THE DEMOLITION CONTRACTOR IS REQUIRED TO STRICTLY FOLLOW WITH THE FOLLOWING STEPS / PROCEDURES:
    - DEMOLITION WORKS SHALL GENERALLY COMPLY WITH THE BUILDING (DEMOLITION) REGULATIONS AND BS6187-1982, FNAP (APP-21) LATEST EDITIONS AND THE CODE OF PRACTICE FOR DEMOLITION OF BUILDINGS 2004 ISSUED BY THE BUILDINGS DEPARTMENT.
    - DEMOLITION SHALL BE CARRIED OUT FRAME CUTTING OR UNSCREWING THE BOLT. OXY-ACETYLENE TORCH MAY BE USED TO CUT THE STEEL SECTION.
    - THE DEMOLITION OF THE INDIVIDUAL ELEMENTS SHALL FOLLOW THE "DETAILED PROCEDURES FOR DEMOLITION OF INDIVIDUAL ELEMENTS" SHOWN ON THE DEMOLITION DRAWINGS AS LISTED BELOW.
      - REMOVAL OF STEEL SECTION:
        - THE STRUCTURAL ELEMENT SUCH AS COLUMN, SECONDARY AND MAIN BEAM SHALL BE REMOVED BY FRAME CUTTING BY OXY-ACETYLENE FLAME. PRIOR TO CUTTING, THE MEMBERS SHALL BE FIRED BY WRES AT BOTH ENDS. THE DETACHED MEMBER SHALL THEN BE LIFTED UP AND CARRIED (GRADUALLY BY MOBILE CRANE).
  - METHOD OF DEMOLITION:
    - THE DEMOLITION OF THE EXISTING BUILDINGS SHALL BE PROCEED BY HAND CUTTING WITH OXY-ACETYLENE FLAME AND HAND HELD HYDRAULIC BREAKER.

Plan Approved

AU Wing-hung  
Chief Building Surveyor  
for BUILDING AUTHORITY  
22 DEC 2017

FOR B.D.

CLIENT: CONSTRUCTION INDUSTRY COUNCIL 建築業議會

STRUCTURAL ENGINEER: DAVID S. K. AU & ASSOCIATES LTD.

QUANTITY SURVEYOR: DAVID S. K. AU & ASSOCIATES LTD.

REV. DATE DESCRIPTION DWN CHK APP

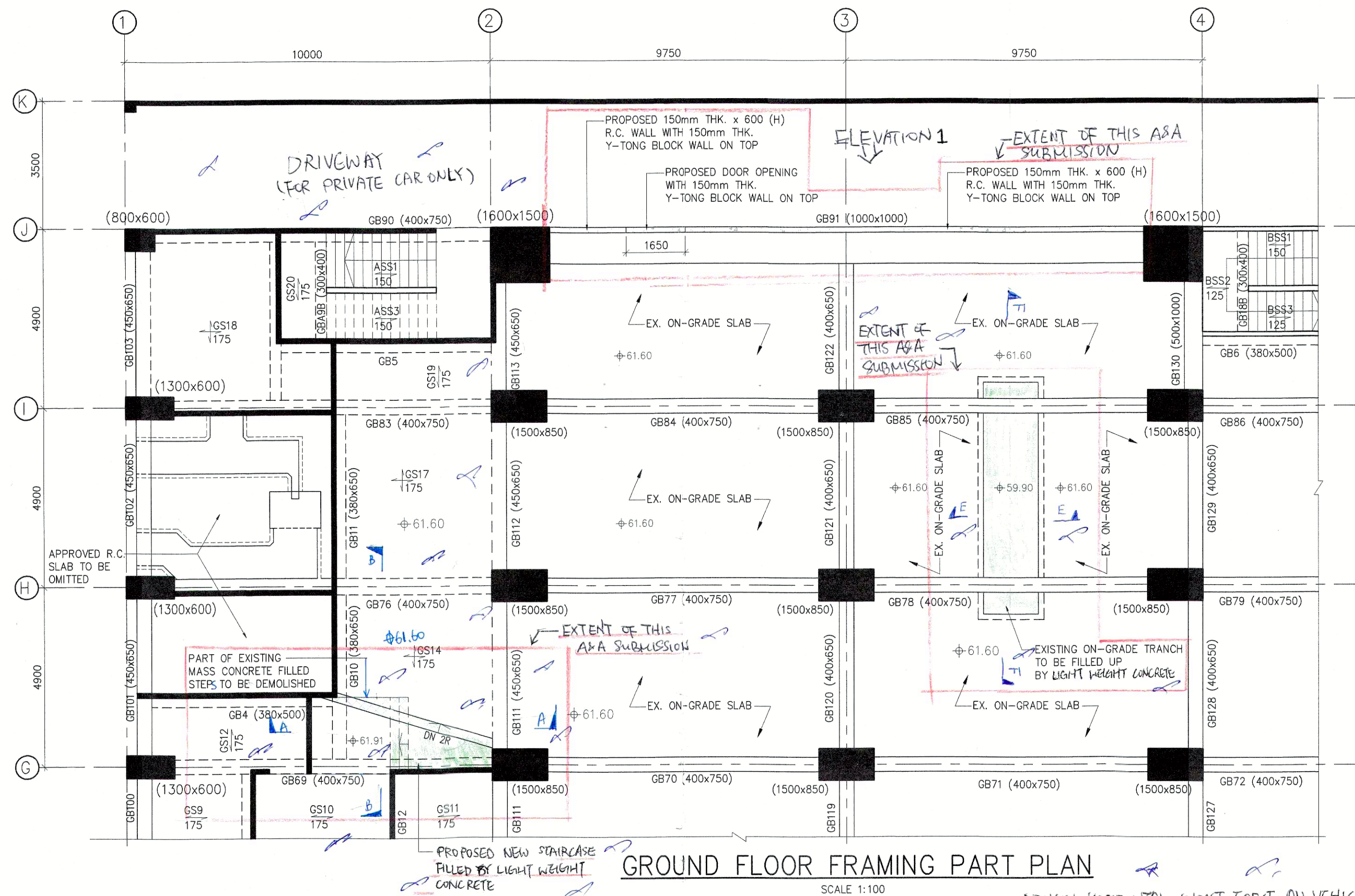
Note: This plan has been processed on a curtailed check basis under the centralized processing system as promulgated in PNAP A2016-18. The duties of the authorized person, registered structural engineer and/or registered geotechnical engineer concerned as specified under section 4(3)(b) and the provision of section 14(2)(c) of the Buildings Ordinance are of particular relevance in this regard.

FOR BUILDING AUTHORITY'S OFFICIAL USE

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

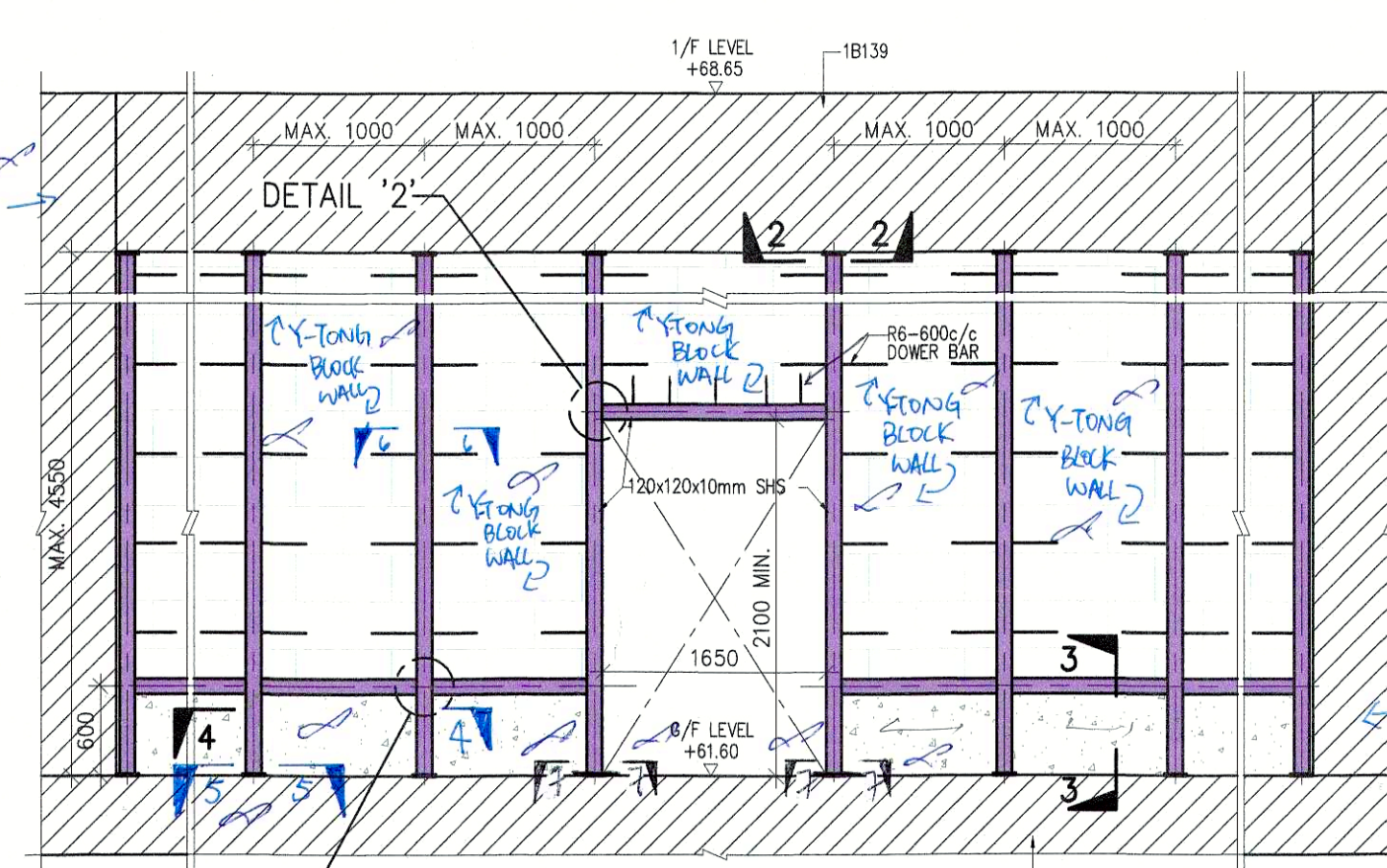
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG.  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dsd.com.hk  
CAD PATH: C:\Users\AUWING\Documents\PROJECTS\2017\2017-12\2017-12-22\2017-12-22-01\2017-12-22-01.dwg  
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PROJECT: PROPOSED A&A WORKS  
DRAWING TITLE: KWAI CHUNG TRAINING CENTRE  
AT 7-11 KWAI HOP STREET, KWAI CHUNG, N.T.  
BLOCK PLAN, NOTES, LEGEND, CALCULATIONS, SCHEDULES, PART G/F PLAN & PART ELEVATION  
DRAWING NO: AA-01  
PROJECT NO.: DA17003  
B.D. REF.:  
F.S.D. REF.:  
AU SHIU KIN  
MSc, CEng, MInstE, MIMKE, RPE  
Authorized Person  
Registered Structural Engineer





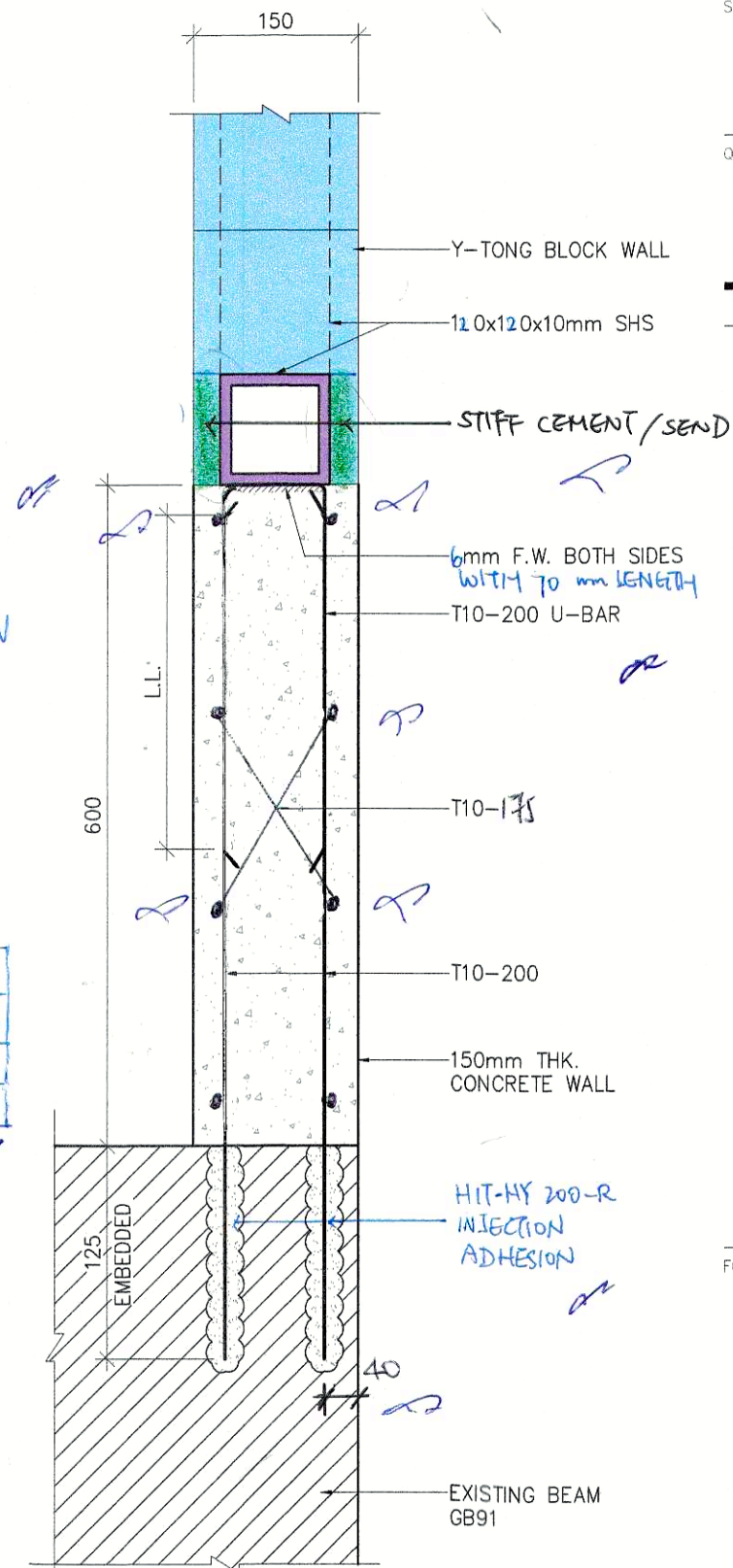
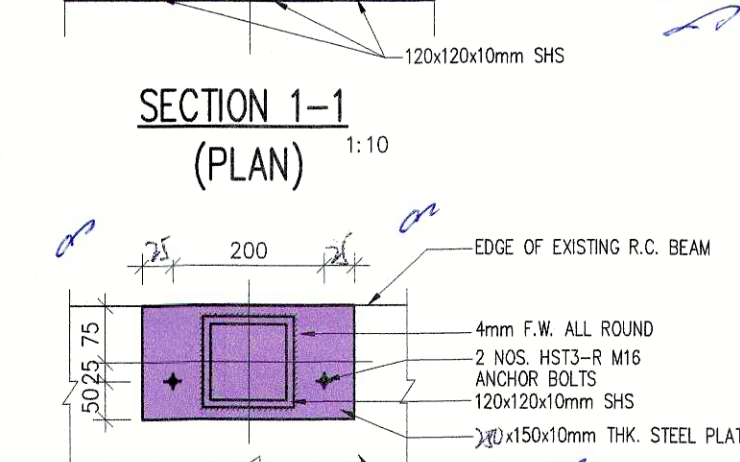
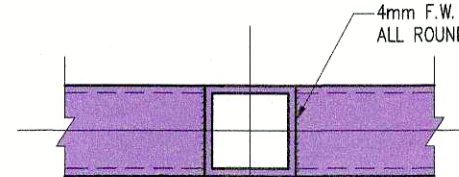
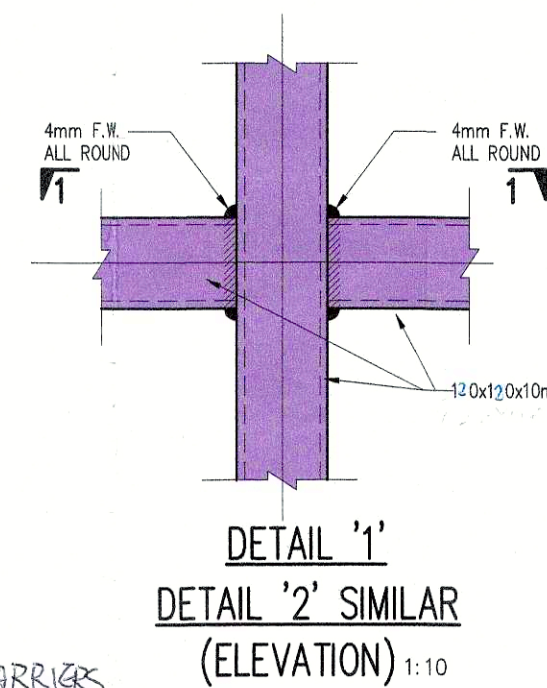
GROUND FLOOR FRAMING PART PLAN

SCALE 1:100



TYPICAL ELEVATION OF Y-TONG BLOCK WALL WITH OPENING (OR EQUIVALENT LIGHT WEIGHT BLOCK WALL)

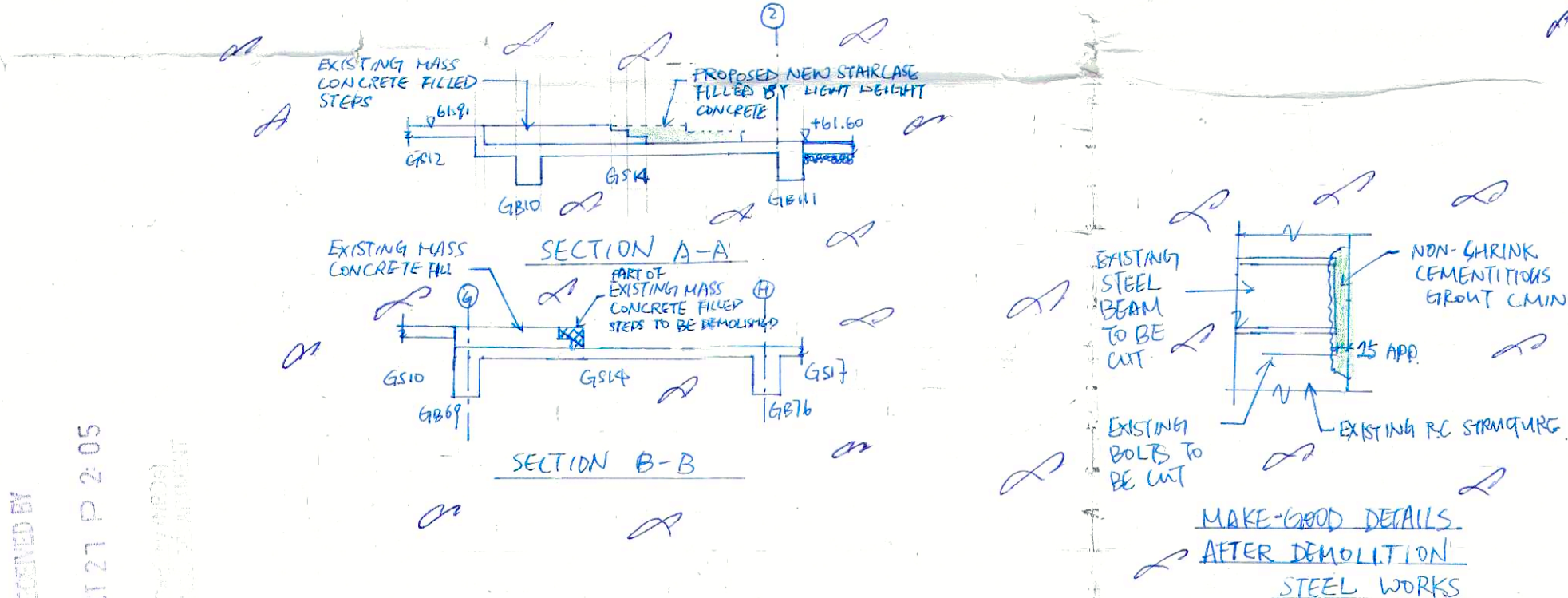
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120x120x10mm SHS	S255 JO
25x10x10mm THK PLATE	S275 JO
450x150x10mm THK PLATE	S275 JO



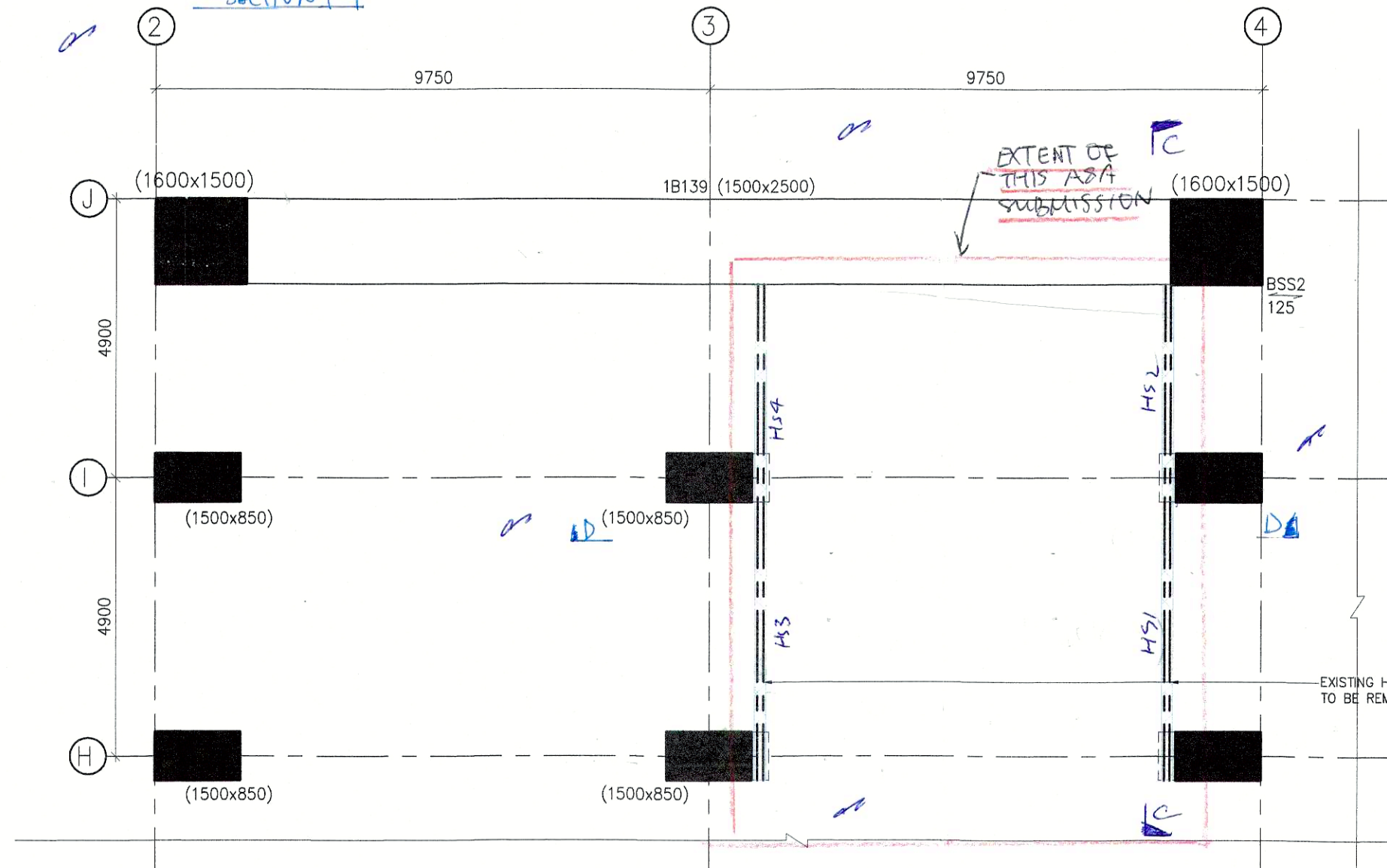
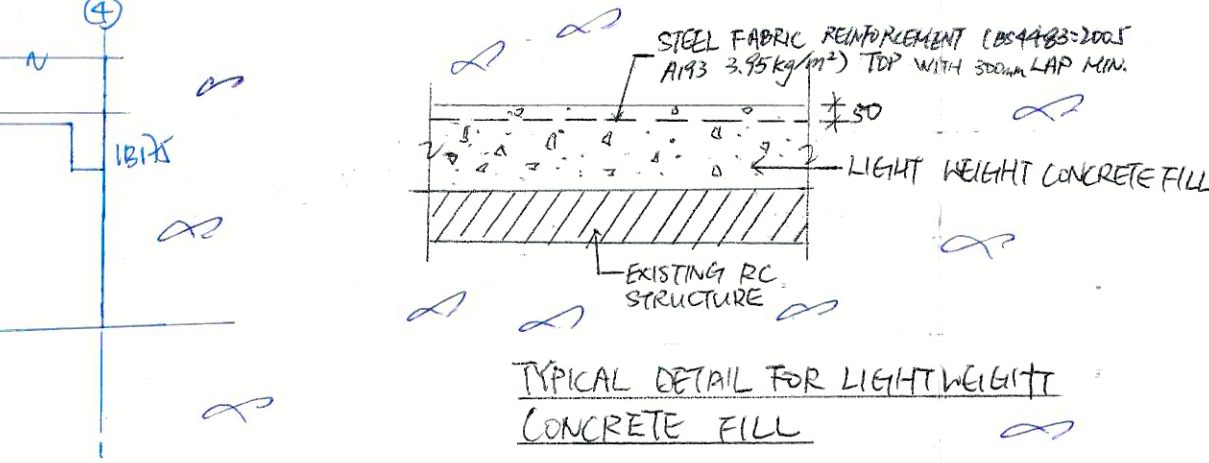
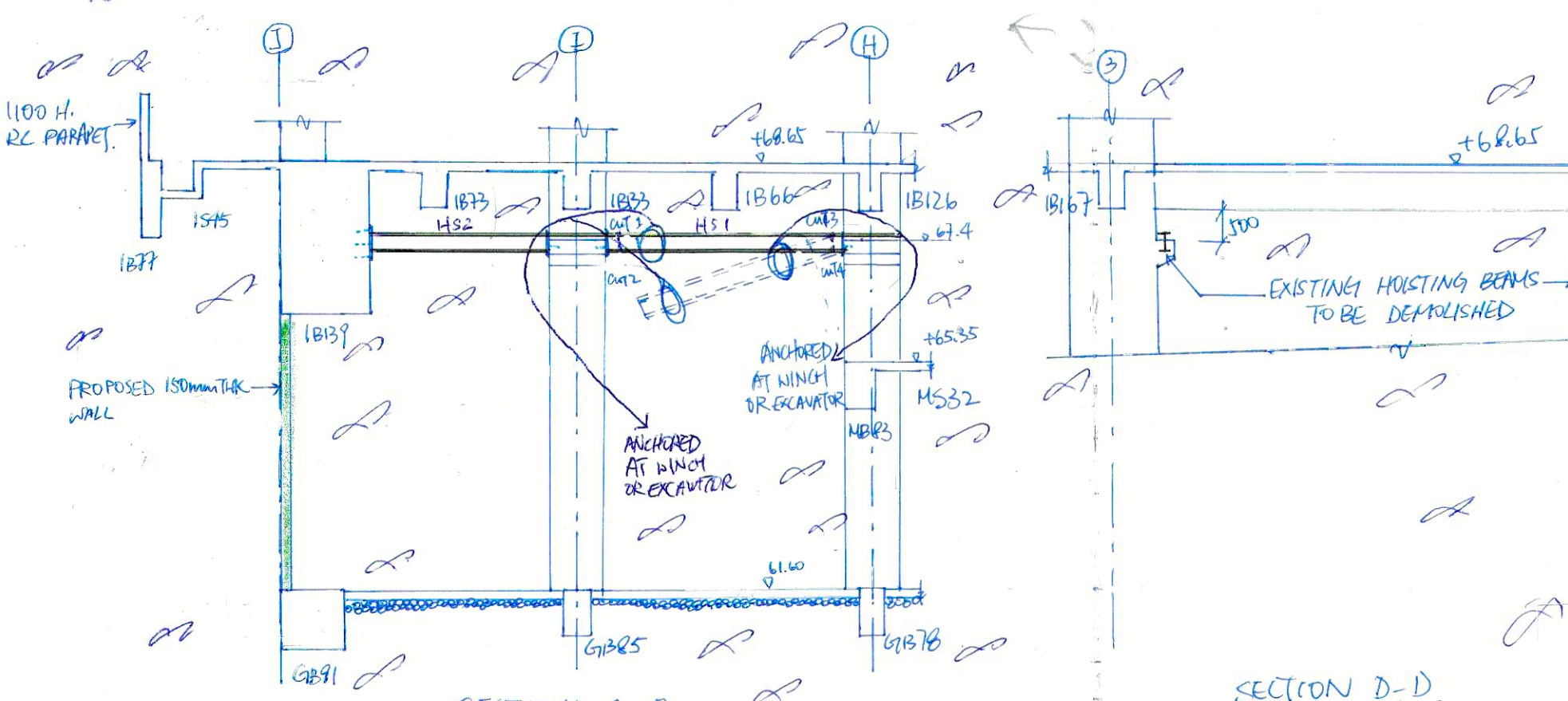
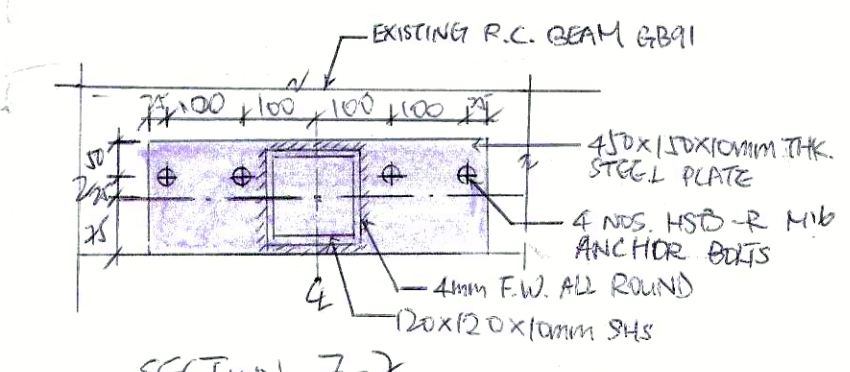
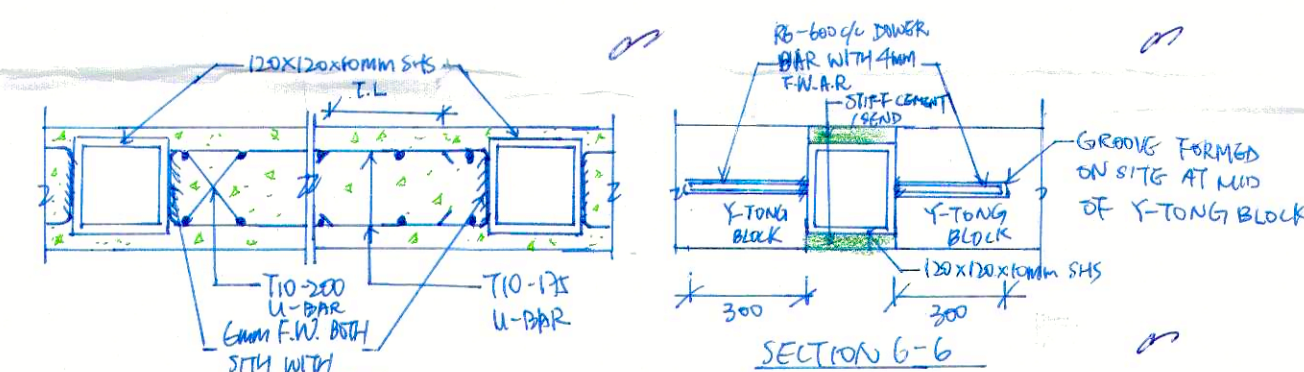
SECTION 3-3

Note: This plan has been processed on a curtailed check basis under the centralized processing system as promulgated in PNAP ADM-19. The duties of the authorized person, registered structural engineer and/or registered geotechnical engineer concerned as specified under section 4(3)(b) and the provision of section 14(2)(c) of the Buildings Ordinance are of particular relevance in this regard.

FOR BUILDING AUTHORITY'S OFFICIAL USE



DESIGN HORIZONTAL IMPACT FORCE ON VEHICLE BARRIERS (NEW PROPOSED EXTERNAL WALL)  
1. LOADS COMPLY WITH CLAUSE 3.8.3 OF CODE OF PRACTICE FOR DEEP AND FINISHED GRADES 2011.  
2. FOR PROPOSED EXTERNAL WALL:  
a)  $\phi = 0$  FOR RIGID BARRIERS.  
b) TAKING CLASS GA FOR THE DRIVEWAY  
c) DESIGN BUMPER HEIGHT ABOVE FLOOR LEVEL = 600mm.  
d) IN CASE OF BARRIERS ADJACENT TO THE DRIVEWAY, THE HORIZONTAL IMPACT FORCE SHALL BE HALF (1/2) THE DIRECTION OF THE FORCE IS TAKEN AS NORMAL TO AND UNIFORMLY DISTRIBUTED OVER BUMPER HEIGHT.



FRAMING PART PLAN AT +67.40mPD

SCALE 1:100

DAVID S.K. AU & ASSOCIATES LTD.

15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dsol.com.hk  
CAD PATH: C:\Users\au\Documents\New Folder\DWG\AA-02.dwg  
SCALE: 1:100  
PROJECT: PROPOSED A&A WORKS

PROPOSED A&A WORKS  
KWAI CHUNG TRAINING CENTRE  
AT 7-11 KWAI HOP STREET, KWAI CHUNG, N.T.

DRAWING TITLE  
PART G/F FRAMING PLAN & DETAILS

DRAWING NO.  
AA-02  
PROJECT NO.  
DA17003  
B.D. REF.  
P.D. REF.

Plan Approved  
AU Wing-hung  
Chief Building Surveyor  
for BUILDING AUTHORITY  
22 DEC 2017

FOR B.D.

AU SHIU KIN  
MSc, Eng, MStruE, MKHIE, RPE  
Authorized Person  
Registered Structural Engineer





# TENDER DRAWINGS (BUILDING SERVICES WORKS)

FOR

## MAIN CONTRACTOR

FOR

## RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC)

AT

## KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL

NOTES:

1. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
2. MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
3. UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
4. UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
5. ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: D:\PROJECTS\SETC AT KWAI CHUNG CC\BMS\CONSTRUCTION DRAWINGS\EL\20180118\_UPDATE\BS-001.DWG

SCALE: N.T.S.

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
COVER

DRAWING NO.	REV.
-	-
PROJECT NO.	DA17003



REV.	DATE & DESCRIPTION	DRN	CHK	APP
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DA17003 TENDER DRAWING LIST FOR MAIN CONTRACT OF CIC SETC

TYPE	DRAWING NO.	TITLE
GENERAL	BS-001	DRAWING LIST
	BS-101	DEMOLITION PLAN FOR G/F
	BS-102	DEMOLITION PLAN FOR M/F
MVAC	AC-001	LEGEND, ABBREVIATIONS AND GENERAL NOTES
	AC-002	ELECTRICAL CONTROL DIAGRAM FOR MOTOR CONTROL PANEL
	AC-101	MVAC LAYOUT PLAN
	AC-102	SECTION DRAWING FOR MVAC INSTALLATION AND LAYOUT PLAN FOR M/F STORE ROOM
	AC-201	INSTALLATION DETAILS
ELECTRICAL	EL-001	GENERAL NOTES, LEGEND, ABBREVIATIONS, CABLE SCHEDULE, LIGHTING SCHEDULE & MCB BOARD DETAILS
	EL-002	SCHEMATIC DIAGRAM FOR ELV SYSTEM
	EL-101	LIGHTING LAYOUT PLAN
	EL-201	POWER LAYOUT PLAN FOR G/F
	EL-202	POWER LAYOUT PLAN FOR M/F
	EL-301	ELV LAYOUT PLAN
	EL-401	TYPICAL INSTALLATION DETAILS
FIRE SERVICES	FS-001	F.S. NOTES, GENERAL NOTES, ABBREVIATIONS, LEGEND, SCHEMATIC DIAGRAM & INSTALLATION DETAILS
	FS-101	FIRE SERVICES LAYOUT PLAN
EXISTING	F821152/M280/FP/S1	SCHEMATIC DIAGRAM FOR SPRINKLER SYSTEM (FOR REFERENCE ONLY)
FIRE SERVICES	F821152/M280/FP/S2	SCHEMATIC DIAGRAM FOR FH/HR SYSTEM (FOR REFERENCE ONLY)
RECORD DRAWING	F821152/M280/FP/L3	FIRE SERVICE LAYOUT FOR LG/F (FOR REFERENCE ONLY)
(FOR REFERENCE ONLY)	F821152/M280/FP/L4	FIRE SERVICE LAYOUT FOR G/F (FOR REFERENCE ONLY)
	F821152/M280/FP/L5	FIRE SERVICE LAYOUT FOR M/F (FOR REFERENCE ONLY)

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

dca

DAVID S.K. AU & ASSOCIATES LTD.

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CAD PATH: 

PROJECT/DAVIDS SITE AT NEW QUAYS CC/SHIMMU CONSTRUCTION/DRAWINGS/EL/20180118 UPDATE/BS-002.DWG

SCALE

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
DRAWING LIST FOR  
BUILDING SERVICES  
INSTALLATIONS

DRAWING NO.  
BS-001

REV.  
-

PROJECT NO.  
DA17003

LEGEND:

- LIGHTING SWITCH  
= FLUORESCENT LIGHT FITTING  
13A SOCKET OUTLET  
13A TWIN SOCKET OUTLET  
13A WEATHERPROOF SOCKET OUTLET  
5-PIN INDUSTRIAL TYPE SOCKET OUTLET  
ISOLATING SWITCH  
F FUSED SPUR UNIT

- ⓔ EMERGENCY STOP BUTTON  
⊗ INDICATION LAMP  
⊗ OSCILLATING FAN  
⊗ PROPELLER FAN  
⊗ AXIAL FAN

- [H.R.] HOSE REEL FOR FIRE SERVICE / CLEANSING WATER  
[DRINK] DRINKING FOUNTAIN

NOTE:

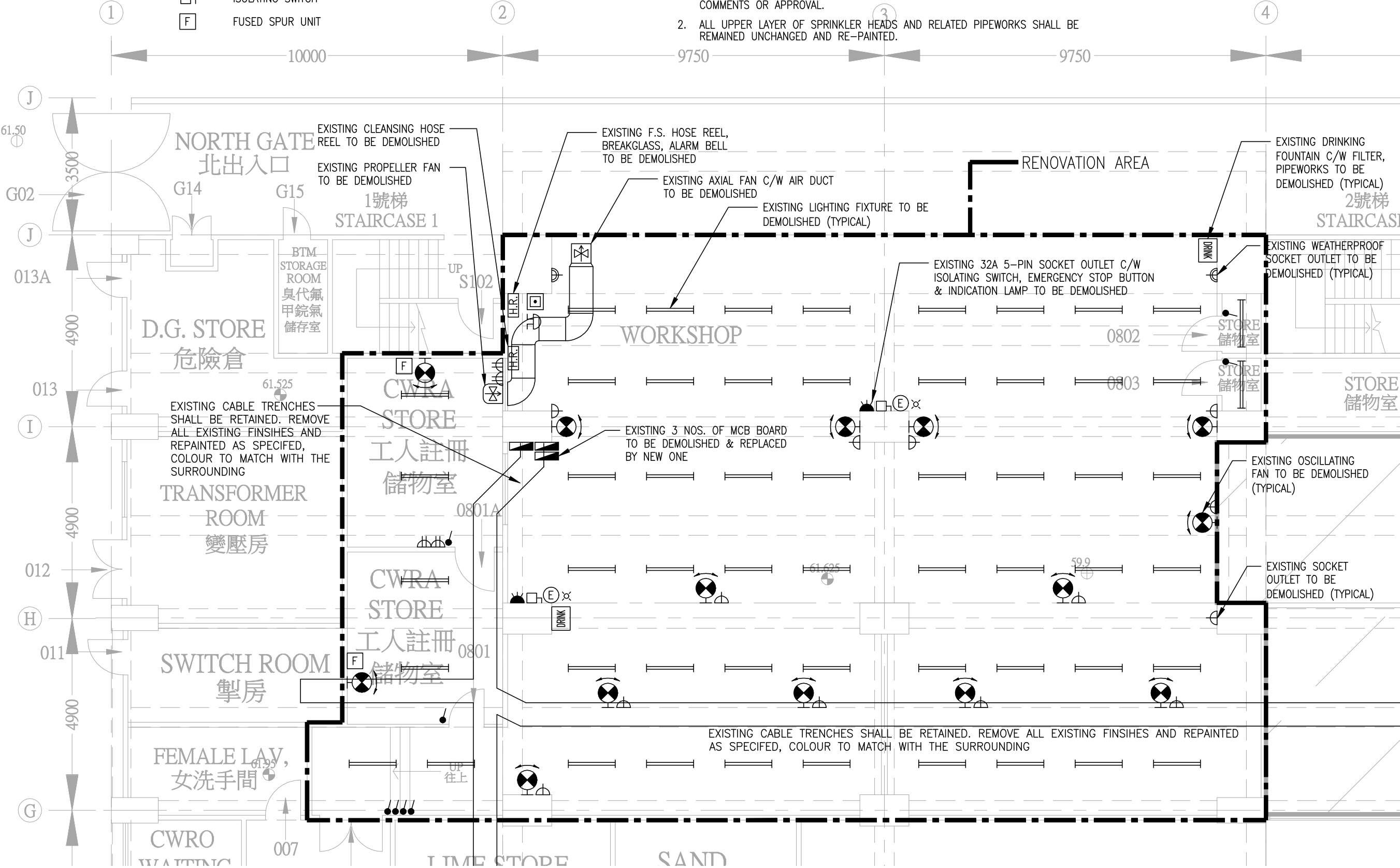
- THIS DRAWINGS FOR THE DEMOLITION WORKS IS FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION OF ALL THE EXISTING E&M INSTALLATION ON THE SITE UNLESS OTHERWISE SPECIFIED. PRIOR TO THE WORKS, THE CONTRACTOR SHALL SUBMIT A SURVEY REPORT TO SHOW ALL THE ITEMS TO BE DEMOLISHED FOR THE ARCHITECT'S COMMENTS OR APPROVAL.
- ALL UPPER LAYER OF SPRINKLER HEADS AND RELATED PIPEWORKS SHALL BE REMAINED UNCHANGED AND RE-PAINTED.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	WKS	BK

- NOTES:
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ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**da** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dool.com.hk  
CAD PATH:   
SCALE: 1:100  
PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)  
DRAWING TITLE: DEMOLITION PLAN FOR G/F

DRAWING NO.	REV.
BS-101	-
PROJECT NO.	DA17003

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	WKS	BK

NOTES:

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TENDER DRAWING

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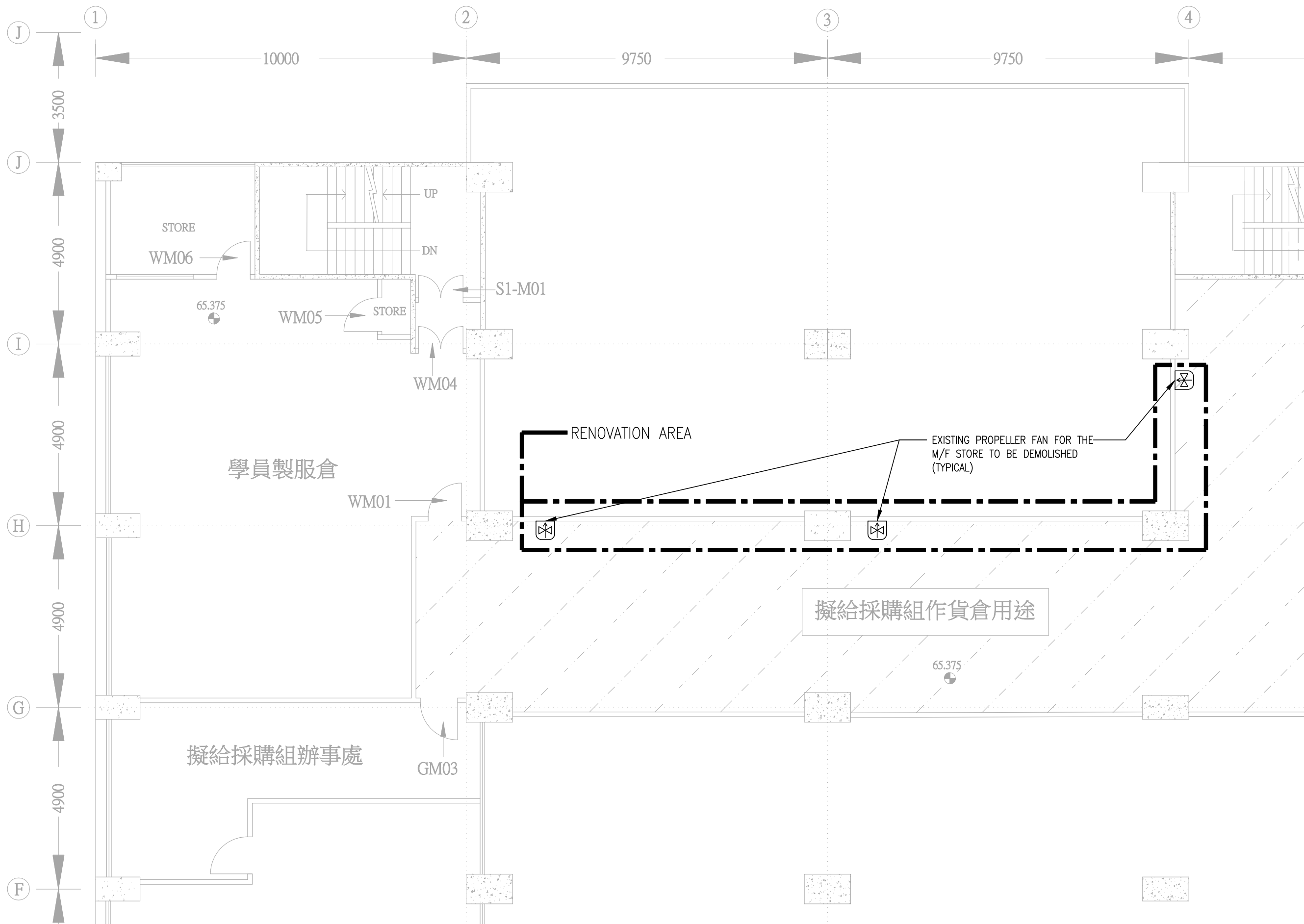
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: PROJECT/WORKS SITE AT NEW CHINA SQUARE CONSTRUCTION DRAWING/BS-1017003 UPDATE  
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
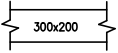














PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
DEMOLITION PLAN FOR M/F

DRAWING NO.	REV.
BS-102	-
PROJECT NO.	DA17003



LEGEND

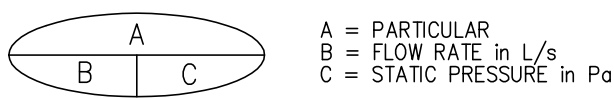
	SUPPLY AIR DUCT / PRIMARY AIR DUCT / FRESH AIR DUCT
	RETURN AIR DUCT / EXHAUST AIR DUCT / TRANSFER AIR DUCT
	SPLITTER DAMPER
	RECTANGULAR AIR DUCT (300 WIDE x 200 DEEP) AIRWAY SIZE
	OPPOSED BLADE VOLUME CONTROL DAMPER
	MOTOR CONTROL PANEL
	ROOM TYPE THERMOSTAT (WALL MOUNTED)
	AC OUTDOOR UNIT (VRV FOR PAU; SPLIT TYPE FOR OTHERS)
	CONDENSING WATER DRAIN
	REFRIGERANT PIPES FOR AC SYSTEM
	CENTRIFUGAL FAN
	CEILING MOUNTED CASSETTE TYPE INDOOR UNIT
	MIDDLE/HIGH PRESSURE DUCT TYPE SPLIT AC INDOOR UNIT
	250 WIDTH LINEAR AIR GRILLE
	300x500 DOUBLE DEFLECTION FRESH AIR DIFFUSER C/W VCD
	600x600 RETURN AIR LOUVRE
	RETURN AIR GRILLE C/W ALUMINIUM FILTER
	MOTORIZED ON/OFF DAMPER

ABBREVIATIONS

T/A	TO ABOVE
F/A	FROM ABOVE
T/B	TO BELOW
F/B	FROM BELOW
H/L	HIGH LEVEL
M/L	MID LEVEL
L/L	LOW LEVEL
C/W	COMPLETE WITH
FRP	FIRED RATED PERIOD
F.D.	FUSEBLE LINK FIRE DAMPER
PAD	PRIMARY AIR DUCT
EAD	EXHAUST AIR DUCT
FAD	FRESH AIR DUCT

F.A.	FRESH AIR
R.A.	RETURN AIR
E.A.	EXHAUST AIR
L/S	AIR QUANTITY (LITRES/SECOND)
PAU	PRIMARY AIR UNIT
EAF	EXHAUST AIR FAN
FAF	FRESH AIR FAN
WP	WEATHERPROOF
WPL	WEATHERPROOF LOUVRE
RP	REFRIGERANT PIPE
CDP	CONDENSATE DRAIN PIPE
FAG	FRESH AIR GRILLE
SAD	SUPPLY AIR DUCT
RAD	RETURN AIR DUCT
A.P.	ACCESS PANEL

EQUIPMENT NOTATION :



GENERAL NOTES

- THE DRAWINGS AS SHOWN ARE FOR DESIGN INTENT ONLY.
- ALL DIMENSIONS ARE IN MM. DO NOT SCALE THE DRAWINGS.
- UNLESS OTHERWISE NOTED, ALL EXTERNAL LOUVRES SHALL BE WEATHERPROOF TYPE AND COMPLETE WITH WIRE MESH
- ALL CONDENSATE DRAIN PIPE DIRECTLY CONNECTED TO THE WASTE WATER PIPE SHALL HAVE ANTI-SYPHONIC TRAPS.
- AN EMERGENCY STOP SWITCH SHALL BE INSTALLED ADJACENT TO EACH MOTOR.
- THE CONTRACTOR SHALL ENSURE THAT ALL THE OFFERED EQUIPMENT CAN BE POSITIONED IN THE SPACE PROVIDED WITH ADEQUATE CLEARANCE FOR MAINTENANCE.
- THE CONTRACTOR SHALL SUPPLY AND INSTALL FIRE DAMPERS FOR AIR DUCTS, EXCEPT FIRE RATED AIR DUCT, PASSING THROUGH FIRE RATED WALLS /SLABS IN ORDER TO FULFILL THE REQUIREMENTS OF F.S.D. AND B.D.
- AIR TIGHT ACCESS PANELS SHOULD BE PROVIDED FOR SPLIT AC INDOOR UNITS, AIR DUCTS ADJACENT TO FIRE DAMPERS, INLET AND DISCHARGE SIDE OF EQUIPMENT AND EVERY 15m OF STRAIGHT RUN AIR DUCT WHERE NO AIR GRILLES ARE INSTALLED.
- ALL FIRE RATED ENCLOSURE SHALL BE IN COMPLIANCE WITH BS476 PARTS 20 TO 24 AND SHALL BE APPROVED BY F.S.D. AND B.D.
- ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COMPLETED WITH OPPOSED BLADE VOLUME CONTROL DAMPERS.

- ALL SPACE THERMOSTATS/SWITCHES SHALL BE MOUNTED AT 1350 A.F.F.L. UNLESS OTHERWISE NOTED.
- POSITION OF GRILLES AND DIFFUSERS ARE SHOWN FOR INDICATIVE PURPOSE ONLY. EXACT SETTING OUT SHALL REFER TO APPROVED REFLECTED CEILING PLAN.
- THE DUCT DIMENSION SHOWN ON THE DRAWING ARE THE NET SIZE EXCLUDING INTERNAL LINING & EXTERNAL INSULATION THICKNESS.
- THE SIZES OF DIFFUSERS, GRILLES & LOURVES AS SHOWN ON DRAWINGS ARE THE NECK SIZE ONLY UNLESS OTHERWISE SPECIFIED.
- THE CONTRACTOR SHALL CHECK THE NOISE DATA OF EQUIPMENT /MATERIAL OFFERED AND SHALL INSTALL SOUND ATTENUATORS WHERE NECESSARY TO MEET THE NOISE CRITERIA AS SPECIFIED IN THE SPECIFICATION.
- THE CONTRACTOR SHALL SELECT SILENCERS FOR ALL FANS AND AIR HANDLING EQUIPMENT AT SUCTION AND DISCHARGE SIDES TO ACHIEVE THE SPECIFIED ROOM AND EXTERNAL ACOUSTIC LEVELS BASED ON THE EQUIPMENT OFFERED NO MATTER THE SILENCERS ARE SHOWN OR NOT SHOWN ON DRAWINGS OR SCHEMATIC TO MEET THE ACOUSTIC REQUIREMENT AS SPECIFIED.
- THE CONTRACTOR SHALL CALCULATE THE EXACT PRESSURE REQUIRED ACCORDING TO THE EQUIPMENTS OFFERED AND THE FINAL SERVICES ROUTING AND SUBMIT ALL CALCULATIONS FOR APPROVAL.
- THE COLOUR AND SURFACE FINISH OF THE GRILLE/LOUVRE SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL BEFORE MATERIAL ORDERING. UNLESS OTHERWISE SPECIFIED SURFACE FINISH SHALL BE IN BAKED ENAMEL PAINT.
- SIZES AND TYPES OF POWER CABLES AND CONTROL CABLES SHALL BE SELECTED BY THE CONTRACTOR ACCORDING TO IEE REGULATION AND LOCAL REGULATION AND SHALL BE SUBMITTED FOR APPROVAL BEFORE ORDERING.
- ALL CONTROL AND POWER CONDUITS SHALL BE OF CONCEALED TYPE. SURFACE CONDUIT SHALL BE USED ABOVE FALSE CEILINGS AND INSIDE PLANT ROOMS, OR LOCATIONS APPORVED BY THE ARCHITECT.
- ALL FRESH AIR INTAKE LOURVES AND RETURN AIR LOUVRES SHALL BE COMPLETED WITH 50mm THICK WASHABLE TYPE ALUMINIUM FILTER.
- ACCESS PANEL SHALL BE PROVIDED ON THE DUCTWORK WHERE CONNECTED TO THE WEATHERPROOF LOUVRE FOR FUTURE CLEANING AND MAINTENANCE.
- ALL DUMMY LOUVRE SHALL BE BLANKED OFF WITH STEEL PLATE OF COLOUR BY CONTRACTOR AND APPROVED BY THE ARCHITECT.
- THE DIMENSION AND POSITION OF ACCESS PANEL FOR EQUIPMENT SHALL BE PROPOSED BY THE CONTRACTOR FOR APPROVAL.
- ALL DUCTWORK BRANCHES SHALL BE C/W SPLITTER DAMPER.
- FIRE DAMPER WITH ACCESS PANEL SHALL BE INSTALLED WHERE AIR DUCT, EXCEPT FIRE RATED AIR DUCT, PENETRATES THROUGH FIRE COMPARTMENTATION WALL OR FLOOR SLAB.
- THE MOTOR RATINGS SHOWN ARE FOR GUIDANCE ONLY. THE ACTUAL RATING DEPENDS ON FINAL EQUIPMENT SELECTION AND SUBMISSION.
- CONDENSATE DRAIN SHALL HAVE A FALL OF NOT LESS THAN 1 IN 100.
- ALL PIPEWORK/DUCTWORK PASSING THROUGH STRUCTURAL MOVEMENT JOINTS SHALL BE PROVIDED WITH PIPE/DUCTWORK EXPANSION JOINTS OF 20MM MOVEMENT IN ALL DIRECTIONS.
- ALL PIPEWORK SHALL BE THOROUGHLY CLEANED AND ONE COAT OF PRIME PAINT SHALL BE AFFIXED BEFORE COVERING THERMAL INSULATION.
- UNLESS OTHERWISE SPECIFIED, THE SIZE OF CONDENSATE DRAIN PIPE SHALL BE Ø25.

USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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- NOTES:
- THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
  - MEASUREMENTS TO EXISTING WORKS TO BE CHECKED ON SITE BY CONTRACTOR.
  - UNLESS OTHERWISE INDICATED ALL LEVELS ARE RELATIVE TO HONG KONG PRINCIPAL DATUM.
  - UNLESS OTHER DRAWINGS EXTRACT FROM THE ORIGINAL APPROVED BUILDING LAYOUT PLANS FOR EXACTLY LAYOUT SHOULD BE CHECKED ON SITE.
  - ADEQUATE TEMPORARY MEASURES TO BE PROVIDED TO FENCE OFF THE WORK SITE FROM AREA IN USE.
  - ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER



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CAD PATH: 

PROJECT: 

RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

LEGEND, ABBREVIATIONS AND GENERAL NOTES

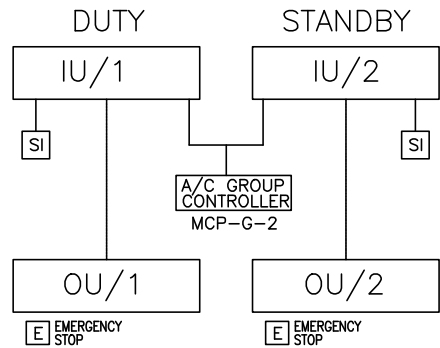
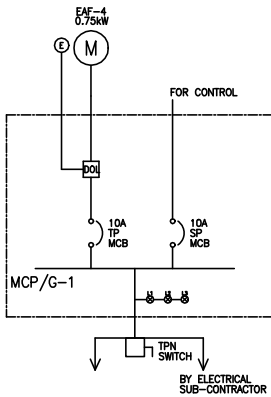
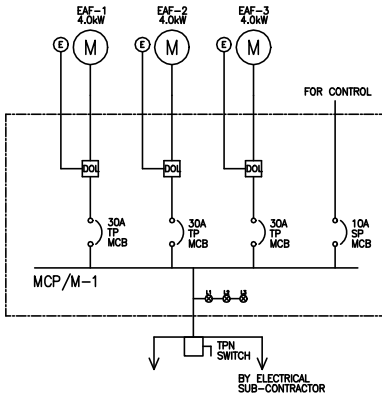
DRAWING NO.	REV.
AC-001	-
PROJECT NO.	DA17003

NOTES:

1. ALL CONTROL ACCESSORIES AND DRY CONTACTS FOR CONTROLLING EQUIPMENT SHALL BE HOUSED IN THE CORRESPONDING MCP.
2. THE ARRANGEMENTS SHOWN ARE INDICATIVE ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DESIGN THE MCPs AND ASSOCIATED PROTECTIVE DEVICES/CABLES TO SUIT THEIR OFFERED EQUIPMENT.
3. ALL EQUIPMENT WHICH ARE LOCATED AT OUTDOOR SHALL BE OF WEATHER-PROOF TYPE.
4. THE MCP SHALL BE OF WALL MOUNTED TYPE.
5. THE CONTRACTOR SHALL SIZE ALL POWER CABLES CONSIDERING THE FOLLOWING FACTORS TO ENSURE THAT THE CABLES HAVE SUFFICIENT RATING FOR THEIR DUTIES.
  - a) GROUPING FACTOR
  - b) VOLTAGE DROP
  - c) AMBIENT TEMPERATURE
  - d) CURRENT RATING
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL ADDITIONAL CONDUITS, CABLE TRAYS, TRUNKINGS, CABLES AND ELECTRICAL EQUIPMENT/ACCESSORIES NOT SHOWN ON THE DRAWINGS BUT NECESSARY TO COMPLETE THE WHOLE POWER DISTRIBUTION SYSTEM AND CONTROL SYSTEM.
7. THE CONTRACTOR SHALL ENSURE THAT ALL EQUIPMENT HAS POWER FACTOR NOT LESS THAN 0.85 LAGGING.
8. CABLE COLOUR CODE COMPLY WITH LOCAL STANDARD SHALL BE ADOPTED.
9. ALL SWITCHGEARS SHALL BE SUITABLE FOR MOTOR LOAD AND HIGH STARTING CURRENT EQUIPMENT.

CABLE SCHEDULE

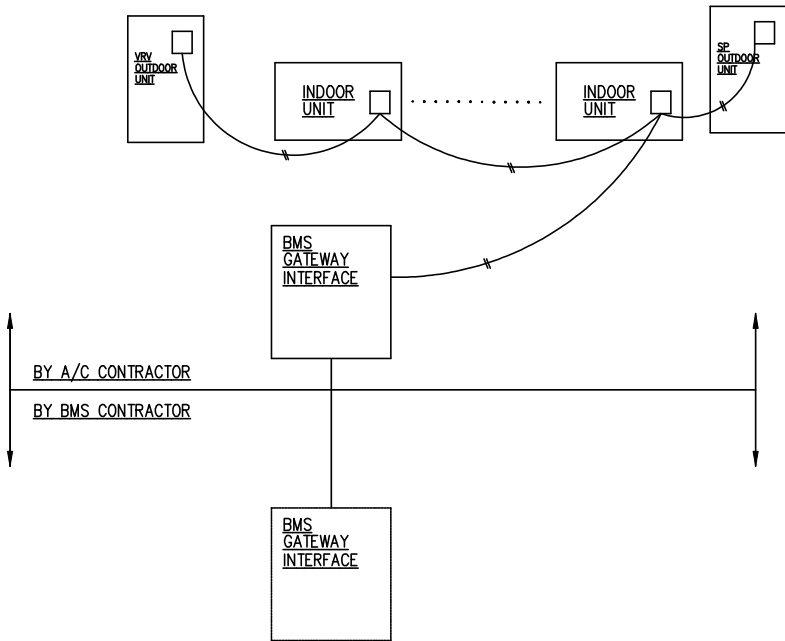
MOTOR RATING (kW)	CABLE DESCRIPTION	
	FROM MCB TO STARTER	FROM STARTER TO MOTOR
0.75	3X2.5mm <sup>2</sup> 1/C PVC Cu CABLE C/W CPC	3X2.5mm <sup>2</sup> 1/C PVC Cu CABLE C/W CPC
4.0	3X10mm <sup>2</sup> 1/C PVC Cu CABLE C/W CPC	3X10mm <sup>2</sup> 1/C PVC Cu CABLE C/W CPC



REMARK:

- THE AIR-CONDITIONING SYSTEM IN CCTV SERVER ROOM SHOULD GENERALLY HAVE THE FOLLOWING FUNCTIONS:
  - 1) SET TEMPERATURE TO BE CONTROLLED BY A REMOTE CONTROLLER
  - 2) PROVISION OF ROTATION FUNCTION FOR DUTY CYCLE AND CUT-IN FUNCTION. CUT-IN TEMPERATURE SET AT SET TEMP.(25°C) + 4°C AND STANDBY UNIT WILL BE OPERATED AUTOMATICALLY UNDER ROOM TEMPERATURE HIGHER THAN CUT-IN TEMPERATURE.
  - 3) STANDBY UNIT SHOULD BE SWITCHED "ON" AUTOMATICALLY WHENEVER ANY DUTY UNIT IS FAILED OF WHATEVER REASONS AND SWITCHED "OFF" AUTOMATICALLY WHEN DUTY UNIT RESUMES TO NORMAL.
  - 4) HIGH LOW REFRIGERANT PRESSURE SAFETY CUTOUT

CONTROL DIAGRAM FOR NEW SPLIT TYPE A/C UNIT AT CCTV SERVER ROOM



BMS CONTROL SCHEMATIC DIAGRAM FOR SPLIT TYPE AND VRF AC UNITS (FOR REFERENCE ONLY)

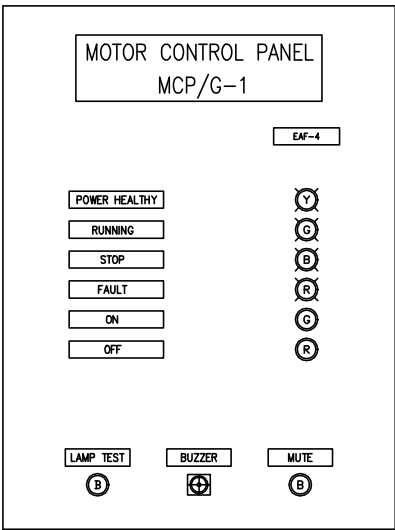
USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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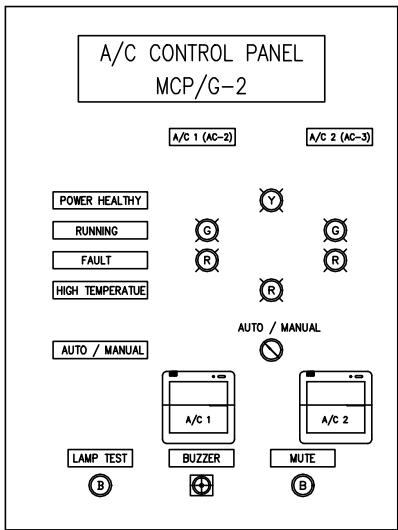
REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	SG	SKY	BK

NOTES:

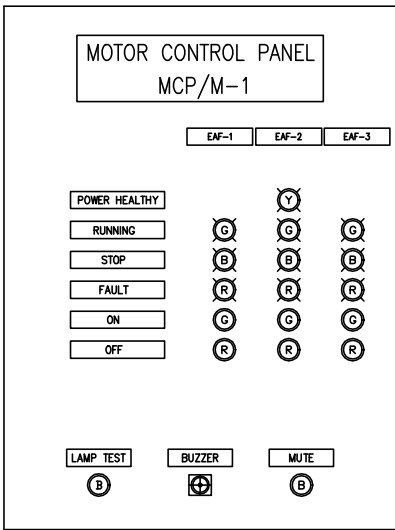
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MCP LAYOUT FOR EAF (FOR REFERENCE ONLY)



MCP LAYOUT FOR SERVER ROOM A/C (FOR REFERENCE ONLY)



MCP LAYOUT FOR EAF (FOR REFERENCE ONLY)

TENDER DRAWING

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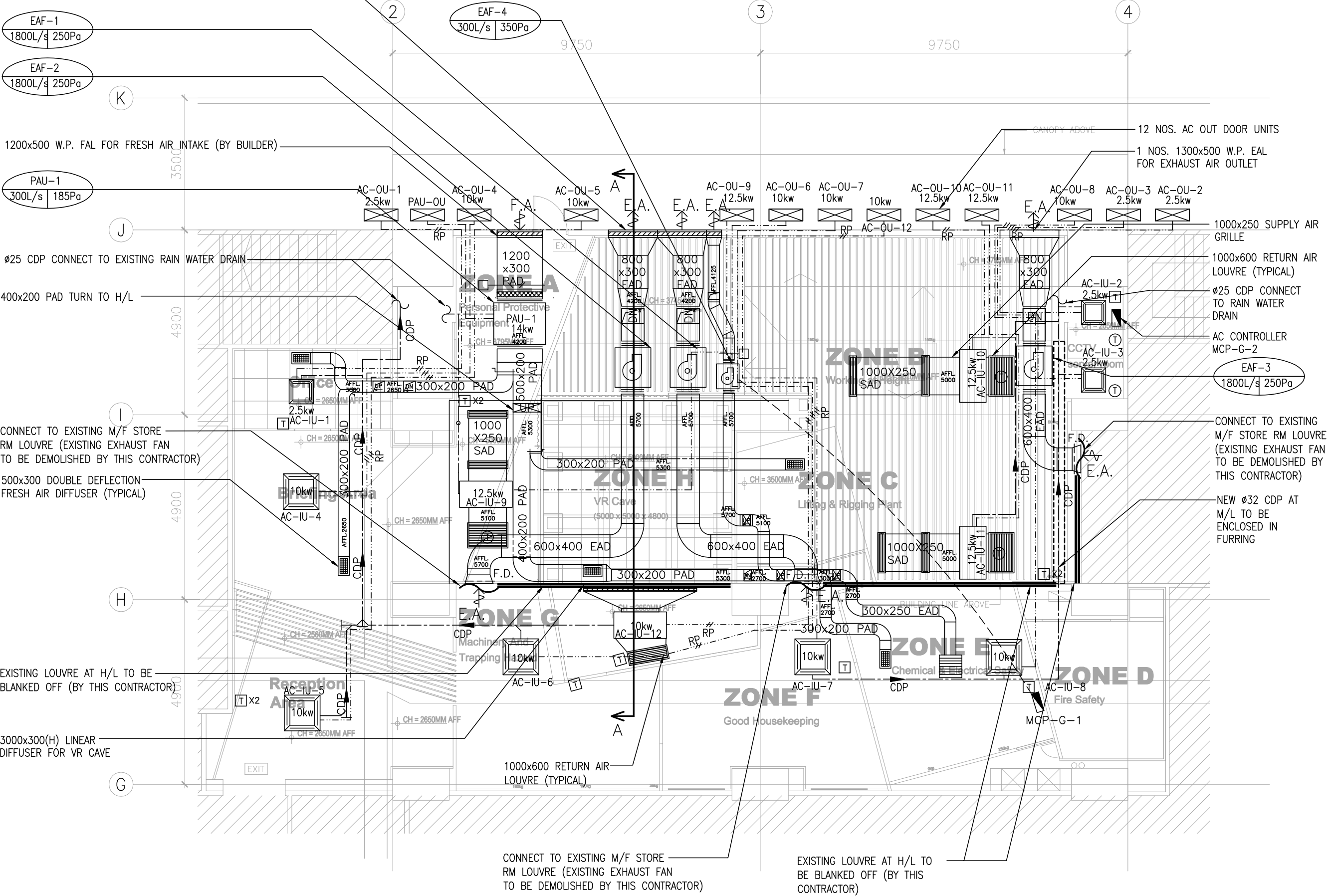
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SCALE: N.T.S.

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE: ELECTRICAL CONTROL DIAGRAM FOR MOTOR CONTROL PANEL

DRAWING NO.	REV.
AC-002	-
PROJECT NO.	DA17003

3200x500 W.P. EAL AT H/L FOR EXHAUST AIR OUTLET (BY BUILDER), FROM LEFT TO RIGHT:  
- 2 NOS 1300x500 E.A. OUTLET FOR EAF-1 AND EAF-2  
- 1 NOS 600x500 E.A. OUTLET FOR EAF-4



USE FIGURED DIMENSIONS. READ THE DRAWING IN CONJUNCTION WITH ALL RELATED DRAWINGS. ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN. ALL DIMENSIONS TO BE VERIFIED & CHECKED ON SITE. THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE RESPECTIVE CONSULTANTS WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF.  
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CLIENT



REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 18 ISSUE FOR TENDER	SG	SKY	BK

NOTES:

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TENDER DRAWING

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CAD PATH: PROJECTS\HONG KONG\1517\1517003\1517003.dwg  
SCALE: 1:100 @ A3

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE

MVAC LAYOUT PLAN

DRAWING NO.	REV.
AC-101	-
PROJECT NO.	DA17003



**CLIENT**

- JAN 2018 ISSUE FOR TENDER SG SKY BK

2. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

PROJECT: 0417055 SET: AT KNU DRUG DC TRAINING CENTREWORKING  
DRAWINGS: MVAC\20170111\20170707 PRELIMINARY  
DESIGN: 2.DWG

DRAWING TITLE

**SECTION DRAWING FOR MVAC  
INSTALLATION AND LAYOUT  
PLAN FOR EXISTING M/F STORE  
ROOM**

DRAWING NO. <b>AC-102</b>	REV.
PROJECT NO. <b>DA17003</b>	

## CLIENT



### MOUNTING DETAIL FOR IN-LINE FAN

AIR DUCT HANGER

(150mm (WIDE) G.I. SHEET IS NOT REQUIRED UNDER UNINSULATED AIR DUCTS)

### SUPPORT FOR HORIZONTAL & VERTICAL RECTANGULAR / OVAL AIR DUCT

	HANGER	BEARER	MAX. SPACING OF HANGER (mm)
MAX. DUCT SIZE (LONGER SIDE mm)	DROP ROD OR STUDTING (TWO)(DIA. IN mm)	ROLLED ANGLE (mm)	
400	6	25X25X1.6	3000
600	8	25X25X3	3000
1000	8	30X30X3	3000
1500	10	40X40X3	2500
2000	10	50X50X5	2500
3000	12	60X60X6	2500

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL SUPPORT AND HANGERS ARE CONSTRUCTED BY HOT DIPPED GALVANISED MILD STEEL.
3. ALL BOLTS AND NUTS ARE ELECTROPLATED WITH ZINC OR CADINM.

TYPICAL INSTALLATION DETAIL OF VERTICAL AIR DUCT SUPPORT

**NOTE** FOR IMPORTED/PROPRIETARY MADE FIRE DAMPERS, THE INSTALLATION DETAILS SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND APPROVED BY HKFSD.

## SHUTTER TYPE FIRE DAMPER INSTALLATION DETAILS FOR SUPPLY AIR DUCT

TYPICAL DETAIL FOR AIR DUCT THROUGH WALL  
WITHOUT FIRE DAMPER

## REFRIGERANT PIPE PENETRATION THROUGH EXTERNAL WALL

TYPICAL HORIZONTAL SUPPORT  
FOR CONDENSATE DRAIN PIPE

NOTES:

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### INSTALLATION DETAIL OF A/C OUTDOOR UNIT INSTALLED ON A/C PLATFORM

ACCESS DOOR FOR INSULATED  
AIR DUCT

### TYPICAL WIRING DIAGRAM FOR SPLIT TYPE AIR CONDITIONER

## TENDER DRAWING

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CAD PATH 2  
 PROJECT\017003 SEVC AT KBN CHUNG CG TRAINING CENTER\0303NO  
 DRAWINGS\SWAC\20171011\20170707 PRELIMINARY  
 DESIGN\_2.DWG

SCALE N.T.S.

**PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)**

DRAWING TITLE

**INSTALLATION DETAILS**

DRAWING NO.	REV.
AC-201	-
PROJECT NO.	DA17003

GENERAL NOTES:

1.

ALL THE FOLLOWING NOTES SHALL BE APPLIED TO RELEVANT DRAWINGS WHERE APPROPRIATE.
2.

THE ELECTRICAL LAYOUTS AS SHOWN ARE FOR GUIDANCE ONLY. EXACT LOCATION OF THE ELECTRICAL ACCESSORIES AND LIGHT FITTINGS SHALL BE CO-ORDINATED WITH RESPECTIVE PARTIES ON SITE AND APPROVED BY ARCHITECT.
3.

THE LIGHTING LAYOUT AS SHOWN ARE FOR GUIDANCE ONLY. THE CONTRACTOR SHALL SUBMIT LUX CALCULATION PLAN FOR ARCHITECT’S APPROVAL PRIOR TO ON-SITE INSTALLATION.
4.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CO-ORDINATION WITH CLIENT’S IT/FM STAFFS, VR SUPPLIER & DIGITAL SIGNAGE SUPPLIER FOR THE POWER REQUIREMENT, TELECOM CABLE CONTAINMENT INSTALLATION AND INCORPORATE THEIR TRUNKING REQUIREMENTS ON THE SHOP DRAWINGS FOR ARCHITECT’S APPROVAL.
5.

EARTHING AND PROTECTIVE CONDUCTORS ARE USUALLY NOT SHOWN ON DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUCH PROVISION IN ACCORDANCE WITH THE IEE REGULATIONS, SUPPLY RULES, EMSD’s COP AND THE SPECIFICATION.
6.

THE CONTRACTOR SHALL SUPPLY AND INSTALL SUITABLE LABELLING FOR THE ELECTRICAL INSTALLATION. ALL LABELS SHALL BE OF "SANDWICH" TYPE WITH LETTERS PERMANENTLY STRIPPED OFF FROM THE TOP LAYER IN BOTH ENGLISH AND CHINESE.
7.

UNLESS OTHERWISE SPECIFIED, ALL CABLES SHALL BE LSOH CABLE.

LEGEND:

- ⏏

13A SWITCHED SINGLE SOCKET OUTLET  
(C DENOTES AT FALSE CEILING LEVEL)

⏏<sup>S</sup>

13A SWITCH TWIN SOCKET OUTLET

⏏<sup>S</sup>

13A SWITCHED SINGLE SOCKET OUTLET FOR SIMULATOR

⏏<sup>S</sup>

3-PIN INDUSTRIAL TYPE SOCKET OUTLET FOR SIMULATOR  
(RATING AS SPECIFIED)

⏏

FUSED SPUR UNIT

⏏

ISOLATOR (RATING AS SPECIFIED)

⏏

WEATHERPROOF ISOLATOR (RATING AS SPECIFIED)

—POW—

100(W)×100(H) G.I. TRUNKING FOR NORMAL POWER

—ELV—

100(W)×100(H) G.I. TRUNKING FOR ELV SYSTEM

—PA—

75(W)×75(H) G.I. TRUNKING FOR ELV SYSTEM

—C100—

100mm(W) G.I. CABLE TRAY

—C300—

300mm(W) G.I. CABLE TRAY

⊙

Ø25 CONDUIT POINT FOR ACCESS CONTROL SYSTEM & CCTV SYSTEM CONNECTED TO NEAREST ELV TRUNKING  
C/W BS4662 BOX, DRAW WIRE  
(W DENOTES WEATHERPROOF TYPE)

Ⓜ

OCCUPANCY SENSOR

CABLE SCHEDULE FOR FINAL CIRCUIT

RATING OF PROTECTIVE DEVICE (AMPERES)	SIZE OF SINGLE CORE LSOH CU. CABLE (mm SQ.)	
	SINGLE PHASE	THREE PHASE
10	1.5	1.5
16	2.5	2.5
20	4	4
32 (FOR 13A POWER SOCKETS & 13A FUSED SPUR UNITS)	4 (IN RING)	–
32	6	10

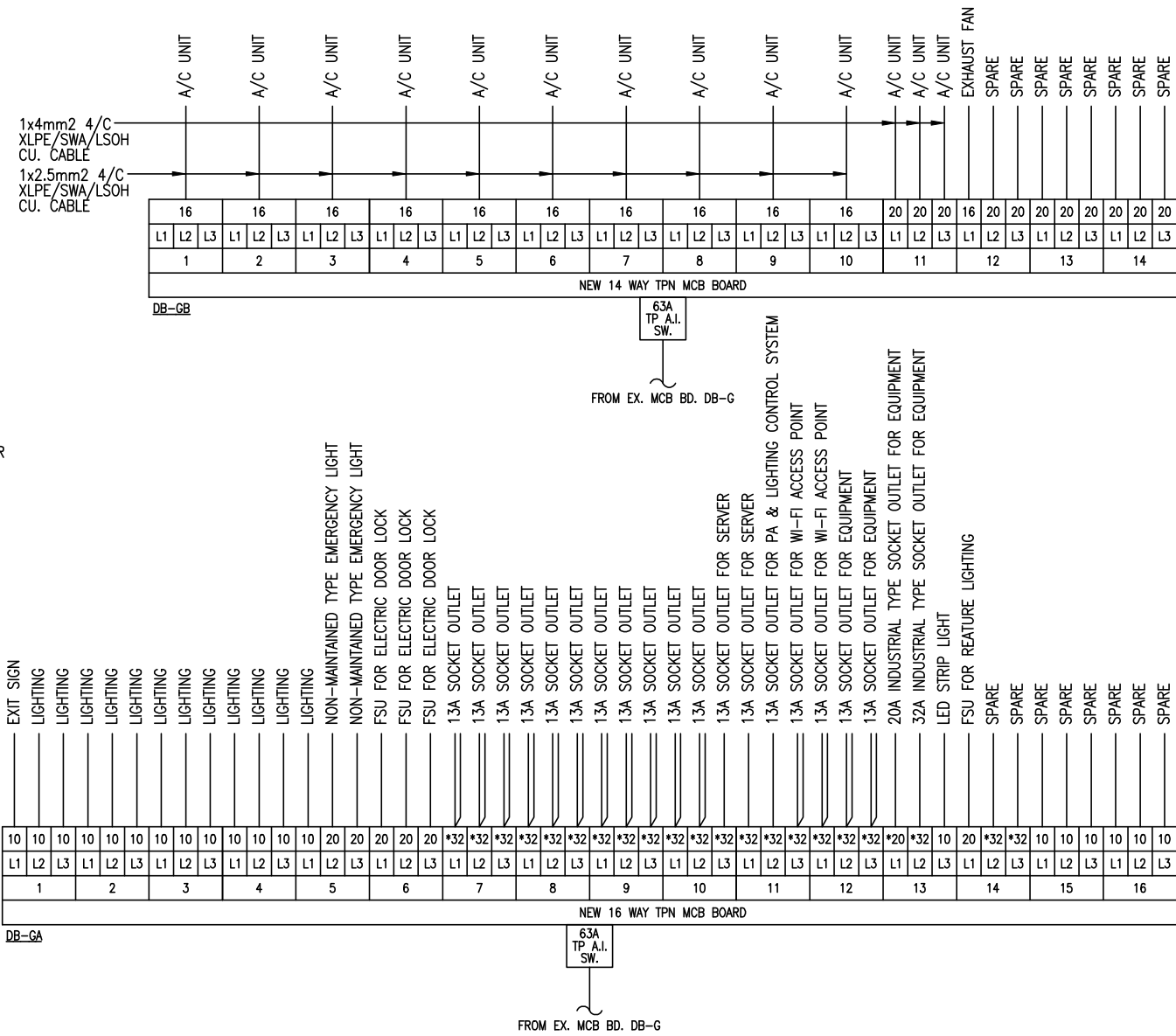
LIGHTING SCHEDULE

TYPE	SYMBOL	DESCRIPTION	REFERENCE MODEL
L01		600mm SINGLE FLUORESCENT BATTEN, 1x14W T5 TUBE C/W ELECTRONIC BALLAST	THORN POPULAR RANGE OR EQUIVALENT
L02		600x600mm RECESSED LUMINAIRE, 41W LED C/W INTEGRAL DALI DIMMIBLE DRIVER	THORN OMEGA LED OR EQUIVALENT
L03		1200mm LINEAR LUMINAIRE, 48W LED, 3500K COLOUR TEMP., C/W INTEGRAL DALI DIMMIBLE DRIVER, ALUMINIUM HOUSING, ACRYLIC DIFFUSER	THORN EQUALINE LED OR EQUIVALENT
L04		Ø150mm RECESSED DOWNLIGHT, 12W LED, 3500K COLOUR TEMP., C/W INTEGRAL DALI DIMMIBLE DRIVER DRIVER	THORN LUXSPACE MINI OR EQUIVALENT
L05		Ø200mm RECESSED DOWNLIGHT, 36W LED, 3500K COLOUR TEMP., C/W INTEGRAL DALI DIMMIBLE DRIVER DRIVER	PHILIPS LUXSPACE OR EQUIVALENT
L06		LED EXIT SIGN C/W 2-HOUR BATTERY KIT AND INVERTER/CONTROLLER.	CRYSTALITE OR EQUIVALENT
L07		RECESSED NON-MAINTAINED TYPE LED EMERGENCY LIGHT	CRYSTALITE OR EQUIVALENT
L08		LED STRIP, 5W/m, 3500K COLOUR TEMP., C/W DALI DIMMIBLE DRIVER	PHILIPS OR EQUIVALENT

NOTE:  
B – DENOTES THE FITTING TO BE EQUIPPED WITH BATTERY AND CHARGER MODULE, HEALTHY "LED" INDICATOR, MAINTAINED TYPE FOR 2-HOUR BACK-UP OPERATION

ABBREVIATIONS

AFFL	ABOVE FINISHED FLOOR LEVEL
A.I.	ALL INSULATED
BBC	TP&N BUSBAR CHAMBER
C.P.C.	CIRCUIT PROTECTIVE CONDUCTOR
C.S.A.	CROSS SECTIONAL AREA
Cu	COPPER
FSU	FUSED SPUR UNIT
F/A	FROM ABOVE
F/B	FROM BELOW
FR	FIRE RESISTANCE
G.I.	GALVANIZED IRON
H/L	HIGH LEVEL
L/L	LOW LEVEL
P.C.T.	PROTECTION CURRENT TRANSFORMER
RCCB	RESIDUAL CURRENT CIRCUIT BREAKER
R.C.D.	RESIDUAL CURRENT DEVICE
SP	SINGLE POLE
SPN	SINGLE POLE & NEUTRAL
SW.	SWITCH
S/O	SOCKET OUTLET
C/W	COMPLETE WITH
DP	DOUBLE POLE
D/B	DISTRIBUTION BOARD
F.F.L.	FINISHED FLOOR LEVEL
F.R.P.	FIRE RESISTIVE PERIOD
F.S.	FIRE SERVICE
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
N.T.S.	NOT TO SCALE
TP	TRIPLE POLE
TPN/TP&N	TRIPLE POLE & NEUTRAL
T/A	TO ABOVE
T/B	TO BELOW
U/G	UNDERGROUND
WP	WEATHER PROOF
W/	WITH
W/O	WITHOUT



MCB BOARD DETAILS



REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	AC	BK

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6. ITEMS MARK AS "UPON FURTHER INSTRUCTION" ARE INCLUDED IN THE CONTRACT.

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dcaol.com.hk

CAD PATH: BASED UPON THE DATE OF NEW CHINA SEC TRADING CENTER HONG KONG DRAWING/REV/2017/0003 UPDATE  
SCALE: 1:100

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
GENERAL NOTES, LEGEND,  
ABBREVIATIONS, CABLE  
SCHEDULE, LIGHTING  
SCHEDULE & MCB BOARD  
DETAILS

DRAWING NO.	REV.
EL-001	-
PROJECT NO.	DA17003



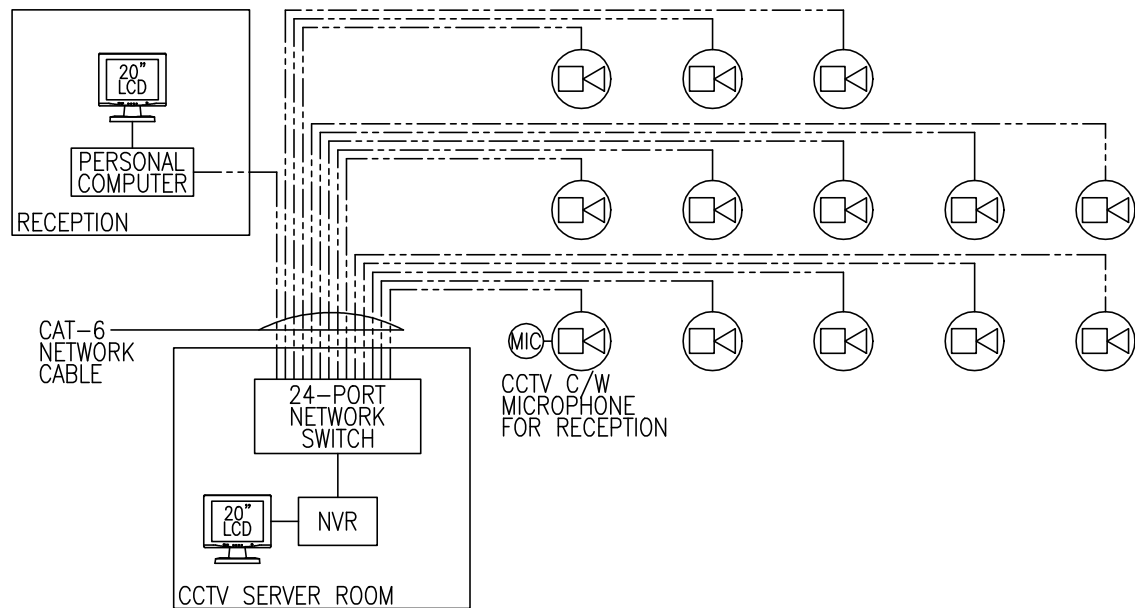
REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	AC	BK

NOTES:

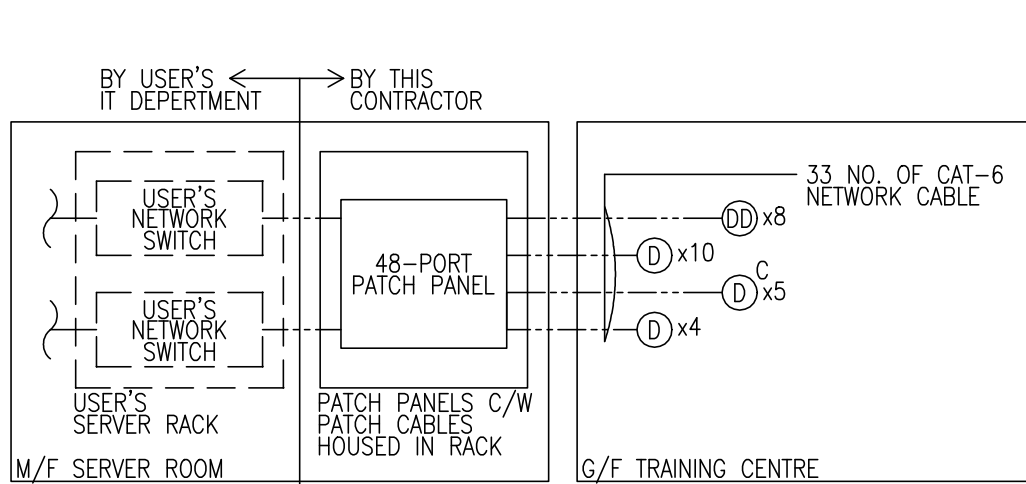
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LEGEND:

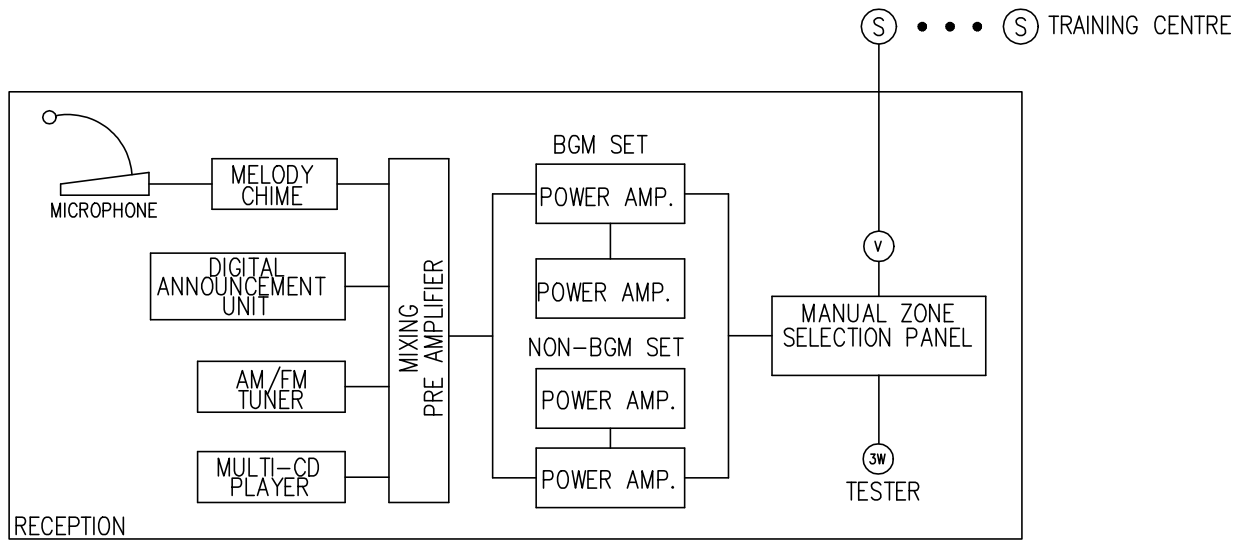
- Ⓜ FULL HD FIXED DOME IP TYPE CCTV CAMERA
- Ⓜ FULL HD WEATHERPROOF IP TYPE CCTV CAMERA
- Ⓢ RECESSED TYPE 3W SPEAKER
- Ⓢ<sup>C</sup> CEILING MOUNTED 3W SPEAKER
- Ⓢ<sup>P</sup> PENDENT TYPE 3W SPEAKER MOUNTED ABOVE BAFFLE CEILING
- ① RJ45 DATA OUTLET POINT C/W BS4662 BOX & Ø25 CONDUIT & CAT-6 CABLE CONNECTED TO M/F SERVER ROOM
- ①<sup>C</sup> RJ45 DATA OUTLET POINT C/W BS4662 BOX & Ø25 CONDUIT & CAT-6 CABLE CONNECTED TO M/F SERVER ROOM MOUNTED AT CEILING LEVEL FOR WIFI ACCESS POINT
- ①① TWIN RJ45 DATA OUTLET POINT C/W BS4662 BOX & Ø25 CONDUIT & CAT-6 CABLE CONNECTED TO M/F SERVER ROOM
- CAT-6 NETWORK CABLE



SCHEMATIC FOR CCTV SYSTEM



SCHEMATIC FOR TELECOM CABLING SYSTEM



SCHEMATIC FOR PA SYSTEM

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
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CAD PATH: D:\PROJECTS\20170825\_UPDATE\ELV.DWG  
SCALE: 1:100

PROJECT: SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG TRAINING CENTRE (KTC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE: SCHEMATIC DIAGRAM FOR ELV SYSTEM

DRAWING NO.	REV.
EL-002	-
PROJECT NO.	DA17003

## CLIENT



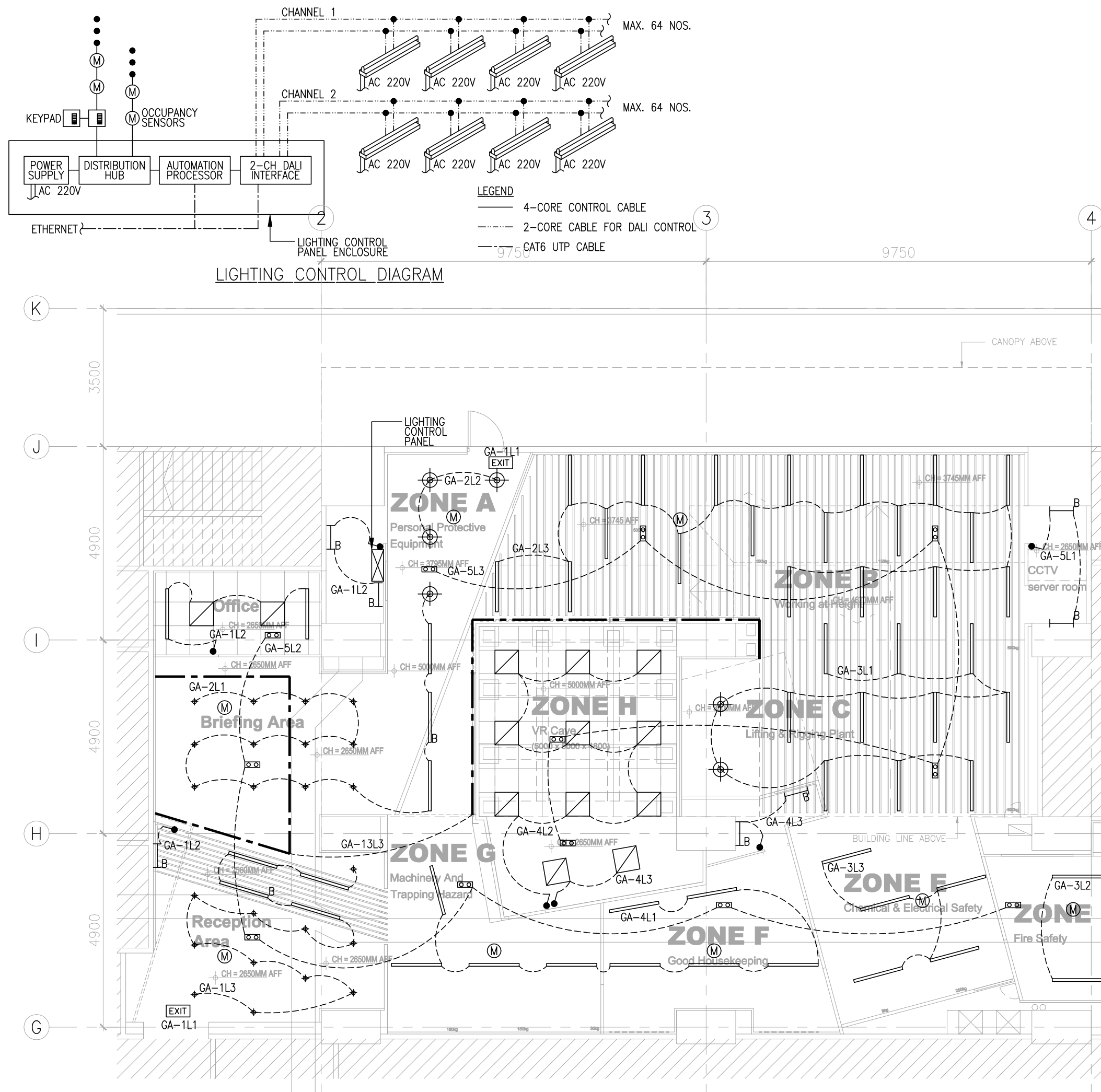
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

SCALE 1:100

DRAWING TITLE  
LIGHTING LAYOUT PLAN

DRAWING NO.	REV.
EL-101	-
PROJECT NO.	DA17003



## CLIENT

- 4

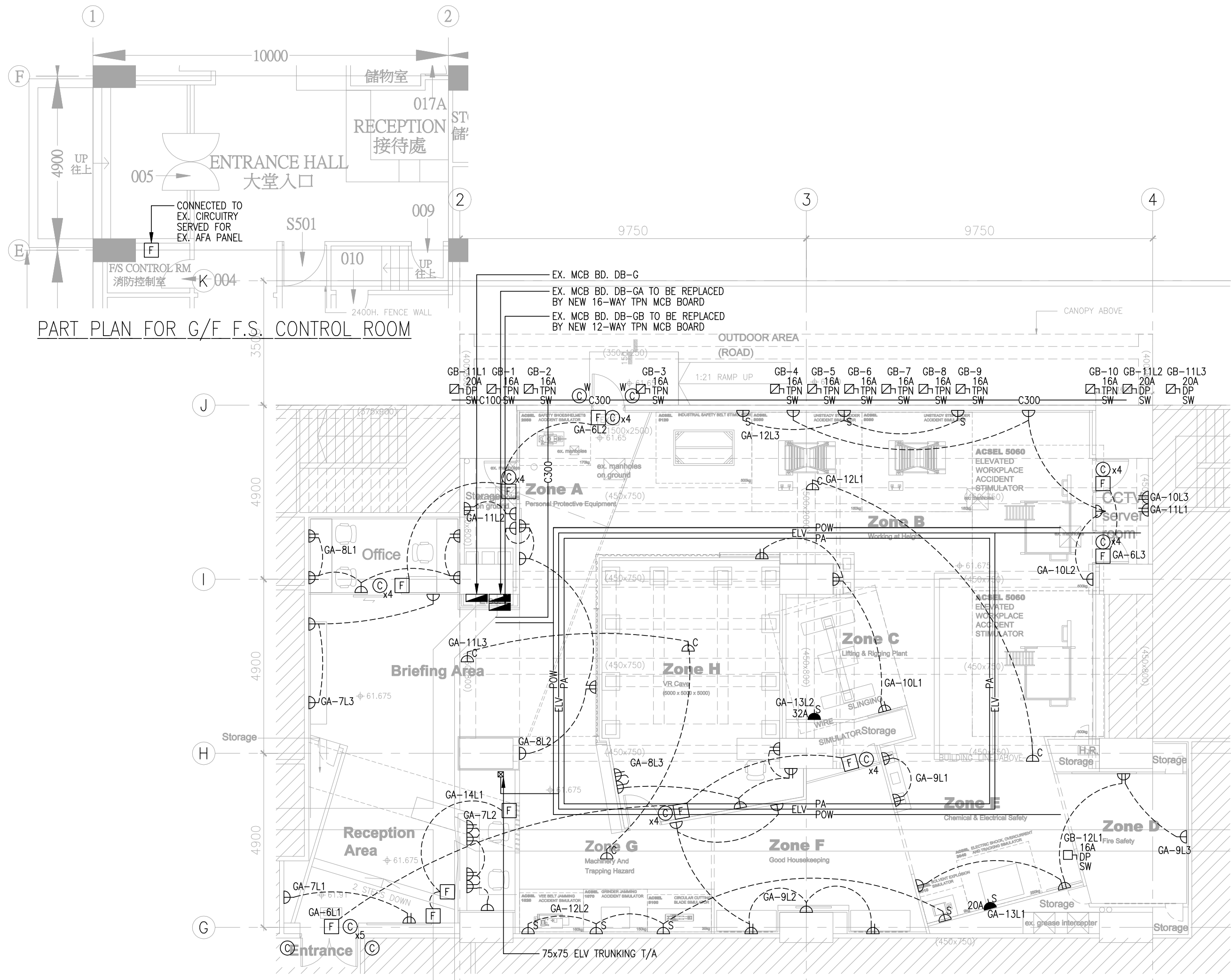
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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

SCALE 1:100

DRAWING TITLE  
**POWER LAYOUT PLAN FOR G/F**

DRAWING NO.	REV.
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CLIENT



REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	AC	BK

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TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

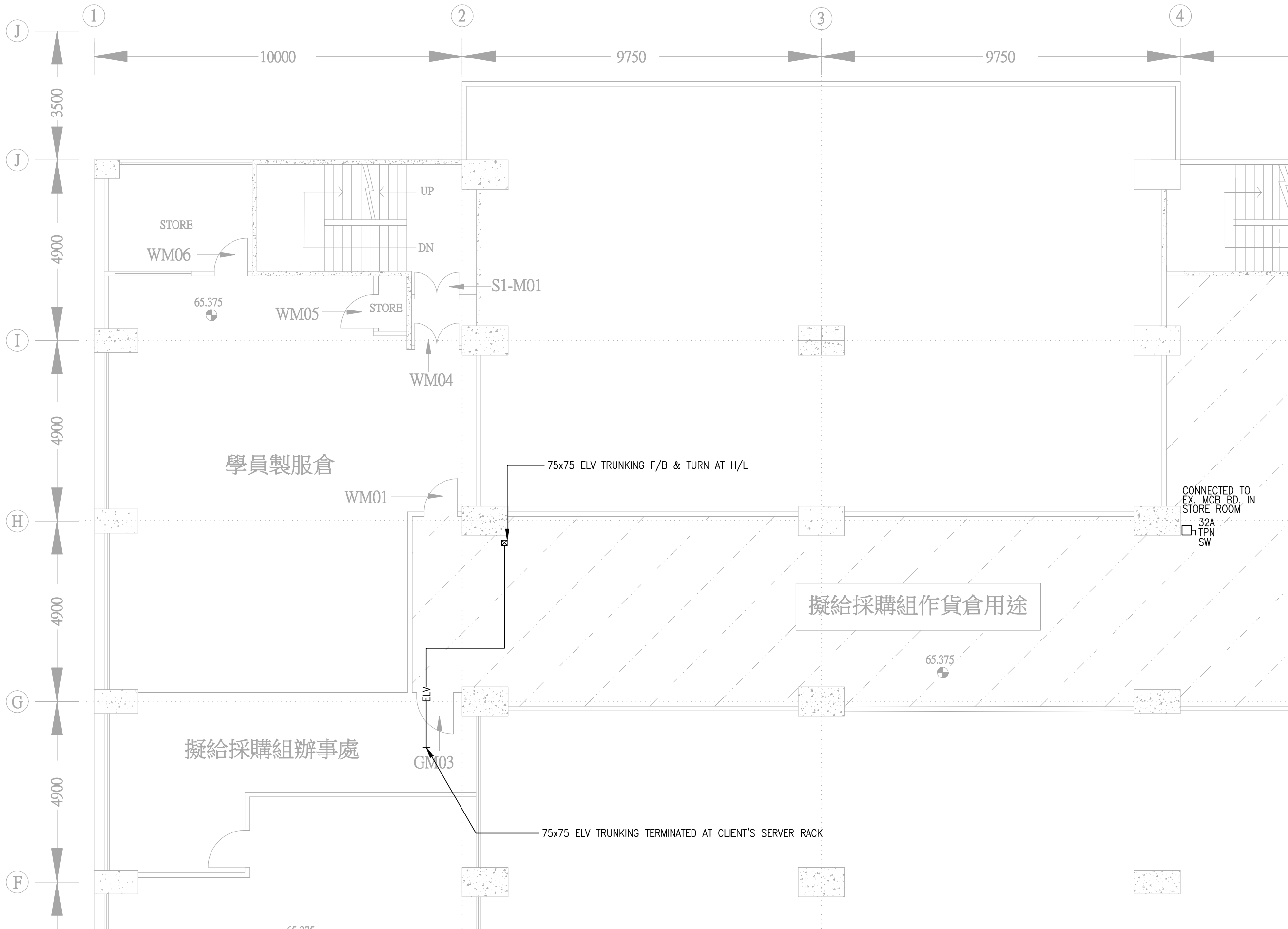
**dca** DAVID S.K. AU & ASSOCIATES LTD.  
15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH: BASED UPON THE SITE AT NEW CHINA SEC TRADING CENTRE HONG KONG  
DRAWING: EL-20170003 UPDATE  
SCALE: 1:100

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
POWER LAYOUT PLAN FOR M/F

DRAWING NO.	REV.
EL-202	-
PROJECT NO.	DA17003



PART PLAN FOR M/F

## CLIENT

- JAN 2018 ISSUE FOR TENDER WKS AC BK

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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

SCALE 1:100

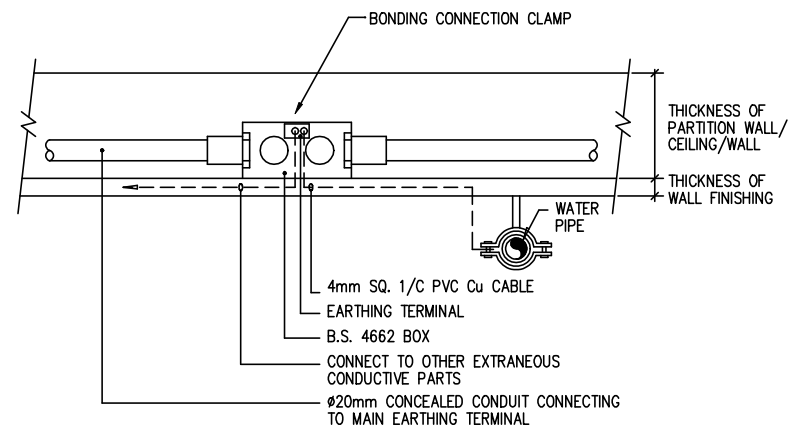
DRAWING TITLE  
ELV LAYOUT PLAN

DRAWING NO. <b>EL-301</b>	REV. <b>-</b>
PROJECT NO. <b>DA17003</b>	

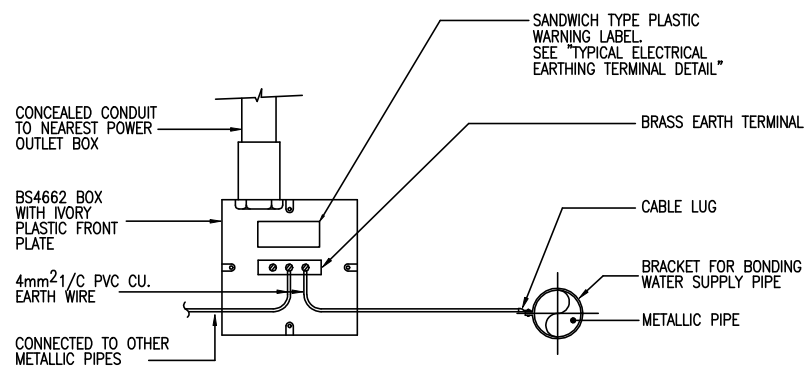




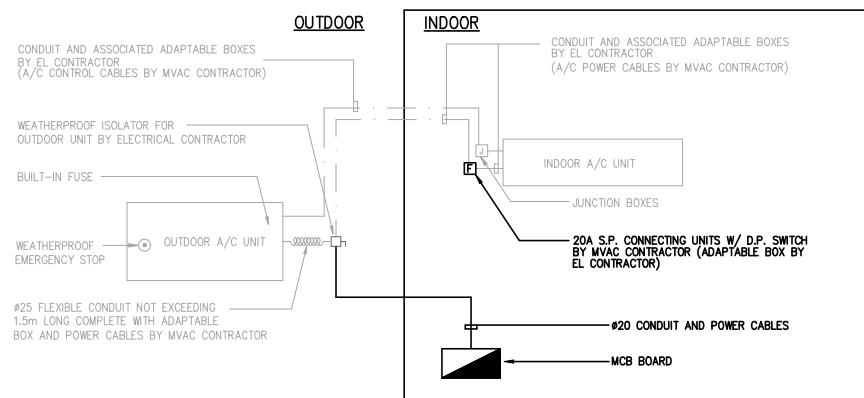
REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	AC	BK



DETAIL 'AA' (NTS)



TYPICAL ARRANGEMENT FOR EQUIPOTENTIAL BONDING OF METALLIC CONDUCTOR



TYPICAL WIRING DIAGRAM FOR SPLIT TYPE AIR CONDITIONER

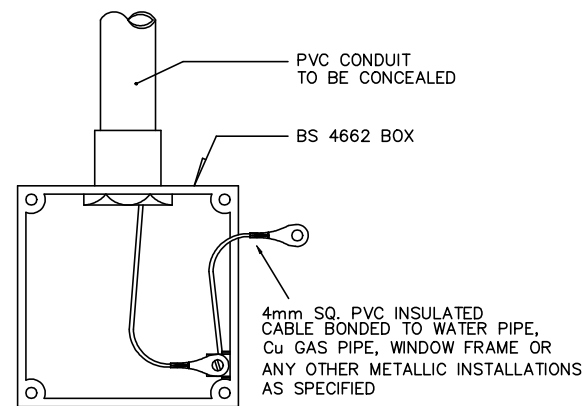
NOTE OF EQUIPOTENTIAL BONDING SYSTEM

THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL THE MAIN EQUIPOTENTIAL AND SUPPLEMENTARY BONDING SYSTEM AS REQUIRED AND SPECIFIED IN THE LATEST EDITION OF IEE WIRING REGULATION OF ELECTRICAL INSTALLATIONS.

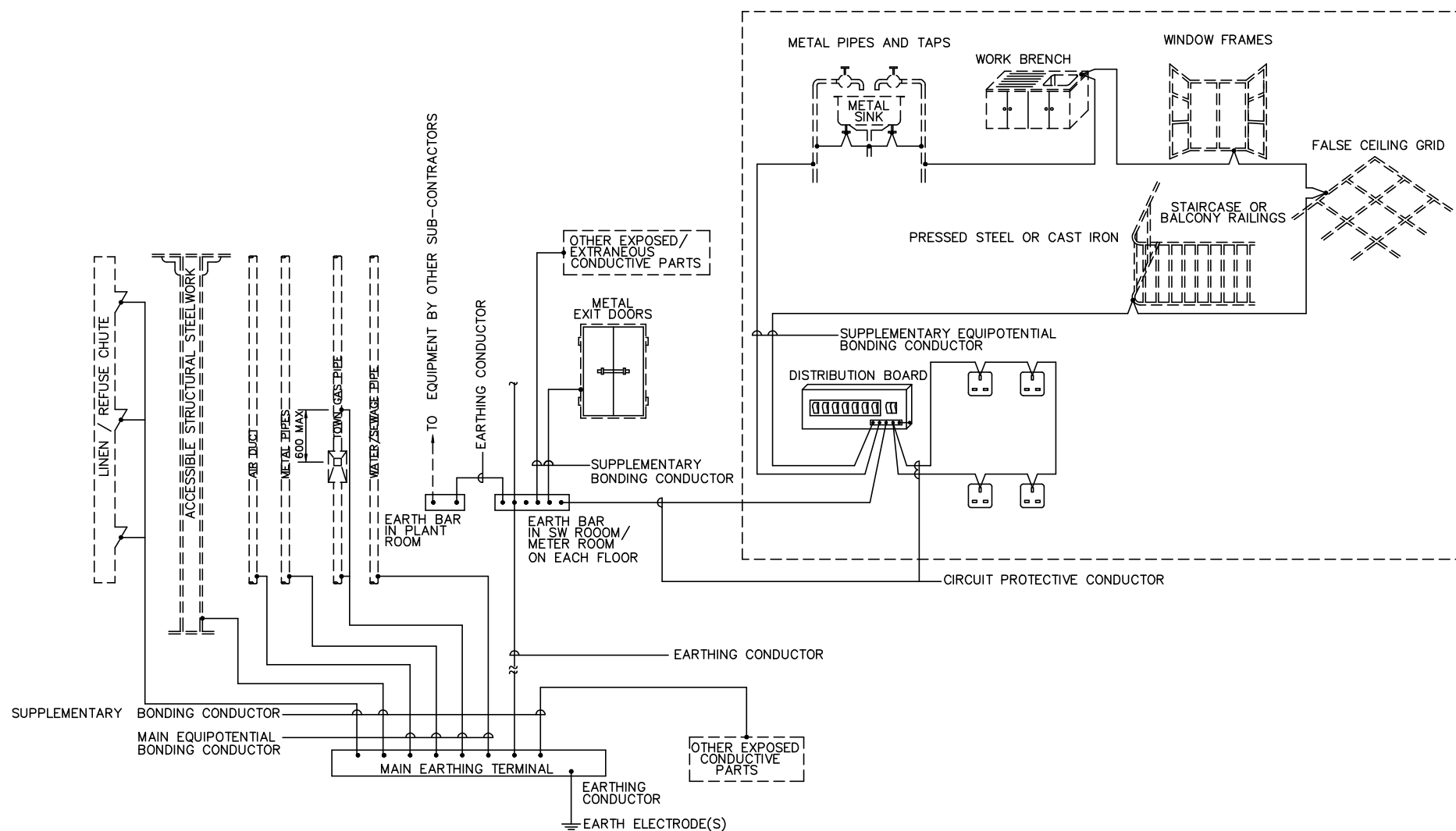
REGULATION 413 - PROTECTION AGAINST INDIRECT CONTACT  
REGULATION 547 - PROTECTIVE BONDING CONDUCTORS

NOTES:

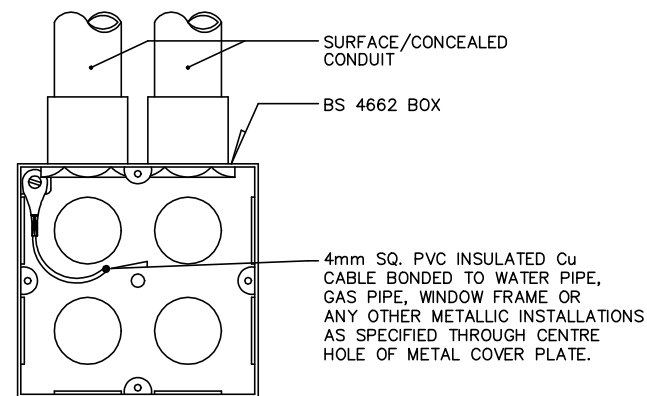
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PLASTIC SQUARE BOX(NTS)



TYPICAL DETAILS OF EQUIPOTENTIAL BONDING



BS4662 BOX DETAIL

TENDER DRAWING

ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

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15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dca.com.hk

CAD PATH:   
SCALE: 1:100

PROJECT  
RENOVATION WORKS OF  
SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT  
KWAI CHUNG CAMPUS (KCC) OF THE  
CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE  
TYPICAL INSTALLATION  
DETAILS

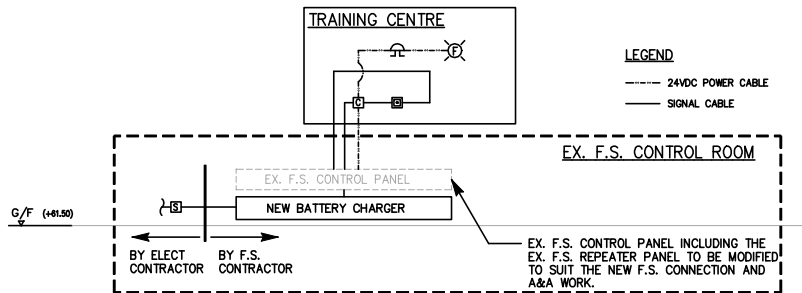
DRAWING NO.	REV.
EL-401	-
PROJECT NO.	DA17003

F.S. NOTES:

- ALL REQUIREMENTS OF FIRE SERVICES DEPARTMENT TO BE FULLY COMPLIED WITH.
- UNLESS OTHERWISE SPECIFIED, ALL EXISTING F.S. INSTALLATION SHALL REMAIN UNCHANGED.
- THE EXISTING SPRINKLER LAYOUT IN THE A&A AREA SHALL BE RE-LAYOUTED TO SUIT THE LATEST ARCHITECTURAL LAYOUTS ACCORDINGLY.
- THE NEW HOSE REEL SET CONNECTING FROM THE EXISTING FH/HR SYSTEM SHALL BE ADDED FOR PROVIDING FOR THE A&A AREA SUCH THAT EVERY PART OF THE A&A AREA CAN BE REACHED BY A HOSE REEL TUBE OF A LENGTH OF NOT MORE THAN 30m.
- VISUAL FIRE ALARM SYSTEM SHALL BE PROVIDED FOR THE A&A AREA THAT SHALL BE ACCESSIBLE BY THE PUBLIC COMPLYING BS5839: PART 1.
- THE NEW MANUAL CALL POINT OF THE NEW HOSE REEL SET CONNECTING TO THE EXISTING MANUAL FIRE ALARM SYSTEM WHEREAS THE EXISTING MANUEL FIRE ALARM SYSTEM INCORPORATED TO THE EXISTING FH/HR SYSTEM SHALL REMAIN UNCHANGED.
- SUFFICIENT EMERGENCY LIGHTING AND EXIT SIGNS WITH BATTERY BACK-UP SHALL BE PROVIDED FOR ALL EXIT ROUTES WITHIN A&a AREA COMPLYING WITH BS5266: PART 1.
- WITHIN A&A AREA, ALL LININGS OR ACOUSTIC AND THERMAL INSULATION PURPOSED IN DUCTING AND CONCEALED LOCATIONS SHAL BE OF CLASS 1 OR 2 RATE OF SURFACE SPREAD OF FRAME AS PER BS476: PART 7 OF ITS INTERNATIONAL EQUIVALENT, OR BE BROUGHT UP TO THAT STANDARD BY USE OF AN APPROVED FIRE RETARDANT PRODUCT.
- WITHIN A&A AREA, ALL LININGS FOR ACOUSTIC AND THERMAL INSULATION AND DECORATIVE PURPOSE WITHIN PROTECTED MEANS OF ESCAPE SHALL BE OF CLASS 1 OR 2 RATE OF SURFACE SPREAD OF FRAME AS PER BS476: PART 7 OR ITS INTERNATIONAL EQUIVALENT, OR BE BROUGHT UP TO THAT STANDARD BY USE OF AN APPROVED FIRE RETARDANT PRODUCT.

ABBREVIATIONS:

F.S.	FIRE SERVICES	F/A	FROM ABOVE
SPR	SPRINKLER	T/B	TO BELOW
F.H.	FIRE HYDRANT	F/B	FROM BELOW
H.R.	HOSE REEL	U/G	UNDERGROUND
H/L	HIGH LEVEL	C/W	COMPLETE WITH
L/L	LOW LEVEL	A.A.V.	AUTOMATIC AIR VENT
T/A	TO ABOVE		



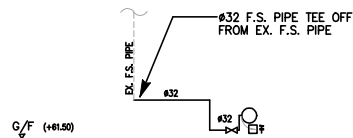
SCHEMATIC DIAGRAM FOR AFA SYSTEM

GENERAL NOTES:

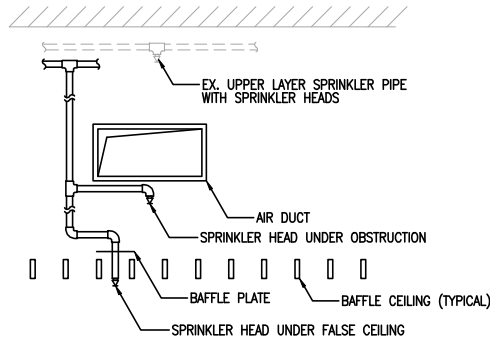
- UNLESS OTHERWISE SPECIFIED, ALL PIPEWORKS SHALL BE  $\varnothing 32\text{mm}$ .
- PIPE/WIRING ROUNTING AND EQUIPMENT LOCATION SHOWN IN THIS DIAGRAM ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CHECK AND VERIFY ON SITE FOR EXACT LOCATION AND ROUTING.
- ALL LOWER LAYER SPRINKLER HEADS TEE FROM EXISTING NEAREST SPRINKLER PIPE.
- THE SPRINKLER LAYOUT IS FOR REFERENCE ONLY. THE CONTRACTOR SHALL CHECK ON SITE FOR THE EXACT LOCATION AND LEVEL FOR THE LOWER LAYER OF SPRINKLERS INCLUDING THE DIMENSION AND ROUTING OF THE PIPEWORK TO BE TEED OFF FROM THE EXISTING SPR. MAIN PIPE SUITING ACTUAL SITE CONDITION.
- THE COMPLETE INSTALLATION SHALL BE IN FULL COMPLIANCE WITH THE LATEST EDITION OF THE LOCAL WATERWORKS REGULATIONS & WATERWORKS STANDARD REQUIREMENTS.
- MATERIAL FOR WATER SUPPLY PIPEWORK AT ABOVEGROUND:  
- F.S. WATER PIPES UP TO AND INCLUDING  $\varnothing 150\text{mm}$  SHALL BE OF GALVANISED MILD STEEL (MEDIUM GRADE) TO B.S. 1387.
- ALL SPRINKLER HEADS THAT ARE FITTED TO FALSE CEILING SHALL BE OF COLOURED POWDER COATING OR CHROME FINISHED MATCHING THE CEILING PANELS. ALL METAL PARTS INCLUDING THE COLOUR CODE OF THE SPRINKLER HEADS, RECESSED PLATES, ESCUTCHEONS, COVER PLATES, ETC., SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL.
- BAFFLE PLATES SHALL BE PROVIDED FOR ALL OBSTRUCTION SPRINKLER HEADS (e.g. FCU, ETC.)
- ALL UPPERLAYER SPRINKLER HEADS SHALL BE RETAINED.
- QUANTITES SHOWN IN THE SCHEMATIC DIAGRAMS ARE FOR REFERENCE ONLY. PLEASE REFER TO THE LAYOUT FOR DETAILS.

LEGEND:

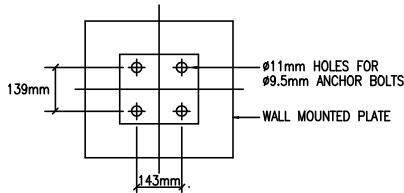
- EXISTING F.S./SPRINKLER PIPE
- NEW F.S./SPRINKLER PIPE
- EX. EXISTING UPPER LAYER SPRINKLER HEAD
- NEW UPPER LAYER SPRINKLER HEAD
- NEW LOWER LAYER SPRINKLER HEAD C/W BAFFLE PLATES
- NEW SPRINKLER HEAD UNDER AIR DUCT, OBSTRUCTION, ETC.
- MANUEL CALL POINT
- ⊗ VISUAL FIRE ALARM
- ⊕ FIRE ALARM BELL
- ⊠ H.R. HOSE REEL
- ⊡ CONTROL MODULE (ADDRESSABLE TYPE)
- ⊞ 13A FUSED SPUR UNIT



SCHEMATIC DIAGRAM FOR HOSE REEL SYSTEM



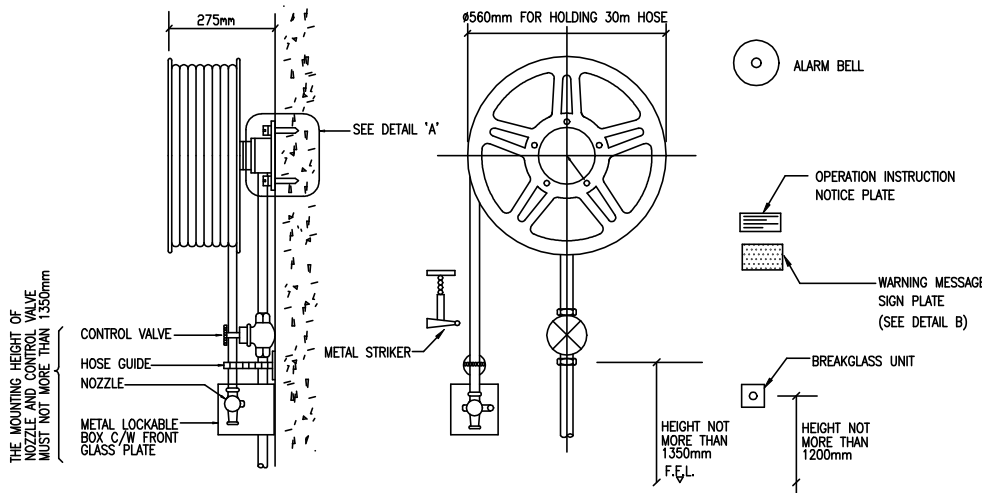
TYPICAL SECTION FOR SPRINKLER UNDER OBSTRUCTION AND FALSE CEILING



DETAIL 'A'



DETAIL 'B'



DETAILS OF FIXED TYPE HOSEREEL (TYPICAL) N.T.S.

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REV.	DATE & DESCRIPTION	DRN	CHK	APP
-	JAN 2018 ISSUE FOR TENDER	WKS	JY	BK

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TEL: (852) 2560 8811 FAX: (852) 2513 1828 WEB: www.dsol.com.hk

CAD PATH: 15TH FLOOR, 633 KING'S ROAD, NORTH POINT, HONG KONG  
SCALE: 1:100

PROJECT: RENOVATION WORKS OF SAFETY EXPERIENCE TRAINING CENTRE (SETC) AT KWAI CHUNG CAMPUS (KCC) OF THE CONSTRUCTION INDUSTRY COUNCIL (CIC)

DRAWING TITLE: F.S. NOTES, GENERAL NOTES, ABBREVIATIONS, LEGEND, SCHEMATIC DIAGRAM & INSTALLATION DETAILS

DRAWING NO.	REV.
FS-001	-
PROJECT NO.	DA17003



**CONSTRUCTION  
INDUSTRY COUNCIL**  
建造業議會

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## ARCHITECT / STRUCTURAL ENGINEER / BUILDING SERVICES ENGINEER

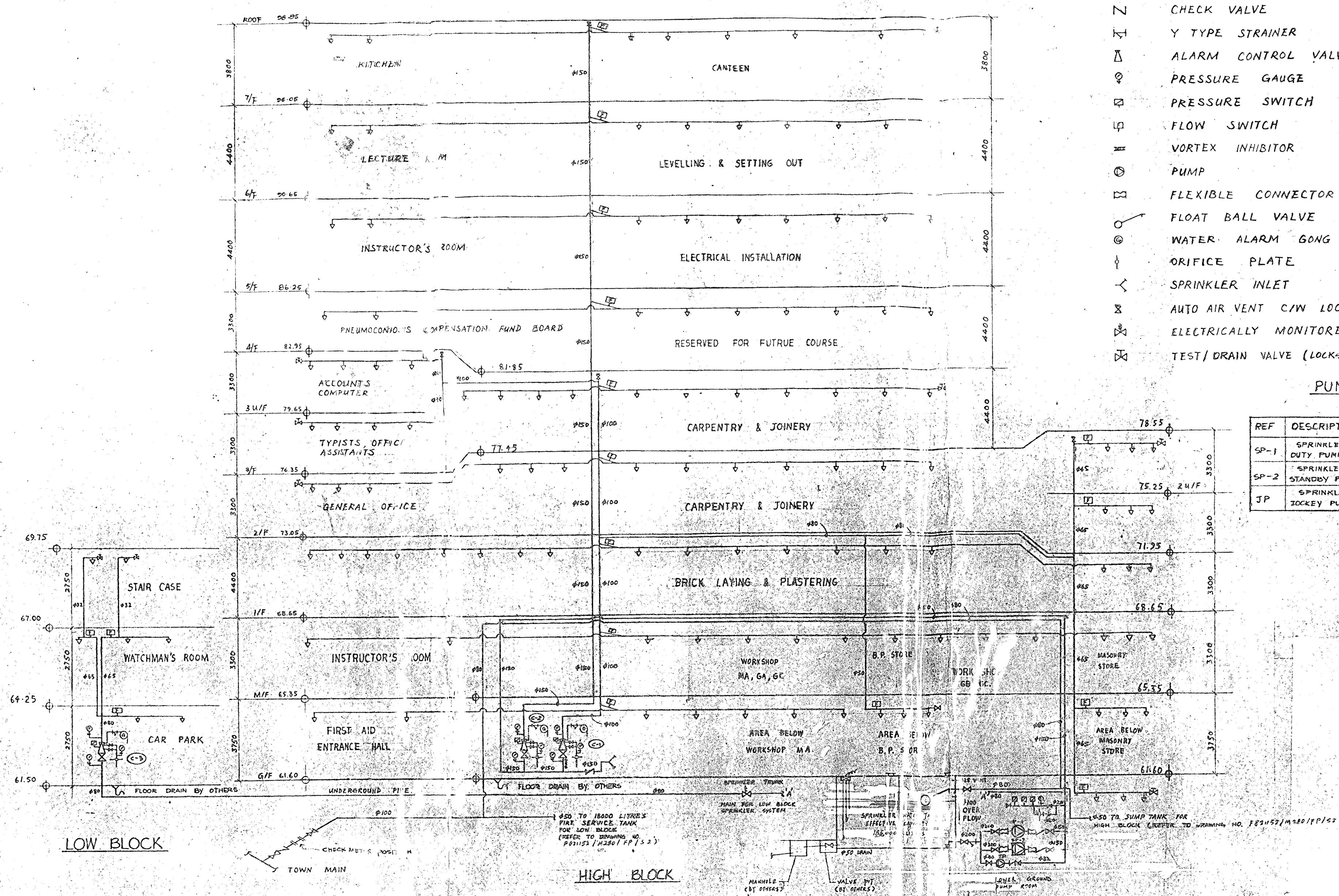
CAD PATH PROJECT/DAY7003 SETC AT KEM CHANG GC TRAINING CENTRE/WORKING

SCALE 1:100

DRAWING TITLE  
**FIRE SERVICES LAYOUT PLAN**

DRAWING NO. <b>FS-101</b>	REV. <b>-</b>
PROJECT NO. <b>DA17003</b>	





- LEGEND**
- SPRINKLER HEAD
  - GATE VALVE
  - CHECK VALVE
  - Y TYPE STRAINER
  - ALARM CONTROL VALVE
  - PRESSURE GAUGE
  - PRESSURE SWITCH
  - FLOW SWITCH
  - VORTEX INHIBITOR
  - PUMP
  - FLEXIBLE CONNECTOR
  - FLOAT BALL VALVE
  - WATER ALARM GONG
  - ORIFICE PLATE
  - SPRINKLER INLET
  - AUTO AIR VENT C/W LOCK SHIELD VALVE
  - ELECTRICALLY MONITORED VALVE
  - TEST/DRAIN VALVE (LOCK-SHIELD VALVE)

**PUMP SCHEDULE**

REF	DESCRIPTION	FIRE RISK	HEAD (BAR)	FLOW (L/MIN)	REMARK
SP-1	SPRINKLER DUTY PUMP	OH II	2.8	1100	ELECT. PUMP
SP-2	SPRINKLER STANDBY PUMP	OH II	2.8	1100	ELECT. PUMP
JP	SPRINKLER JOCKEY PUMP		6.5	10	

LOW BLOCK

HIGH BLOCK

FOR REFERENCE ONLY

**DISTRIBUTION**

REV	DATE	BY	CHKD	APPD
1	11/11/81			
2	11/11/81			
3	11/11/81			
4	11/11/81			
5	11/11/81			
6	11/11/81			
7	11/11/81			
8	11/11/81			
9	11/11/81			
10	11/11/81			

A.C.C. REF NO. 2/9039/81 (P) 327  
 P.P.B. REF NO. 8/16495 (P)  
 REVISION & NOTES

JOB  
 Z-4 TRAINING CENTRE  
 KWAI HOP ST - KWAI CHUNG  
 K.C.T.L. 361

DRAWING TITLE  
 SCHEMATIC DIAGRAM  
 FOR  
 SPRINKLER SYSTEM

DRAWN BY  
 K. C. L. 361  
 DATE 5-3-1982

PRINT DATE

CHECKED BY  
 1/12/82

SCALE

DRAWING NO.  
 F82152/11/12/11/12

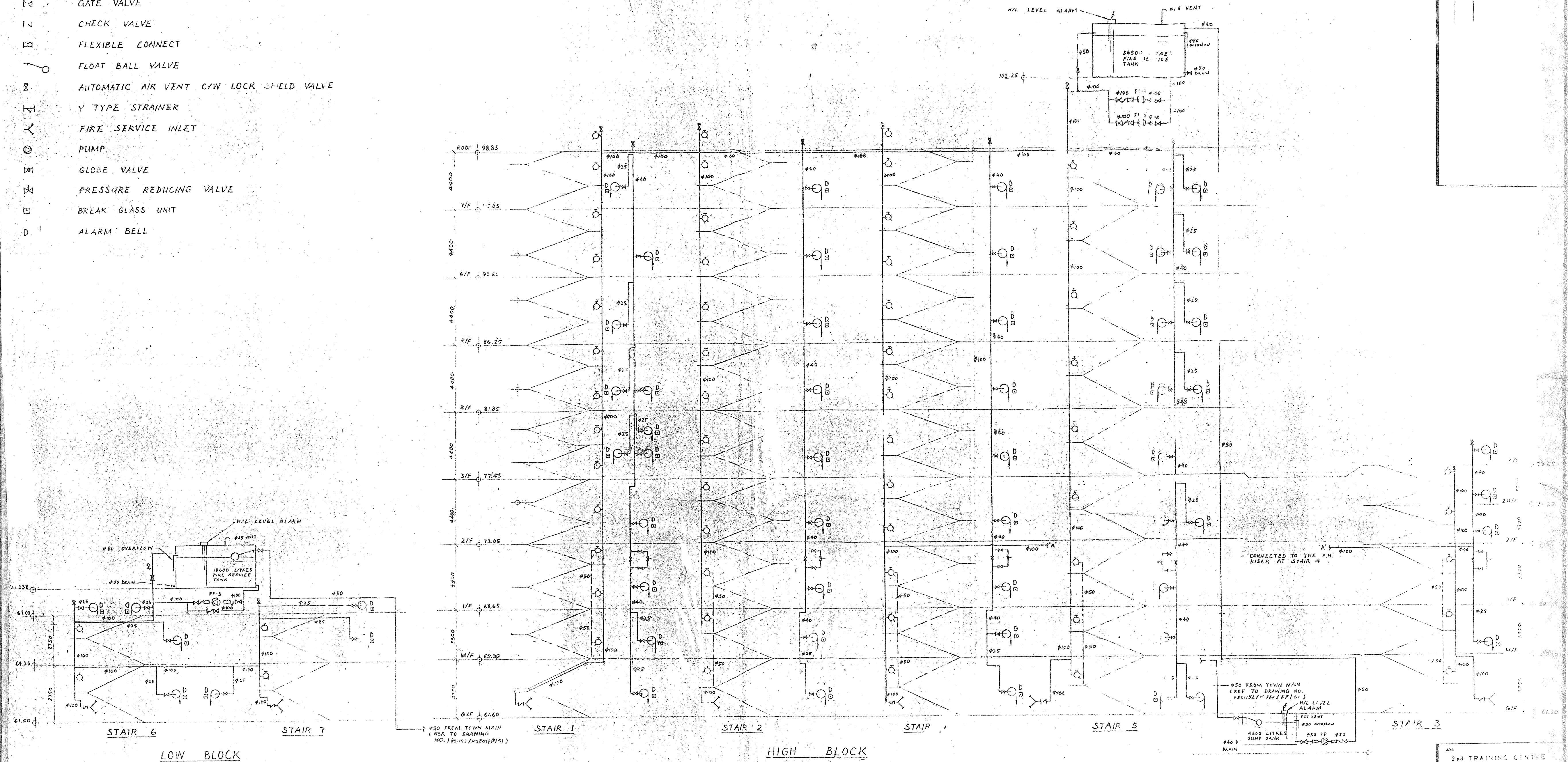
**JARDINE**  
 Engineering

CLIENT  
 CONSTRUCTION INDUSTRY  
 TRAINING AUTHORITY



# LEGEND

- FIRE HYDRANT
- HOSE REEL (30M)
- GATE VALVE
- CHECK VALVE
- FLEXIBLE CONNECT
- FLOAT BALL VALVE
- AUTOMATIC AIR VENT C/W LOCK SHIELD VALVE
- Y TYPE STRAINER
- FIRE SERVICE INLET
- PUMP
- GLOBE VALVE
- PRESSURE REDUCING VALVE
- BREAK GLASS UNIT
- ALARM BELL



PUMP SCHEDULE

REF	DESCRIPTION	QTY	HEAD (BAR)	FLOW (L/S)	LOCATION	REMARK
TP	FIRE SERVICE TRANSFER PUMP	1	5.40	1.680	UPPER GROUND PUMP ROOM	
FP1	FIXED FIRE PUMP	1	4.20	22.75	HIGH BLOCK ROOF	DUT
FP2	FIXED FIRE PUMP	1	4.20	22.75	HIGH BLOCK ROOF	STAND BY
FP3	FIXED FIRE PUMP	1	4.20	22.75	LOW BLOCK ROOF	

2nd TRAINING CENTRE  
KUALA LUMPUR  
K.C.T.L. 3.1

SCHEMATIC DIAGRAM  
FOR  
FH / HR SYSTEM

DRAWN BY: C. F. CHUNG  
DATE: 1/1/2011  
PRINT DATE:  
CHECKED BY: Ngan

SCALE: 1:100  
DRAWING NO: F.21152/1/240

JARDINE  
Engineering

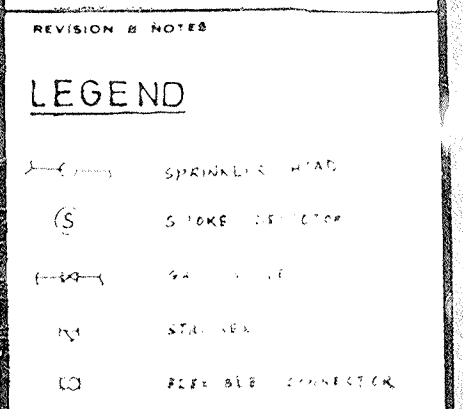
CLIENT  
CONSTRUCTION AUTHORITY

DISTRIBUTION

REV	DATE	BY	CHKD
1	1/1/2011	C. F. CHUNG	
2	1/1/2011		
3	1/1/2011		
4	1/1/2011		
5	1/1/2011		
6	1/1/2011		
7	1/1/2011		
8	1/1/2011		
9	1/1/2011		
10	1/1/2011		

FOR REFERENCE ONLY





REV.	DATE	DESCRIPTION
1	6-7-82	AS PER F.O.D. ADVISED PLAN

FIRE SERVICE LAYOUT  
FOR LG/F

REV		DATE		BY	
DESCRIPTION	1	2	3	4	5
M P R					
WORKSHOP					
ARCHITECT					
CONSULTANT					
BUILDER					
CLIENTS					
WIRING					
CONTROL					
END. M.					

FLOOR LOWER GROUND PLAN

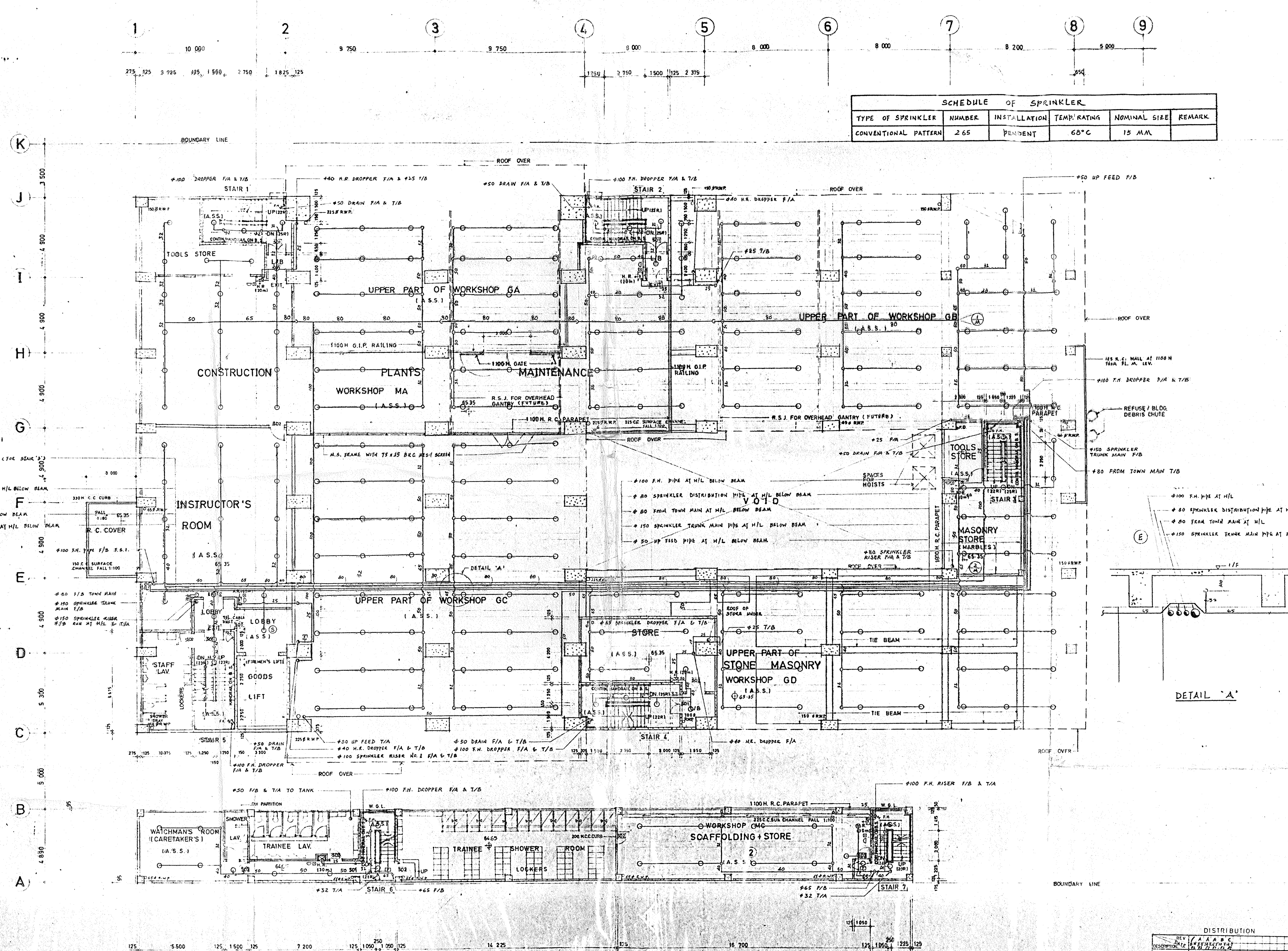
FOR REFERENCE ONLY

CLIENT  
CONSTRUCTION INDUSTRY  
TRAINING AUTHORITY









SCHEDULE OF SPRINKLER					
TYPE OF SPRINKLER	NUMBER	INSTALLATION	TEMP. RATING	NOMINAL SIZE	REMARK
CONVENTIONAL PATTERN	265	PENDENT	68°C	15 MM	

- LEGEND**
- SPRINKLER HEAD
  - HOSE REEL
  - FIRE HYDRANT
  - BREAK GLASS
  - ALARM BELL
  - FLOW SWITCH
  - SMOKE DETECTION
  - DESIGN POINT
  - DESIGN POINT NO.
  - FLASK

**NOTE:**  
ALL PIPES ARE #25 UNLESS OTHERWISE SPECIFIED.

REV.	DATE	DESCRIPTION
C	0-7-82	AS PER F.S.D. APPROVED PLAN
B	22-6-75	GENERAL REV.
A	3-5-82	AS PER ARCHITECTURAL FACILITIES
REV.	DATE	DESCRIPTION
2nd TRAINING CENTRE KWAI HOP ST. KWAI CHUNG K.C.T.L. 381		
DRAWING TITLE		
FIRE SERVICE LAYOUT FOR M/F		
DRAWN BY C.M. CHUNG		
DATE 8-4-1982		
PRINT DATE		
CHECKED BY [Signature]		
SCALE: 1:100		
DRAWING NO. FB21152/1/280/FP/LS		

DISTRIBUTION	
REV.	DESCRIPTION
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
O	15
P	16
Q	17
R	18
S	19
T	20
U	21
V	22
W	23
X	24
Y	25
Z	26

# FLOOR MEZZANINE PLAN

FOR REFERENCE ONLY

**JARDINE Engineering**

CONSTRUCTION INDUSTRY TRAINING AUTHORITY



**Memorandum of Agreement**  
  
**for**  
  
**Renovation Works**  
  
**of Safety Experience Training Centre (SETC)**  
  
**at Kwai Chung Campus (KCC)**  
  
**of the Construction Industry Council**

**February 2018**

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**To be Signed by a Contractor**

**MEMORANDUM OF AGREEMENT**

MEMORANDUM OF AGREEMENT made on the \_\_\_\_\_ day of \_\_\_\_\_  
2018 BETWEEN THE CONSTRUCTION INDUSTRY COUNCIL of <sup>1</sup> \_\_\_\_\_  
\_\_\_\_\_ (hereinafter called “the Employer”) of the  
one part and <sup>2</sup> \_\_\_\_\_  
\_\_\_\_\_ of <sup>3</sup> \_\_\_\_\_

(hereinafter called “the Contractor”) of the other part WHEREAS the Employer requires the Contractor to execute, complete and maintain the whole of the said works in respect of Renovation Works of Safety Experience Training Centre (SETC) at Kwai Chung Campus (KCC) for the Employer (hereinafter called “the Assignment”) and details of which are set out in the Assignment Brief annexed hereto AND WHEREAS the Contractor has agreed to complete the works in accordance with the Assignment Brief, Conditions of Employment annexed hereto (hereinafter referred to as “the Conditions”), and subject to the payment to him by the Employer of the fees and other payments set out in the Fee Proposal and the Conditions annexed hereto.

NOW THEREFORE IT IS AGREED AS FOLLOWS :-

1. This Agreement shall comprise :-
  - (a) Conditions of Tender and Appendices
  - (b) Form of Tender
  - (c) CIC’s General Conditions of Contract and Guidelines for Works or Services (2b-CAR)
  - (d) Assignment Brief and its Annexes
  - (e) Technical Proposal and Fee Proposal
  - (f) General Conditions of Employment
  - (g) Contractor's Safety Requirements
  - (h) Any relevant correspondenceall of which are annexed hereto.
2. The Director for the purposes of this Agreement shall be <sup>4</sup> \_\_\_\_\_  
\_\_\_\_\_

3. In consideration of the payments made at the times and in the manner set forth in the Agreement by the Employer, the Contractor hereby jointly and severally<sup>5</sup> undertakes to perform and complete the said works subject to and in accordance with the Agreement.

IN WITNESS this Agreement has been executed as a deed on the date first above written

SIGNED for and on behalf of )  
the Employer by <sup>6</sup> )  
 )  
 )

in the presence of  
Signature, name and address

(a) SIGNED for and on behalf of )  
the Contractor by <sup>7</sup> )  
 )  
 )

in the presence of  
Signature, name and address

**OR**

(b) SIGNED for and on behalf of and as )  
lawful attorney for <sup>2</sup> )  
under power of )  
attorney dated )  
By )

in the presence of  
Signature, name and address

**OR**

(c) SIGNED on behalf of the Contractor by <sup>8</sup>

)  
)  
)  
)

in the presence of  
Signature, name and address

**NOTES:**

(for preparation of but not inclusion in the engrossment of the Memorandum of Agreement)

Case (a) is for use where the Contractor executes the Assignment.

Case (b) is for use where the Contractor executes through an attorney.

Case (c) is for use where the Contractor comprises a partnership or consortium. As regards the attestation clause, each member forming the partnership or consortium just executes.

- 1 Insert the address for service of documents.
- 2 Insert the name of the Contractor.
- 3 Insert the address of the Contractor.
- 4 Insert the post title.
- 5 Delete “jointly and severally” where cases (a) or (b) apply. Initial the deletion by the signatories of the Memorandum of Agreement.
- 6 Insert the name and appointment of the officer.
- 7 Insert the name(s) and capacity of the person(s) (usually the Directors of the Contractor) executing the Agreement for the Contractor. The person’s authority to execute the Agreement for the Contractor is prescribed in the Memorandum of Association of the Contractor.
- 8 Insert the names of the partners.

**General Conditions of Employment**  
**for**  
**Renovation Works**  
**of**  
**Safety Experience Training Centre (SETC)**  
**at**  
**Kwai Chung Campus (KCC)**  
**of**  
**the Construction Industry Council**

**February 2018**

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**General Conditions of Employment for  
Renovation Works of  
Safety Experience Training Centre (SETC) at  
Kwai Chung Campus (KCC) of  
the Construction Industry Council**

**1 Definitions**

In the Agreement as hereinafter defined the following words and expressions shall have the meaning hereby assigned to them except when the context otherwise requires:

“Agreement” means and includes the Memorandum of Agreement, Conditions of Employment for Renovation Works of Safety Experience Training Centre Renovation Works (SETC) at Kwai Chung Campus, 7-11 Kwai Hop Street, Kwai Chung, New Territories, Hong Kong K.T.C.L. 381 for the Construction Industry Council, the Assignment Brief and its Annexes, Fee Proposal and such other documents as may be referred to in the Memorandum of Agreement.

“Assignment” means that part of the Project undertaken by the Contractor as detailed in the Assignment Brief and its Annexes.

“Assignment Brief” means the document attached to the Memorandum of Agreement which describes the Project and sets out the details of the Assignment.

“Contractor” means the person, firm or company named in the Memorandum of Agreement and includes the Contractor’s permitted assignees.

“Deliverables” means all the reports, drawings, documents, software, certificates and other items described in the Assignment Brief and its Annexes which are to be produced by the Contractor under the Assignment.

“Director” means the person designated in the Memorandum of Agreement to act as the Director or such other person as may be appointed from time to time by the Employer and notified in writing to the Contractor to act as the Director for the purposes of this Agreement and the person so designated or appointed.

“Employer” means the Construction Industry Council.

“Employer’s Representative” means the Architect, Engineers, Quantity Surveyor, Safety Specialist appointed by the Construction Industry Council.

“Government” means the Government of the Hong Kong Special Administrative Region.

“Project” means the scheme described in the Assignment Brief and its Annexes, of which the Assignment forms a part.

“Services” means duties, work, services, surveys and investigations to be carried out and obligations to be fulfilled by the Contractor under this Agreement.

## **2 Singular and Plural**

Words and expressions in the singular include the plural and words and expressions in the plural include the singular where the context so implies.

## **3 Marginal Headings**

The index, marginal notes or headings in any documents forming part of the Agreement shall not in any way vary, limit or extend the interpretation of the Agreement.

## **4 Laws**

The Agreement shall be governed by and construed according to the laws for the time being in force in HKSAR.

## **5 Interpretation**

The Interpretation and General Clauses Ordinance shall apply to the Agreement.

## **6 Memorandum of Agreement**

The Contractor when called upon to do so shall enter into and execute a Memorandum of Agreement which shall be prepared at the cost of the Employer in the form annexed with such modifications as may be necessary.

## **7 Documents Mutually Explanatory**

- (A) Save to the extent that any Special Conditions of Employment provides to the contrary the provisions of the Conditions of Employment shall prevail over those of any other document forming part of the Agreement.
- (B) Subject to sub-clause (A) of this Clause the several documents forming the Agreement are to be taken as mutually explanatory of one another but in the case of ambiguities and discrepancies the same shall be explained and adjusted by the Employer.

## **8 Use of English Language and Metric Units**

All the correspondence in connection with this Agreement shall be in English. All Deliverables shall be in English and metric units shall be used throughout, unless otherwise stated in the Assignment Brief or approved by the Employer and its representative.

## **9 Confidentiality**

- (A) Save for the performance of the Services the Contractor shall not disclose the terms and conditions of this Agreement or any information, specifications, documents, drawing, plan, software, data or particulars furnished by or on behalf of the Employer and its representative in connection therewith, to any person other than a person employed or engaged by the Contractor in carrying out this Assignment or any approved sub-contractors or the Contractor's legal and insurance advisers.
- (B) Any disclosure to any person, sub-contractors or advisers permitted under sub-clause (A) of this Clause shall be in strict confidence and shall extend only so far as may be necessary for the purpose of this Agreement and the Contractor shall take all necessary measures to ensure the confidentiality of any such disclosure.
- (C) The Contractor shall not without the prior written consent of the Director and its representative which approval shall not be unreasonably withheld publish, either alone or in conjunction with any other person, in any newspaper, magazine, or periodical, any article, photograph or illustration relating to this Agreement.
- (D) If the Contractor has provided the Employer and its representative with documents and information which he has declared in writing to be confidential and stamped accordingly whether in relation to his practice or special circumstances or for other good causes, unless the Director within two months of receipt of such information by notice in writing disagrees, then that information will be treated as confidential. The Employer and its representative shall not permit the disclosure of such confidential information to third parties without the written consent of the Contractor.

#### **10 Information to be supplied by the Employer**

The Employer shall keep the Contractor informed on such matters as may appear to him to affect the performance of the Services and shall give such assistance, approvals, and decisions in writing as and when they shall reasonably be required for the performance of the Services.

#### **11 Information to be supplied by the Contractors**

The Contractor shall keep the Employer and its representative informed on all matters related to the Assignment within the knowledge of the Contractor including details of all staff employed by them in the performance of the Services and shall answer all reasonable enquiries received from the Employer and its representative and render reports at reasonable intervals when asked to do so and shall assist the Employer and its representative to form an opinion as to the manner in which they are proceeding with the Assignment.

#### **12 Retention of Documents and Audit Inspection**

- (A) For a period of 2 years commencing with the completion of any works contract, supervision of which is part of the Services, the Contractor shall retain and provide spaces for that purpose all his records, data, accounts and other information in respect of the services.
- (B) The Contractor shall give assistance to Employer for the purpose of audit inspection to inspect such records, data, accounts and other information whatsoever and shall answer queries or supply information reasonably requested by such personnel in pursuance of such audit inspection.

#### **13 Attendance at Meetings**

The Contractor shall, if reasonably possible, attend or be represented at all meetings convened by the Employer and its representative to which he may be summoned and shall advise and assist the Director and the Employer and its representative on all matters relating to the Services.

#### **14 Facilities for Inspection**

The Contractor shall at all time give to the Director, Employer and its representative and any persons duly authorized by him reasonable facilities to inspect or view the documents, records and correspondence in his possession relevant to this Agreement.

## **15 Approval of Documents**

- (A) The Contractor shall, when so requested by the Employer and its representative, submit to him for his approval such record, data, account or other documents, matters or things prepared by them as a direct requirement of the Assignment as he may specify or require.
- (B) No such approval shall affect the responsibility of the Contractor in connection with the Services.

## **16 Delegation of Employer's Power**

The Contractor shall take instructions and directions and, where appropriate, receive the Employer's decisions and views only through the Employer and, subject to any limitations imposed by the Employer in any letter of authority granted by him, such other person to whom the Employer may delegate his powers.

## **17 Amendments to the Contract Conditions**

- (A) The Employer shall make any changes to the Contract Conditions which he considers necessary or desirable for the successful completion of the Assignment or the Project.
- (B) Any queries on, or suggestions for amendments to the Contract Conditions shall be referred to the Employer for his clarification or instructions regarding further action.

## **18 Written Approval**

The Contractor shall obtain the written approval of the Employer prior to entering into any commitment to expenditure for which there is provision for reimbursement under the Fee Proposal.

## **19 Consultation**

The Contractor shall, as may be necessary for the successful completion of the Assignment, consult all authorities, or who may be appointed by the Employer in connection with the Assignment and bodies or persons affected by the Assignment.

## **20 Response to Queries**

- (A) The Contractor shall respond to queries on the findings and conclusions of this Assignment raised during the period defined in the Assignment Brief for such queries by the Employer or by any Contractor who may be appointed by the Employer for the subsequent stage of the Project.
- (B) The Contractor shall use his best endeavours to respond to queries on the findings and conclusions of this Assignment raised after the period defined in the Assignment Brief for such queries by the Employer or any person who may be appointed by the Employer or nominated by the Employer.

## **21 Exclusive Ownership**

The Employer shall become the exclusive owner of all Deliverables, save those Deliverables under licence or those Deliverables in respect of which there is a pre-existing copyright or patent, supplied or produced by, for or on behalf of the Contractor under this Agreement. The liability of the Contractor in respect of the Employer's use of such Deliverables shall be limited to liabilities arising from uses contemplated under this Agreement or expressly agreed to in writing by the Contractor. The Employer hereby:

- (i) Indemnifies the Contractor against all claims, damages, losses or expenses suffered by the Employer; and
- (ii) Agrees to indemnify the Contractor against all claims, made by third parties against the Contractor;

arise out of or in connection with a use by the Employer of any Deliverable which use was not contemplated under this Agreement or not expressly agreed to in writing by the Contractor.

## **22 Care and Diligence**

- (A) The Contractor shall exercise all reasonable professional skill, care and diligence in the performance of all and singular the Services and, in so far as his duties are discretionary, shall act fairly between the Employer and any third party.
- (B) The Contractor shall, in respect of any work done or information supplied by or on behalf of the Employer, report to the Employer and its representative any errors, omissions and shortcomings of whatsoever nature of which the Contractor becomes aware in the performance of the Services.
- (C) The Contractor shall indemnify and keep indemnified the Employer against all claims, damages, losses or expenses arising out of or resulting from any negligence in or about the conduct of and performance by the Contractor, his servants or agents, of the Services.
- (D) In the event of any errors or omissions for which the Contractor is responsible and as a result of which the re-execution of the Services is required, the Contractor shall, without relieving any liability and obligation under the Agreement, at his own cost re-execute such Services to the satisfaction of the Employer.

## **23 Instruction and Procedure**

The Contractor shall comply with all reasonable instructions of the Director or the Employer and its representative. The Employer and its representative shall issue to the Contractor general instructions on procedure and shall supply such additional information as may be required.

## **24 Approval for Variations and Claims**

The Contractor shall obtain prior approval in writing of the Employer and its representative to the order of a variation to the contract works or to the commitment otherwise of the Employer and its representative to expenditure under the works contract other than in respect of claims, if the value of such order or commitment is estimated to exceed the sum specified in the Assignment Brief, or if not specified in the Assignment Brief, as advised in writing by the Employer and its representative. With the exception that in emergencies such prior approval shall not be required, provided that the order or other commitment is essential and that it is impractical to seek the prior approval of the Employer and its representative.

## **25 Referral of Variations and Claims**

(A) Notwithstanding the requirements of Clause 24 the Contractor shall:

- (i) refer the details of every variation to the Contract Works under any such Works Contract, including the reasons for it and its estimated value, to the Employer and its representative for information as soon as the variation is ordered.
- (ii) as soon as the value of a variation to the Contract Works has been determined, refer the details of the evaluation to the Employer and its representative for information.
- (iii) report to the Employer and its representative all claims for additional payment made by the Contractor and, except for those solely in respect of agreement of rates, refer the principles underlying their assessment of each claim, to enable the Employer and its representative to provide its view of the matter before the Contractor reaches a decision; and
- (iv) report to the Employer and its representative all delays to the progress of the Contract Works and, except for those delays solely in respect of inclement weather conditions, refer his assessment of granting of extension of time for completion, if any, to enable the Employer and its representative to provide its view of the matter before the Contractor reach a decision.

(B) The foregoing referrals and reporting to the Employer and its representative shall be in writing.

## **26 Programme to be Submitted and Agreed**

- (A) The Contractor may propose changes to some or all of the key dates specified in the Assignment Brief for incorporation into the draft programme prepared under sub-clause (B) of this Clause. If any of such proposed changes are agreed by the Employer and its representative, who may impose conditions on his agreement, the corresponding key dates shall be changed and the changed dates incorporated into the draft programme.
- (B) The Contractor shall submit a draft programme which shall be in accordance with the requirements of the Assignment Brief and shall incorporate the key dates specified in the Assignment Brief, including any changes agreed under



sub-clause (A) of this Clause. The Employer and its representative shall either agree the draft programme or instruct the Contractor to submit a revised draft programme which he shall do.

- (C) If the Employer and its representative does not agree the revised draft programme submitted under sub-clause (B) of this Clause, he shall issue an instruction under Clause 23 to the Contractor.
- (D) When the Employer and its representative has agreed the draft programme or the revised draft programme submitted under sub-clause (B) of this Clause or such other draft programme as may result from sub-clause (C) of this Clause, the agreed draft programme or revised draft programme shall become the Agreed Programme for carrying out the Assignment and shall be amended only with the approval of the Employer and its representative.

## **27 Payment**

Payments under this Agreement shall be made in accordance with the Fee Proposal.

## **28 Fees to be Inclusive**

Unless provided otherwise, the fees quoted in the Fee Proposal shall be inclusive of all labour, materials and expenses incurred in the performance of the Services.

## **29 Payment in Hong Kong Dollars**

Unless provided otherwise, payments shall be made in Hong Kong dollars.

## **30 Expenses incurred in currencies other than Hong Kong dollars (not used)**

*Not used.*

## **31 Payment of Accounts**

- (A) Except as provided for in sub-clause (B) of this Clause accounts of all money due from the Employer to the Contractor in accordance with this Agreement shall be paid within 30 days after receipt of the Contractor's invoice by the Employer. In the event of failure by the Employer to make payment to the Contractor in compliance with the provisions of this Clause the Employer shall pay to the Contractor interest at the judgment debt rate prescribed from time to time by the Rules of the Supreme Court (Chapter 4 of the Laws of Hong Kong) (interpreted in accordance with the Hong Kong Reunification Ordinance) upon any overdue payment from the date on which the same should have been made.

- (B) If any item or part of an item of an account rendered by the Contractor is reasonably disputed or reasonably subject to question by the Employer and its representative, the Employer shall within 14 days after receipt of the invoice by the Employer inform the Contractor in writing of all items under dispute or subject to question. Payment by the Employer of the remainder of that account shall not be withheld on such grounds and the provisions of sub-clause (A) of this Clause shall apply to such remainder.

### **32 Rendering of Accounts**

The Contractor shall render his accounts for interim payments in accordance with the Fee Proposal.

### **33 Payment for Additional Services**

The Contractor shall be entitled to payment for the performance of any Services which he could not reasonably have anticipated at the time of entering into this Agreement resulting from:

- (i) explanations of adjustments made under sub-clause (B) of Clause 7;
- (ii) changes to the Assignment Brief made under sub-clause (A) of Clause 17;
- (iii) clarifications or instructions given under sub-clause (B) of Clause 17;  
and
- (iv) instructions given under Clause 23.

Provided that such Services are not attributable to default on the part of the Contractor.

### **34 Reduction of Lump Sum Fees**

If there shall be a reduction in the Services resulting from:

- (i) explanations or adjustment made under sub-clause (B) of Clause 7;
- (ii) changes to the Assignment Brief made under sub-clause (A) of Clause 17;
- (iii) clarifications or instructions given under sub-clause (B) of Clause 17;  
and
- (iv) instructions given under Clause 23;

then the Employer shall be entitled to a reduction in the lump sum fees in respect of such a reduction in the Services.

### **35 Notifications and Payment for Delays**

- (A) The Contractor shall not be entitled to payment in respect of any additional costs he incurs as a result of delays arising during the performance of the Services if the causes of delay which are the fault of neither party.
- (B) The Contractor shall notify the Employer when a delay arises and shall detail what in his opinion are the reasons for the delay, the consequences or likely consequences of the delay and any additional costs he has incurred or may incur.
- (C) The Contractor shall keep such contemporary records as may reasonably be necessary to support any claim for payment under this Clause and shall give to the Employer and its representative details of the records being kept in respect thereof. Without necessarily admitting the Employer's liability, the Employer and its representative may require the Contractor to keep and agree with the Employer any additional contemporary records as are reasonable and may in the opinion of the Employer be material to the claim. The Contractor shall permit the Employer and its representative to inspect all records kept pursuant to this Clause and shall supply copies thereof as and when the Employer and its representative so requires.

- (D) After the giving of a notice of delay to the Employer and its representative under sub-clause (B) of this Clause, the Contractor shall, as soon as is reasonable, send to the Employer and its representative a first interim account giving full and detailed particulars of the circumstances giving rise to the delay and any additional costs he incurred. Thereafter at such intervals as the Employer and its representative may reasonably require, the Contractor shall send to the Employer and its representative further up-to-date accounts giving the accumulated total of the additional costs and any further full and detailed particulars in relation thereto.
- (E) If the Contractor fails to comply with the provisions of sub-clause (B) of this Clause in respect of any claim, such claim shall not be considered.
- (F) If the Contractor fails to comply with the provisions of sub-clauses (C) or (D) of this Clause in respect of any claim, the Employer and its representative may consider such claim only to the extent that the Employer and its representative is able on the information made available.
- (G) The Contractor shall take all reasonable steps to mitigate the costs which may be incurred as a result of the delays.

### **36 Resident Site Staff (not used)**

*Not used.*

### **37 Non-Assignment**

The Contractor shall not have the right to assign or transfer the benefit and obligations of this Agreement or any part thereof.

### **38 Employment and Replacement of Sub-contractors**

The Contractor shall obtain the prior written approval of the Employer to:

- (i) the appointment of sub-contractors to undertake any part of the Services;  
and
- (ii) the replacement of any sub-contractors appointed under sub-clause (i) of this Clause.

### **39 Liability of Contractor for acts and default of sub-contractors**

The appointment of sub-contractors to undertake any part of the Services shall not relieve the Contractor from any liability or obligation under this Agreement and he shall be responsible for the acts, default and neglects of any sub-contractors, his agents, servants or workmen as fully as if they were the acts, default and neglects of the Contractor, his agents, servants or workmen.

### **40 Publicity relating to contract works (not used)**

*Not used.*

### **41 Suspension, resumption or termination**

- (A) This Agreement may be suspended or terminated by the Employer at any time, by the Employer giving the Contractor one months' notice in writing.
- (B) On suspension or termination, the Contractor shall be paid all fees and expenses commensurate with the Services performed by them up to the date of suspension or termination less all fees and expenses previously paid to the Contractor. The Contractor has the obligations to stop work immediately but in an orderly manner and do deliver to the Employer documents in its control relating to the Project. The Employer shall not be liable for any loss of profits and other losses incurred by the Contractor as a result of termination or suspension. The Employer reserves its right to claim for loss and damages against the Contractor as a result of termination of his contract including re-nominating the others to carry out and complete the remaining items. In case the payment balance is insufficient to cover the actual loss being suffered by the Employer, the Contractor has to reimburse the same accordingly.
- (C) In the event of suspension or termination the Contractor shall be entitled to reimbursement of the actual cost of or an amount in fair compensation for any financial commitment or obligation outstanding after the giving of the notice of suspension or termination which he has properly incurred in accordance with this Agreement prior to the giving of the notice of suspension or termination.

- (D) The payments referred to in sub-clauses (B) and (C) of this Clause shall be deemed in full and final payment for the Services up to the date of suspension or termination. The Contractor shall be entitled to such payments only if the suspension or termination is not attributable to default on the part of the Contractor.
- (E) In the event of suspension and subsequent resumption of this Agreement the Contractor shall be reimbursed any expenses necessarily incurred as a result of such resumption.
- (F) If this Agreement is resumed any payment of fees under this Clause except in respect of abortive work that has to be re-done shall rank as payment on account towards the fees payable under this Agreement.
- (G) Should this Agreement continue to be suspended for a period of more than two years then either:
  - (i) it shall be terminated upon the written notice of either party; or
  - (ii) it may be renegotiated with the agreement of both parties.

#### **42 Special Risks (not used)**

*Not used.*

#### **43 Appeal to Employer**

The Contractor shall have the right to appeal to the Employer against any instruction or decision of the Employer's Representative, Director and its representative which he considers to be unreasonable.

#### **44 Settlement of Disputes**

- (A) If any dispute or difference of any kind whatsoever shall arise between the Employer and the Contractor in connection with or arising out of this Agreement, either party shall be entitled to refer the dispute or difference to the Employer Delegates and the partner or Director of the Contractor, who shall meet within 21 days of such matter being referred to them.

- (B) If the dispute or difference cannot be resolved within 2 months of a meeting under sub-clause (A) of this Clause or upon written agreement that the dispute or difference cannot be resolved, either the Employer or the Contractor may at any time thereafter request that the matter be referred to mediation in accordance with and subject to the Hong Kong International Arbitration Centre Mediation Rules or any modification thereof for the time being in force.
- (C) If the matter cannot be resolved by mediation, or if either the Employer or the Contractor do not wish the matter to be referred to mediation then either the Employer or the Contractor may within the time specified herein require that the matter shall be referred to arbitration in accordance with and subject to the provisions of the Arbitration Ordinance (Chapter 609, Laws of Hong Kong) or any statutory modification thereof for the time being in force and any such reference shall be deemed to be a submission to arbitration within the meaning of such Ordinance. Any such reference to arbitration shall be made within 90 days of either the refusal to mediate, or the failure of the mediation.
- (D) The Hong Kong International Arbitration Centre Domestic Arbitration Rules shall apply to any arbitration instituted in accordance with this Clause unless the parties agree to the contrary.

#### **45 Prevention of Bribery**

The Contractor shall inform his employees who are engaged either directly or indirectly on the formulation and implementation of a project of the Construction Industry Council that the soliciting or accepting of an advantage as defined in the Prevention of Bribery Ordinance is not permitted. The Contractor shall also caution his employees against soliciting or accepting any excessive hospitality, entertainment or inducements which would impair his impartiality in relation to the projects of the Construction Industry Council.

#### **46 Declaration of Interest**

- (A) On appointment and during the currency of this Agreement, the Contractor must declare any interest if it is considered to be in real or apparent conflict with the Services. The Contractor shall not undertake any services, which could give rise to conflict of interest, except with the prior approval of the Employer which approval shall not be unreasonable withheld.

- (B) In any case, the Contractor or any of his associated companies shall not undertake any services for a Contractor in respect of a contract between that Contractor and the Employer for which the Contractor is providing a service to the Employer.

#### **47 Insurance**

- (A) Without limiting his obligations and responsibilities nor his liability to indemnify the Employer under Clause 22 the Contractor shall, as from the date of commencement of this Agreement, and thereafter, maintain an insurance cover to meet any claims that may be made by the Employer in respect of any negligence in or about the conduct of and performance by the Contractor, his servants and agents of all and singular the Services.
- (B) In the event that through no fault of the Contractor it becomes impractical or unreasonable to maintain the said cover for the full period required by sub-clause (A) of this Clause, the Employer may approve alternative arrangements.
- (C) The foregoing insurance policy or policies shall be affected with an insurer (or insurers) and in terms acceptable to the Employer. Throughout the period of insurance the Contractor shall each year lodge with the Employer a certificate signed by and on behalf of the Contractor's insurers stating that the said policy or policies of insurance remain in force.
- (D) The amount of insurance cover as mentioned in sub-clause (A) of this Clause shall be a minimum of HK\$30 million. (HK\$30 million is the minimum requirement for GCC (2a)-CAR, user may change its requirement if other set of GCC is adopted)

#### **48 Safety Precaution**

The Contractor shall be responsible for taking all necessary steps in ensuring the safety of all persons and properties affected by the work stipulated under the Assignment in the vicinity of the works at all stages, whether or not they are engaged in the execution of the works.



#### **49 Avoidance of Nuisance and Making Good Working Areas**

- (A) All Contractor's operations shall be carried out in such a manner as to cause as little inconvenience as possible to residents, the public or the operation of construction sites. The Contractor shall be held responsible for any claim, which arises from non-compliance with this clause.
- (B) The Contractor shall take all reasonable care so as not to cause any damage to property or not to cause any nuisance. The Contractor shall indemnify the Employer against any claim arising from default of the Contractor in this respect.
- (C) The Contractor shall confine his operations to the minimum areas required for the works and shall at all times work in a tidy and considerate manner. As soon as work has been completed for any location, the Contractor shall remove all debris resulting from his activities and make good any damage.

#### **50 Disclosure of Information**

The Employer shall have the right to disclose to any person, whenever it considers appropriate or upon request by any third party (written or otherwise), and in such form and manner as it deems fit:

- (i) the fees, costs and expenses payable by the Employer for engaging the Contractor; and
- (ii) the fee proposal submitted by the Contractor.

#### **51 Code of Conduct for Staff**

- (A) The Contractor shall explicitly prohibit his employees from soliciting or accepting any advantages as defined in the Prevention of Bribery Ordinance when providing service in relation to this Assignment.
- (B) The Contractor shall implement a system requiring his employees to declare to him any interest they or their immediate families may have, or any conflict between their personal interest and their official positions, in relation to this Assignment.
- (C) The Contractor shall prohibit his employees to take up any outside work or employment, which could create or potentially give rise to a conflict of interest

situation in connection with this Assignment.

- (D) The Contractor shall take adequate measures to protect any confidential / privileged information entrusted or obtained in relation to this Assignment; and his employees must not disclose to a third party any such information without prior consent from the Employer.
- (E) The Contractor shall prohibit his employees from introducing or recommending, directly or indirectly, service providers (including contractors) to owners, tenants or occupiers of premises in buildings covered by this Assignment.

## **52 Probity**

The Contractor shall prohibit his employees, agents and sub-contractors who are involved in this Contract from offering, soliciting or accepting any advantage as defined in the Prevention of Bribery Ordinance, Cap 201 when conducting business in connection with this Contract. Any such offence committed by the Contractor or his employee or agent will render the tender null and void. The Employer may also terminate the contract granted.

## **53 Copyright**

The copyright of all reports, documents, recommendations, Guidelines, Alerts and any other information prepared or collected by the Contractor's team, and their employees and agents in the course of this Agreement shall be with the Employer. The Contractor shall not disclose any information in relation to this Consultancy to any third party without the written consent of the Employer.

#### **54 Contractor's Claims for Extras**

- (A) The Contractor shall send to the Employer and its representative once in every month an account giving particulars (as full and detailed as possible) of all claims for any extension of contract period and / or additional expense to which the Contractor may consider himself entitled and of all extra or additional work contained in Contractor's instructions issued during the preceding month.
- (B) No consideration will be given to any claim for extension of contract period and / or payment for additional expense or extra or additional work which has not been made within a reasonable time to enable the circumstances and reasons for extensions or the additional expense to be ascertained and evaluated.

#### **55 Commencement of the Works**

The Contractor shall commence the Works on the date for commencement of the Works as notified in writing by the Employer and its representative and shall proceed with the same with due diligence. The Contractor shall not commence the Works before the notified date for commencement.

#### **56 Time for Completion**

- (A) The Works and any Section thereof shall be completed within the time or times stated in the Contract calculated from and including the date for commencement notified by the Employer and its representative in accordance with Clause 55 or such extended time as may be determined in accordance with Clause 54.
- (B) General Holidays shall be included in the time for completion unless otherwise stated in the Contract.

#### **57 Liquidated Damages**

- (A) If the Contractor fails to complete the Works or where the Works are divided into Sections any Section within the time for completion prescribed by Clause 56 or such extended time as may be granted in accordance with Clause 54, then the Employer shall be entitled to recover from the Contractor liquidated damages. The payment of such damages shall not relieve the Contractor from his obligations to complete the Works or from any other of his obligations under the Contract.

- (B) The liquidated damages shall be calculated using the rate per day prescribed in the Contract, either for the Works or for the relevant Section, whichever is applicable. Provided that, if the Employer and its representative certifies completion under Clause 58 of any part of the Works before completion of the Works or any part of any Section before the completion of the whole thereof, then the rate per day of liquidated damages for the Works or the relevant Section shall from the date of such certification be reduced in the proportion which the value of the part so certified bears to the value of the Works or the relevant Section, as applicable, both values as of the date of such certification shall be determined by the Employer and its representative.
- (C) The period for which liquidated damages shall be calculated shall be the number of days from the prescribed date for completion or any extension or revision thereof of the Works or the relevant Section until and including the certified date of completion.
- (D) All monies payable by the Contractor to the Employer pursuant to this Clause shall be paid as liquidated damages for delay and not as a penalty.

## **58 Completion of the Works**

- (A) When the Works have been substantially completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may serve notice in writing to that effect to the Employer and its representative, accompanied by an undertaking to carry out any outstanding work during the Defects Liability Period, requesting the Employer and its representative to issue a certificate of completion in respect of the Works. The Employer and its representative shall, within 21 days of the date of receipt of such notice either:
- (i) issue a certificate of completion stating the date on which, in the Employer and its representative's opinion, the Works were substantially completed in accordance with the Contract and the Defects Liability Period shall commence on the day following the date of completion stated in such certificate, or
  - (ii) give instructions in writing to the Contractor specifying all the work which, in the Employer and its representative's opinion, is required to be done by the Contractor before such certificate can be issued, in which case the Contractor shall not be permitted to make any further request for a certificate of completion and the provisions of sub-clause (B) of this Clause shall apply.

- (B) Notwithstanding the provisions of sub-clause (A) of this Clause, as soon as in the opinion of the Employer and its representative the Works have been substantially completed and satisfactorily passed any final test which may be prescribed by the Contract, the Employer and its representative shall issue a certificate of completion in respect of the Works and the Defects Liability Period shall commence on the day following the date of completion stated in such certificate.
- (C) The Contractor shall carry out any outstanding work as soon as practicable after the issue of the certificate of completion or as reasonably directed by the Employer and its representative and in any event before the expiry of the Defects Liability Period. The Contractor's obligation to provide, service and maintain site offices, latrines and the like, shall continue for as long as may be required by the Employer and its representative.
- (D) The provisions of sub-clauses (A), (B) and (C) of this Clause shall apply equally to any Section.
- (E) (i) The Employer and its representative shall give a certificate of completion in respect of any part of the Works which has been completed to the satisfaction of the Employer and its representative and is required by the Employer for permanent occupation or use before the completion of the Works or any Section.
- (ii) The Employer and its representative, following a written request from the Contractor, may give a certificate of completion in respect of any substantial part of the Works which has been completed to the satisfaction of the Employer and its representative before the completion of the Works or any Section and is capable of permanent occupation and/or permanent use by the Employer.
- (iii) When a certificate of completion is given in respect of a part of the Works such part shall be considered as completed and the Defects Liability Period for such part shall commence on the day following the date of completion stated in such certificate.
- (F) Any certificate of completion given in accordance with this Clause in respect of any Section or part of the Works shall not be deemed to certify completion of any ground or surface requiring reinstatement unless the certificate shall expressly so state.

## **59 Variations**

- (A) The Employer and its representative may order in writing any Variation that is necessary for the completion of the Works or is in his opinion desirable for or to achieve the satisfactory completion and functioning of the Works. The Contractor shall forthwith carry out such Variation in accordance with the Employer and its representative's instruction.
- (B) No Variation ordered by the Employer and its representative shall in any way vitiate or invalidate the Contract but all such Variations shall be valued in accordance with Clause 60.
- (C) Any Variation ordered by the Employer and its representative may include a requirement for the Contractor to prepare and submit within 14 days of the Contractor receiving the Variation order, a lump sum quotation in writing for complying with the order.
- (D) (i) Notwithstanding sub-clause (C) of this Clause, prior to ordering a Variation, the Employer and its representative may request the Contractor to submit a lump sum quotation in writing within 14 days of receipt of such request, or within such other time as may be agreed between the Employer and its representative and the Contractor.
- (ii) In the event that the Contractor is not subsequently instructed by the Employer and its representative to execute the Variation referred to in Clause 59(D)(i) above, the Contractor shall be entitled to any cost incurred in the preparation of the lump sum quotation which cost shall be ascertained and certified by the Employer and its representative.
- (E) (i) The Contractor may propose a Variation by submitting in writing to the Employer and its representative a proposal together with sufficient details and justification to show that:
- (1) the time for construction of the Works can be reduced, and/or
  - (2) the future maintenance cost can be reduced, and/or
  - (3) the quality of design and/or the construction of the Works can be enhanced, and/or
  - (4) the Contract Sum can be reduced by the amount of the lump sum reduction that the Contractor can offer to the Employer, and
  - (5) in any event:
    - (1) the quality of the design or construction of the Works is not prejudiced, or

- (2) the proposed Variation is in the interests of the Employer.
- (ii) The Employer and its representative shall within 14 days of receipt of the Contractor's proposed Variation and supporting detailed information under sub-clause (E)(i) of this Clause, or within such time as may be agreed between the Contractor and the Employer and its representative, but solely at the discretion of the Employer, confirm whether or not he agrees to the proposed Variation and, if so, order the Contractor in writing to carry out the proposed Variation under this sub-clause.
- (iii) No adjustment shall be made to the Contract Sum by virtue of this sub-clause except the reduction pursuant to sub-clause (E)(i)(4) of this Clause.

## **60 Valuation of Variations**

(A) The Employer and its representative shall determine the sum (if any) which in his opinion shall be added to or deducted from the Contract Sum as a result of a Variation order given by the Employer and its representative under Clause 59 (other than a Variation ordered under sub-clause (E) of Clause 59) in accordance with the following principles:

- (1) by valuation in accordance with sub-clause (D) of this Clause, or
- (2) by acceptance of a lump sum quotation prepared and submitted by the Contractor to the Employer and its representative in accordance with sub-clauses (E) and (F) of this Clause.

(B) The valuation of any Variation ordered by the Employer and its representative in accordance with sub-clause (A) of Clause 59 shall include the cost (if any) of any disturbance to, or prolongation of both varied and unvaried work.

(C) In the event of the Employer and its representative and the Contractor failing to reach agreement on any rate or price under the provisions of sub-clause (D) of this Clause, the Employer and its representative shall fix such rate or price as shall in his opinion be reasonable and notify the Contractor accordingly.

(D) The Employer and its representative shall determine the value of a Variation as follows:

- (1) Any item of work omitted shall be valued at the rate or price set out in the Contract for such work or, in the absence of such a rate or price, at a rate or price agreed between the Employer and the Contractor.
- (2) Any work carried out which is the same as or similar in character to and executed under the same or similar conditions and circumstances to any item of work priced in the Contract shall be valued at the rate or price set out in the Contract for such item of work.
- (3) Any work carried out which is not the same as or similar in character to or is not executed under the same or similar conditions or circumstances to any item of work priced in the Contract shall be valued at a rate or price based on the rates or prices in the Contract so far as may be reasonable, failing which, at a rate or price agreed between the Employer and the Contractor.

Provided that if the nature or extent of any Variation ordered in accordance with sub-clause (A) of Clause 59 relative to the nature or extent of the Works or any part thereof shall be such that in the opinion of the Employer and its representative any rate or price contained in the Contract for any item of work is by reason of such Variation rendered unreasonable or inapplicable then a new rate or price shall be agreed between the Employer and its representative and the Contractor for that item, using the Contract rates or prices as the basis for determination and taking into account the provisions of sub-clause (B) of this Clause.

(E) Any lump sum quotation submitted by the Contractor to the Employer and its representative in accordance with sub-clause (C) or (D) of Clause 59 shall indicate how the lump sum was calculated by showing separately full details of:

- (1) the cost of complying with the order,
- (2) the cost of preparing the lump sum quotation,
- (3) the cost (if any) of any disturbance to or prolongation of varied and unvaried work as a consequence of complying with the order, and
- (4) such other information as will enable the Employer and its representative to evaluate the lump sum quotation.



- (F) The Employer and its representative shall notify the Contractor not later than 14 days from the receipt of any such lump sum quotation (or such other time as may be agreed between the Employer and its representative and the Contractor) whether or not it has been accepted. If accepted, the amount specified in the lump sum quotation, or otherwise agreed between the Employer and its representative and the Contractor, shall be the full sum to which the Contractor is entitled for complying with that order.
- (G) In the event that a lump sum quotation is submitted in accordance with sub-clause (C) or (D) of Clause 59 and the lump sum quotation is not accepted by the Employer and its representative, then the work ordered under sub-clause (A) of Clause 59 shall be valued in accordance with sub-clause (E) of this Clause.
- (H) The Contractor shall supply the Employer and its representative with any further information reasonably requested by the Employer and its representative within 14 days of the request to enable him to value any Variation ordered under sub-clause (A) of Clause 59.
- (I) The Employer shall within 28 days of the receipt of the information requested under sub-clause (H) of this Clause notify the Contractor of his valuation.

## **61 Rights of Third Parties**

Notwithstanding the Contracts (Rights of Third Parties) Ordinance (Chapter 623 of the Laws of Hong Kong), no one other than a party to this Contract will have any right to enforce any of the terms in this Contract.



## General Conditions of Contract and Guidelines for Works or Services

### **A. General Conditions of Contract**

1. "Contractor" means the person who enters into the contract with the Construction Industry Council or the person or service provider whose quotation has been accepted.
2. "Contract" means the Contract, purchase order or letter of acceptance herein including the contents of the Schedule and these general conditions.
3. The Works / Services and Variation
  - (a) The works to be undertaken or services to be performed under this Contract shall be as laid down in the Quotation and Special conditions (if any) and shall be carried out to the satisfaction of Construction Industry Council.
  - (b) The Contractor shall not extend the works / services beyond the requirements specified in the Schedule except as directed in writing by Construction Industry Council; but Construction Industry Council may, at any time during the Contract period by notice in writing direct the Contractor to alter, amend, omit, add to, or otherwise vary any of the works / services and/or the contract period, and the Contractor shall carry out such variations, and be bound by the same conditions, so far as are applicable, as though the said variations were stated in the Schedule.
  - (c) Where a variation has been made to this Contract the amount to be added to or deducted from the Contract price in accordance with that variation shall be determined in accordance with the discounted rates specified in the Schedule so far as the same may be applicable and where rates are not contained in the said Schedule, or are not applicable, such amount shall be such sum as is reasonable in the circumstances. In any circumstances, such amount should be subject to the approval of Construction Industry Council.
4. Assignment  
The Contractor shall not, without the written consent of Construction Industry Council, assign or otherwise transfer any part of this Contract, and the performance of this Contract by the Contractor shall be deemed to be personal to him.
5. Quality of Works / Services  
The works / services shall be as specified in the Schedule and shall fulfil all the conditions and terms of any drawings and specifications (if any) supplied to the Contractor.
6. Compliance with the laws of Hong Kong Special Administrative Region and Valid Licences  
The Contractor has to comply with all laws of Hong Kong Special Administrative Region. The Contractor shall not employ illegal workers or any person who are forbidden by the laws of Hong Kong Special Administrative Region or not entitled for whatever reasons to undertake any employment in Hong Kong Special Administrative Region in the execution of this Contract. The Contractor should hold valid licences when performing relevant works if required by law. If there is any breach of this clause, Construction Industry Council may terminate this Contract and the Contractor is not entitled to claim any compensation. The Contractor shall be liable for all financial loss or expenses necessarily incurred by Construction Industry Council as a result of the termination of this Contract.
7. Inspection, Rejection and Acceptance
  - (a) The Works undertaken or Services performed shall be subject to inspection by Construction Industry Council who may at its own discretion terminate this Contract or withhold payment unless the works / services have been undertaken / performed in accordance with the terms and conditions of this Contract and to the satisfaction of Construction Industry Council. Upon breach of any essential terms and conditions of this Contract by the Contractor, including but not limited to failure to comply with the performance requirements in accordance with the Schedule, Construction Industry Council shall have the right to reject unsatisfactory performance of the Works / Services and suspend payment until the defects have been rectified by the Contractor to the satisfaction of Construction Industry Council. Construction Industry Council reserves the right to claim against the Contractor for all related financial loss or expenses necessarily incurred by Construction Industry Council.
  - (b) Being notified in writing of the rejection of any works / services, the Contractor shall take immediate and necessary action to rectify such rejected Works / Services within reasonable time as agreed by Construction Industry Council.

- (c) If the Contractor shall fail to rectify such rejected works / services in accordance with item (b) above, Construction Industry Council may, without prejudice to any other rights and remedies available to Construction Industry Council, carry out and complete such works / services by its own resources or by other contractors. All costs and expenses whatsoever which may be incurred by Construction Industry Council thereof shall be recoverable in full from the Contractor forthwith.
- (d) The works undertaken or services performed in pursuance of this Contract shall not be deemed to have been accepted unless either:-
  - i. Construction Industry Council shall so certify; or
  - ii. The works / services are not rejected as being unsatisfactory within 21 working days after receiving the report of certification upon the execution of the work.

8. Payment for works / services

After the receipt of goods and provision of services or completion of works in accordance with the agreed terms and conditions and to the satisfaction of Construction Industry Council, Construction Industry Council will settle payment within 30 days after receiving and verifying the invoices.

9. Injury to Persons and Property and Indemnity

- (a) The Contractor shall be liable for, and shall indemnify Construction Industry Council against, any expense, liability, loss, claim or proceedings whatsoever arising under any statute or at common law in respect of personal injury to or the death of any person whomsoever arising out of or in the course of or caused by the carrying out of the works under the Contract, save to the extent that the same may be due to any act or neglect of Construction Industry Council or of any person for whom Construction Industry Council is responsible.
- (b) The Contractor shall be liable for, and shall indemnify Construction Industry Council against, any expense, liability, loss, claim or proceedings in respect of any injury or damage whatsoever to any property real or personal in so far as such injury or damage arises out of or in the course of or by reason of the carrying out of the works under the Contract, save to the extent that the same may be due to any act or neglect of Construction Industry Council or of any person for whom Construction Industry Council is responsible.

10. Employee's Compensation Insurance Policy ("EC policy")

- (a) Without prejudice to the Contractor's obligations, liabilities and responsibilities under the Contract and his obligation to insure by law, the Contractor shall at his own expenses warrant to take out and maintain an EC policy covering against all liabilities arising from any death, accident or injury to any workmen or other persons in the employment of the Contractor and any sub-contractor of any tier and Construction Industry Council shall not be liable for any damages or compensation in respect thereof. Such EC policy shall be maintained during the Contract period and for the whole of the time that such workmen or other persons are employed on the works including the Maintenance Period or Defects Liability Period (if applicable).
- (b) Before the commencement of works under the Contract, the Contractor shall, whenever required by Construction Industry Council, produce to Construction Industry Council a copy of the EC policy (include Endorsements W338, W348 and W204) which he is required to effect pursuant to item (a) above together with satisfactory proof of payment of the current premiums thereof.
- (c) If the Contractor shall fail to effect and maintain the EC policy or if the Contractor shall fail to provide any evidence thereof which he is required to by item (b), Construction Industry Council may at its own discretion terminate the Contract.
- (d) In the event of any of the Contractor's sub-contractors of any tier or employees or agents or the subcontractors' employees suffering any injury or death in the course of or arising out of this Contract and whether there be a claim for compensation or not, the Contractor shall within 7 working days give notice in writing of such injury or death to Construction Industry Council.

11. Contractors' All Risks Insurance Policy ("CAR")

- (a) Without limiting the obligations, liabilities and responsibilities of the Contractor under the Contract, Construction Industry Council has effected, with insurers of Construction Industry Council's choice, for the benefit inter alia of Construction Industry Council, the Contractor and his sub-contractors of any tier and other direct specialist contractors a CAR in respect of inter alia:
  - i. Loss and damage to the works under the Contract;
  - ii. Third party liability

Refer to **Section B** for an **insurance synopsis** and reference should be made thereto for its full terms and effect.
- (b) The Contractor's All Risks / Third Party Liability Insurance only covers contract within the contract details as stated in the Insurance Synopsis of Contractors' All Risks/ Third Party Liability Insurance. Should the contract not within the contract details, contractor must arrange another Contractor's All Risks / Third Party Liability Insurance, joint name with Construction Industry Council, at contractor's own cost. Minimum coverage for third party liability is HK\$30,000,000.

- (c) The Contractor shall for himself and on behalf of all sub-contractors of any tier accept the CAR as if it has been effected by himself and shall with all due diligence observe and fulfil, and procure that all sub-contractors of any tier observe and fulfil, the terms, provisions and conditions contained therein.
- (d) The Contractor shall be deemed to have read and understood the terms, provisions, conditions, exclusions and excesses of the CAR. If, in the Contractor's opinion, the amounts and / or risks insured are insufficient to cover the Contractor's risks, duties, obligations and liabilities under the Contract, at common law or otherwise, the Contractor may effect such further insurance at his own expense as he considers necessary.
- (e) It is acknowledged and understood that the CAR is subject to excesses and exclusions. In the event of a claim under the CAR in respect of a matter for which the Contractor is responsible or liable under the Contract, the full amount of such excesses and exclusions shall be borne by the Contractor. In the event of any default by the Contractor in making good any damage to the works where required by the terms and conditions of the Contract, Construction Industry Council may deduct the applicable policy excess from any sums due or to become due to the Contractor under this Contract or recover the same as a debt due from the Contractor.
- (f) Save for any case in which the relevant loss or injury arises from any act or neglect of Construction Industry Council or any person for whom Construction Industry Council is responsible, all costs and incidental expenses incurred in relation to claims including the preparation and submission of all formal quantified claims under the CAR shall be borne by the Contractor.
- (g) The Contractor shall forward to Construction Industry Council's representative a copy of all notices and claims submitted by him or all sub-contractors of any tier pursuant to the conditions of the CAR within 24 hours of dispatch of such notice or claim. Upon a written request from Construction Industry Council, Construction Industry Council shall be entitled to take over the conduct of any claim submitted by the Contractor or all sub-contractors of any tier under the CAR, and in any such event the Contractor hereby appoints, and shall procure that all sub-contractors of any tier appoint, Construction Industry Council as his or their agent for that purpose.
- (h) All monies to be received under the CAR shall be paid to Construction Industry Council as loss payee. The Contractor and all sub-contractors of any tier hereby irrevocably authorize Construction Industry Council to give good discharge to the insurers for such monies.
- (i) Upon the occurrence of any loss or damage to the works under the Contract, the Contractor with due diligence shall restore works damaged, replace or repair any unfixed materials or goods which have been destroyed or injured, remove and dispose any of debris and proceed with the carrying out and completion of the works. All monies received under the CAR (less any amounts to cover professional fees) shall be paid to the Contractor by instalments under the Interim Payment Certificates or Final Payment Certificates issued by Construction Industry Council's representative. The Contractor shall not be entitled to any payment in respect of the restoration of work damaged, the replacement and repair of any unfixed materials or goods, and the removal and disposal of debris other than the monies received under the said CAR.

#### 12. Bankruptcy or Receivership

Construction Industry Council may at any time by notice in writing summarily terminate the Contract without entitling the Contractor to compensation if the Contractor shall at any time become bankrupt, insolvent, or shall be placed in receivership or go into liquidation or receivership, or if a petition for liquidation, bankruptcy or receivership (whether voluntary or involuntary, save for the purpose of reconstruction or amalgamation) is filed against the Contractor, but without any prejudice to any right or action or remedy which shall have accrued or shall accrue thereafter to Construction Industry Council.

#### 13. Corruption

Construction Industry Council prohibits any member of the staff from soliciting or accepting any advantage. Without the approval of Construction Industry Council, it is an offense under the Prevention of Bribery Ordinance to offer or give any gift, loan, fee, reward, commission, office, employment, contract, other services of favour, discount to any staff of Construction Industry Council. Construction Industry Council will terminate the Contract without prior notice and hold the Contractor liable for any loss or damage so caused to Construction Industry Council.

#### 14. Personal Data Submitted by Contractor

All personal data submitted by the Contractor will be used by Construction Industry Council for the purpose of this Contract only. Under the provisions of the Personal Data (Privacy) Ordinance, the Contractor has the right to request access to or correction of personal data. Written requests should be addressed to Construction Industry Council. Construction Industry Council may be unable to process and consider incomplete information submitted.

#### 15. Working Hours

Unless it is specifically allowed in other part of the Contract, the works under this Contract shall be undertaken during normal working hours as specified by Construction Industry Council.

16. Valid Certificates of Intermediate Trade Testing or higher qualifications  
Except for carrying out general cleaning, delivering or sweeping tasks or having special approval of Construction Industry Council, all workers employed by the Contractor to work under this Contract have to hold valid certificates of intermediate trade testing (or higher qualifications) relevant to the trades under which they are working. A list of such workers with their valid and relevant qualifications has to be submitted to Construction Industry Council before the commencement of works.
17. Temporary Work Permit  
When carrying out the works under the Contract, all workers have to wear the temporary work permit issued by Construction Industry Council. If the temporary work permit is lost, the Contractor or worker has to report to Construction Industry Council and request a re-issue at \$30.
18. Parking  
If the Contractor finds it necessary to park their motor vehicles within the premises of Construction Industry Council, application has to be lodged in advance. If the application is approved, the parking permit issued by Construction Industry Council and the contact telephone number of the driver has to be displayed on the motor vehicles.
19. Refuse Removal  
All refuse has to be delivered to the refuse collection warehouse specified by Construction Industry Council at the end of each working day or on any dates specified by Construction Industry Council.
20. Rights of Third Parties  
Notwithstanding the Contracts (Rights of Third Parties) Ordinance (Chapter 623 of the Laws of Hong Kong), no one other than a party to this Contract will have any right to enforce any of the terms in this Contract.

## **B. Insurance Synopsis of Contractors' All Risks / Third Party Liability Insurance**

### 1. Summary

<b>Type</b>	:	Contractors' All Risks – Open Cover
<b>Form</b>	:	To follow the terms, limits and conditions of Asia Insurance Co Ltd Contractors' All Risks policy wordings as agreed.
<b>Insured</b>	:	Construction Industry Council as principal &/or all Main Contractors and its sub-contractors of every tier.
<b>Period of Insurance</b>	:	From 00:00 1 <sup>st</sup> January 2018 to 24:00 31 <sup>st</sup> December 2018 Local Hong Kong Time (both dates inclusive).

**Contract Details** : Scope and Nature  
Renovation / Restoration / Maintenance / Alteration / Repair Work and/or Installation Work of Building Services including building maintenance work and/or builder's work but excluding construction/erection/demolition of building structure (i.e. structural walls, columns, beams and slabs of a building) and/or Installation/ Maintenance/ Repair Work of Building Services equipment; office equipment; training equipment; and trade test equipment carried out at the premises of the Insured which are covered under the Property Policy but definitely excluding any construction sites.

Contract Value of Each Contract

Contract Value at inception must not exceed HK\$3,000,000.

Period of Insurance for Each Contract

(1) Insured Contract other than Maintenance Contract Work

(a) Contract Period

Follow the original Contract Period of each contract work provided that: -

- the duration of the Contract Period shall not exceed 120 days;
- the Insured Contract must commence within the Period of Insurance specified in the Schedule

(b) Maintenance Period

Follow the original Maintenance Period of each contract work provided that the duration of the Maintenance Period shall not exceed 12 months immediately after the Original Contract Period.

(2) Maintenance Contract Work only

The Period of Insurance in respect of the Maintenance Work shall follow the original Contract Period of each Maintenance Work provided that:-

- the duration of the Maintenance Work shall not exceed 12 months;
- the Insured Contract must commence within the Period of Insurance specified in the Schedule.

**Coverage** : Section I – Material Damage

To indemnify the Insured in respect of loss of or damage to the Insured Property whilst at the site during the Period of Insurance arising from any cause whatsoever not excluded by the original policy.

Insured Property – Item 1

The permanent and temporary works constructed erected or in the course of construction or erection in performance of the contract and all other property for which the insured contractors are responsible under the contract whilst on the site and subject to its value being included in the sum insured however excluding constructional plant and temporary buildings.

Insured Property – Item 2

Removal of debris : costs and expenses necessarily incurred by the Insured with the consent of the Insurers in dismantling and removing debris of the portion or portions of the property insured under item (1) destroyed or damaged by any peril hereby insured against.

Sum Insured : 4% of Individual Contract Value

Insured Property – Item 3

Professional Fees : costs and expenses in respect of architects' surveyors and consulting engineers' fee necessarily incurred in the reinstatement of the insured property consequent upon its loss or damage but not for preparing any claim it being understood that the amount payable hereunder shall not exceed the scale charges of the appropriate professional body.

: Section II – Liability to Third Parties

To indemnify the Insured in respect of all sums which the Insured shall become legally liable for:

- i) Accident death bodily injury illness or disease suffered by any person
- ii) Accidental loss or damage to physical property arising out of the performance of the contract and in addition the insurers shall be liable for
- iii) All costs and expenses of litigation recovered by any claimant against the insured
- iv) All costs and expenses of litigation incurred by the insured with written consent of the insurers in resisting any claim

Limit of Indemnity : HK\$30,000,000 any one accident and unlimited for the period of insurance (Cost inclusive)

**Geographical Area** : Hong Kong SAR  
**and Jurisdiction**

**Excess** : Section I – Material Damage

	<u>For contract with value of HK\$500,000 or below HK\$</u>	<u>For contract with value exceeding HK\$500,000 upto HK1,500,000 HK\$</u>	<u>For contract with value exceeding HK\$1,500,000 upto HK\$3,000,000 HK\$</u>
Act of God/Fire/Theft:	20,000	25,000	35,000
Others:	20,000	25,000	35,000
Temporary Works:	20,000 min or 50% of loss (*)	25,000 min or 50% of loss (*)	35,000 min or 50% of loss (*)
Water Damage to Work:	20,000 min or 20% of loss (*)	25,000 min or 20% of loss (*)	35,000 min or 20% of loss (*)
Designer/Testing:	20,000	25,000	35,000

Section II – Liability to Third Party

	<u>HK\$</u>
Third Party Property Damage	: 50,000 min or 10% of loss (*)
Vibration	: 50,000 min or 20% of loss (*)
Underground Services	: 50,000 min or 20% of loss (*)
Oil-Filled/Fibre-Optic Cable	: 50,000 min or 40% of loss (*)
Principal Property	: 50,000 min or 20% of loss (*)
Water Damage to Third Party Property	: 50,000 min or 20% of loss (*)
Third Party Bodily Injury	: 50,000

(\*) – whichever is the greater

- Conditions** : 1. Revised Cross Liability Clause/ As per Asia's standard Contractors' All Risk Policy Jacket
- (Inter alia)** 2. B1 – Safety Precaution Clause amended to delete the 24 hours watchman requirement.
3. B2 – Special Conditions for Underground Services Clause
4. A9 – Including the risks of strikes, riots and civil commotion
5. A6 – Extra charges for overtime, night work, work on public holiday and express freight (15% of adjusted loss)

6. A1 – Extended to cover liability to third party property damage caused by vibration, removal or weakening of support (Limit : HK\$30,000,000 any one accident and in aggregate during any one period of insurance)
  7. A7 – Extended to cover employer's property under the care, custody or control of the insured contractors under Section II (Limit : HK\$30,000,000 any one period in aggregate)
  8. Yearly Declaration (CIC has to submit the actual annual turnover with details upon policy expiry)
  9. Burning and Welding Clause
  10. 90 Days Cancellation Clause, i.e. the policy may be cancelled by the Insured at any time subject to short-term premium but 90 days' advance notice by the Insurer.
  11. Extended Maintenance Period Cover
  12. 90 Days Non- Renewal Notice by Insurer
  13. Claim Control Clause
  14. 72 hours Clause
  15. HK Jurisdiction Clause
  16. Run Off Liability Clause
  17. Revised Arbitration Clause
  18. A3 – Extension of Cover for Designer's Risks
  19. A4 – Extension of Cover for Inland Transit (Limit: HK\$100,000 any one loss)
  20. A5 –Extension of Cover for Off-Site Storage anywhere in HKSAR (Limit: HK\$100,000 any one loss)
  21. A2 – Extension of Cover for Testing and Commissioning (4 weeks)
  22. Escalation Clause (Limit: 15% of Contract Value)
- Other terms and conditions as per policy wording.

**Principal Policy Exclusions (Inter alia)** : 1. Cyber Exclusion  
 2. Total Asbestos Exclusion  
 3. Pollution Exclusion Clause  
 4. War & Terrorism Exclusion  
 5. Date Related Performance & Functionality Clause (A) and (B)  
 6. Professional Liability Exclusion  
 7. Electromagnetic Radiation Exclusion  
 8. Products Liability Exclusion  
 9. Self-Employed Person and Sole Proprietors Exclusion  
 10. Sanction Clause  
 Other exclusions as per original policy.

**Insurer** : Asia Insurance Company Limited – 100%

**Policy No.** : ABK/ECA/18-0910005641

**Applicable Jurisdiction and/or Law Practice** : Hong Kong SAR

## 2. Contractors' Own Insurance Responsibilities

- (a) The Contractor's All Risks / Third Party Liability Insurance does not cover the liability arising out of or in connection with the following:
- i. motor vehicles and other Statutory Insurances.
  - ii. employees of the Insured Parties, sole proprietors and self-employed persons acting as sub-contractors, including labour masters and persons supplied by them, persons employed by labour only sub-contractors, self-employed persons, drivers and / or operators of plant hired to the Insured, student gaining work experience, and any other persons hired or borrowed by contractors.  
**"Contractors allow such persons to enter site at their own risk".**
  - iii. deductibles of the Policy.



- (b) The Contractor's All Risks / Third Party Liability Insurance does not cover the physical loss of or damage to construction plant tools and equipment owned or leased by the contractors or for which the contractors may be responsible.
- (c) Contractors and Subcontractors are required to arrange Employees' Compensation Insurance complying with the Employees' Compensation Ordinance (Cap 282) in respect of their employees. Such insurance is to be endorsed to cover the Construction Industry Council as an Insured Party.
- (d) **The Third Party Liability Insurance cover is HK\$30,000,000. Construction Industry Council advises contractors to review its adequacy in relation to their risks and liability under the contract with the Construction Industry Council and to purchase additional limit, if required, at their own costs.**
- (e) The Contractor's All Risks / Third Party Liability Insurance only covers contract within the contract details as stated in the Insurance Synopsis of Contractors' All Risks/ Third Party Liability Insurance. Should the contract not within the contract details, contractor must arrange another Contractor's All Risks / Third Party Liability Insurance, joint name with Construction Industry Council, at contractor's own cost. Minimum coverage for third party liability is HK\$30,000,000.

### C. Safety Guidelines

#### 1. General Duties of Contractor and Persons Employed

Pursuant to the Factories and Industrial Undertakings Ordinance (Cap. 59) and Occupational Safety and Health Ordinance (Cap.509), whilst executing the works under the Contract, it shall be the duty of the Contractor to ensure the health and safety at work of all persons employed by him, and it shall be the duty of every person employed to take care for the safety of himself and of other persons who may be affected by his acts or omissions at work.

#### 2. Relevant Mandatory Safety Training Certificates (please select one of the following clauses)

All subcontractors of all tiers and employees employed by the Contractor to work in the CIC premises under the Contract shall :

- ☒ hold valid Construction Industry Safety Training Certificates (commonly known as "Green Cards") and Specified Trade Safety Training Certificates (commonly known as "Silver Cards") and any other relevant mandatory certificates required for safe operation of the works.

#### 3. Safe Means of Access and Egress

The Contractor must maintain the workplace in a safe condition and ensure that every access to and egress from the workplace is safe. The Contractor shall also ensure that all means of escape from the workplace are kept free from obstruction.

#### 4. Personal Protective Equipment

The Contractor must supervise and ensure all his sub-contractors and employees wear appropriate personal protective equipment, e.g. protective clothing, safety helmet, safety shoes, harness, fall arresting system, eye-protector, ear protector, and mask, etc., as Construction Industry Council may consider necessary or appropriate or as legally required. Any such personal protective equipment must be provided, maintained and replaced as necessary by the Contractor at his own expenses.

#### 5. No Smoking and Fire Prevention Measures

Smoking is not permitted in the workplace. If the works involve the use of naked flame, the Contractor must implement sufficient fire prevention measures.

#### 6. Working at Height

The Contractor shall take adequate steps to prevent any person from falling from a height of 2 metres or more.



**D. Consequences of Breach**

If the Contractor, his sub-contractors of all tiers or employees do not comply with the relevant laws of Hong Kong Special Administrative Region and the terms and conditions of this Guidelines, or if the performance of works undertaken by the Contractor causes any damages or losses to Construction Industry Council, Construction Industry Council may at its discretion terminate this Contract and the operations of the Contractor until any non-compliance or the unfavourable operation is rectified. The Contractor shall be liable to any loss or damage so caused to Construction Industry Council. Construction Industry Council shall be entitled to recover in full from the Contractor forthwith. The Contractor shall also lose his right from submitting quotations or tenders to Construction Industry Council in the future.

**Additional Information**

Tender Reference No.: (340) in P/AE/PUR/AGC

Period of Validity: From commencement date to completion date per contract

Location of Works / Services: Designate area at G/F and 2/F of Kwai Chung Campus at 7-11 Kwai Hop Street, Kwai Chung, New Territories

No. of pages for this document: 9

This document was issued on: 14-Feb-2018

**The Contractor's Declaration**

If the quotation is accepted, this document together with the tender or quotation will form part of the Contract and I/we hereby agree to comply with them.

Name of Contractor: \_\_\_\_\_

Signature with Company Chop: \_\_\_\_\_

Date: \_\_\_\_\_



# **Contractor's Safety Requirements**

## **承判商安全守則**

The following requirements include general safety requirements to be complied with by contractors and are by no means exhaustive. In general, contractors are to take all reasonable steps to ensure the safety and health of their employees and their subordinate workers (including their subordinate contractors). All site work activities of contractors shall be in full compliance with all relevant legislation of the Hong Kong Special Administrative Region including:

- Factories and Industrial Undertakings Ordinance (Cap 59) and its subsidiary legislation / regulations,
- Occupational Safety And Health Ordinance (Cap 509) and its subsidiary legislation / regulations,
- Dangerous Goods Ordinance (Cap 295) and its subsidiary legislation / regulations,
- Electricity Ordinance (Cap 406) and its subsidiary legislation / regulations,
- Builders' Lifts and Tower Working Platforms (Safety) Ordinance (Cap 470) and its subsidiary legislation / regulations,
- Boilers and Pressure Vessels Ordinance (Cap 56) and its subsidiary legislation / regulations.
- Construction Workers Registration Ordinance (Cap 583) and its subsidiary legislation / regulations,
- Employees' Compensation Ordinance (Cap 282) and its subsidiary legislation / regulations.

Other than legislation, contractors also must comply with relevant codes of practice or any other guidelines issued by government bodies or organization including the Labour Department, Fire Services Department, Electrical and Mechanical Services Department, Highways Department, Buildings Department, Construction Industry Council and Occupational Safety and Health Council.

Construction Industry Council (CIC) reserves the right to charge HKD 500.00 for each violation of any of CIC's internal safety requirements listed below or each violation of any relevant legislation, code of practice or guidelines.

In case of any dispute, CIC reserves all rights of final interpretation of the rules. The safety requirements to be complied by contractors include:

## General Rules

- 1) Contractors must arrange a representative(s) to attend a safety briefing before work commencement. Failure to attend briefings may result in work commencement not being permitted. Attendance at a briefing will be valid for 6 months; any contractor who had

attended a briefing within the 6 months prior to the work commencement day will be exempted from attending a further briefing.

- 2) Before work commencement, contractor must obtain an Attendance Proof – Safety Briefing. Work will be suspended immediately if an Attendance Proof – Safety Briefing has not been obtained.
- 3) The contractor's representative must be a direct employee of the awarded contractor.
- 4) The contractor's representative has the duty to clearly deliver to the employer all messages from safety briefings or any safety meetings.
- 5) Contractors have the obligation to send a representative(s) to attend any safety meeting held by CIC.
- 6) The contractor must ensure all of CIC's safety requirements are delivered and clearly explained to all personnel in the working team (including direct employees and subordinate contractors) before working within CIC's premises.
- 7) The delivery of CIC's safety requirements mentioned in clause 6) above must be documented in writing and a copy must be maintained within the work area for inspection.
- 8) In case of any inspection or visit conducted by government officials, contractors must notify the site's responsible person, CIC's department responsible for the project and CIC's Corporate Safety Team immediately.
- 9) Contractors are required to prepare a method statement document ("Method Statement") and a risk assessment document ("Risk Assessment") before work commencement. The Method Statement is to be a comprehensive and step-wise statement of the work sequence and method, with the help of drawings, layout plan etc. to illustrate in detail how the work will be conducted. The Risk Assessment is to cover all foreseeable risks resulting from each step of the work sequence. Adequate and suitable rectifying measures should be stated in the Risk Assessment and implemented. The Risk Assessment should be prepared or reviewed by the contractor's safety officer.
- 10) Contractors should submit the statutory appointment notice (Forms 4 & 5 in Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulation (Cap 59Z)) of any safety supervisors or safety officers to CIC for record.
- 11) Occurrence of any kind of imminent danger or unsafe act may result in suspension of work on site until adequate and appropriate remedial action to the satisfaction of CIC is taken.
- 12) All contractors' personnel must not smoke within CIC premises.
- 13) All contractors' personnel must not work under the influence of alcohol or drugs. Non-compliant individuals may be immediately removed from the site.

- 14) Work areas and material storage areas should be fully enclosed and the following signage should be displayed at the entrance of each individual area:
  - i. "No unauthorized entry" or similar,
  - ii. "No Entry Without Wearing Safety Helmet or Safety Shoes" or similar,
  - iii. Contractor Work Commencement Permit
  - iv. Pedestrian diversion instruction (if original access was affected),
  - v. List of Competent Persons (if applicable).
- 15) Whip checks should be installed on the connections of compressed air hoses.
- 16) CIC reserves the right to request any contractor's personnel to be suspended from working within CIC premises for repeated violations of safety requirements.
- 17) If the construction area is adjacent to any public area, the affected area must be fully enclosed in order to ensure no members of the public would be able to access the site area. For example, enclosing the work area with securely erected boards.
- 18) If the construction area is directly above any public area, the contractor is required to fence off the area below or any area that may be vulnerable to any falling objects from the construction project. Sufficient, proper warning notice must be displayed.

## Personal Protective Equipment

- 19) Contractors have the obligation to ensure all workers, including all their subordinate contractor workers, have been provided with suitable and adequate personal protective equipment.
- 20) Contractors have the obligation to ensure all workers, including all their subordinate contractor workers, use personal protective equipment properly.
- 21) Contractors have the obligation to ensure personal protective equipment is in safe working condition.
- 22) All personnel within the works area must wear a safety helmet (which should be in compliance with the "Guidance Notes on the Selection, Use and Maintenance of Safety Helmets" issued by the Labour Department) and safety shoes with a steel toe cap and steel midsole (which should be in compliance with BS EN ISO 20345 or any other equivalent standards).
- 23) All safety helmets used should be equipped with a Y-type chin strap.
- 24) Contractors should maintain sufficient amount of safety helmets onsite for visitors' use.
- 25) All full body harnesses used must be equipped with double lanyards and comply with the "Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems" issued by the Labour Department.

### Safety Training

- 26) Copies of relevant certificates/safety training attendance records of all site personnel should be maintained onsite for inspection upon CIC's request. The Internal Safety Induction Training should be conducted by contractors' safety personnel.
- 27) All personnel engaged in site activities must possess a valid Mandatory Basic Safety Training Course (Construction Work) card and a Construction Worker Registration Card, and have attended Internal Safety Induction Training conducted by the contractor. Non-compliant individuals may be immediately removed from the site.

### Safety Inspection

- 28) If a safety officer or safety supervisor must be employed for the project, all completed Forms 2A and Forms 3A under the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations (Cap 59Z) should be submitted to CIC for record.
- 29) Contractors' management staff should conduct regular safety inspections. The inspections should be documented and submitted to CIC Corporate Safety Team for record.
- 30) All recommendations for improvement in the Safety Inspection report issued by CIC should be implemented by contractors within 3 working days and evidence of improvement should be submitted to CIC.
- 31) The reoccurrence of any unsafe items from a CIC Safety Inspection report may result in suspension of work until recommendations for improvement have been implemented.

### Temporary Structures

- 32) Drawings and designs of all metal scaffolds, bamboo scaffolds or any temporary structures for support use or load bearing purposes must be checked by an appropriate registered engineer prior to erection, and the maximum safe load of the scaffold or structure must be determined. The registered engineer should clearly indicate the permitted load of the scaffold or structure in the drawings. Approved / endorsed drawings should be submitted to CIC's Corporate Safety Team for record.
- 33) All bamboo scaffolds that will be constructed with more than 15 meters in height should be designed and endorsed by an appropriate registered engineer, and this document should be submitted to CIC's Corporate Safety Team for record.
- 34) All structures or scaffolds mentioned in clauses 32) and 33) must be inspected by an appropriate registered engineer after construction. This inspection should be targeted at verifying whether the aforesaid structure or scaffold is in compliance with the design. The verification should be in written form with the registered engineer's endorsement and



should be submitted to CIC for record. Any works associated with the structures or scaffolds should not be commenced before the verification is made.

## Emergency Preparedness

- 35) Contractors should provide one primary emergency contact number and one secondary emergency contact number to the CIC's Corporate Safety Team, and these contact numbers should be reachable 24 hours.
- 36) If there is any accident, incident, near miss, occupational disease or dangerous occurrence (as defined in Schedule 1 of the Occupational Safety and Health Regulation (Cap 509)) contractors must notify the premises occupier, CIC's Corporate Safety Team and CIC's department responsible for the project immediately.
- 37) CIC's contractors have the obligation to conduct necessary investigations of any accident, incident or near miss caused by their work activities or their sub-contractors' work activities. The investigation should be conducted within 24 hours after the occurrence of the accident. After the investigation, a detailed report should be composed to illustrate the cause(s) and suggest recommendations to avoid reoccurrence.
- 38) Reports of the investigations mentioned in clause 37) should be submitted to CIC within 3 working days after the occurrence of the incident.
- 39) CIC's contractors have the obligation to suggest and implement necessary improvement measures to prevent the reoccurrence of accidents, incidents or near misses.
- 40) In every work location, at least one first aid box should be maintained. If a contractor is engaged at more than one work location, and the work locations are physically separated or not readily accessible, a first aid box is to be maintained at each work location.
- 41) The type and quantity of first aid items contained in the first aid box should comply with Schedule 2 of the Construction Sites (Safety) Regulations (Cap 59I).
- 42) Contractors should arrange a person / team of persons to conduct regular checks on the first aid box to ensure the proper condition and quantity of first aid items. If first aider(s) is/are deployed for the construction project, the first aider should be included in the aforesaid team.
- 43) Adequate and proper firefighting equipment should be ready in the site area. At least one fire extinguisher of proper type should be maintained at each electrical distribution box and hot work area.
- 44) Clearly visible signage should be displayed to indicate the location of firefighting equipment and first aid equipment.
- 45) Contractors must not obstruct any emergency escape route or make any emergency equipment defective. If this is unavoidable, the obstruction is to be pre-approved by CIC



and alternative measure(s) provided during temporary unavailability of the emergency escape route or equipment.

### Competent Person

46) All of the competent persons deployed in the works area shall be appropriately qualified as specified in relevant legislation and codes of practice, including but not limited to the following:

- i. Metal scaffold competent person
- ii. Bamboo scaffold competent person
- iii. Metal scaffolder
- iv. Bamboo scaffolder
- v. Gas Welder
- vi. Safety Supervisor
- vii. Electrical worker
- viii. Abrasive wheel mounting competent person
- ix. Crane Operator
- x. Lifting Appliance Inspector
- xi. Loadshifting Machinery operator
- xii. Confined Space Competent Person
- xiii. Confined Space Certified Worker
- xiv. First Aider
- xv. Suspended working platform operator
- xvi. Cartridge-operated fixing tools operator
- xvii. Excavation Inspector
- xviii. Power-operated elevating work platform operator
- xix. Electric Arc Welder
- xx. Rigger
- xxi. Signaler

47) For competent persons of the trades specified below, these additional qualifications shall be met:

Trade	Qualification
Cartridge-operated fixing tools operator	Attended operational training organized by the tool's supplier
Excavation Inspector	Holder of Bachelor's degree in Civil Engineering or other relevant discipline
Power-operated elevating work platform operator	Attended operational training organized by the machine's supplier
Electric Arc Welder	Holder of General Welder intermediate trade test certificate or above

Rigger and Signaler	Holder of Safety Training Course for Construction Workers of Specified Trade (Construction Material Rigger) Certificate or other equivalent
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- 48) A list of the competent persons (if any) mentioned in clauses 46) and 47) above, should be displayed at the entrance of the site.
- 49) In case work activity is not conducted by suitable competent persons, CIC reserves the right to temporarily suspend that related work activity.

### Working at Height

- 50) All scaffolding works must be supervised by a relevant competent person and performed by trained workers as per the requirement stated in the Metal and Bamboo Scaffold Code of Practice issued by the Labour Department.
- 51) Contractors must provide proper fall protection to prevent any person falling from height. Contractors also have the obligation to ensure the fall protection is being used properly.
- 52) Contractors should take necessary steps to avoid any objects falling from height, such as implementing hand-tag lines for tools, installing toe boards or mesh etc.
- 53) All floor edges must be protected with rigid and secure guardrails and toe-boards at all times. The aforesaid guardrails and toe-boards are to comply with the requirements stated in Schedule 3 of the Construction Sites (Safety) Regulations (Cap 59I).
- 54) All floor openings must be covered and secured with sound and solid materials at all times. Clearly visible notices should be placed to indicate floor openings.
- 55) Proper working platforms must be provided for work carried out at 2 meters or above. Non-compliance with such will be considered as an unsafe act.
- 56) Mini scaffolds, stepladder platforms, hop-up platforms or step stools are to be provided for working at heights lower than 2 meters. The equipment mentioned must be in compliance with the requirements stated in clause 58).
- 57) Access ladders (Single sided, non-self-standing ladders), and A-type ladders (two-sided, self-standing ladders) are prohibited for use as working platforms.
- 58) Any mini scaffold, stepladder platform, hop-up platform or step stool must comply with the following standards and be free from any defects:

Equipment Type	Standard /Requirement
Mini scaffold	EN131-7 or PAS250 or any other equivalent
Stepladder platform	EN131 or ANSI A14 or AS/NZS 1892 or any other

Hop-up platform	EN131-7 or any other equivalent international standard, and may only be used when a guardrail is equipped properly
Steps stools	EN14183 or other equivalent international standard equivalent international standard

### Health Hazard Control

- 59) Noise assessments should be conducted as per the requirements stated in the Factories & Industrial Undertakings (Noise at Work) Regulation (Cap 59T) and relevant codes of practice. Relevant documents such as results of noise assessments and evidence of improvement measure(s) implemented should be submitted to CIC's Corporate Safety Team for record.
- 60) Manual handling assessments should be conducted as per the requirement stated in the Occupational Safety & Health Regulation (Cap 509A) and relevant codes of practice. Relevant documents such as results of manual handling assessments and evidence of improvement measure(s) implemented should be submitted to CIC's Corporate Safety Team for record.
- 61) The quantities of any dangerous goods stored within the works area should not exceed the exemption quantities stated in Fire Protection Notice No. 4 published by the Fire Services Department, otherwise, a dangerous goods store must be set up and a licence applied for. CIC's Corporate Safety Team is to be informed beforehand.
- 62) Chemical hazard assessments are to be conducted for all chemicals on the construction site. The storage, usage of chemicals, the usage of personal protective equipment etc. are to follow the results of the assessment.
- 63) The proper prescribed form of chemical label is to be clearly displayed on chemical containers.
- 64) Contractors should conduct heat stress assessments and arrange mitigation measures accordingly whenever the work condition may lead to their employees suffering heat stroke, such as prolonged outdoor work during the summer season or exhausting work in confined spaces.
- 65) Contractors should provide sufficient drinking water to the employees.

### Electrical Works

- 66) For any installation or excavation work required to be conducted on existing walls or structures, or the ground, active cable detection is to be conducted and the alignment and depth of cables are to be conveyed to the relevant personnel involved before the

start of work. The attendance record and cable detection survey report should be submitted to CIC's Corporate Safety Team for record.

- 67) Only registered electrical workers should conduct electrical installation work. A lock and tag system is to be implemented for any installation work in connection to an existing electricity power supply.
- 68) All electrical tools are to be checked by a registered electrical worker prior to use.
- 69) All mobile electricity generators are to be properly earthed before use.
- 70) When working outdoors, waterproof plugs should be used.

## Lifting Operations

- 71) All lifting appliances and lifting gear used are to comply with the requirements stated in the Factories and Industrial Undertakings (Lifting Appliance and Lifting Gear) Regulations (Cap 59J) and a list of all the lifting appliances and lifting gear used by contractors should be sent to CIC for record. The certificates of the aforesaid equipment should be always ready onsite during the works period for checking.
- 72) Contractors should check the condition of lifting gear before commencement of each lifting operation.
- 73) All rigging and signaling should be conducted by a competent person. Walkie-talkies with a secured channel or other similar communication channel should be provided to the signaller and the crane operator.
- 74) Contractors should take all necessary action to ensure lifted loads are balanced, secure and will not cause any object to fall.
- 75) Lifted objects should be fitted with 2 tag lines of sufficient length.
- 76) Contractors are to take all necessary action to ensure all lifting appliances, cranes and lifting gear are free from any defects.
- 77) Overloading of any lifting appliances or cranes is strictly prohibited. The occurrence of overloading will be considered as an unsafe act.
- 78) All crane outriggers must be fully extended before conducting any lifting operations.
- 79) All cranes must be seated on firm and even ground.
- 80) All lifting zones must be fully enclosed and contractors should take all necessary action to ensure that no one is under any lifted load.
- 81) Every 3 months, contractors should conduct detailed checking of the certificates and physical condition of all lifting gear, and use the below color coding to indicate usable lifting gear:

Months/ Condition	Color
Jan to Mar	Blue
Apr to Jun	Yellow
Jul to Sep	Green
Oct to Dec	Orange
Substandard condition	Red
Invalid certificate	White

### Hot Work

- 82) Contractors are to take necessary action to contain sparks generated from hot work.
- 83) Contractors should deploy a watchman in the area affected by sparks generated from hot work.
- 84) All flammable substances, materials or chemicals must be removed before conducting hot work.
- 85) All compressed air cylinders such as oxygen and acetylene should always be kept upright and secured with chains.
- 86) Proper handling tools, such as trolleys, should be used during the transport of any compressed air cylinders.
- 87) Contractors are to ensure flashback arrestors, non-return valves and springs are properly fitted to flame cutting sets before use.
- 88) Pre-use checking are to be conducted by a competent person to ensure equipment used for hot work is free from any defects.
- 89) No electric-arc welding is permitted in outdoor area when it is raining.
- 90) Contractors are to ensure all work pieces are completely cooled down before leaving the work premises.