



**NEW TERRITORIES WEST
REGIONAL OFFICE & WATER
RESOURCES EDUCATION
CENTRE AT TIN SHUI WAI
NEW TERRITORIES**

**Air Ventilation Assessment
Study Report**

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9 December 2016
Revision 3


aurecon

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Aurecon Hong Kong Limited

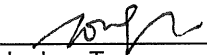
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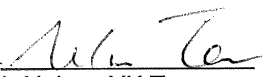
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1. Introduction

1.1 Background

Aurecon Hong Kong Limited was commissioned to carry out an Air Ventilation Assessment for the proposed development of the New Territories West Regional Office & Water Resources Education Centre of the Water Supplies Department (WSD) at Tin Pak Road, Tin Shui Wai, Hong Kong.

1.2 Objective

The study presents the Air Ventilation Assessment (AVA) generated by Computational Fluid Dynamics (CFD) Modelling Program. The assessment investigated the air ventilation performance of the proposed developments using the methodology for the AVA as stipulated in the “Technical Circular No. 1/06 – Air Ventilation Assessments” (Technical Circular) and Annex A to the Technical Circular “Technical Guide for Air Ventilation Assessment for Developments in Hong Kong” (Technical Guide) jointly issued by Housing, Planning and Lands Bureau and Environmental, Transport and Works Bureau on 19th July 2006.

1.3 Scope

Relative wind speeds around buildings are assessed by placing a suitable scale model of the building and surrounding large structures within radius of 2H (H being the height of the tallest building on site, approximately 40m) from the site boundary. The assessment area where test points are positioned is within 1H from the site boundary.

Wind flow around the buildings can be simulated using Computational Fluid Dynamics (CFD) modelling Program. Relative wind speed in the assessment area are predicted. Evaluation of the wind performance, identification of the general ventilation performance over the site and assessment of ventilation performance at targeted areas were conducted in the current study.

2. Evaluation

2.1 Site and Surrounding Area Characteristics

The Subject Site is located at Tin Shui Wai of New Territories, Hong Kong, with a site area of 3,340 m². It is bounded by Tin Cheung Road to the north, Tin Tsz Road to the east and Tin Pak Road to the west. The Subject Site is positioned at an open flat terrain with few isolated obstacles. It is located in an area where adjacent land is predominantly school and recreational facilities. Buddhist Mau Fung Memorial College, with height of 21 m, is situated at the south adjacent to the Subject Site. To the west across Tin Pak Road is Tin Shui Wai Swimming Pool. To the north across Tin Cheung Road is Tin Pak Road Park. **Figure 1** shows the site location and the surrounding area.

2.2 Study Scheme


In the Air Ventilation Assessment, the Baseline Scheme and Proposed Scheme were simulated. The pedestrian area of the site is located at the northern and eastern of the Site along Tin Pak Road and Tin Cheung Road.

Baseline Scheme was the previously designed scheme, which included 1.5 storeys of carpark, 1.5 storeys of the Education Centre, 4 storeys of office and workshop and a separate M&E room. **Appendix A** shows the design of the Baseline Scheme.

Proposed Scheme was the currently designed scheme, which included 1.5 storeys of carpark, 1.5 storeys of the Education Centre, 3 storeys of office. **Appendix B** shows the design of the Proposed Scheme.

Compared to the Baseline Scheme, there are several wind enhancement features in the Proposed Scheme, which include:

- i. More Streamline Building Design
Sharp-turning at building corners of the baseline development will block the wind passage at pedestrian levels. It is replaced by chamfered building corners in the proposed development where the wind circulated around the building is promoted.
- ii. Removal of the Separated M&E Room
The separated M&E Room is situated at the north-western boundary of the Baseline Development. In the proposed development, the M&E room is incorporated in the main building. The footprint of the proposed development is reduced. This promote wind passage through the northwestern portion of the development site and increase the wind permeability toward Tin Shui Wai town centre.
- iii. Building Setback and Reduced Building Footprint
Reduced building footprint in the proposed case compared to the base case give rise to increased setback distance between the proposed building and the pedestrian walkway to the north and sports ground of Buddhist Mau Fung



Memorial College to the south. Smaller building footprint promote the wind passage besides the proposed building and improve the ventilation environment.

Appendix C illustrates the difference between the Baseline and Proposed Schemes for easy reference.

3. Methodology of the Study

3.1 Modelling Tool and Model Setup

In the current study, the analysis was conducted using the Computational Fluid Dynamic (CFD) model. To determine the air ventilation at pedestrian areas, wind flow pattern and local velocity of the subject area were computed for the main prevailing wind directions.

The Baseline and Proposed Schemes were simulated.

3.1.1 Wind Availability

The prevailing wind data is extracted from the Site Wind Availability Data, which was a wind data set simulated using the meso-scale numerical model Regional Atmospheric Modelling System (RAMS) version 6.0 and released by the Planning Department. The relevant wind rose analysis result of the Proposed Development is shown in **Figure 4**. According to the Wind Probability Table as shown in **Appendix G**, the wind rose result indicates the dominance of each of the 16 wind directions and distribution of wind speed which is illustrated in **Table 1**.

Table 1: Frequency of Occurrence of Individual Wind Directions

Wind Direction	Percentage of Occurrence, % ⁽¹⁾	Average Velocity at infinity, m/s ^{(2)(3) (4)}
90°(E)	16.1	5.81
45°(NE)	10.9	7.06
112.5°(ESE)	10.0	5.24
67.5°(ENE)	9.4	5.46
202.5°(SSW)	8.8	6.34
135°(SE)	8.0	5.55
157.5°(SSE)	7.2	6.42
22.5°(NNE)	7.0	6.81
180°(S)	6.8	5.84
225°(SW)	5.2	6.19
0° (N)	2.3	3.74
247.5°(WSW)	2.3	4.52
270°(W)	2.2	2.73
337.5°(NNW)	1.3	3.58
292.5°(WNW)	1.2	2.88
315°(NW)	1.2	3.04

Note:

- (1) Percentage of occurrence extracted directly from the wind probability table
- (2) Average wind speed calculated based on percentage of occurrence of individual range of wind speed from the wind probability table
- (3) The reference height of the wind speed is 500 m.
- (4) The bolded wind directions are the top 8 most predominant wind directions which were selected for wind performance simulation. The sum of percentage of occurrence of these wind

directions (8 prevailing wind directions) was over 75%. The selection of wind data is made reference from Section 20, Annex A of Technical Circular No. 1/06 – Air Ventilation Assessments jointly issued by House, Planning and Lands Bureau and Environmental, Transport and Works Bureau on 19th July 2006.

3.1.2 Wind Profile

The vertical discretization of the velocity profile is approximated by using a logarithmic law:

$$u_z = \frac{u_*}{k} \times \ln\left(\frac{z}{z_0}\right)$$

Where

u_z = mean wind speed at height z (m)

u_* = friction velocity (m/s)

k = Von Kármán constant (~0.41)

z_0 = surface roughness length (m)

Surface Roughness Length (z_0) is a corrective measure to account for the effect of the roughness of a surface on wind flow, and between 1/10 and 1/30 of the average height of the roughness elements on the ground. Terrain crossed by approaching wind and the corresponding Surface Roughness Length (z_0) are shown in **Table 2**.


Table 2: Terrain Crossed by Approaching Wind and Corresponding Surface Roughness Length (z_0)

Terrain Crossed by Approaching Wind	Surface Roughness Length (z_0)
Open Sea	0.0002
Open Flat Terrain, Grass, Few isolated Obstacles	0.0300
Low Crops, Occasional Obstacles	0.1000
High Crops, Scattered Obstacles	0.2500
Parkland, Bushed, Numerous Obstacles	0.5000
Suburb, Forest, regular Large Obstacle Coverage	0.7500

As the Proposed Development is surrounded by occasional obstacles in the 8 most predominant directions (i.e. E, NE, ESE, ENE, SSW, SE, SSE & NNE), the surface roughness was assumed to be 0.1 for wind from these directions.

3.2 Study Area & Test Points

According to the “Technical Guide for Air Ventilation Assessment for Developments in Hong Kong” published by Housing, Planning and Lands Bureau and Environment, Transport and Works Bureau, the Assessment Area of the project shall include the project’s surrounding up to a perpendicular distance of the height of the tallest



building on site (i.e. $H \approx 40\text{m}$) from the project boundary. Moreover, the Surrounding Area of up to a perpendicular distance of $2H$ from the project boundary shall be included.

The height of the Proposed Development is about 40 m. The Assessment Area of the project is set to 40 m. All buildings within 80 m radius from the site were included in the model assessment. The study area is shown in **Figure 2**.

Test points are positioned alongside of the site boundary and open space surrounding the site. Test points are located in the following areas:

Perimeter Test Points

Perimeter test points (red dots) are the test points positioned along the site boundary of the Proposed Development. 45 perimeter test points are selected and shown in **Figure 2**. Since the eastern part of the site boundary facing the Tin Tsz Road is not commonly accessed by pedestrian, this area was regarded to have no major air ventilation issue. Thus, no test point is selected in this area.

Overall Test Points

Overall test points (blue dots) are the test points evenly distributed in the open space on the streets and places where pedestrian frequently access within Assessment Area. 37 overall test points are selected and are shown in **Figure 2**.

3.3 Assessment Parameters

Wind Velocity Ratio

The Wind Velocity Ratio (VR) as proposed by the Technical Circular was employed to assess the ventilation performances of the Proposed Development and the surrounding environment. Higher VR implies better ventilation. The calculation of VR is given by the following formula:

$$VR = V_p / V_\infty$$

V_∞ = the wind velocity at the top of the wind boundary layer (typically assumed to be around 596m above the centre of the site of concern, or at a height where wind is unaffected by the urban roughness below).

V_p = the wind velocity at the pedestrian level (2 m above ground) after taking into account the effects of buildings.

A higher VR indicates a lower impact due to the buildings on wind availability.

The Average VR is defined as the weighted average VR with respect to the percentage of occurrence of the considered wind directions. This gives a general idea of the ventilation performance at the considered location on an annual basis.

Site Spatial Average Velocity Ratio

The site spatial average velocity ratio (SVR) proposed by the Technical Circular was also employed to assess the ventilation performances of the proposed development and the surrounding environment. SVR represents the average VR of all perimeter test points at the site boundary which identified in the report. It quantifies the general ventilation performances over the site.

Local Spatial Average Velocity Ratio

The local spatial average velocity ratio (LVR) represents the average VR of all test points positioned in the assessment area. It quantifies the general ventilation performances over the assessment area.

3.4 Assessment Tools

The commercial Computational Fluid Dynamics (CFD) software, PHOENICS, was used for this study. With the use of three-dimensional CFD method, the local airflow distribution can be visualised in detail. The air velocity distribution within the flow domain, being affected by the site-specific design and the surrounding buildings, was simulated under the prevailing wind conditions round the year.

3.4.1 CFD Model

Domain Size & Grid Setting

The size of the CFD model for this study was approximately 985 m (L) x 855 m (W) x 240 m (H) and contains more than 747,522 cells. The whole CFD domain covered the entire development and the surrounding buildings.

Cartesian grid with Fine-Grid Embedding systems were used in the current study. Finer grid system (with the smallest grid size of 2 m horizontally and 0.5 m vertically) was applied to the most concerned area within 80 m from the Development, i.e., ~2H) based on preliminary judgement with expansion ratio of 1.2 from 80 m away from the Development. The wall boundary was set to slip wall to reduce the shear stress near the wall.

Turbulence Models

For the external wind flow simulations, K-e turbulence model was used.

Solution Convergence

The model set up allowed for the number of convergence to be input prior to running the model. All models were conducted for 7,000 iterations at a convergence of 0.1%.

4. Result and Discussion

4.1 Modelling Results

An air ventilation assessment was conducted to evaluate the potential impact of the proposed development on the wind environment of the surrounding of the site on pedestrian level. Baseline and Proposed Schemes were simulated under 8 predominant wind directions (i.e. E, NE, ESE, ENE, SSW, SE, SSE and NNE). Wind Velocity Ratio (VR) is used as indicator of performance for each test point to evaluate the ventilation performance on the pedestrian level. The results from the prevailing wind directions for the Development Site, the Surrounding Area and different concerned areas are summarized in **Table 3**. Contour and vector plots are attached in **Appendix E**. Detailed results are illustrated in **Appendix F**.

Table 3: Velocity Ratio at Assessment Area for Baseline and Proposed Schemes

Assessment Area	Average Velocity Ratio (VR)			
	Baseline Scheme	Proposed Scheme	Change	%Change
SVR (P1 to P45)	0.206	0.231	0.025	+12.2%
LVR (P1 to P45, O46 to O82)	0.236	0.249	0.013	+5.5%
Tin Cheung Road (P7 to P23, O46 to O57)	0.310	0.342	0.032	+10.2%
Tin Pak Road (P1 to P6, P45, O58 to O71)	0.184	0.188	0.004	+2.4%
Buddhist Mau Fung Memorial College (P24 to P44, O72 to O82)	0.203	0.205	0.001	+0.7%

4.2 Discussion on Site Air Ventilation Assessment


From **Table 3**, SVRs of Baseline and Proposed Schemes are 0.206 and 0.231, respectively. Results showed that the wind performance at immediate vicinity in Proposed Scheme is relatively better than that in the Baseline Scheme. The overall improvement (+12.2%) in wind performance of the Subject Site might be caused by the removal of separate M&E room and the streamlined building design. Removal of blockage from the separate M&E enhance the wind performance at the north-eastern portion of the subject site.

For better wind performance at the western and southwestern portions of the proposed building, the improvement might be due to the streamlined building design. In difference with sharp-turning of building corner as in the base case design, the proposed case building provide round corner which facilitate the wind passage around the building.

For better wind performance at the northern and southern portions of the proposed building, the improvement might be due to the increase building setback of the proposed building. Greater setback distance promote the wind passage around the proposed building and improve the ventilation environment.

4.3 Discussion on Local Air Ventilation Assessment

From **Table 3**, LVRs of the Baseline and Proposed Schemes are 0.236 and 0.249, respectively. Similar to SVRs, the local air ventilation performance would be improved from Baseline Scheme to Proposed Scheme. According to **Table 3**, the removal of separate M&E room, chamfered corner design and reduced building footprint in the



proposed scheme building contributed to the slight overall improvement (+5.5%) in the wind performance for the whole assessment area.

4.4 Discussion on Focused Area

VRs at test points along Tin Cheung Road (P7 to P23, O46 to O57) are improved for Proposed Schemes, with an increase in average VRs of 0.032 for the Proposed Scheme. This might be due to the removal of separate M&E room, the chamfered design of southwest corner and reduced building footprint at the north of the proposed scheme, which cause redistribution of wind penetrating through the north-western part of the site.

VRs at test points along Tin Pak Road (P1 to P6, P45, O58 to O71) are comparable for both Baseline and Proposed Schemes, with a slight increase in average VRs of 0.004 for the Proposed Scheme. There is a slight increase in VRs at Tin Pak Road, which situated at the west of the project. This might be due to the removal of separate M&E room and the chamfered design of southwest corner of the proposed scheme, which cause redistribution of wind penetrating through the north-western part of the site.

VRs at test points in Buddhist Mau Fung Memorial College (P24 to P44, O72 to O82) are also comparable for Baseline and Proposed Scheme, with a slight increase in average VRs of 0.001 for the Proposed Scheme. This slight increase in VR at the college might be due to the removal of separate M&E room, the chamfered building corner and reduced building footprint at the south of the proposed case building which redirect the prevailing east wind to the northwest of the project site.



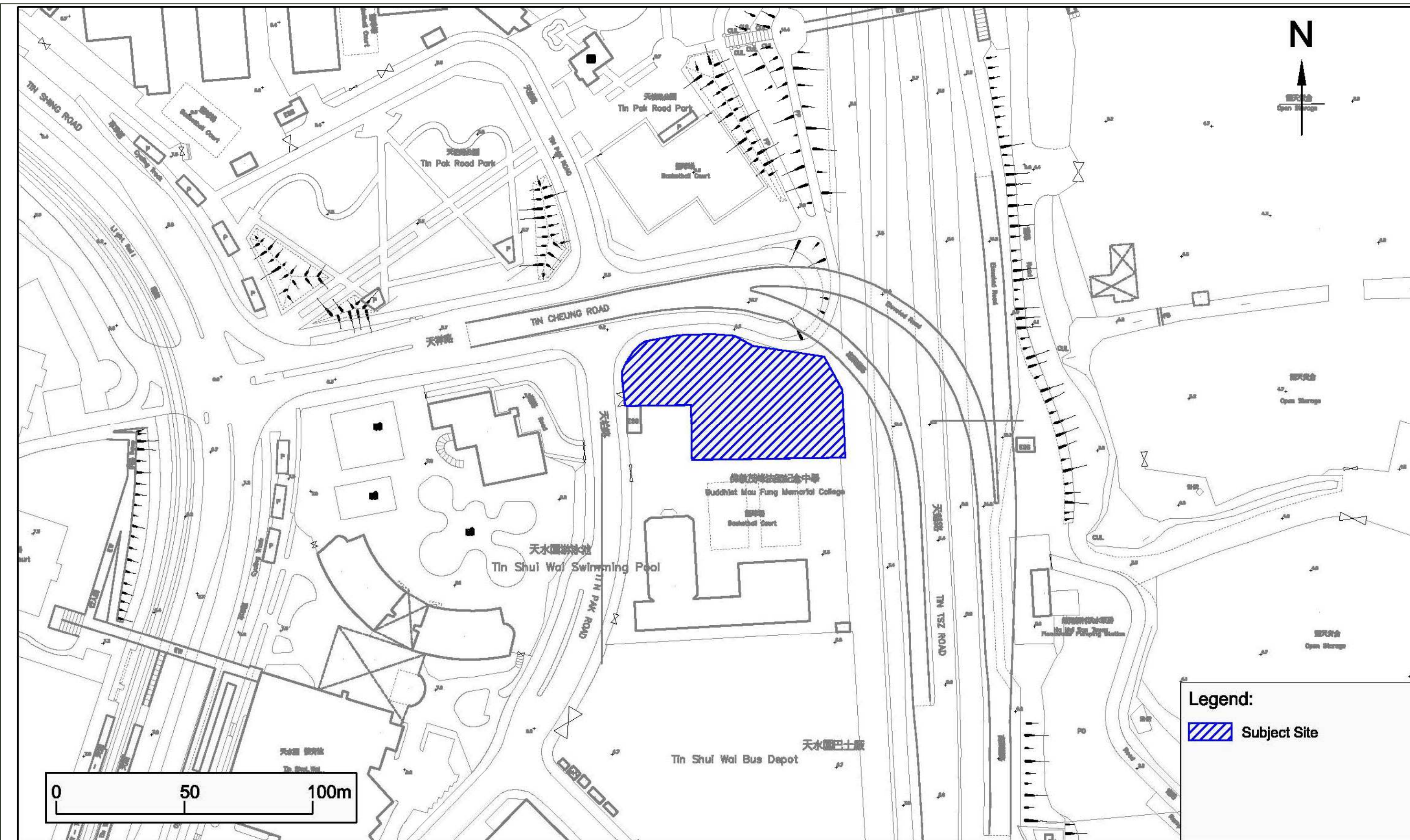
5. Conclusion

An Air Ventilation Assessment was conducted for the Proposed Development of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department to evaluate the wind performance of the pedestrian areas within the Site and its immediate surroundings. Baseline and Proposed Schemes were compared. Eight (8) wind directions were considered, which cover over 75% of annual wind availability.

Overall, the findings of the study indicated that the Proposed Scheme would provide a better wind environment in the immediate vicinity and local area.



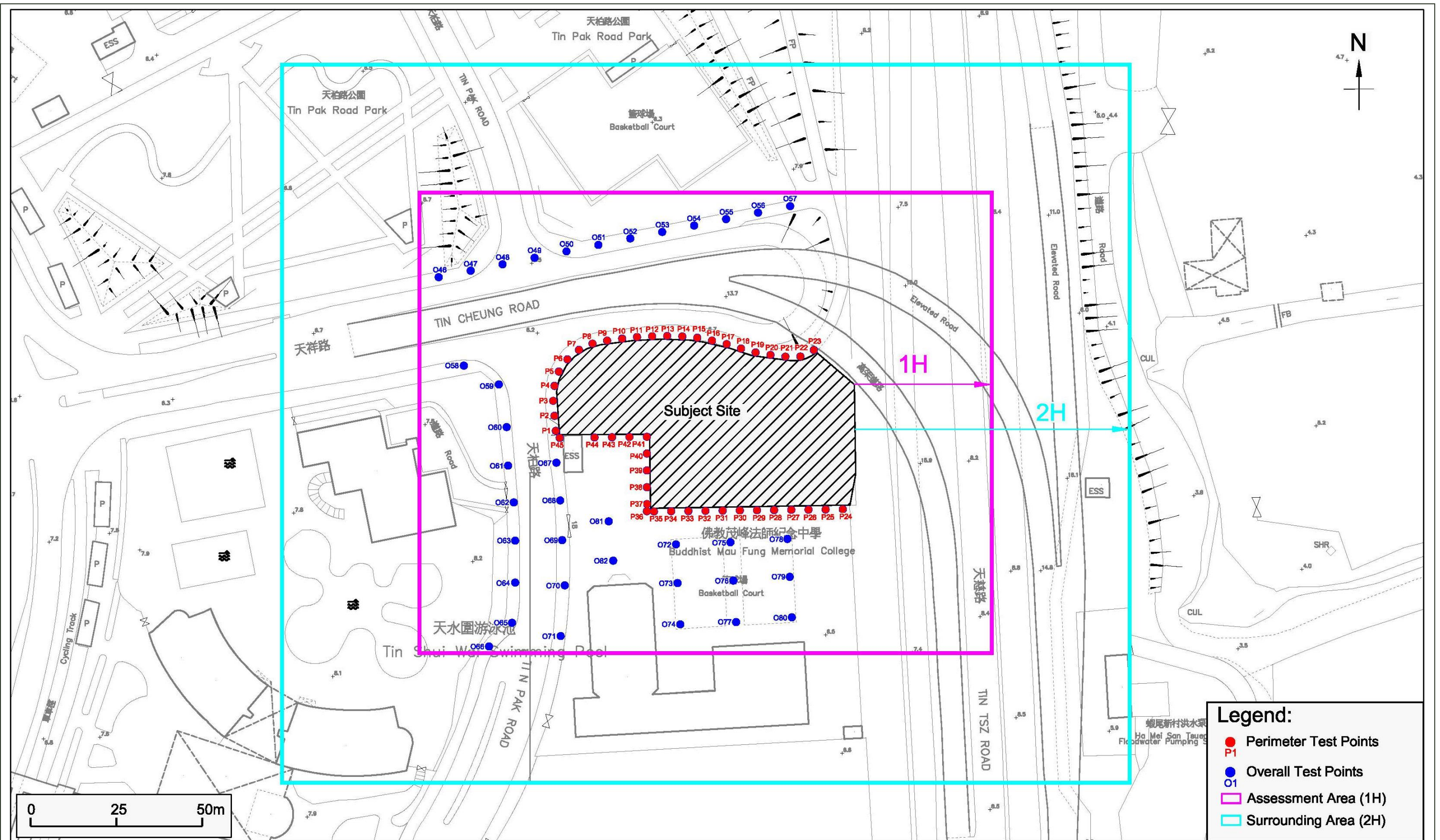
Figures



Project:	New Territories West Regional Office and Water Resources Educational Centre at Tin Shui Wai, New Territories				
Figure No.:	1				
Figure Name:	Site Location and Surrounding Area			Rev: 1	
Drawn By:	SC	Verified By:	JT	Approved By:	NT

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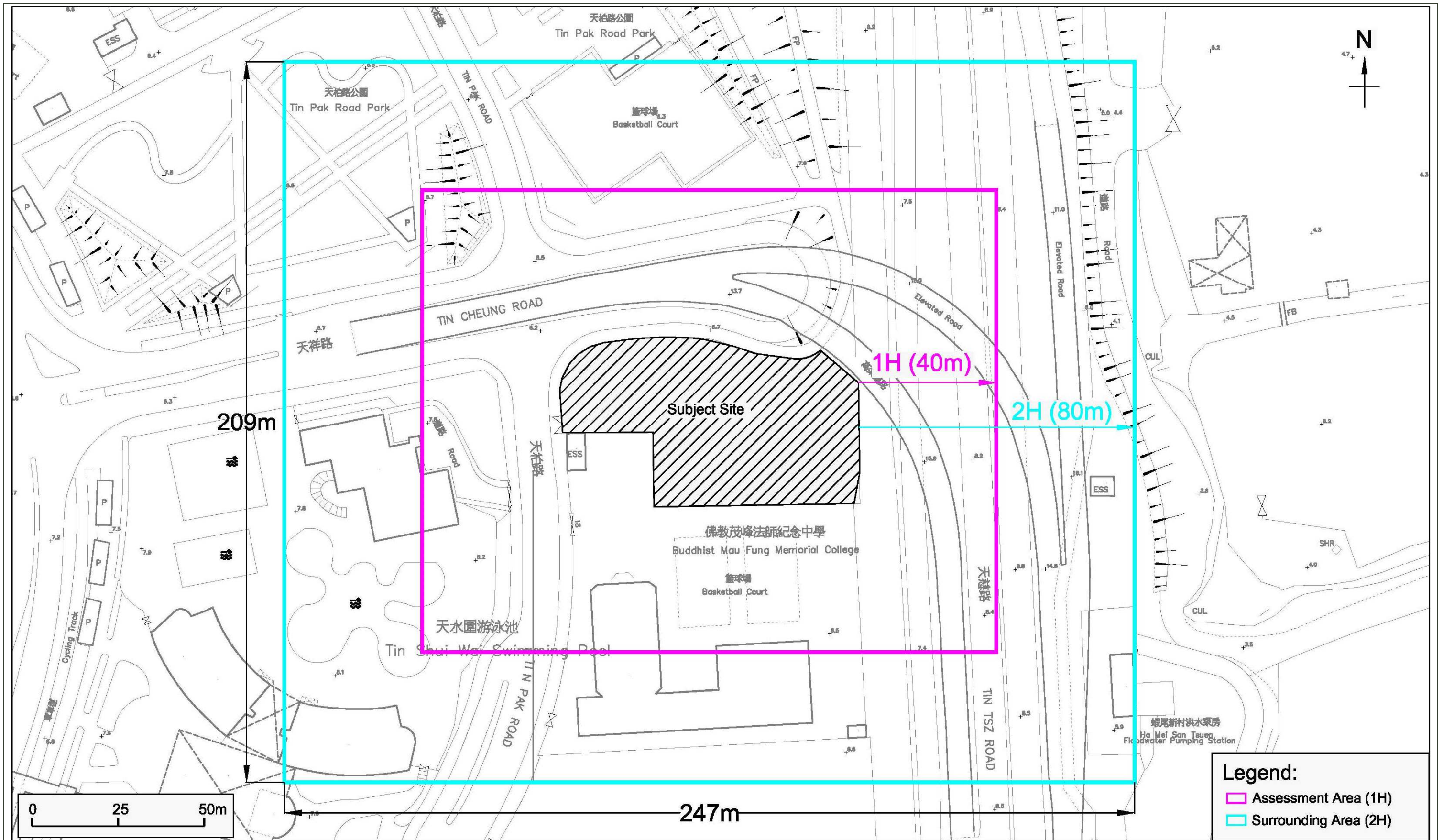
Date: 1 August 2016



Project:	New Territories West Regional Office and Water Resources Educational Centre of Water Supplies Department				
Figure No.:	2				
Figure Name:	Assessment Area, Surrounding Area and Proposed Test Point Locations			Rev: 1	
Drawn By:	SC	Verified By:	JT	Approved By:	NT



Date: 1 August 2016



Project:	New Territories West Regional Office and Water Resources Educational Centre of Water Supplies Department				
Figure No.:	3				
Figure Name:	Size of Assessment Area and Distance from Project Site			Rev: 1	
Drawn By:	SC	Verified By:	JT	Approved By:	NT

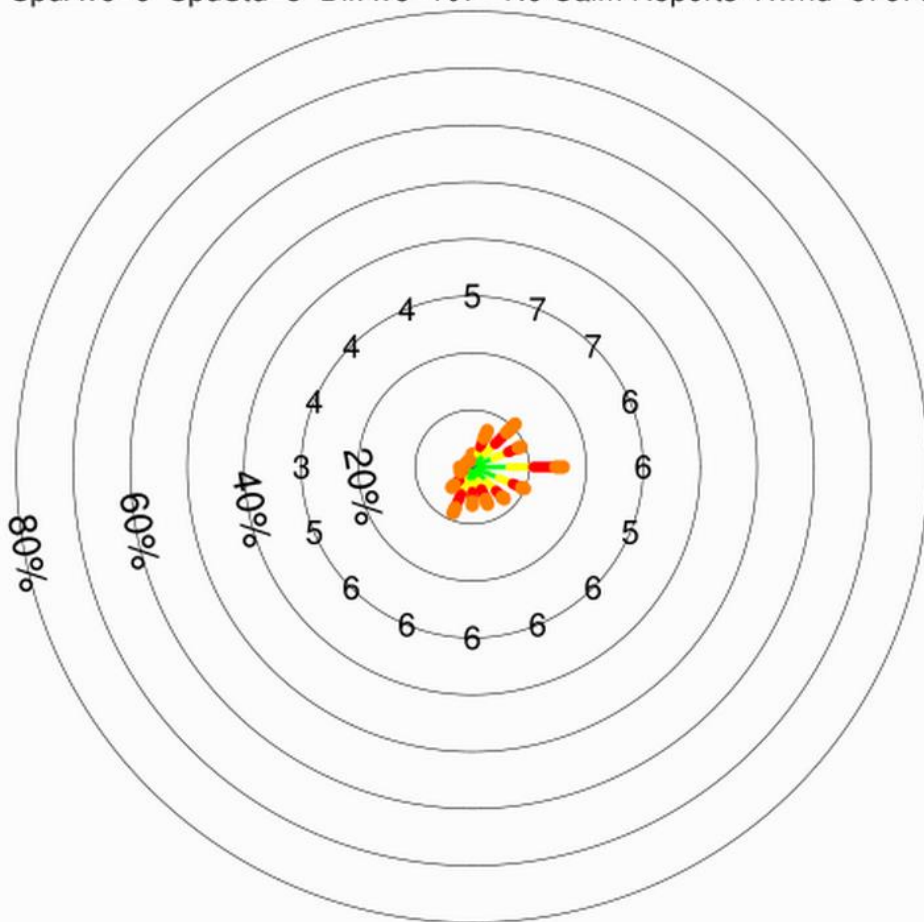

 Date: 1 August 2016

x:046
y:073

Wind Rose - Annual

SpdAve=6 SpdStd=3 DirAve=107 No Calm Reports Nwnd=87670

500m



Wind Speed(m/s)



Project: New Territories West Regional Office and Water Resources Educational Centre, Tin Shui Wai, New Territories

Figure No.: 4

Figure Name: Wind Rose Diagram representing V_{∞} of Area under Concern

Rev: 1

Drawn By: SC

Verified By: JT

Approved By: NT



Date: 1 August 2016

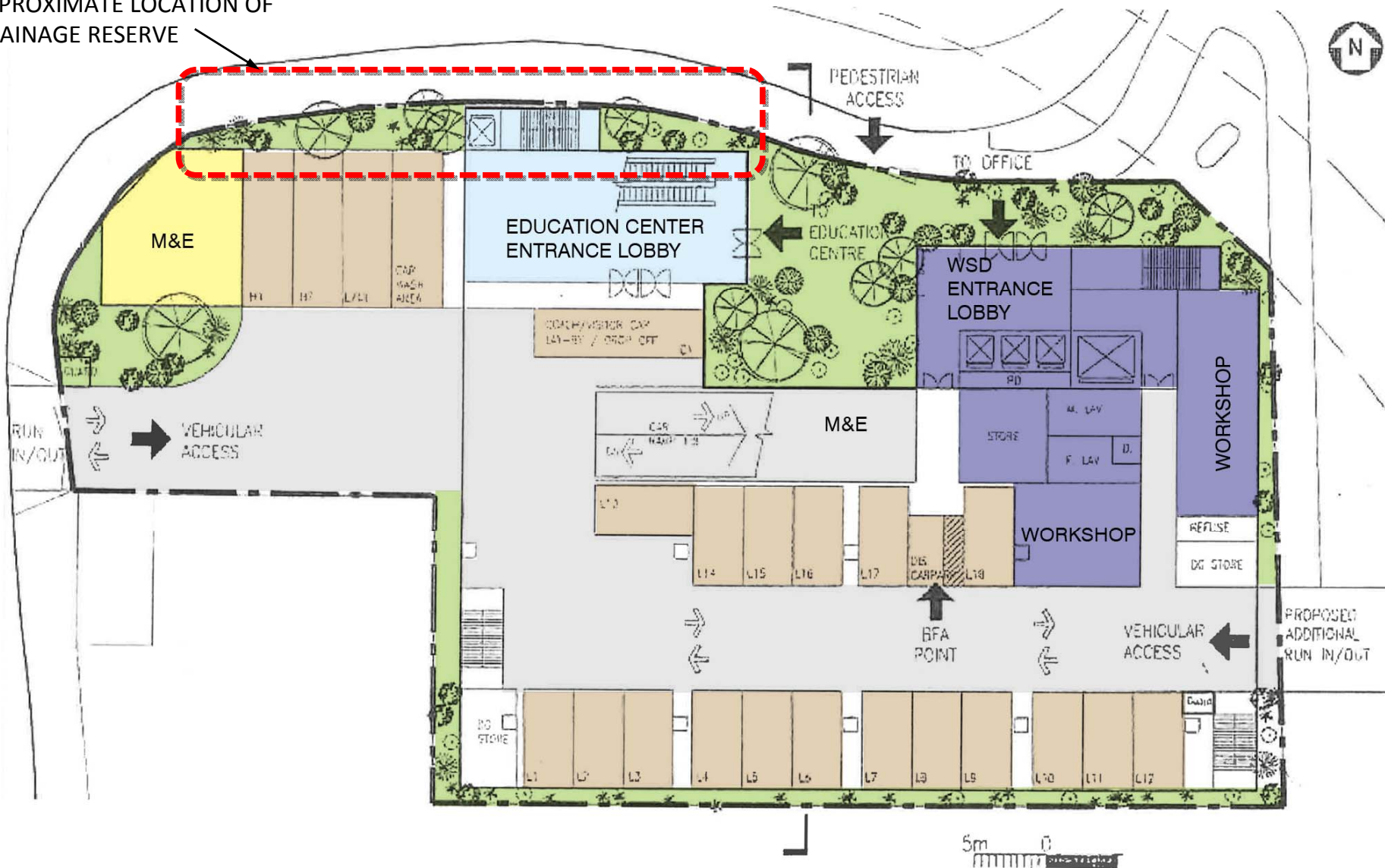


Appendix A

Baseline Scheme

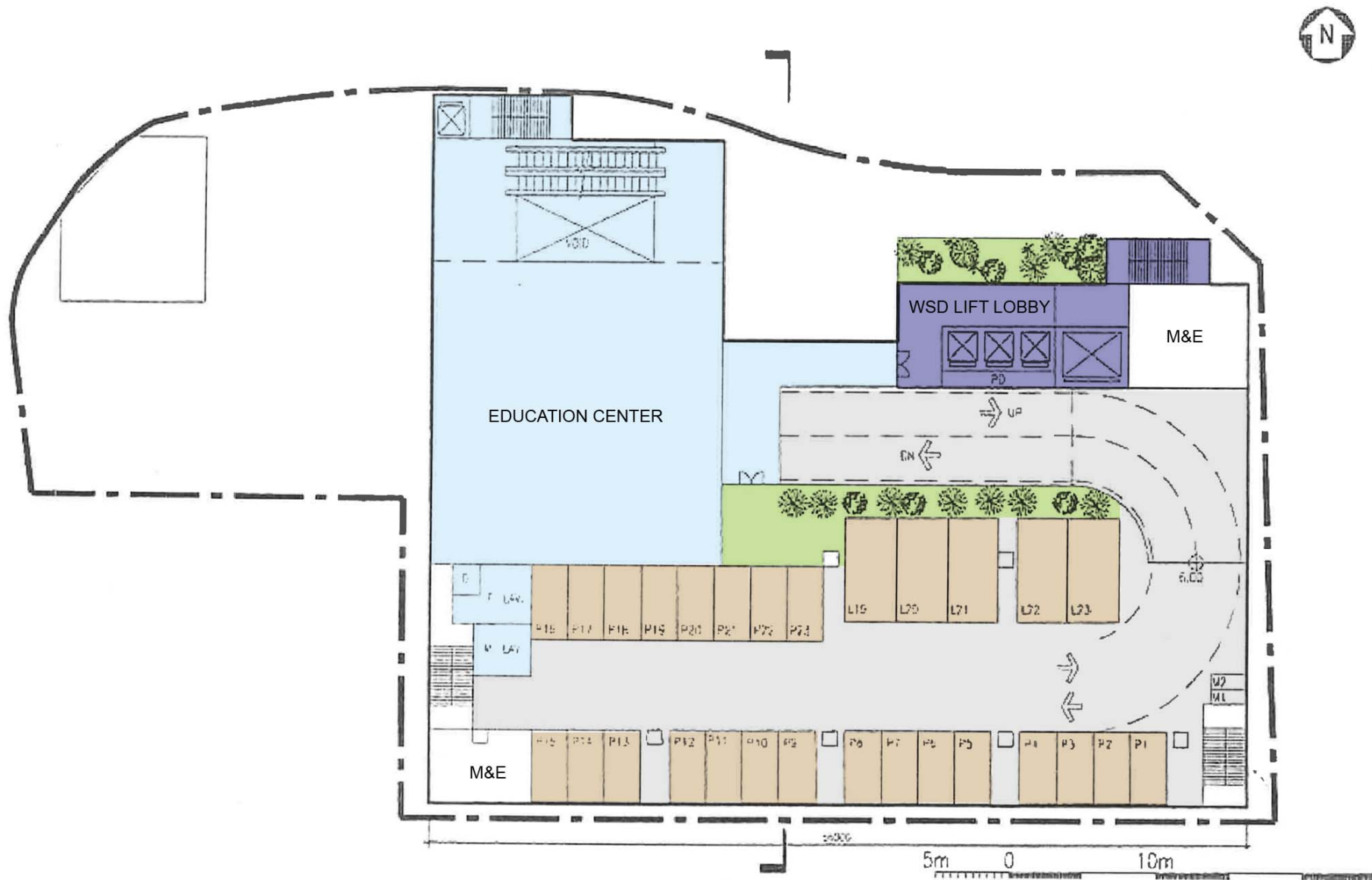
Architectural Design Baseline Scheme - Ground Floor

APPROXIMATE LOCATION OF
DRAINAGE RESERVE

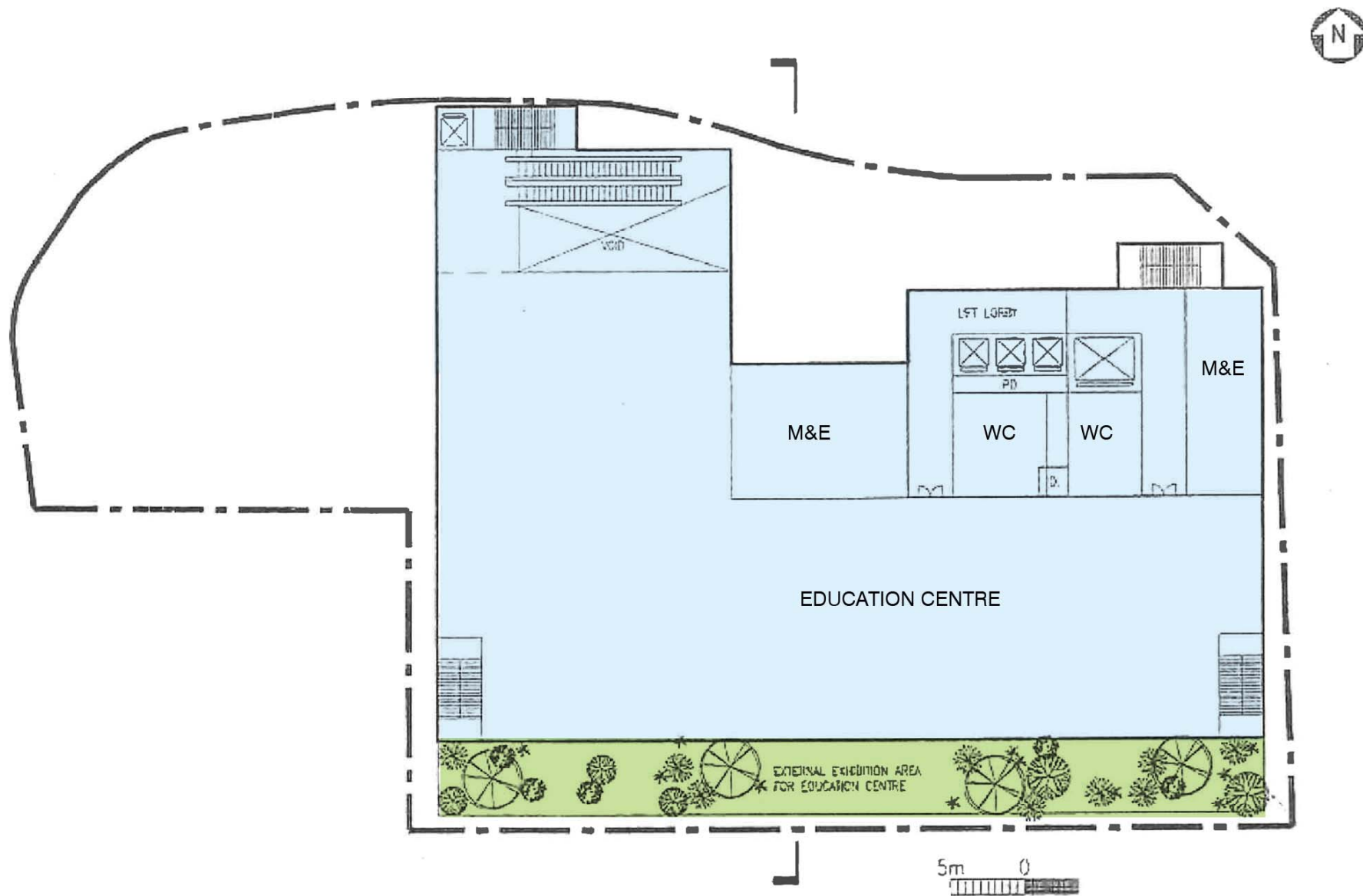


Architectural Design

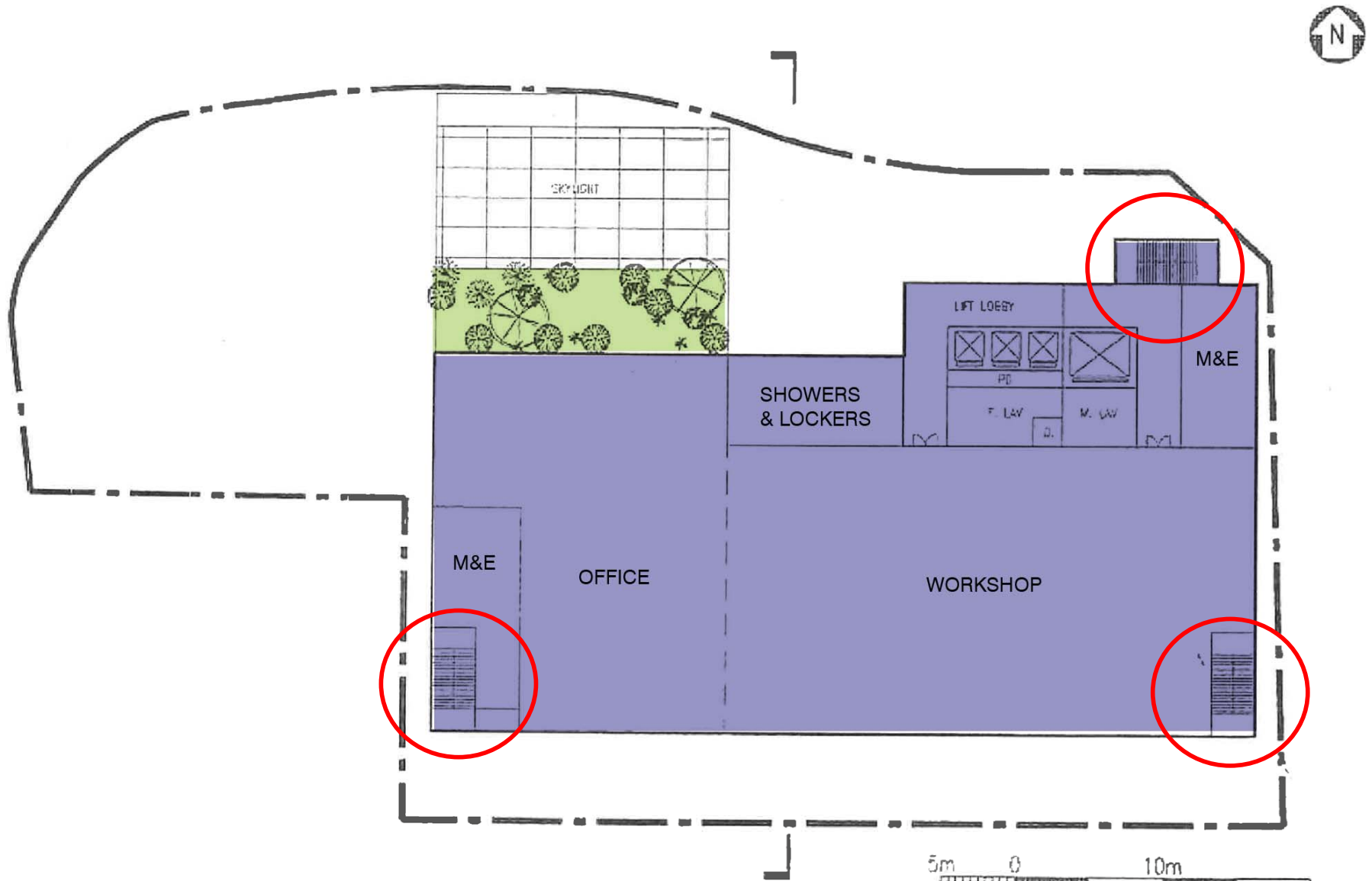
Baseline Scheme - First Floor



Architectural Design Baseline Scheme - Second Floor

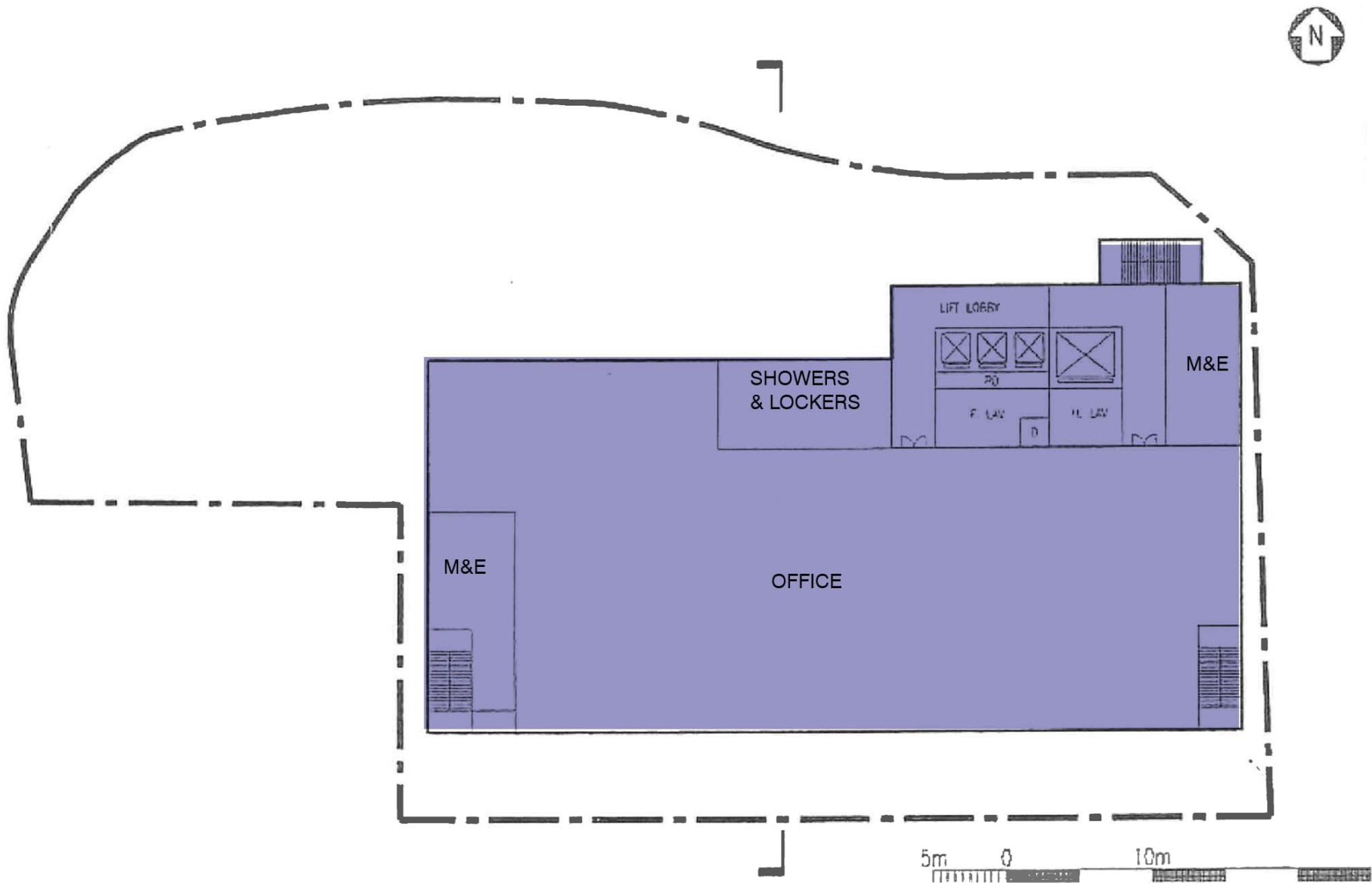


Architectural Design Baseline Scheme - Third Floor

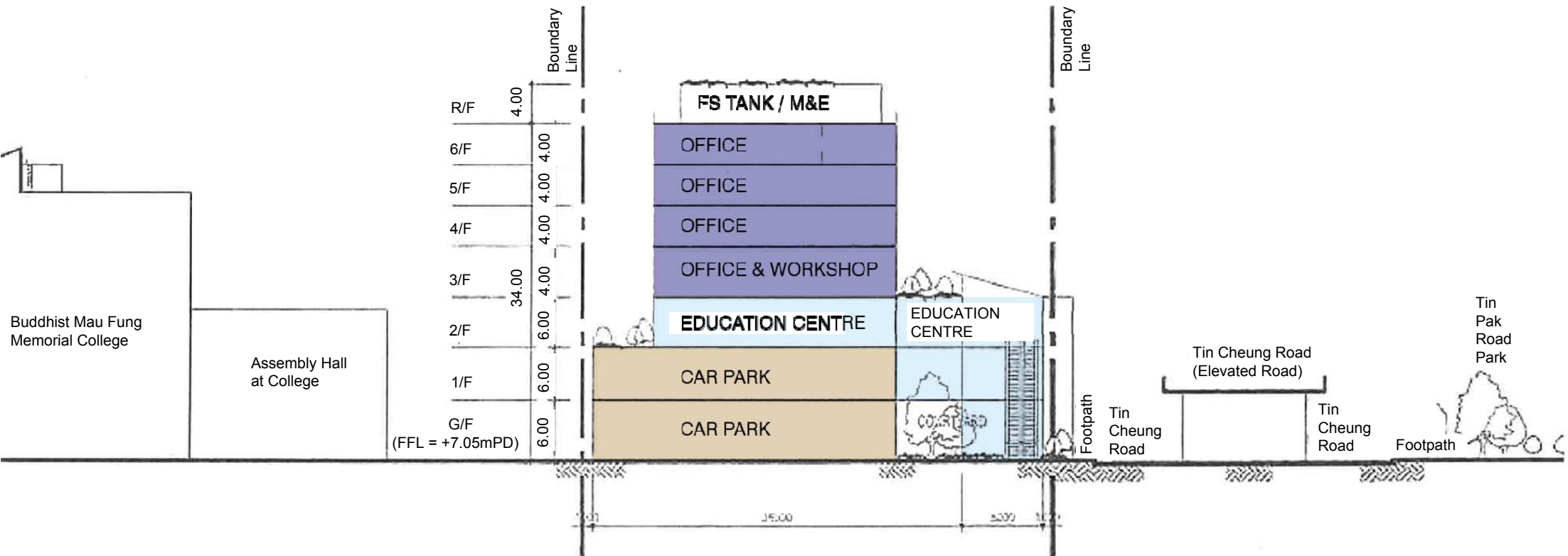


Architectural Design

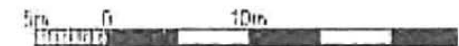
Baseline Scheme - Fourth, Fifth & Sixth Floor



Architectural Design Baseline Scheme - Section



Note:
Dimension is expressed as meters (m).



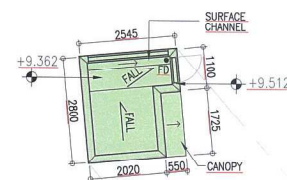


Appendix B

Proposed Scheme

TIN CHEUNG ROAD

GUARD HOUSE ROOF PLAN
SCALE 1:100



TIN PAK ROAD

EXISTING BUILDING ONE STORY HEIGHT

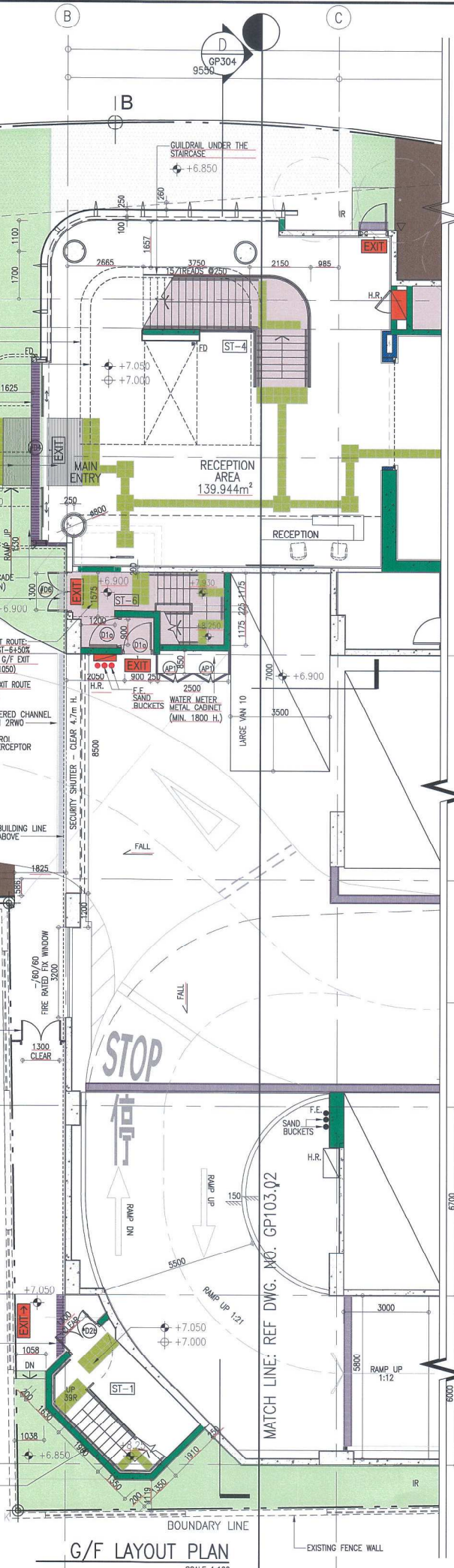
PART PLAN OF ST-6
SCALE 1:100



PART PLAN OF ST-1
SCALE 1:100



G/F LAYOUT PLAN
SCALE 1:100



F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YG9/2013
Reference Drawings:

LEGEND:

--- DRAINAGE RESERVE AREA
--- SITE BOUNDARY LINE

- General Notes:
- The facade package is a design intent performance specification contract.
 - All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 - All enlarged details to be submitted in D.D.A stage.
 - Boundary wall, external stair and doors to be issued in separate package.
 - Refer to Landscape package for greenery area design and outside LOT Green area approach.
 - All car parking spaces are EV charging enabling.
 - EV charging for all carparks should comply with technical guidelines for on charging facilities for electric vehicles by EMSD (July 2011 version)

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client

建築署
Architectural Services Department

Design & Build Contractor

俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer

L&O ARCHITECTS

Structural Designer

Mott MacDonald

Building Services Designer

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Landscape Designer

Kenneth Ng & Associates Ltd
Landscape & Environmental Consultants

Signage & Wayfinding Designer

Atelier Pacific

Interior Lighting Designer

light directions

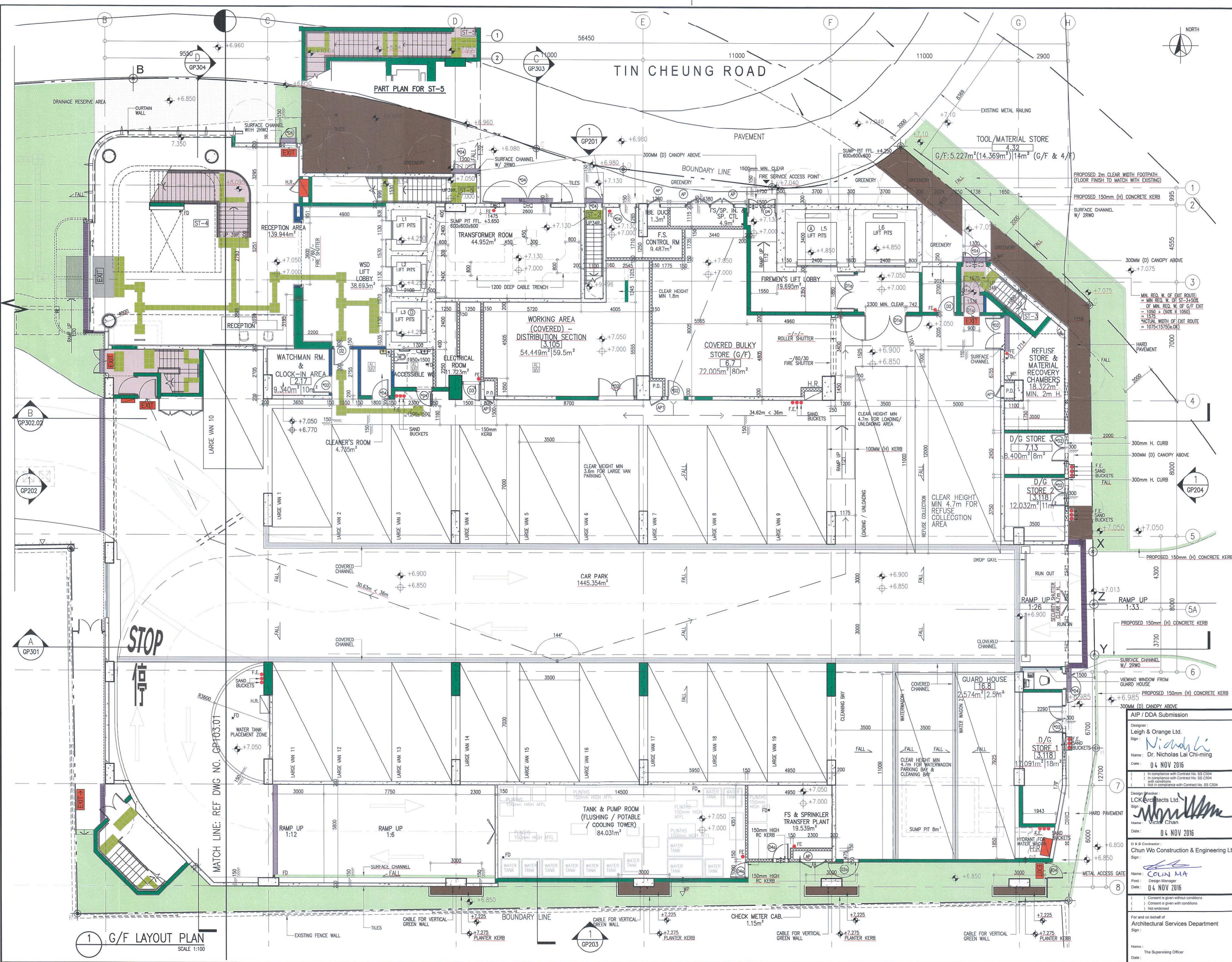
Facade Designer

ALPHA

Universal Access Designer

UPA

AIP / DDA Submission	
Designer: Leigh & Orange Ltd. Sign: <i>Nicholas</i> Name: Dr. Nicholas Lai Chi-ming Date: 04 NOV 2016	Project: Contract No. SS C504 Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories
Design Checker: LCK Architects Ltd. Sign: <i>Vicki Chan</i> Name: Vicki Chan Date: 04 NOV 2016	
D & B Contractor: Chun Wo Construction & Engineering Ltd. Sign: <i>Colin Ma</i> Name: COLIN MA Post: Design Manager Date: 04 NOV 2016	Designed By: LW Date: 25/01/2016 Approved: EI Date: - CAD REF: PMB1A-8207-ALL-GP103.01.dwg Scale: 1:100 = A1 Drawing No: PMB1A/8207/ALL/GP103.01 Job No.: 8207 Drawing Status: - Rev: e
For and on behalf of: Architectural Services Department Name: The Supervising Officer Date: -	



F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL31/YGS/2013
Reference Drawings:
Notes:
Louvre sizes refer to structural opening

LEGEND:
--- DRAINAGE RESERVE AREA
--- SITE BOUNDARY LINE

General Notes:
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5. Refer to Landscape package for greenery area design and outside LOT Green area approach.
6. All car parking spaces are EV charging enabling.
7. EV charging for all carparks should comply with technical guidelines for charging facilities for electric vehicles by EMSD (July 2011 version)
8. FEI will be fully installed, tested and commissioned before OP application

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client:
建築署
Architectural Services Department

Design & Build Contractor:
俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:
L&O ARCHITECTS

Structural Designer:
Mott MacDonald

Building Services Designer:
àurecon

Landscape Designer:
Kenneth Ng & Associates Ltd
Landscape & Environmental Consultants

Signage & Wayfinding Designer:
Atelier Pacific

Interior Lighting Designer:
light directions

Facade Designer:
ALPHA

Universal Access Designer:
UDA Consultants Ltd
UDA

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
G/F LAYOUT PLAN

Designed By:	Drawn By:
LW	EI
Date:	Approved:
25/01/2016	IL

CAD REF:
PMB1A-8207-ALL-GP103.02.dwg

Scale:
1 : 100 = A1

Drawing No.
PMB1A/8207/ALL/GP103.02

Job No.	Drawing Status	Rev.
8207	-	e

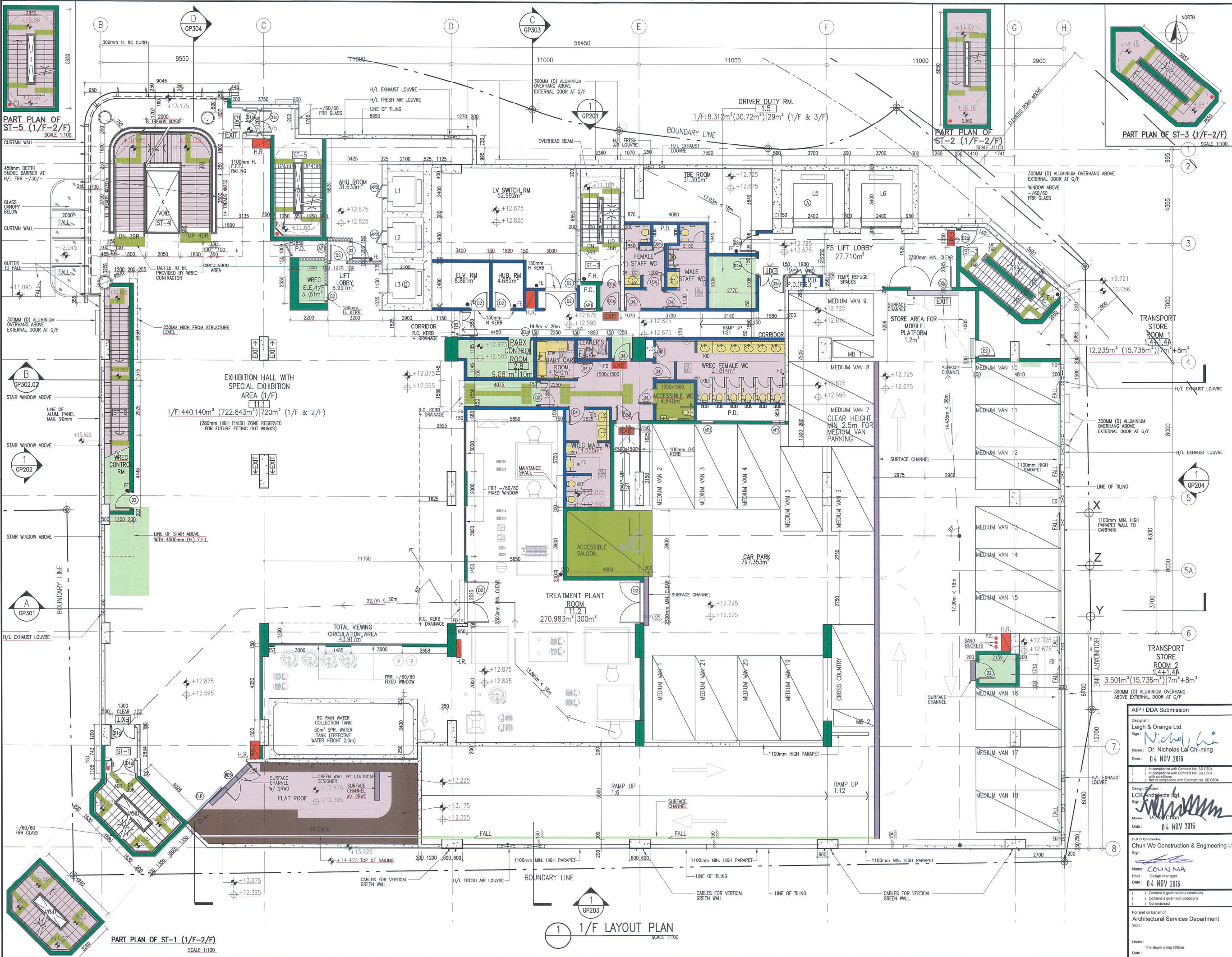
For and on behalf of:
Architectural Services Department
Name: The Supervising Officer
Date:

Design: Leigh & Orange Ltd.
Sign: *Nicholas Lai Chi-ming*
Name: Dr. Nicholas Lai Chi-ming
Date: 04 NOV 2016
In compliance with Contract No. SS C504
In compliance with Contract No. SS C504
Not in compliance with Contract No. SS C504

Design Checker: LCK Architects Ltd.
Sign: *Victor Chan*
Name: Victor Chan
Date: 04 NOV 2016

D & B Contractor:
Chun Wo Construction & Engineering Ltd.
Sign: *COLIN MA*
Name: COLIN MA
Post: Design Manager
Date: 04 NOV 2016
Consent is given without conditions
Consent is given with conditions
Not endorsed

DO NOT SCALE DRAWING. ALL DIMENSIONS SHOULD BE CHECKED ON SITE.
THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE ISSUER WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF CAN BE MADE.



F.S.D. ref.: FPB/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:
 Notes:
 Louvre sizes refer to structural opening

LEGEND:
 --- SITE BOUNDARY LINE

General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.
 6. All car parking spaces are EV charging enabling.
 7. Socket outlets for EV charging facilities should be provided to all car parking spaces on 1/F.
 8. EV charging for all carparks should comply with technical guidelines for on charging facilities for electric vehicles by EMSD (July 2011 version)
 9. FEI will be fully installed, tested and commissioned before OP application

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client:
 建築署
 Architectural Services Department

Design & Build Contractor:
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:
 L&O ARCHITECTS

Structural Designer:
 Mott MacDonald

Building Services Designer:
 aurecon

Landscape Designer:
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer:
 Atelier Pacific

Interior Lighting Designer:
 light directions

Facade Designer:
 ALPHA

Universal Access Designer:
 UDA CONSULTANTS LTD

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
1/F LAYOUT PLAN

Designed By:-	Drawn By:-
LW	EI
Date:-	Approved:-
25/01/2016	IL

CAD REF:
 PMB1A-8207-ALL-GP104.dwg

Scale:-
 1 : 100 = A1

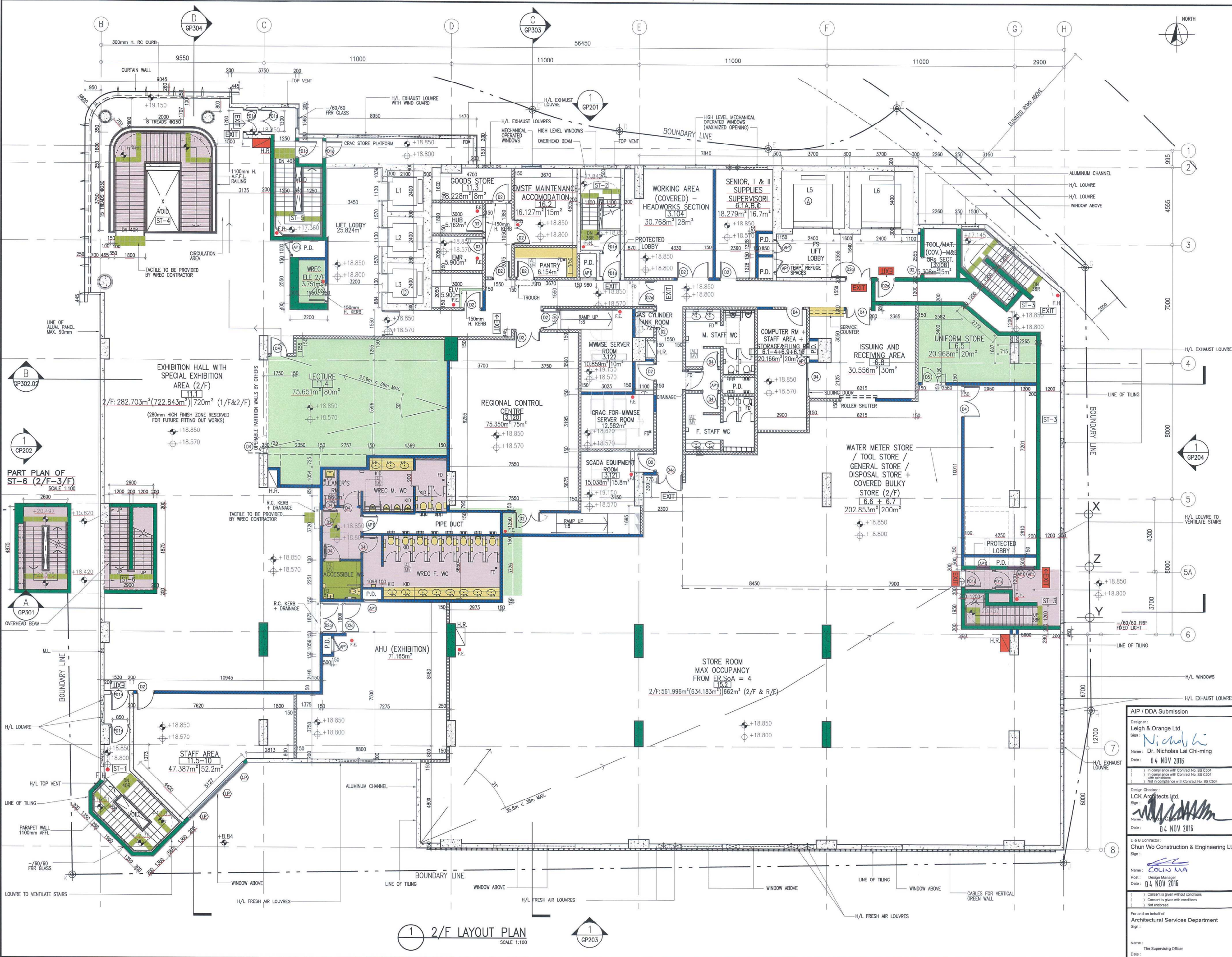
Drawing No.
 PMB1A/8207/ALL/GP104

Job No.:-	Drawing Status:-	Rev.
8207	-	e

For and on behalf of:
 Architectural Services Department
 Sign:
 Name: The Supervising Officer
 Date:

1/F LAYOUT PLAN
 SCALE 1:100

DO NOT SCALE DRAWING. ALL DIMENSIONS SHOULD BE CHECKED ON SITE.
 THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE ISSUER WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF CAN BE MADE.



F.S.D. ref.: FP8/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

LEGEND:
 — SITE BOUNDARY LINE

General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary Info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client:
 建築署
 Architectural Services Department

Design & Build Contractor:
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:
 L&O ARCHITECTS

Structural Designer:
 Mott MacDonald

Building Services Designer:
 aurecon

Landscape Designer:
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer:
 Atelier Pacific

Interior Lighting Designer:
 light directions

Facade Designer:
 ALPHA

Universal Access Designer:
 UDA Consultants Ltd.

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
2/F LAYOUT PLAN

Designed By:	LW	Drawn By:	EI
Date:	25/01/2016	Approved:	IL

CAD REF: PMB1A-8207-ALL-GP105.dwg
 Scale: 1:100 = A1
 Drawing No: PMB1A/8207/ALL/GP105
 Job No.: 8207
 Drawing Status: -
 Rev: e

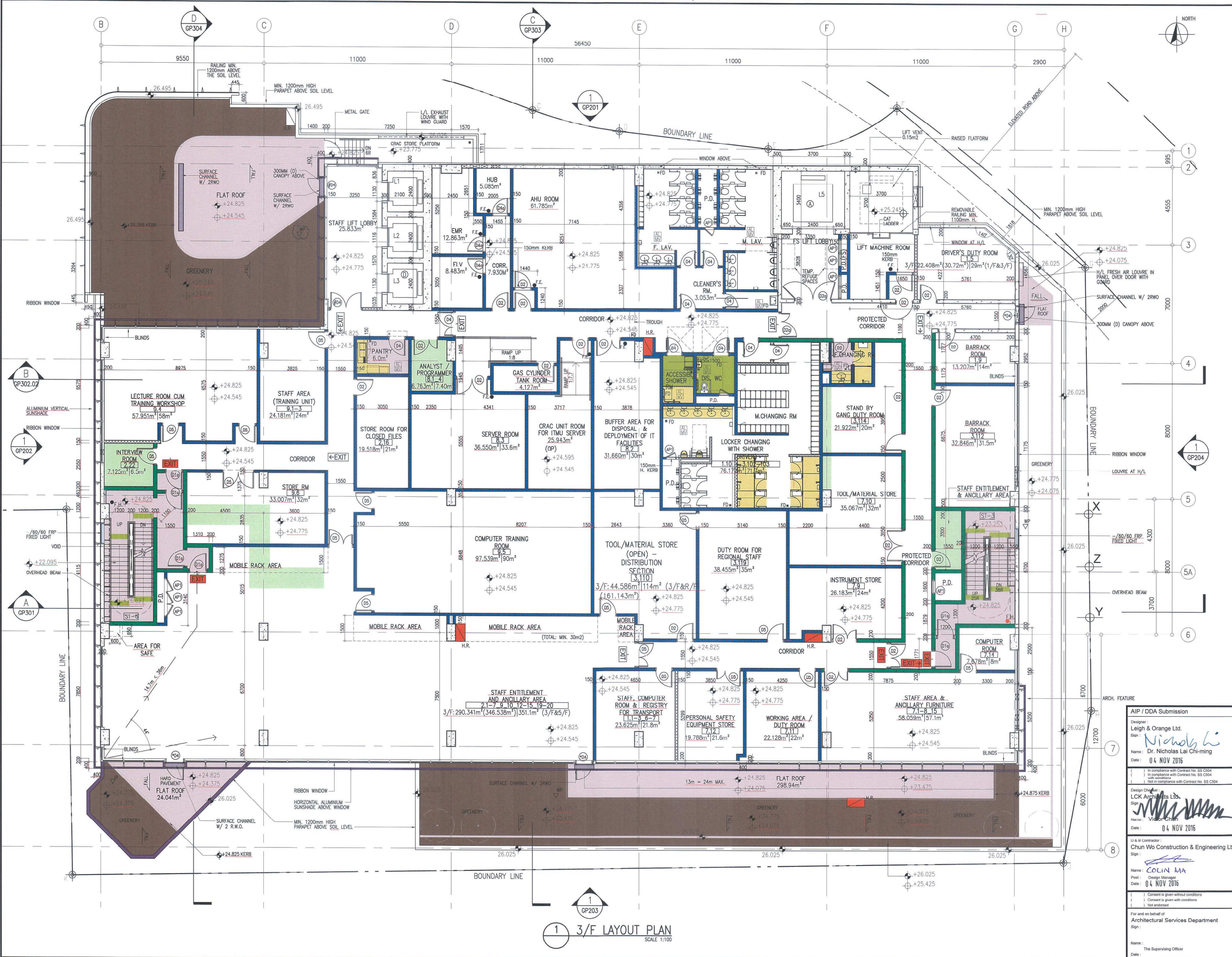
AIP / DDA Submission
 Designer: Leigh & Orange Ltd.
 Sign: Nicholas Lai Chi-ming
 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016

Design Checker: LCK Architects Ltd.
 Sign: LCK Architects Ltd.
 Name: LCK Architects Ltd.
 Date: 04 NOV 2016

U & A Contractor: Chun Wo Construction & Engineering Ltd.
 Sign: Chun Wo Construction & Engineering Ltd.
 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016

For and on behalf of:
 Architectural Services Department
 Sign: The Supervising Officer
 Name: The Supervising Officer
 Date:

DO NOT SCALE DRAWING. ALL DIMENSIONS SHOULD BE CHECKED ON SITE.
 THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE ISSUER WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF CAN BE MADE.



1 3/F LAYOUT PLAN
SCALE 1:100

F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YGS/2013
Reference Drawings:

LEGEND:
--- SITE BOUNDARY LINE

General Notes:
1. The facade package is a design intent performance specification contract.
2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
3. All enlarged details to be submitted in D.D.A stage.
4. Boundary wall, external stair and doors to be issued in separate package.
5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary Info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client:
建築署
Architectural Services Department

Design & Build Contractor:
俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:
L&O ARCHITECTS

Structural Designer:
Mott MacDonald

Building Services Designer:
aurecon

Landscape Designer:
Kenneth Ng & Associates Ltd.
Landscape & Environmental Consultants

Signage & Wayfinding Designer:
Atelier Pacific

Interior Lighting Designer:
light directions

Facade Designer:
ALPHA

Universal Access Designer:
UDA Consultants Ltd.

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
3/F LAYOUT PLAN

Designed By: LW
Drawn By: EI
Date: 25/01/2016
Approved: IL

CAD REF: PMB1A-8207-ALL-GP106.dwg
Scale: 1 : 100 = A1
Drawing No. PMB1A/8207/ALL/GP106

Job No.: 8207
Drawing Status: -
Rev: e
A

U & S Contractor:
Chun Wo Construction & Engineering Ltd
Sign: *COLIN MA*
Name: COLIN MA
Post: Design Manager
Date: 04 NOV 2016

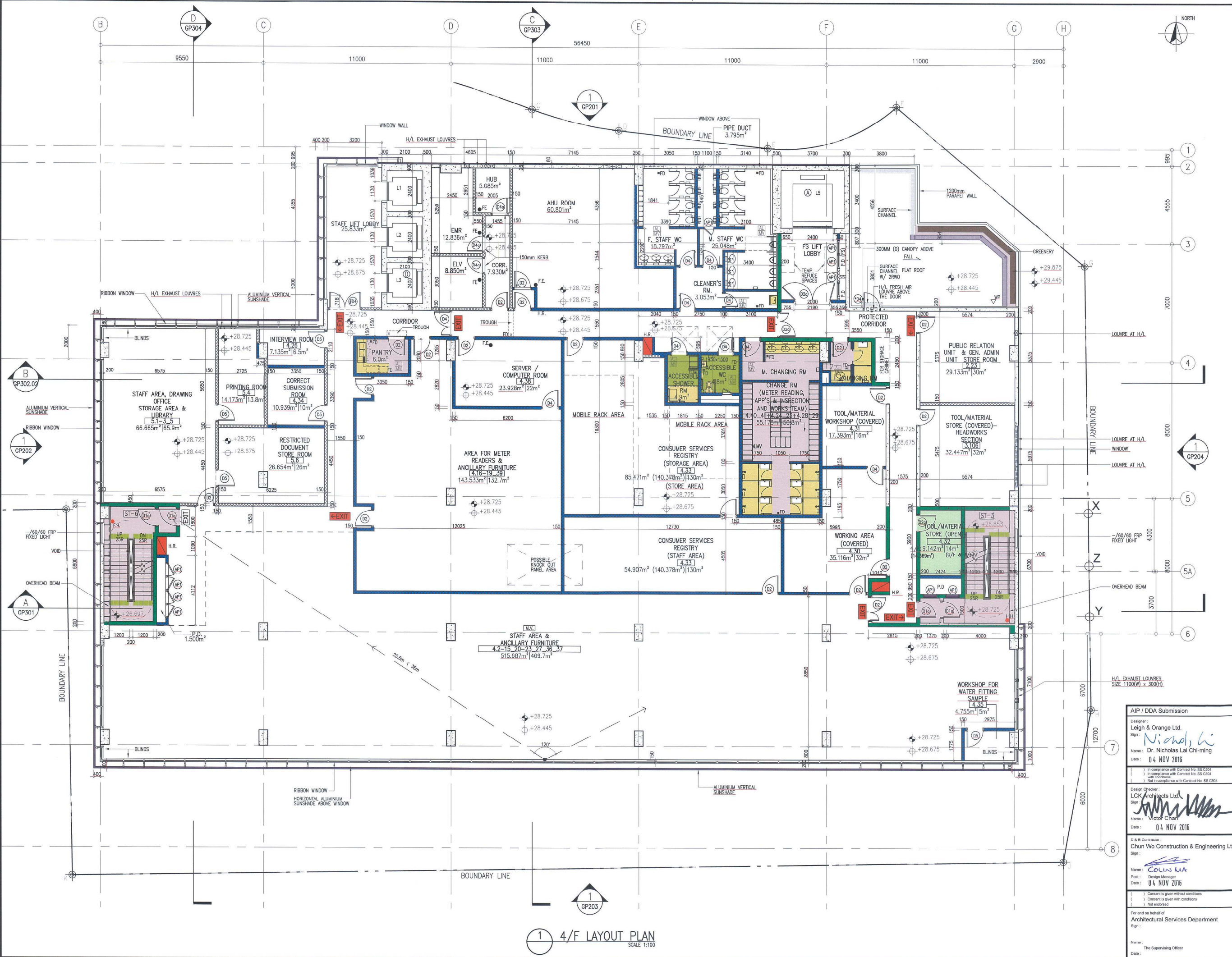
Design Checker:
LCK Architects Ltd.
Sign: *Victor Chan*
Name: Victor Chan
Date: 04 NOV 2016

Designer:
Leigh & Orange Ltd.
Sign: *Nicholas Li*
Name: Dr. Nicholas Lai Chi-ming
Date: 04 NOV 2016

() In compliance with Contract No. SS C504
() In compliance with Contract No. SS C504 with variations
() Not in compliance with Contract No. SS C504

For and on behalf of:
Architectural Services Department
Sign: _____
Name: The Supervising Officer
Date: _____

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THE OWNERSHIP OF THE COPYRIGHT IN THIS DRAWING IS RETAINED BY THE ISSUER WHOSE CONSENT MUST BE OBTAINED BEFORE ANY USE OR REPRODUCTION OF THE DRAWING OR ANY PART THEREOF CAN BE MADE.



1 4/F LAYOUT PLAN
SCALE 1:100

F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YGS/2013
Reference Drawings:

LEGEND :
- - - SITE BOUNDARY LINE

General Notes:
1. The facade package is a design intent performance specification contract.
2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
3. All enlarged details to be submitted in D.D.A stage.
4. Boundary wall, external stair and doors to be issued in separate package.
5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary Info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/08/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client
建築署
Architectural Services Department

Design & Build Contractor
俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
L&O ARCHITECTS

Structural Designer
Mott MacDonald

Building Services Designer
àurecon

Landscape Designer
Kenneth Ng & Associates Ltd
Landscape & Environmental Consultants

Signage & Wayfinding Designer
Atelier Pacific

Interior Lighting Designer
light directions

Facade Designer
ALPHA
Architectural & Facade Services

Universal Access Designer
UDA Consultants Ltd.
UDA

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
4/F LAYOUT PLAN

Designed By:	Drawn By:
LW	EI
Date:	Approved:
25/01/2016	IL

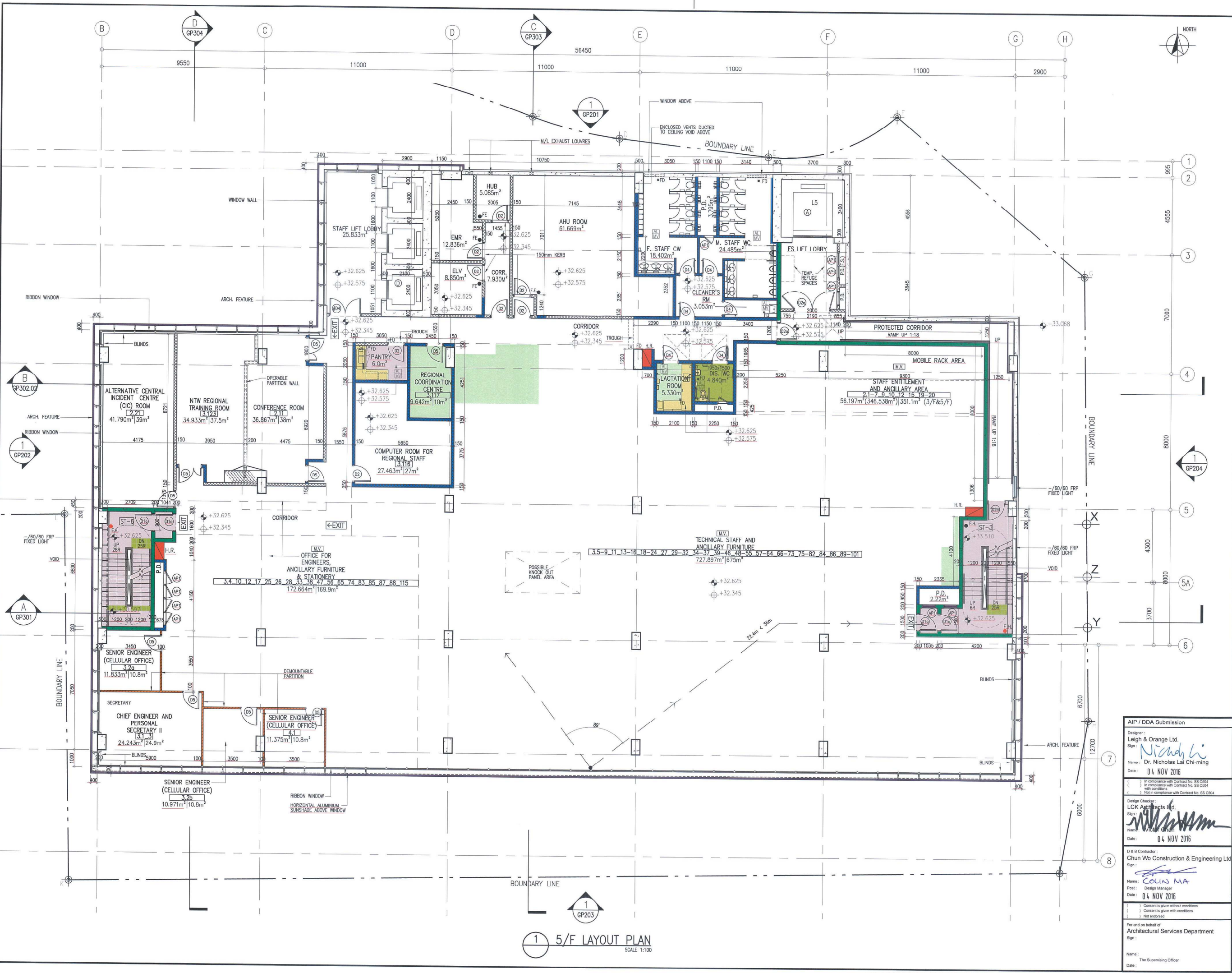
CAD REF:
PMB1A-8207-ALL-GP107.dwg

Scale:
1 : 100 = A1

Drawing No.
PMB1A/8207/ALL/GP107

Name:	Job No.:	Drawing Status:	Rev.
The Supervising Officer	8207	-	e

AIP / DDA Submission
Designer:
Leigh & Orange Ltd.
Sign:
Nicholas Li
Name: Dr. Nicholas Lai Chi-ming
Date: 04 NOV 2016
I am in compliance with Contract No. SS C504
I am in compliance with Contract No. SS C504 with conditions
I am not in compliance with Contract No. SS C504
Design Checker:
LCK Architects Ltd.
Sign:
Victor Chan
Name: Victor Chan
Date: 04 NOV 2016
D & B Contractor:
Chun Wo Construction & Engineering Ltd.
Sign:
Colin Kaa
Name: COLIN KAA
Post: Design Manager
Date: 04 NOV 2016
I consent to give without conditions
I consent to give with conditions
I do not endorse
For and on behalf of
Architectural Services Department
Sign:
Name:
Date:



F.S.D. ref.: FP8/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

LEGEND:
 --- SITE BOUNDARY LINE

General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary Info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client
 建築署
 Architectural Services Department

Design & Build Contractor
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
 L&O ARCHITECTS

Structural Designer
 Matt MacDonald

Building Services Designer
 aurecon

Landscape Designer
 Kenneth Ng & Associates Ltd.
 Landscape & Environmental Consultants

Signage & Wayfinding Designer
 Atelier Pacific

Interior Lighting Designer
 light directions

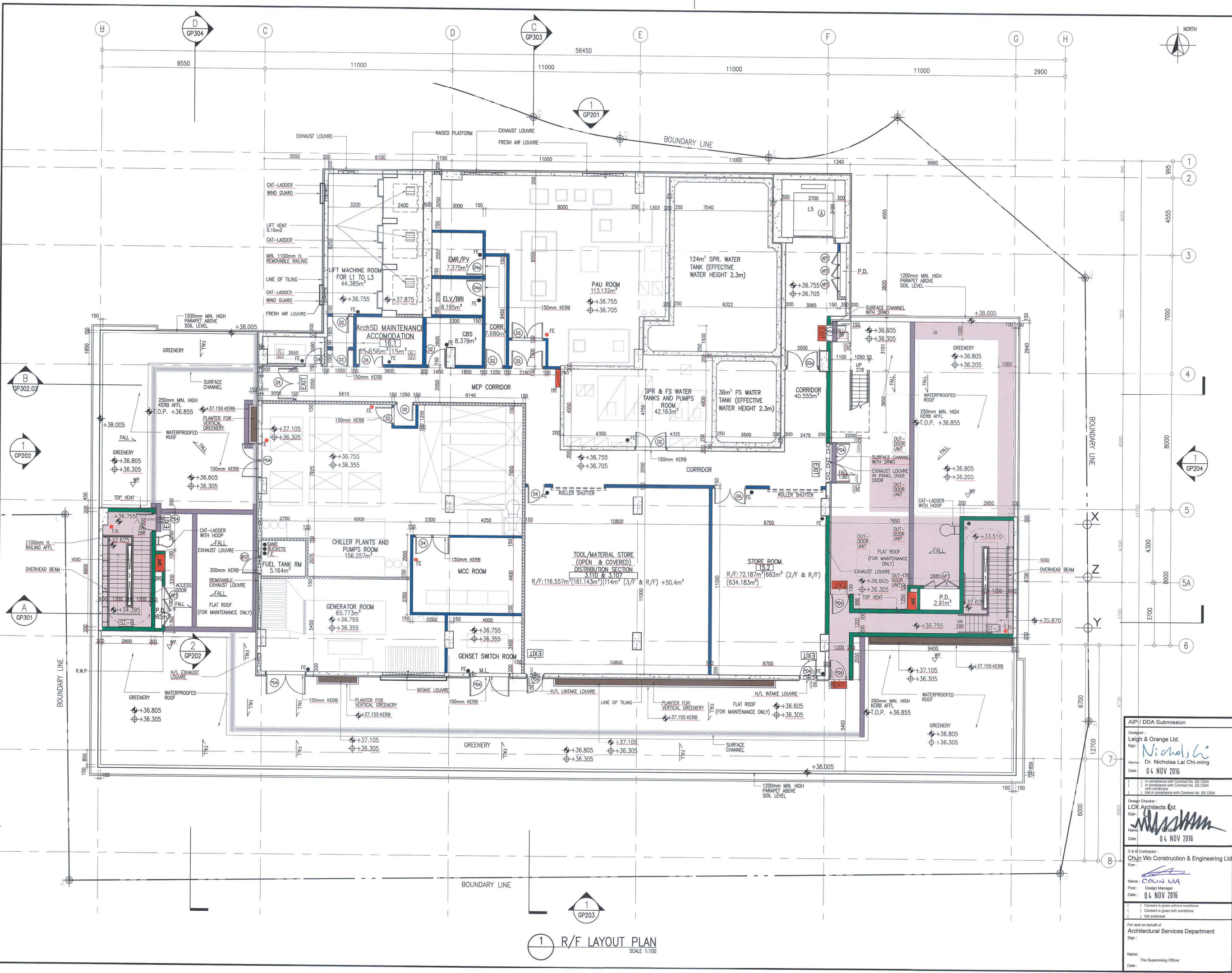
Facade Designer
 ALPHA

Universal Access Designer
 UDA CONSULTANTS LTD.

AIP / DDA Submission		Project:	
Designer: Leigh & Orange Ltd. Sign: 	Date: 04 NOV 2016	Contract No. SS C504 Design and Construction of New Territories West Regional Office & Water Resources Education Centre at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories	
Design Checker: LCK Architects Ltd. Sign: 	Date: 04 NOV 2016	Drawing Title: 5/F LAYOUT PLAN	
D & B Contractor: Chun Wo Construction & Engineering Ltd. Sign: 	Date: 04 NOV 2016	Designed By:- LW	Drawn By:- EI
Name: COLIN MA Post: Design Manager Date: 04 NOV 2016		Date:- 25/01/2016	Approved:- IL
For and on behalf of Architectural Services Department Sign: The Supervising Officer		CAD REF: PMB1A-8207-ALL-GP108.dwg	
Scale: 1 : 100 = A1		Drawing No. PMB1A/8207/ALL/GP108	
Job No.:- 8207		Drawing Status:- -	Rev. e

1 5/F LAYOUT PLAN
 SCALE 1:100

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F.S.D. ref : FP8/30784
 D.L.O. ref : DLOYL 31/YGS/2013
 Reference Drawings :

LEGEND :
 --- SITE BOUNDARY LINE

General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal. actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L
d	2nd AIP SUBMISSION	28/09/2016	A.L
c	2nd AIP SUBMISSION	03/08/2016	A.L
b	2nd AIP SUBMISSION	17/06/2016	A.L
a	1st AIP RE-SUBMISSION	06/04/2016	A.L
0	FIRST SUBMISSION	07/12/2015	A.L

Client

建築署
 Architectural Services Department

Design & Build Contractor

俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer

L&O
 ARCHITECTS

Structural Designer

Matt MacDonald

Building Services Designer

airecon

Landscape Designer

Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer

Atelier Pacific

Interior Lighting Designer

light directions

Facade Designer

ALPHA

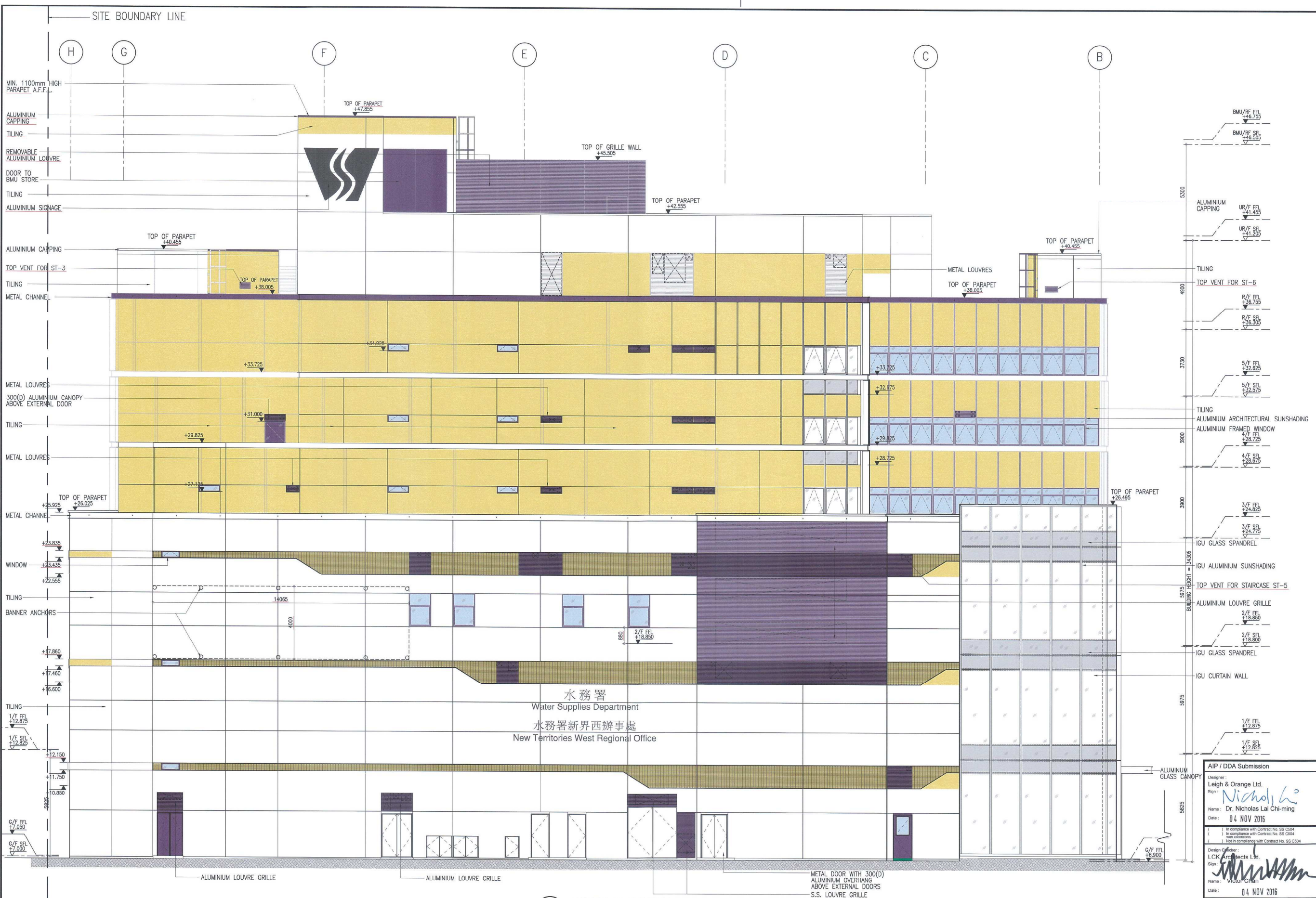
Universal Access Designer

UDA Consultants Ltd.
 UDA

AIP / DDA Submission		Project:	
Designer : Leigh & Orange Ltd. Sign: <i>Nicholas Lai</i> Name: Dr. Nicholas Lai Chi-ming Date: 04 NOV 2016		Contract No. SS C504 Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories	
Design Checker: LCK Architects Ltd. Sign: <i>[Signature]</i> Name: [Name] Date: 04 NOV 2016		Drawing Title: R/F LAYOUT PLAN	
D & B Contractor: Chun Wo Construction & Engineering Ltd. Sign: <i>[Signature]</i> Name: COLIN MA Post: Design Manager Date: 04 NOV 2016		Designed By: LW	Drawn By: EI
For and on behalf of: Architectural Services Department Sign: [Signature]		Date: 25/01/2016	Approved: IL
CAD REF: PMB1A-8207-ALL-GP109.dwg		Scale: 1 : 100 = A1	
Drawing No. PMB1A/8207/ALL/GP109		Job No.: 8207	Rev. e

1 R/F LAYOUT PLAN
 SCALE 1:100

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1 NORTH ELEVATION
SCALE 1:100

F.S.D. ref.: FP8/30784
 D.I.G. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

Client
 建築署
 Architectural Services Department

Design & Build Contractor
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
 L&O ARCHITECTS

Structural Designer
 Mott MacDonald

Building Services Designer
 aurecon

Landscape Designer
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer
 Atelier Pacific

Interior Lighting Designer
 light directions

Facade Designer
 ALPHA

Universal Access Designer
 UDA

AIP / DDA Submission
 Designer:
 Leigh & Orange Ltd.
 Sign: Nicholas Lai
 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016
 () In compliance with Contract No. SS C504
 () In compliance with Contract No. SS C504
 () Not in compliance with Contract No. SS C504

Design Checker:
 L&O Architects Ltd.
 Sign: Victor Chan
 Name: Victor Chan
 Date: 04 NOV 2016

D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign: Colin Ma
 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016

For and on behalf of
 Architectural Services Department
 Sign:
 Name: The Supervising Officer
 Date:

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Chung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
NORTH ELEVATION

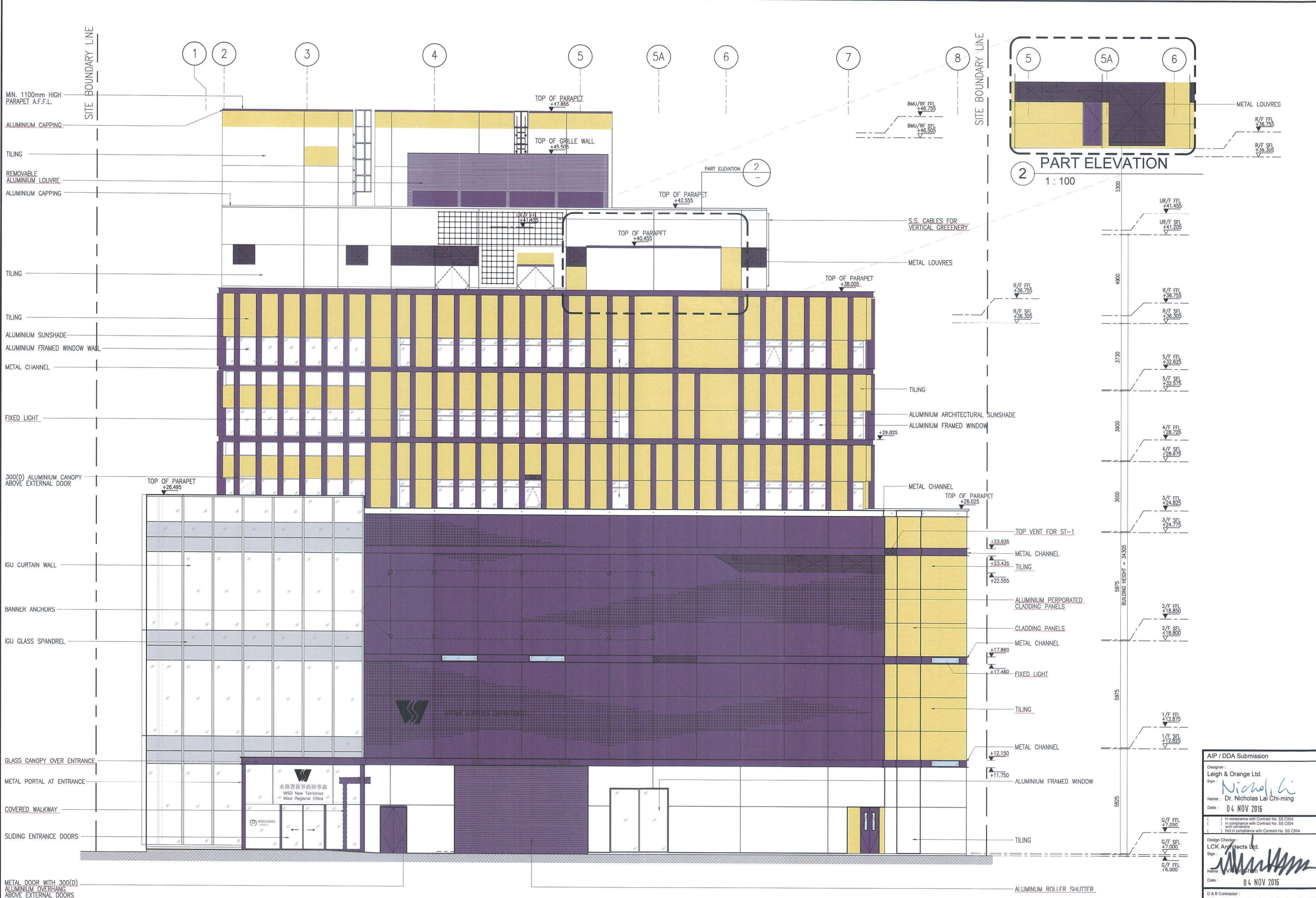
Designed By:- LW	Drawn By:- EI
Date:- 7 DEC 2015	Approved:- IL

CAD REF:
PMB1A-8207-ALL-GP201.dwg

Scale:-
1 : 100 = A1

Drawing No.
PMB1A/8207/ALL/GP201

Job No.:- 8207	Drawing Status:- -	Rev. e
-------------------	-----------------------	-----------



1 WEST ELEVATION
SCALE 1:100

2 PART ELEVATION
1:100

F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YGS/2013

Reference Drawings:

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

General Notes:
1. The facade package is a design intent performance specification contract.
2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
3. All enlarged details to be submitted in D.D.A stage.
4. Boundary wall, external stair and doors to be issued in separate package.
5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client
建築署
Architectural Services Department

Design & Build Contractor
俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
L&O ARCHITECTS

Structural Designer
Mott MacDonald

Building Services Designer
aurecon

Landscape Designer
Kenneth Ng & Associates Ltd
Landscape & Environmental Consultants

Signage & Wayfinding Designer
Atelier Pacific

Interior Lighting Designer
light directions

Facade Designer
ALPHA
Architectural Facade Design

Universal Access Designer
UDA Consultants Ltd
UDA

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
WEST ELEVATION

Designed By:- LW	Drawn By:- KY
Date:- 8 DEC 2015	Approved:- IL

CAD REF:
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Scale:-
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Drawing No.
PMB1A/8207/ALL/GP202

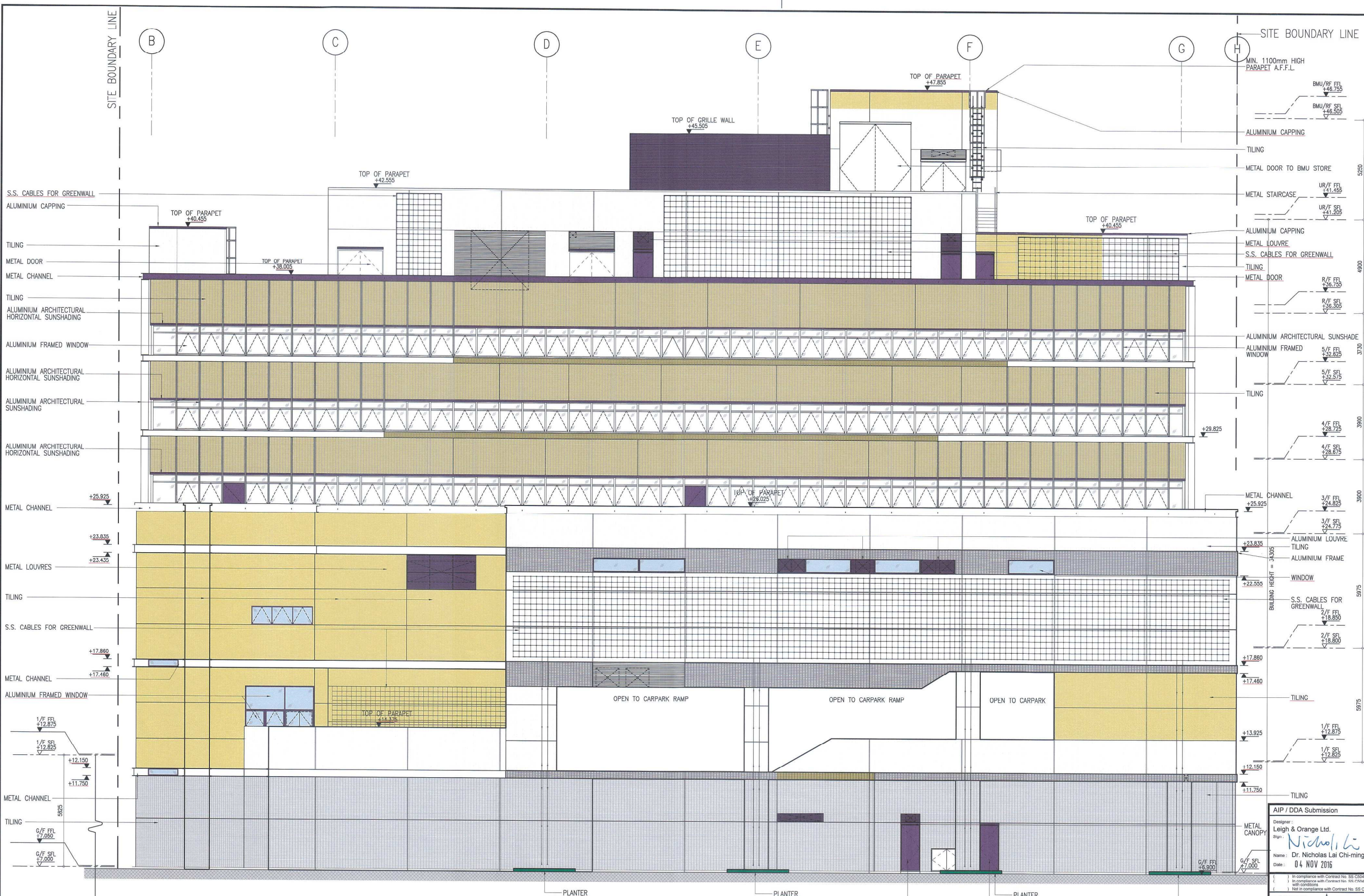
Job No.:- 8207	Drawing Status:- -	Rev. e
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AIP / DDA Submission
Designer:
Leigh & Orange Ltd.
Sign:
Nicholas Lai
Name: Dr. Nicholas Lai Chi-ming
Date: 04 NOV 2016

Design Checker:
LCK Architects Ltd.
Sign:
Wai Lam
Name: Wai Lam
Date: 04 NOV 2016

D & B Contractor:
Chun Wo Construction & Engineering Ltd.
Sign:
Colin Ma
Name: COLIN MA
Post: Construction Manager
Date: 04 NOV 2016

For and on behalf of
Architectural Services Department
Sign:
Name:
The Supervising Officer



1 SOUTH ELEVATION
SCALE 1:100

F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YGS/2013
Reference Drawings:

- General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
 3. All enlarged details to be submitted in D.D.A stage.
 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

REV	DESCRIPTION	DATE	CHECKED
e	2nd AIP SUBMISSION (Supplementary info)	04/11/2016	A.L.
d	2nd AIP SUBMISSION	28/09/2016	A.L.
c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.


Client
 建築署
 Architectural Services Department

Design & Build Contractor
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
 L&O
 ARCHITECTS

Structural Designer
 Mott MacDonald


Building Services Designer
 aurecon

Landscape Designer
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer
 Atelier Pacific

Interior Lighting Designer
 light directions

Facade Designer
 ALPHA

Universal Access Designer
 UDA Consultants Ltd

Project:
 Contract No. SS C504
 Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories


Drawing Title:
 SOUTH ELEVATION


Designed By: LW
 Drawn By: KY

Date: 10 DEC 2015
 Approved: IL

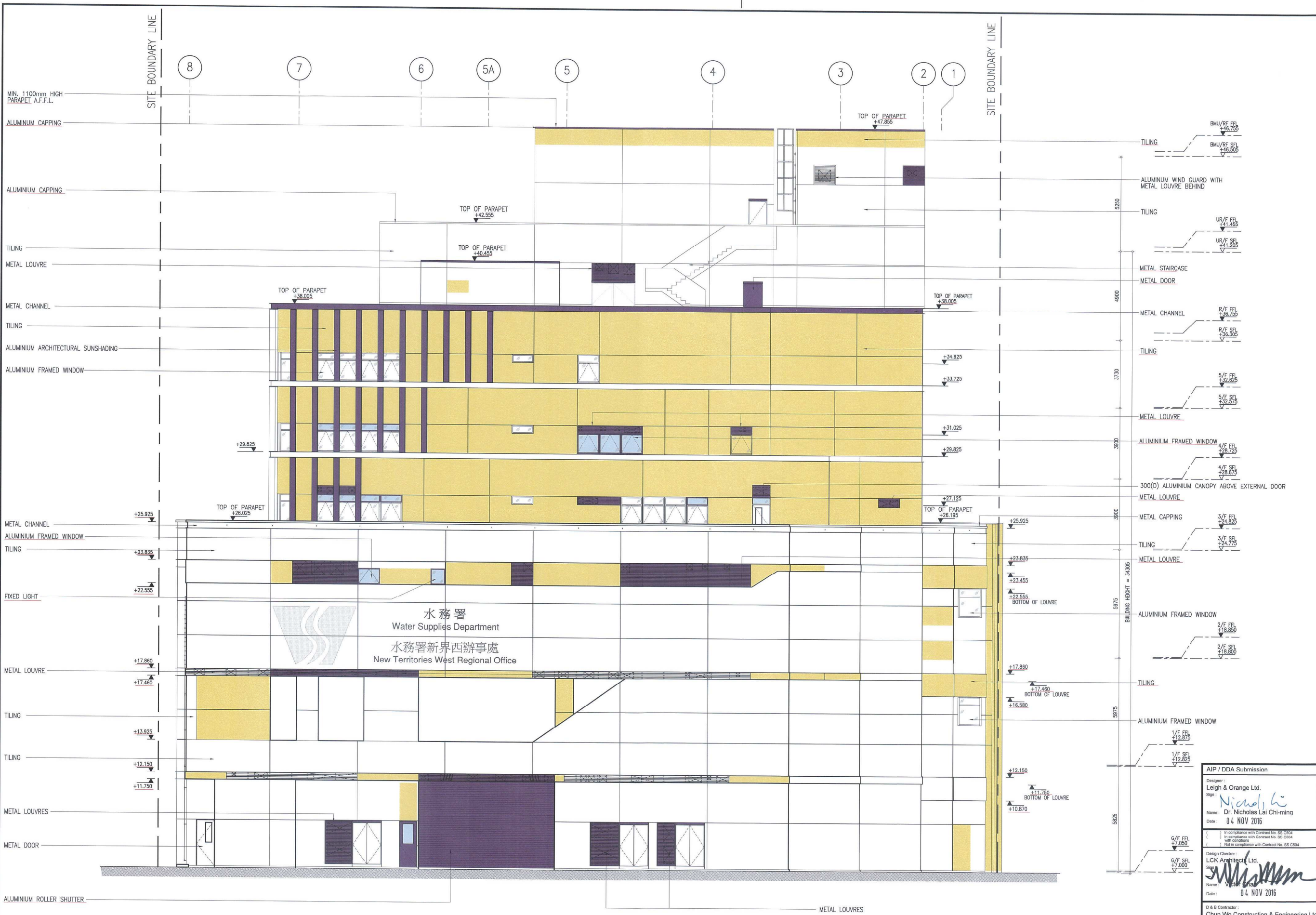
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Drawing No. PM8207/GP203
 Job No.: 8207
 Drawing Status: -
 Rev: e

AIP / DDA Submission
 Designer:
 Leigh & Orange Ltd.
 Sign: 
 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016

Design Checker:
 LCK Architects Ltd.
 Sign: 
 Name: Victor Chan
 Date: 04 NOV 2016

D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign: 
 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016



1 EAST ELEVATION
SCALE 1:100

F.S.D. ref.: FP8/30784
D.L.O. ref.: DLOYL 31/YGS/2013
Reference Drawings:

- General Notes:
 1. The facade package is a design intent performance specification contract.
 2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.
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REV	DESCRIPTION	DATE	CHECKED
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c	2nd AIP SUBMISSION	03/08/2016	A.L.
b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

Client:

 建築署
 Architectural Services Department

Design & Build Contractor:

 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:


 L&O ARCHITECTS

Structural Designer:

 Mott MacDonald

Building Services Designer:

 aurecon

Landscape Designer:

 Kenneth Ng & Associates Ltd.
 Landscape & Environmental Consultants

Signage & Wayfinding Designer:

 Atelier Pacific

Interior Lighting Designer:

 light directions

Facade Designer:

 ALPHA

Universal Access Designer:

 UPA

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
EAST ELEVATION




Designed By:- LW	Drawn By:- KY
Date:- 7 DEC 2015	Approved:- IL

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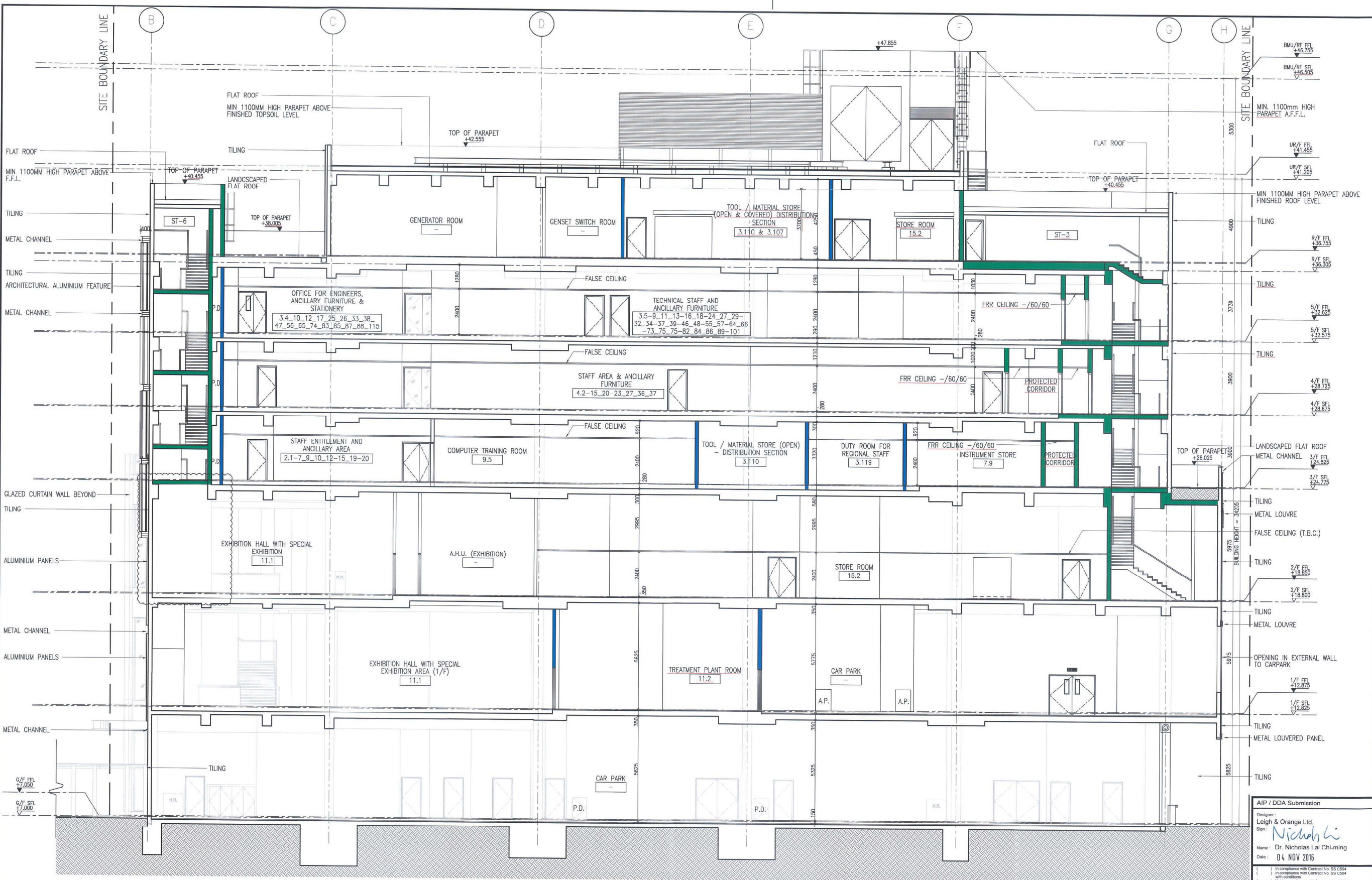
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Drawing No.
PMB1A/8207/ALL/GP204

Job No.:- 8207	Drawing Status:- -	Rev. e
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AIP / DDA Submission
 Designer:
 Leigh & Orange Ltd.
 Sign:

 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016
 () In compliance with Contract No. SS C504
 () In compliance with Contract No. SS C504
 () In compliance with Contract No. SS C504
 Design Checker:
 LCK Architects Ltd.
 Sign:

 Name: Victor
 Date: 04 NOV 2016
 D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign:

 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016

For and on behalf of
 Architectural Services Department
 Sign:
 Name:
 The Supervising Officer
 Date:



F.S.D. ref.: FP8/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

REV	DESCRIPTION	DATE	CHECKED
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d	2nd AIP SUBMISSION	28/09/2016	A.L.
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b	2nd AIP SUBMISSION	17/06/2016	A.L.
a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

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Client
 建築署
 Architectural Services Department

Design & Build Contractor
 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer
 L&O ARCHITECTS

Structural Designer
 Mott MacDonald

Building Services Designer
 aurecon

Landscape Designer
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer
 Atelier Pacific

Interior Lighting Designer
 light directions

Facade Designer
 ALPHA

Universal Access Designer
 UPA

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
SECTION A-A

Designed By: LW Drawn By: EI
 Date: 7 DEC 2015 Approved: IL
 CAD REF: PMB1A-8207-ALL-GP301.dwg
 Scale: 1 : 100 = A1
 Drawing No. PMB1A/8207/ALL/GP301
 Job No.: 8207 Drawing Status: Rev. e

A SECTION A
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AIP / DDA Submission
 Designer: Leigh & Orange Ltd.
 Sign: Nicholas Lai Chi-ming
 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016

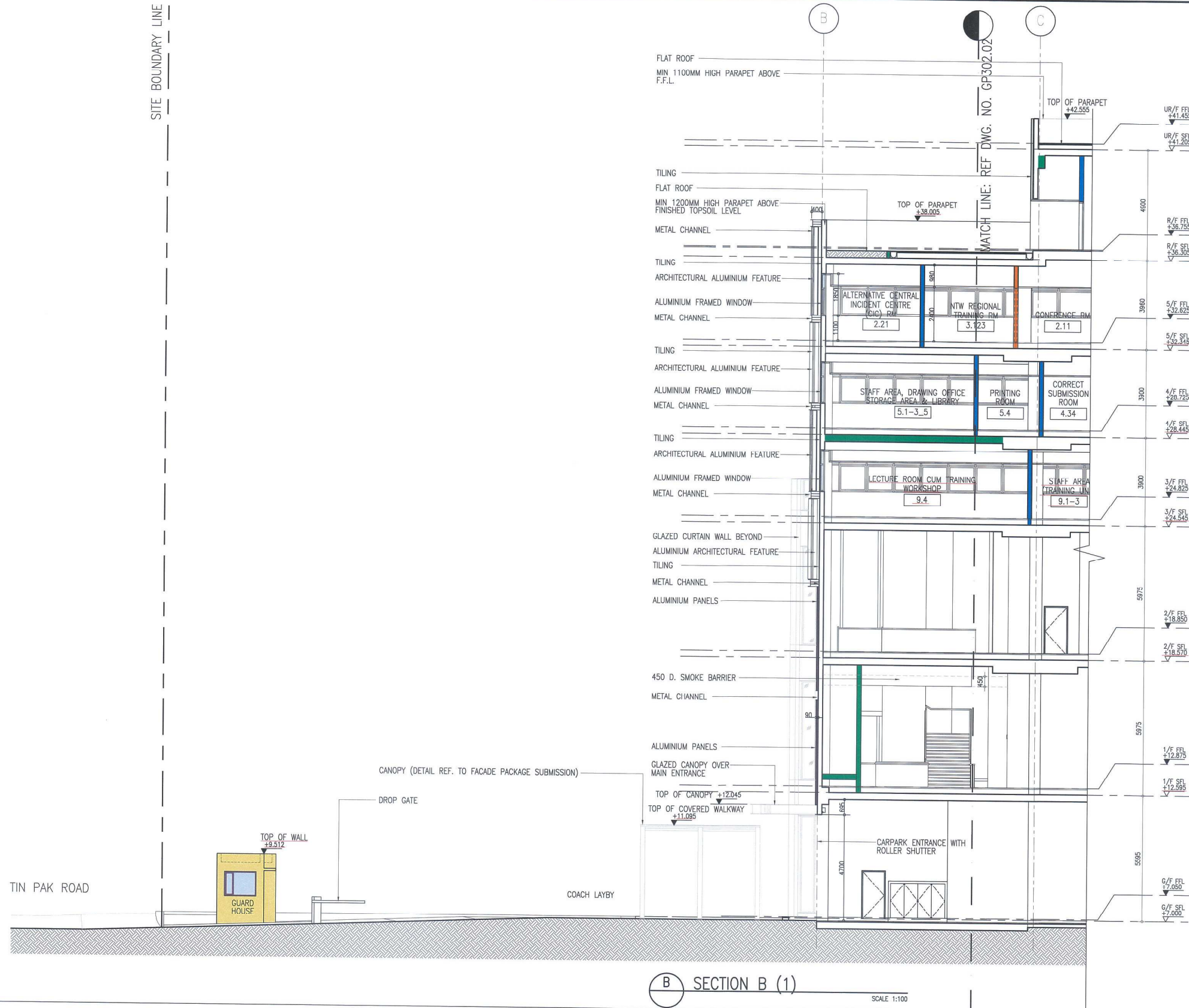
Design Checker:
 L&O Architects Ltd.
 Sign: Victor Chan
 Name: VICTOR CHAN
 Date: 04 NOV 2016

D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign: Colin Ma
 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016

For and on behalf of
 Architectural Services Department
 Sign: _____
 The Supervising Officer

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SITE BOUNDARY LINE

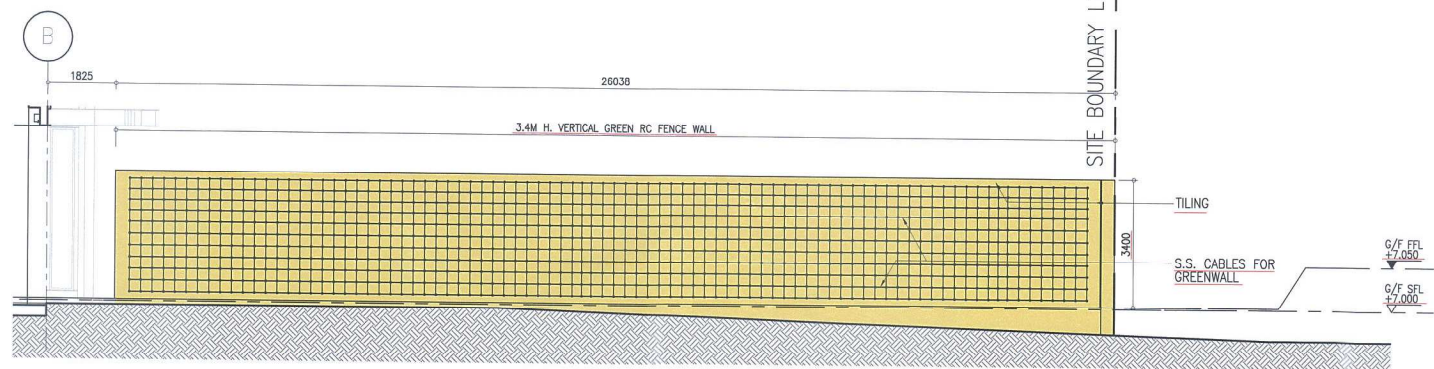


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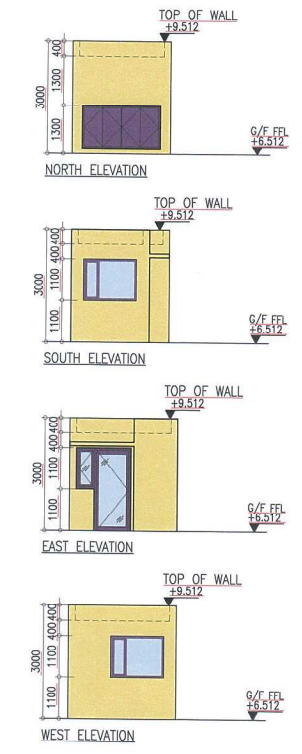
FENCE WALL ELEVATION

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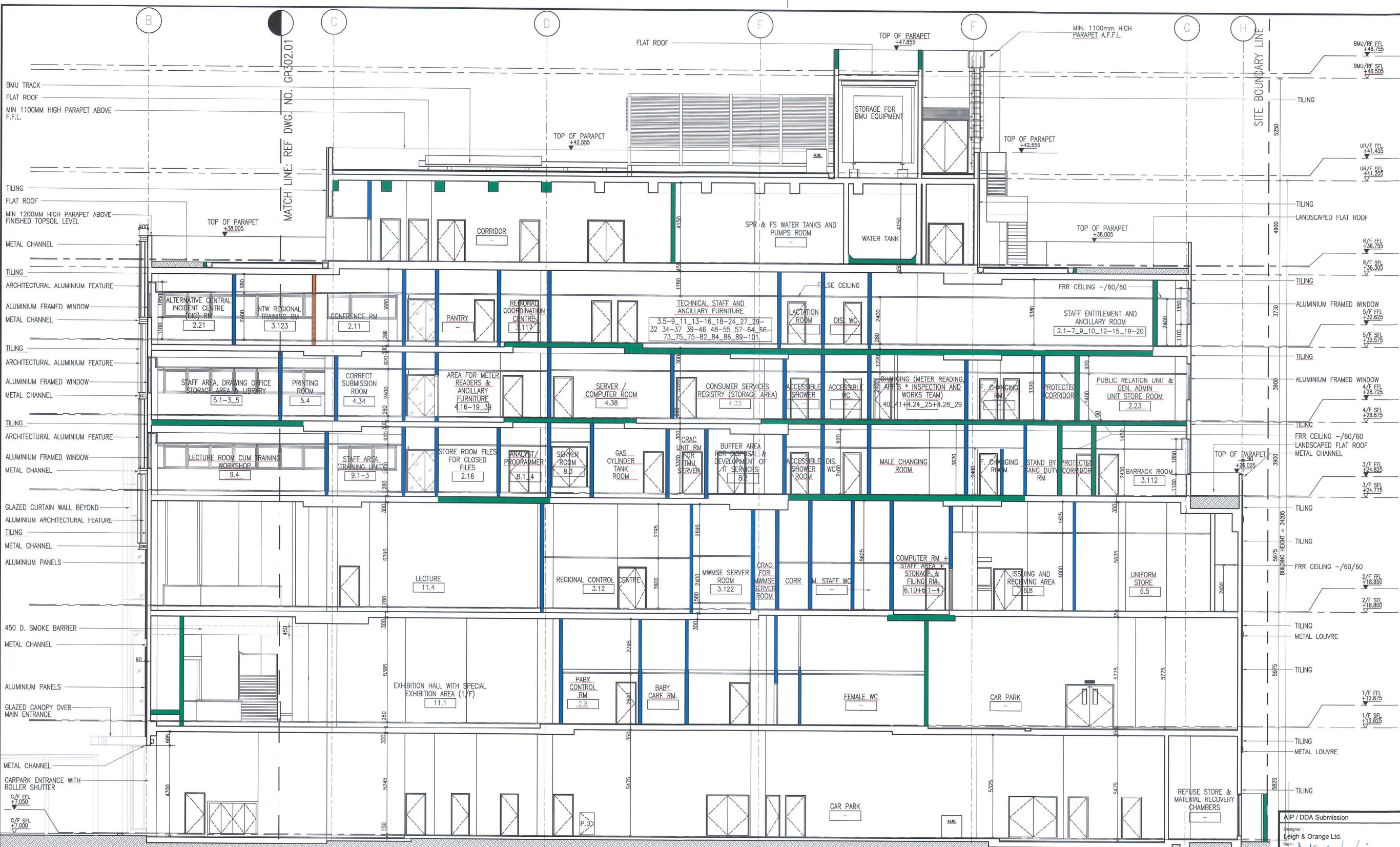


2 GUARD HOUSE ELEVATIONS

SCALE 1:100



F.S.D. ref. :		
D.L.O. ref. :		
Reference Drawings :		
General Notes:		
1. The facade package is a design intent performance specification contract.		
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4. Boundary wall, external stair and doors to be issued in separate package.		
5. Refer to Landscape package for greenery area design and outside LOT Green area approach.		
REV	DESCRIPTION	DATE CHECKED
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c	2nd AIP SUBMISSION	28/09/2016 A.L
b	2nd AIP RE-SUBMISSION	03/08/2016 A.L
a	2nd AIP SUBMISSION	17/06/2016 A.L
0	1st AIP RE-SUBMISSION	06/04/2016 A.L
Client		
Design & Build Contractor		
Architectural and Interior Designer		
Structural Designer		
Building Services Designer		
Landscape Designer		
Signage & Wayfinding Designer		
Interior Lighting Designer		
Facade Designer		
Universal Access Designer		
AIP / DDA Submission		Project:
Designer: Leigh & Orange Ltd.		Contract No. SS C504 Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories
Sign:		
Name: Dr. Nicholas Lal Chi-ming Date: 04 NOV 2016		
Design Checker: LCK Architects Ltd.		Drawing Title:
Sign:		SECTION B-B
Name: Victor Chan Date: 04 NOV 2016		
D & B Contractor: Chun Wo Construction & Engineering Ltd.		Designed By:-
Sign:		LW
Name: COLIN MA Post: Design Manager Date: 04 NOV 2016		Drawn By:- EI
		Date:- 7 DEC 2015
		Approved:- IL
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For and on behalf of Architectural Services Department		Drawing No. PMB1A/8207/ALL/GP302.01
Sign:		Job No.:- 8207
Date: _____		Drawing Status:-
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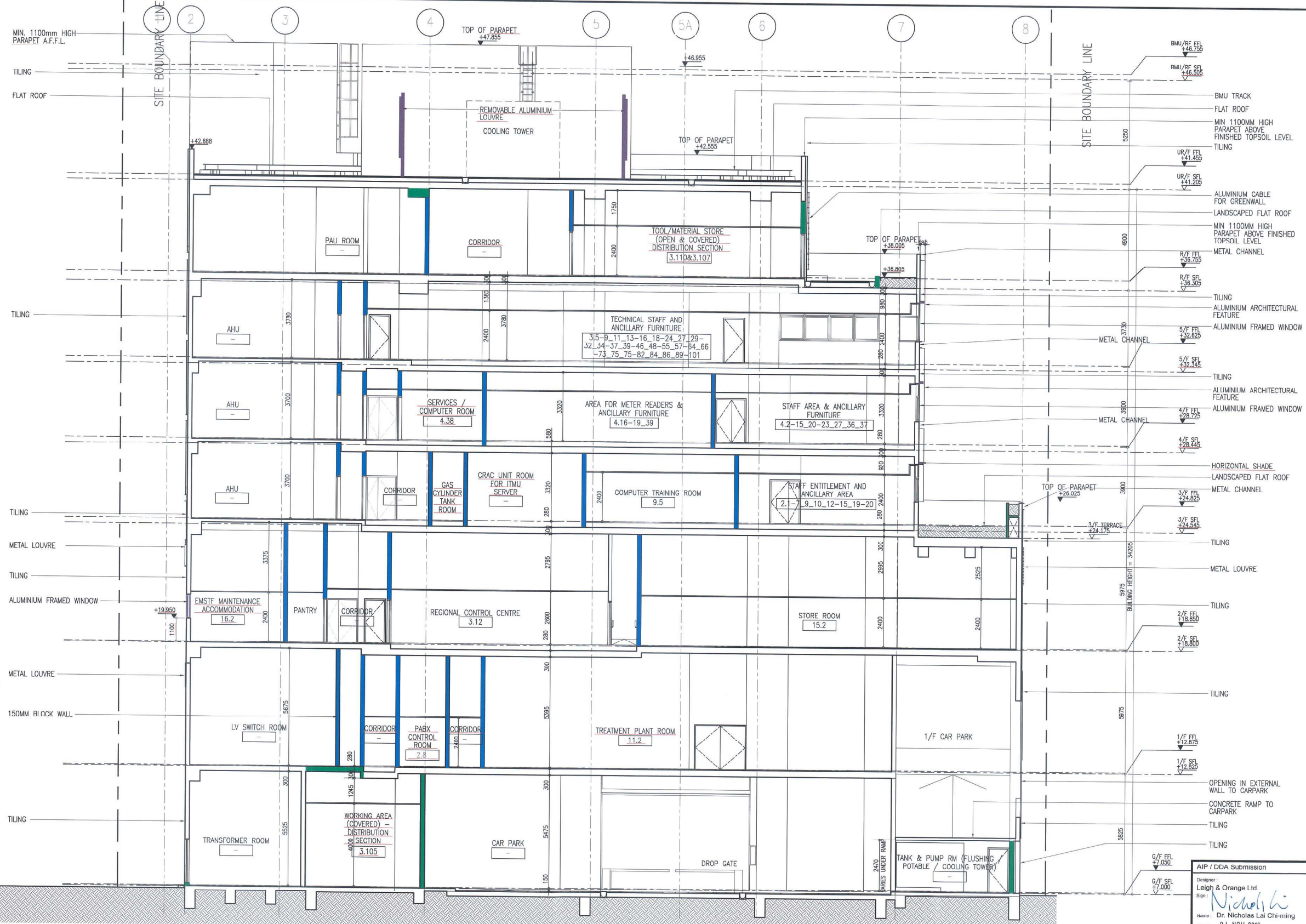


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D.L.O. ref.: DLOYL 31/YGS/2013		
Reference Drawings:		
General Notes:		
1. The facade package is a design intent performance specification contract.		
2. All windows and features dimensions as shown are nominal, actual thickness shall be subject to details design co-ordination.		
3. All enlarged details to be submitted in D.D.A stage.		
4. Boundary wall, external stair and doors to be issued in separate package.		
5. Refer to Landscape package for greenery area design and outside LOT Green area approach.		
REV	DESCRIPTION	DATE CHECKED
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c	2nd AIP SUBMISSION	03/08/2016 A.L
b	2nd AIP SUBMISSION	17/06/2016 A.L
a	1st AIP RE-SUBMISSION	06/04/2016 A.L
0	FIRST SUBMISSION	07/12/2015 A.L
Client		
Design & Build Contractor		
Architectural and Interior Designer		
Structural Designer		
Building Services Designer		
Landscape Designer		
Signage & Wayfinding Designer		
Interior Lighting Designer		
Facade Designer		
Universal Access Designer		

AIP / DDA Submission	
Designer:	Leigh & Orange Ltd.
Sign:	
Name:	Dr. Nicholas Lai Chi-ming
Date:	04 NOV 2016
<input type="checkbox"/> In compliance with Contract No. SS C504 <input type="checkbox"/> In compliance with Contract No. SS C504 with conditions <input type="checkbox"/> Not in compliance with Contract No. SS C504	
Design Checker:	
LCO Architects Ltd.	
Sign:	
Name:	Victor Chan
Date:	04 NOV 2016
D & B Contractor:	
Chun Wo Construction & Engineering Ltd.	
Sign:	
Name:	Colin Ma
Post:	Design Manager
Date:	04 NOV 2016
<input type="checkbox"/> Consent is given without conditions <input type="checkbox"/> Consent is given with conditions <input type="checkbox"/> Not endorsed	
For and on behalf of:	
Architectural Services Department	
Sign:	
Name:	The Supervising Officer
Date:	

Project:		
Contract No. SS C504		
Design and Construction of New Territories West Regional Office & Water Resources Education Centre at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories		
Drawing Title:		
SECTION B-B		
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Date:-	7 DEC 2015	Approved:- IL
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Job No.:-	8207	Rev. e



C SECTION C
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F.S.D. ref.: FP8/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

General Notes:
 1. The facade package is a design intent performance specification contract.
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a	1st AIP RE-SUBMISSION	06/04/2016	AL
0	FIRST SUBMISSION	07/12/2015	AL

Client:
 建築署
 Architectural Services Department

Design & Build Contractor:

 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:

 L&O ARCHITECTS

Structural Designer:

 Matt MacDonald

Building Services Designer:

 aurecon

Landscape Designer:

 Kenneth Ng & Associates Ltd.
 Landscape & Environmental Consultants

Signage & Wayfinding Designer:

 Atelier Pacific

Interior Lighting Designer:

 light directions

Facade Designer:

 ALPHA

Universal Access Designer:

 UPA

AIP / DDA Submission
 Designer:
 Leigh & Orange Ltd.
 Sign:

 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016
 () In compliance with Contract No. SS C504
 () In compliance with Contract No. SS C504 with conditions
 () Not in compliance with Contract No. SS C504

Design Checker:
 LCK Architects Ltd.
 Sign:

 Name: [Name]
 Date: 04 NOV 2016

D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign:

 Name: [Name]
 Post: Design Manager
 Date: 04 NOV 2016
 () Consent is given without conditions
 () Consent is given with conditions
 () Not endorsed

For and on behalf of
 Architectural Services Department
 Sign:
 Name: The Supervising Officer
 Date:

Project:
 Contract No. SS C504
 Design and Construction of New Territories West Regional Office & Water Resources Education Centre at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
 SECTION C-C

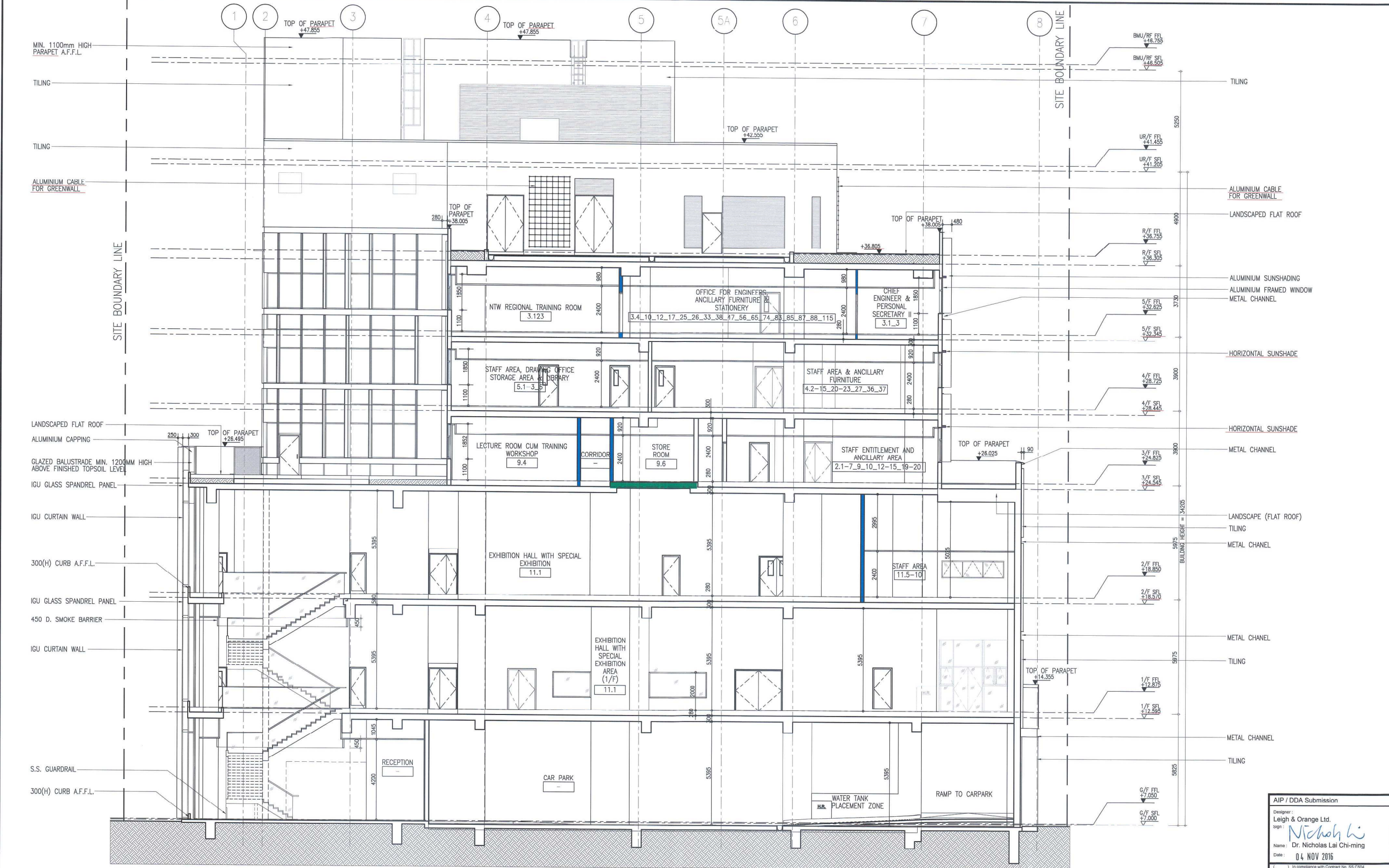
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 Drawn By:- EI
 Date:- 7 DEC 2015
 Approved:- IL

CAD REF:
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Scale:-
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Drawing No.
 PMB1A/8207/ALL/GP303

Job No.:- 8207
 Drawing Status:-
 Rev. e



D SECTION D
SCALE 1:100

F.S.D. ref.: FP8/30784
 D.L.O. ref.: DLOYL 31/YGS/2013
 Reference Drawings:

Rev	Description	Date	Checked
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d	2nd AIP SUBMISSION	28/09/2016	A.L.
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a	1st AIP RE-SUBMISSION	06/04/2016	A.L.
0	FIRST SUBMISSION	07/12/2015	A.L.

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 4. Boundary wall, external stair and doors to be issued in separate package.
 5. Refer to Landscape package for greenery area design and outside LOT Green area approach.

Client:


 建築署
 Architectural Services Department

Design & Build Contractor:

 俊和建築工程有限公司
 CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Architectural and Interior Designer:

 L&O ARCHITECTS

Structural Designer:

 Matt MacDonald

Building Services Designer:

 aurecon

Landscape Designer:
 Kenneth Ng & Associates Ltd
 Landscape & Environmental Consultants

Signage & Wayfinding Designer:

 Atelier Pacific

Interior Lighting Designer:

 light directions


Facade Designer:


 ALPHA

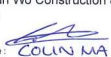
Universal Access Designer:

 UPA

AIP / DDA Submission

Designer:
 Leigh & Orange Ltd.
 Sign: 
 Name: Dr. Nicholas Lai Chi-ming
 Date: 04 NOV 2016

Design Checker:
 LCK Architects Ltd.
 Sign: 
 Name: Colin Ma
 Date: 04 NOV 2016

D & B Contractor:
 Chun Wo Construction & Engineering Ltd.
 Sign: 
 Name: COLIN MA
 Post: Design Manager
 Date: 04 NOV 2016

Project:
Contract No. SS C504
Design and Construction of New Territories West Regional Office & Water Resources Education Centre of Water Supplies Department at Junction of Tin Cheung Road & Tin Pak Road, Tin Shui Wai, New Territories

Drawing Title:
SECTION D-D


Designed By:- LW
 Drawn By:- EI
 Date:- 7 DEC 2015
 Approved:- IL

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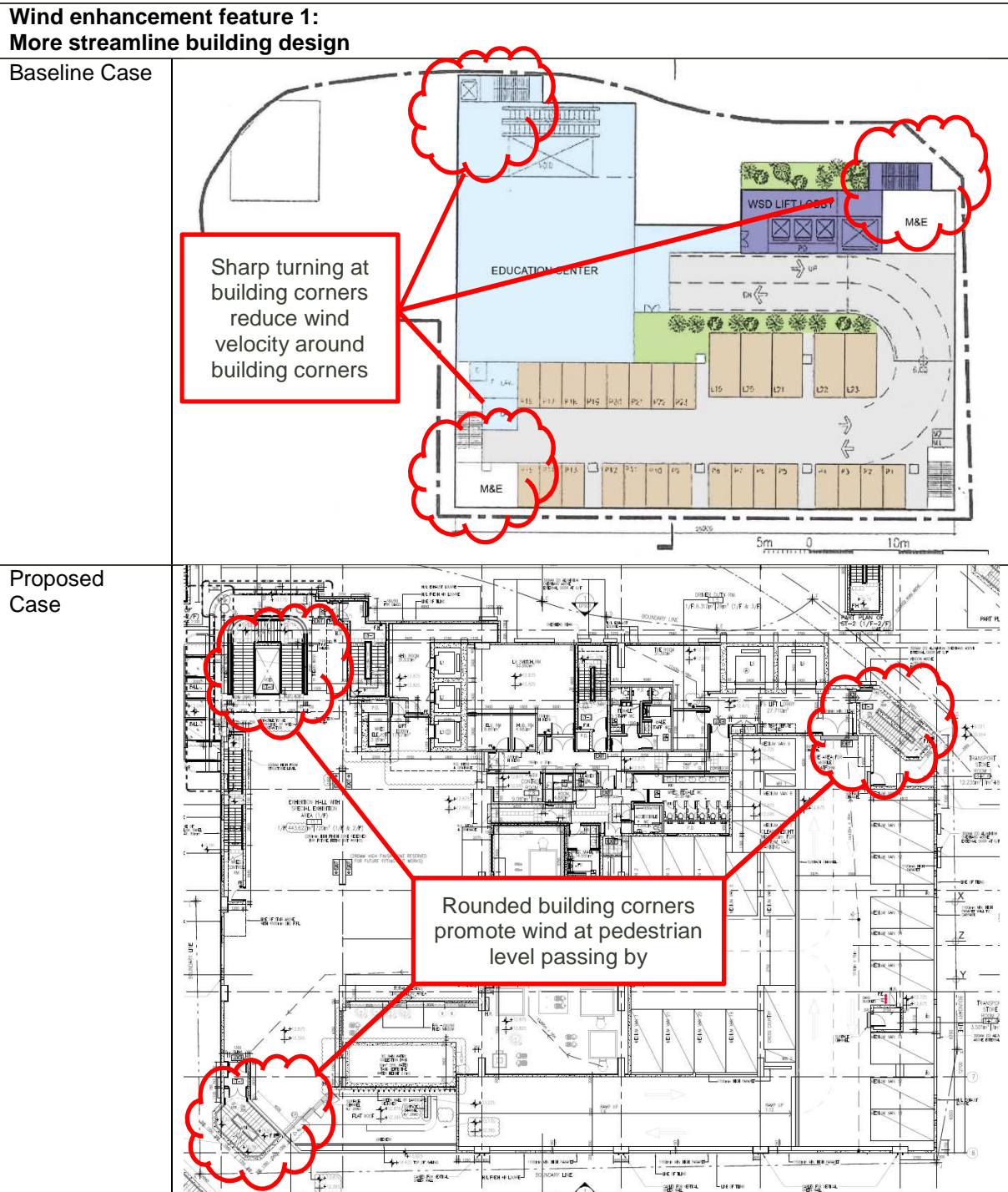
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Appendix C

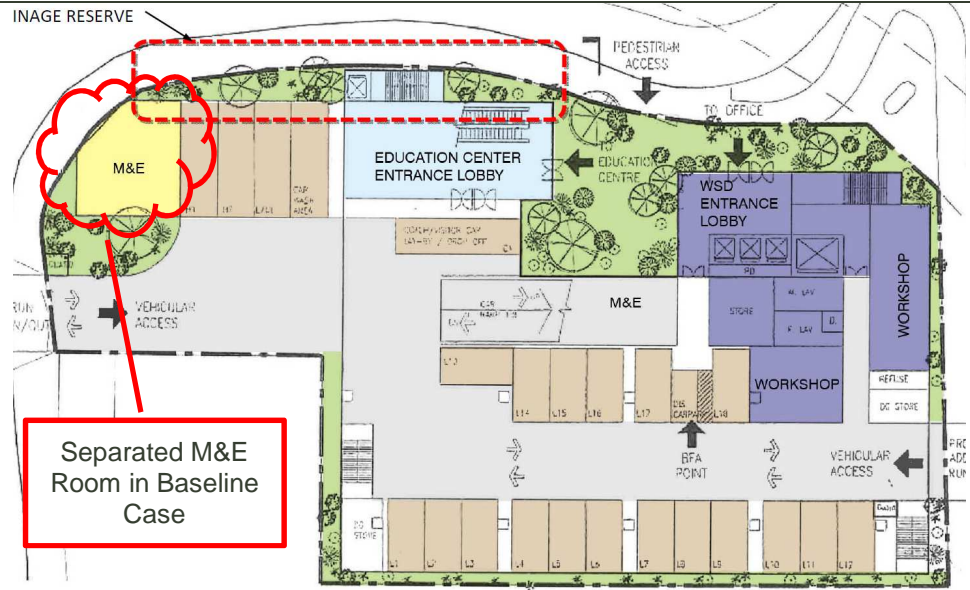
Indicative of Difference between Baseline and Proposed Schemes

**New Territories West Regional Office & Water Resources Education Centre at Tin Shui Wai
 New Territories – Air Ventilation Assessment (AVA) Report
 Appendix C: Illustration of Wind Enhancement Features in the Proposed Scheme with Respect to the Baseline Scheme**



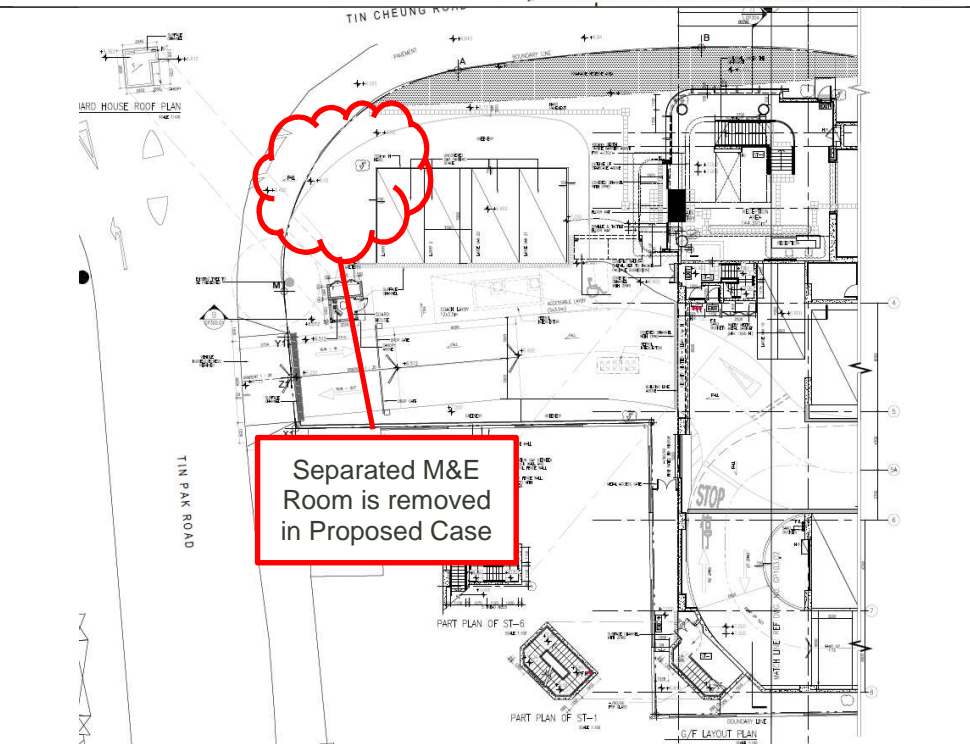
**Wind enhancement feature 2:
Removal of separated M&E Room**

Baseline Case



Separated M&E Room in Baseline Case

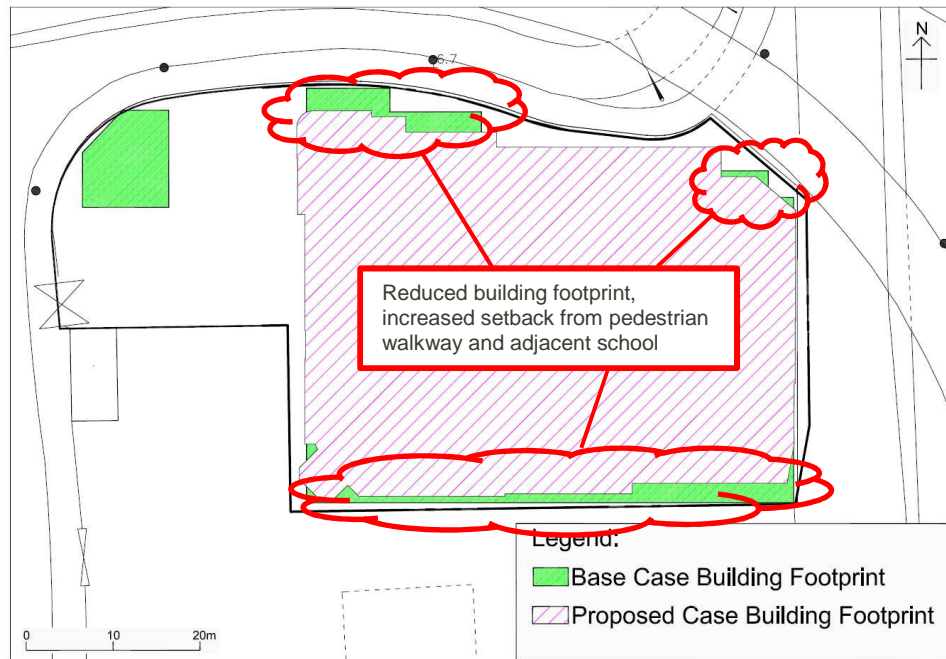
Proposed Case



Separated M&E Room is removed in Proposed Case

**Wind enhancement feature 3:
Building Setback**

Comparison of building footprint between Base Case and Proposed Case





Appendix D

Captured CFD Models

Captured CFD Models

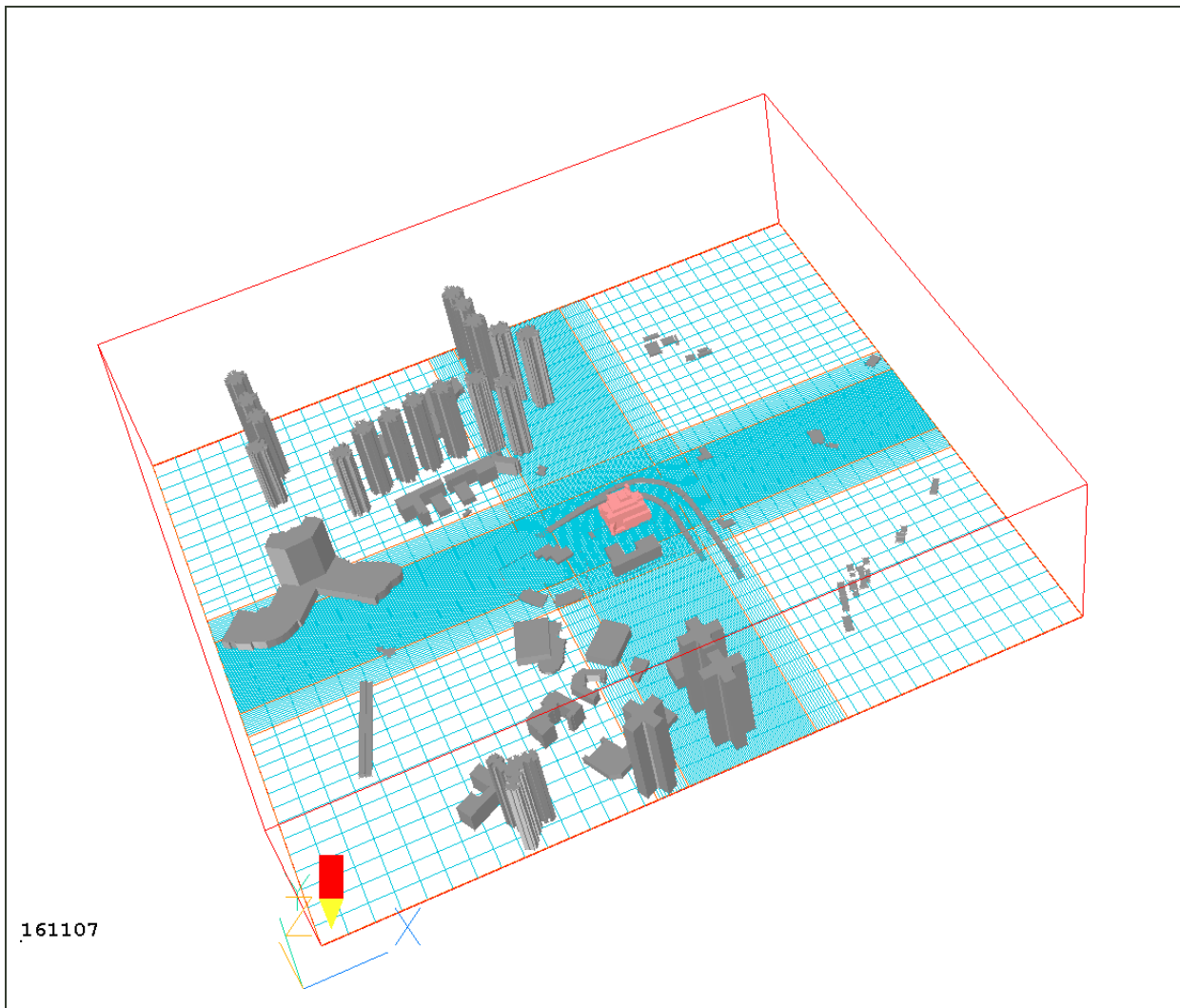


Fig1a - Domain and mesh setting (3-Dimensional view)

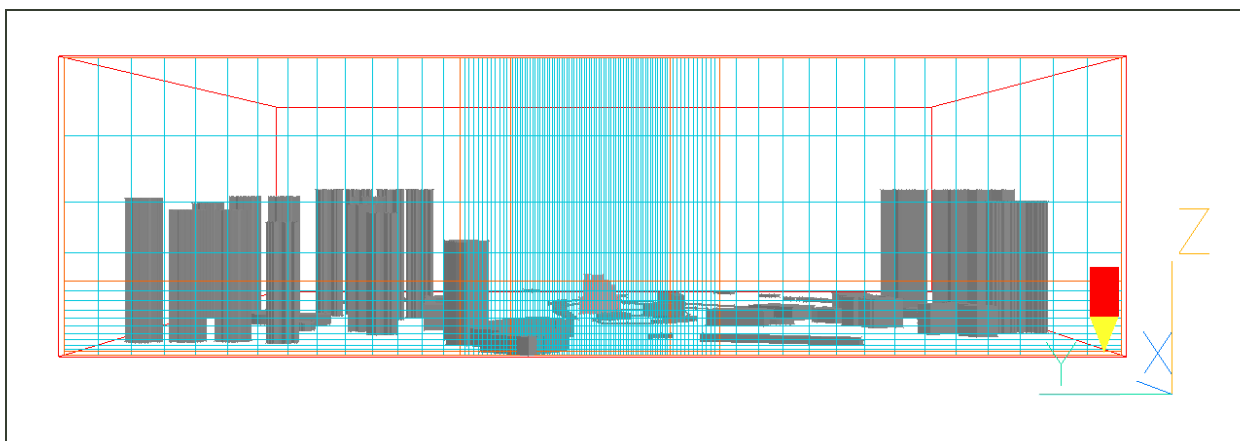


Fig 1a - Domain and mesh setting (Side view)

Note: Red line is the boundary of the domain, light blue line is the grid setting, pink object is the proposed case building block and the grey objects are the building in the vicinity.

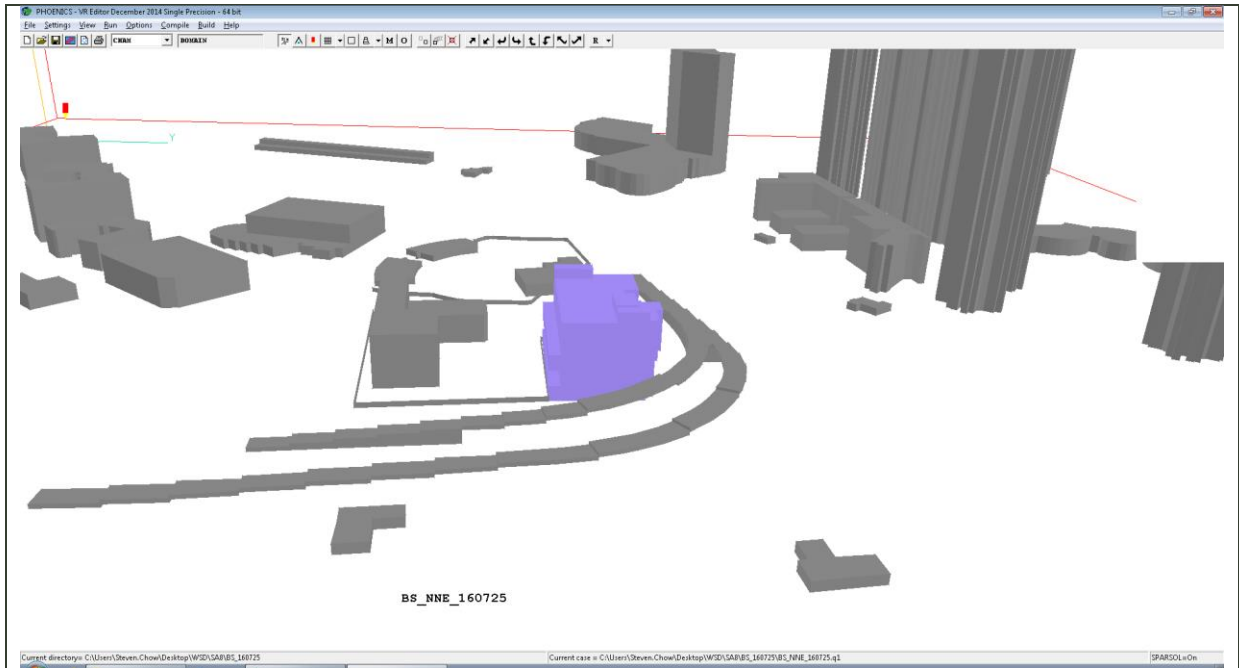


Figure 2a - Base Case Building Block Setting (East View)

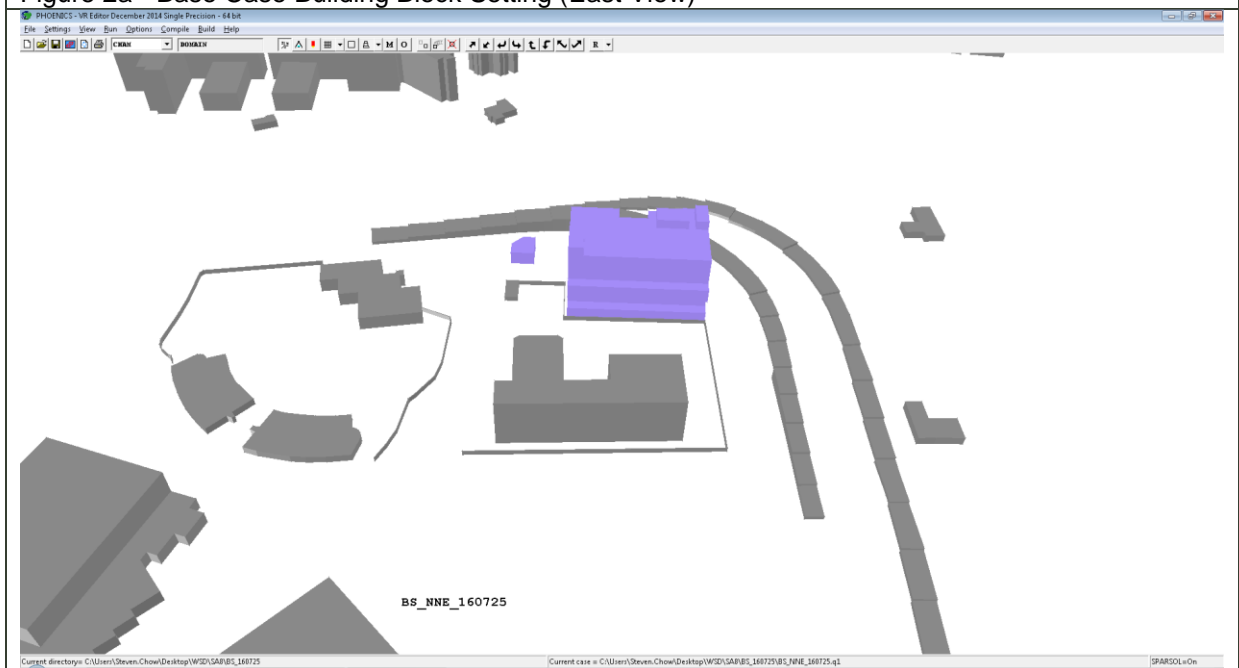


Figure 2b - Base Case Building Block Setting (South View)

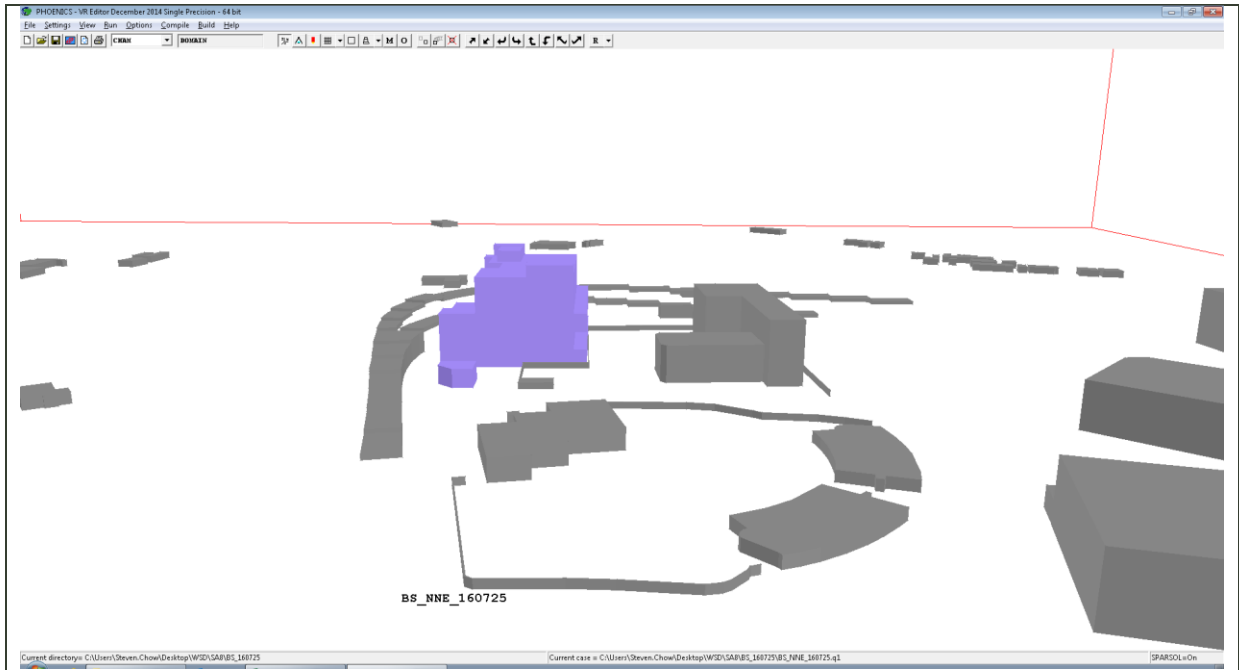


Figure 2c - Base Case Building Block Setting (West View)



Figure 2d - Base Case Building Block Setting (North View)

Note: Violet object is the base case building block and the grey objects are the building in the vicinity.

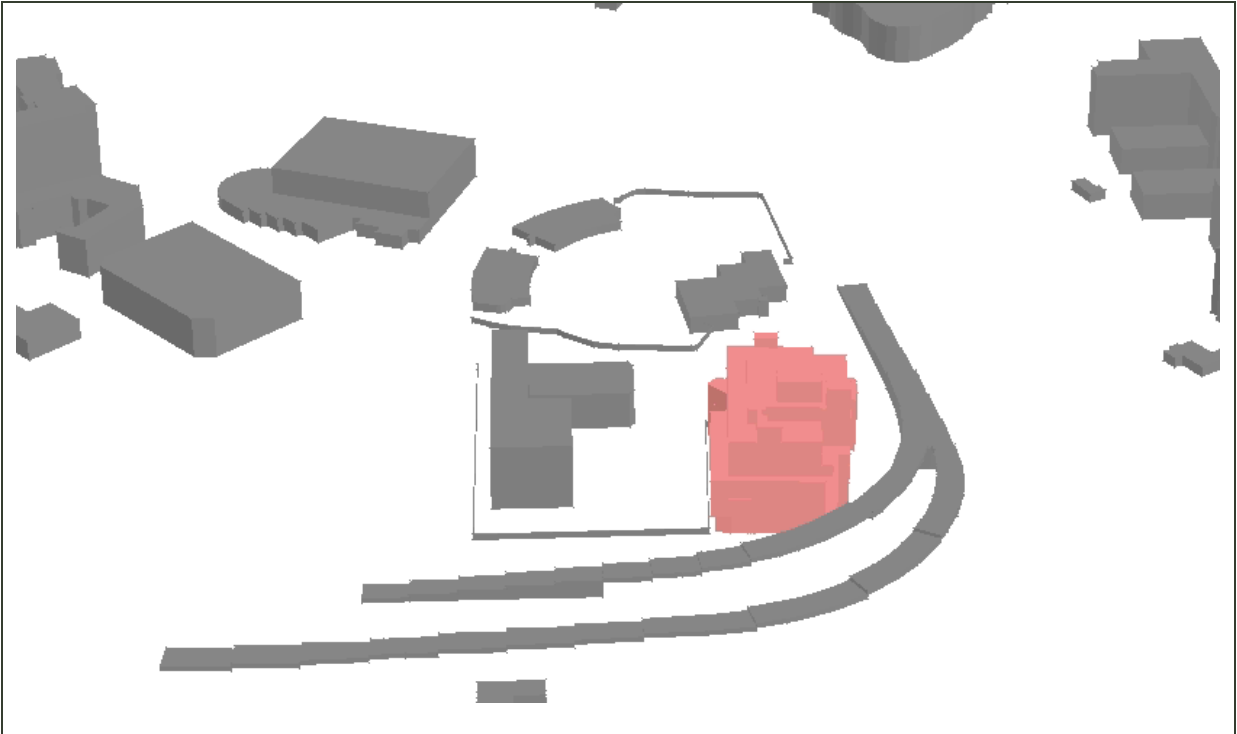


Figure 3a - Proposed Case Building Block Setting (East View)

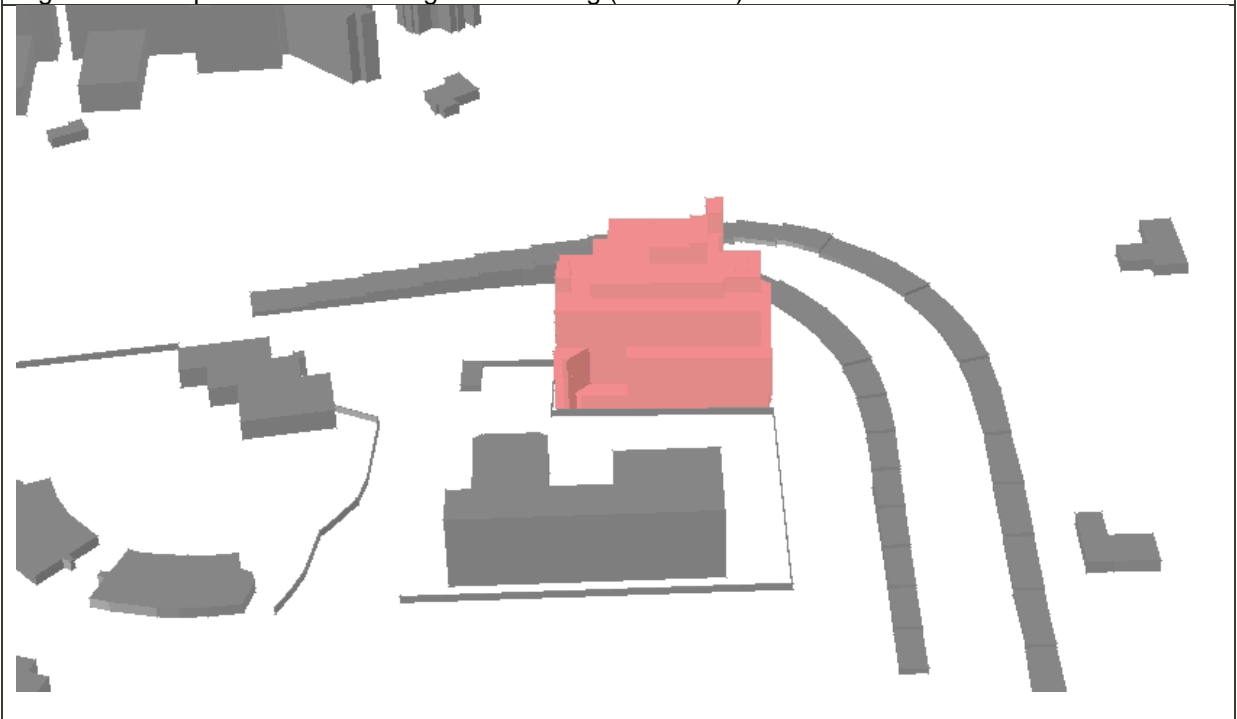


Figure 3b - Proposed Case Building Block Setting (South View)

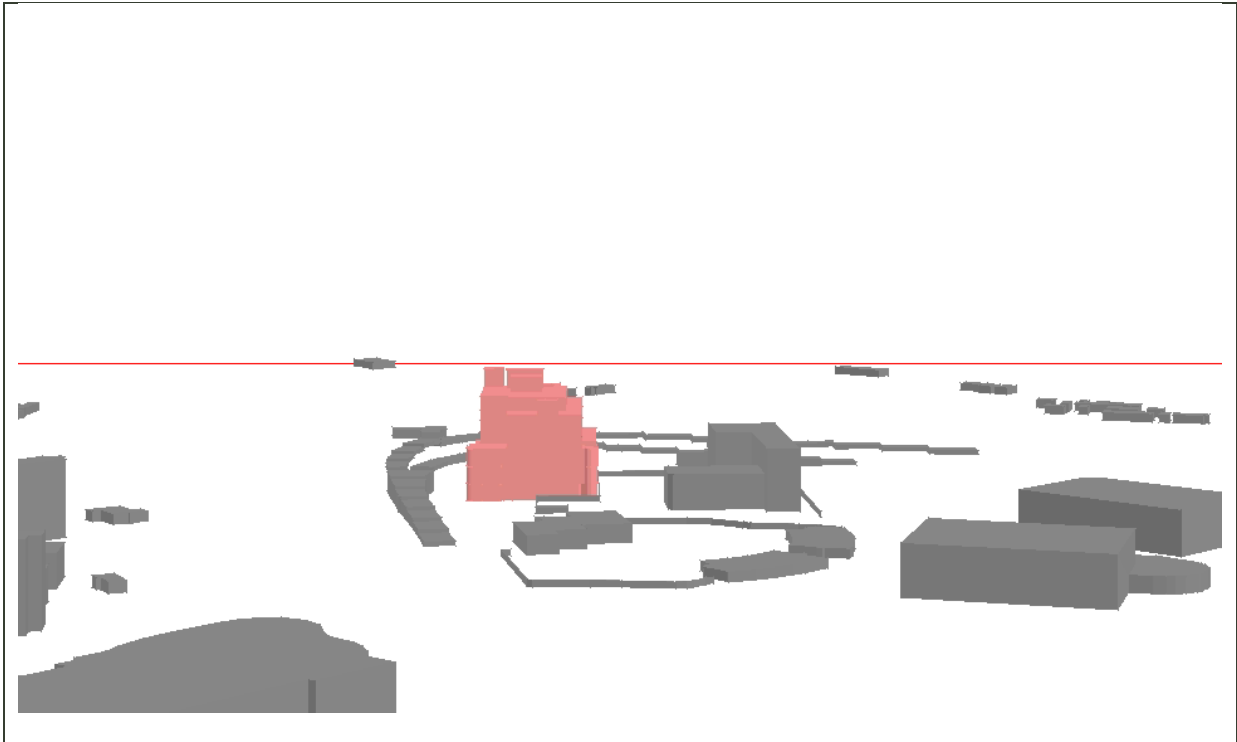


Figure 3c - Proposed Case Building Block Setting (West View)

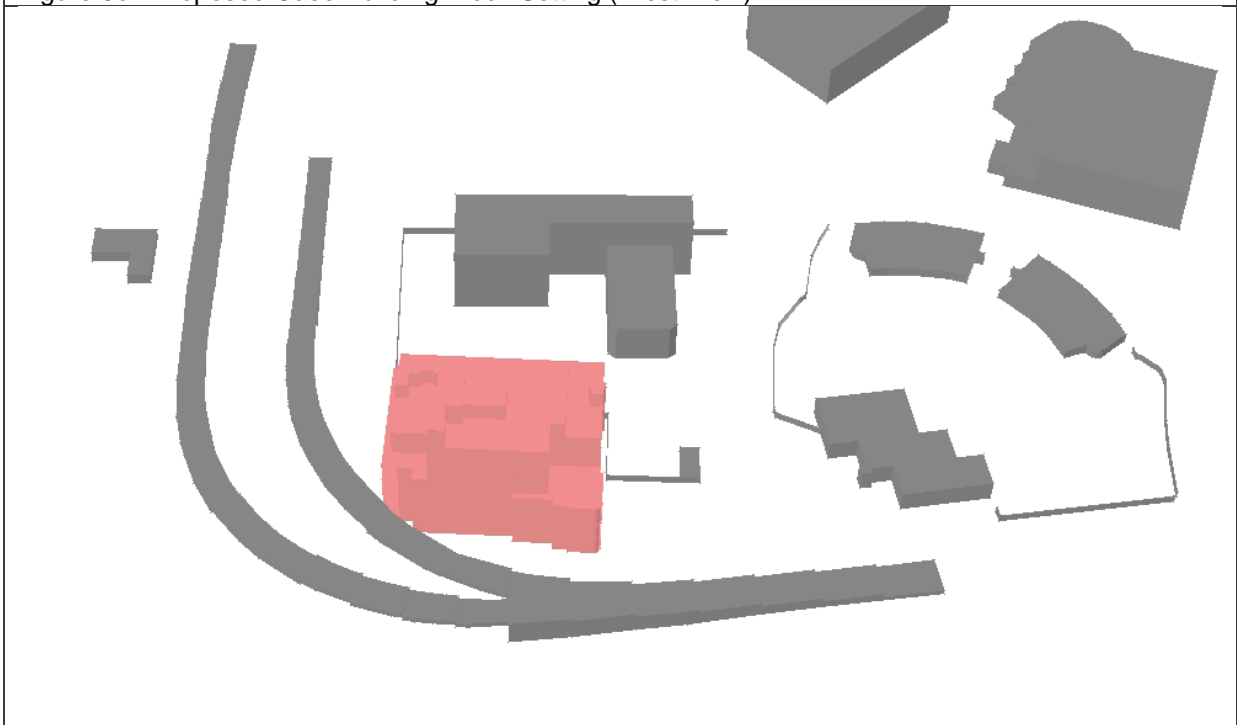


Figure 3d - Proposed Case Building Block Setting (North View)

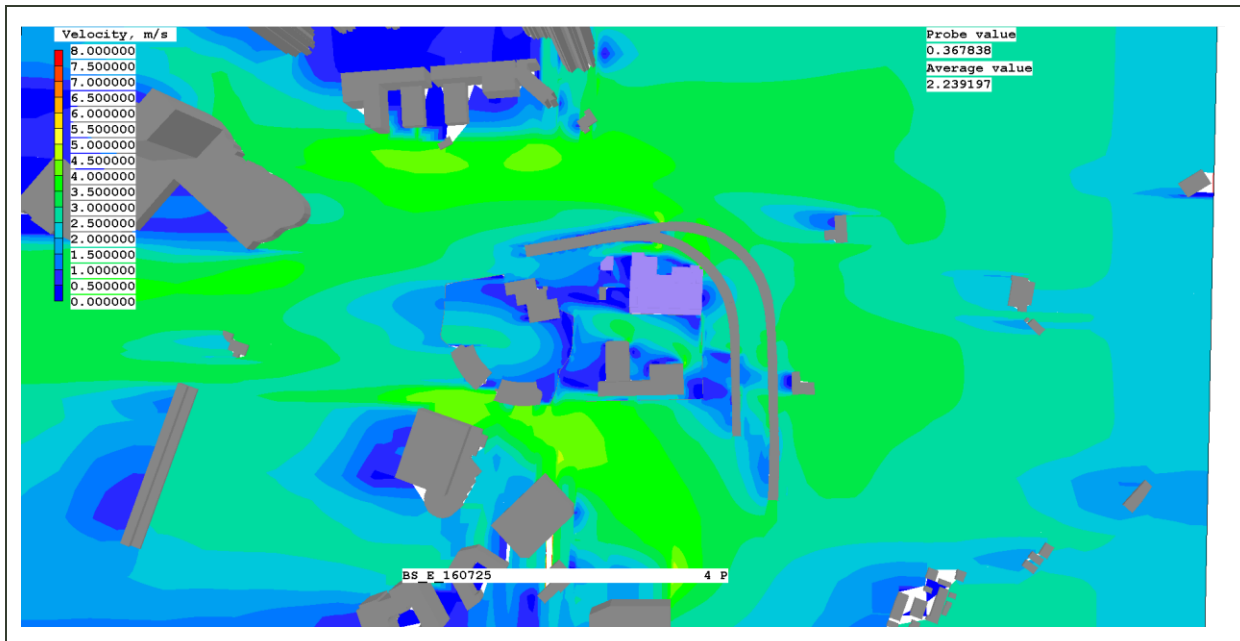
Note: Pink object is the proposed case building block and the grey objects are the building in the vicinity.



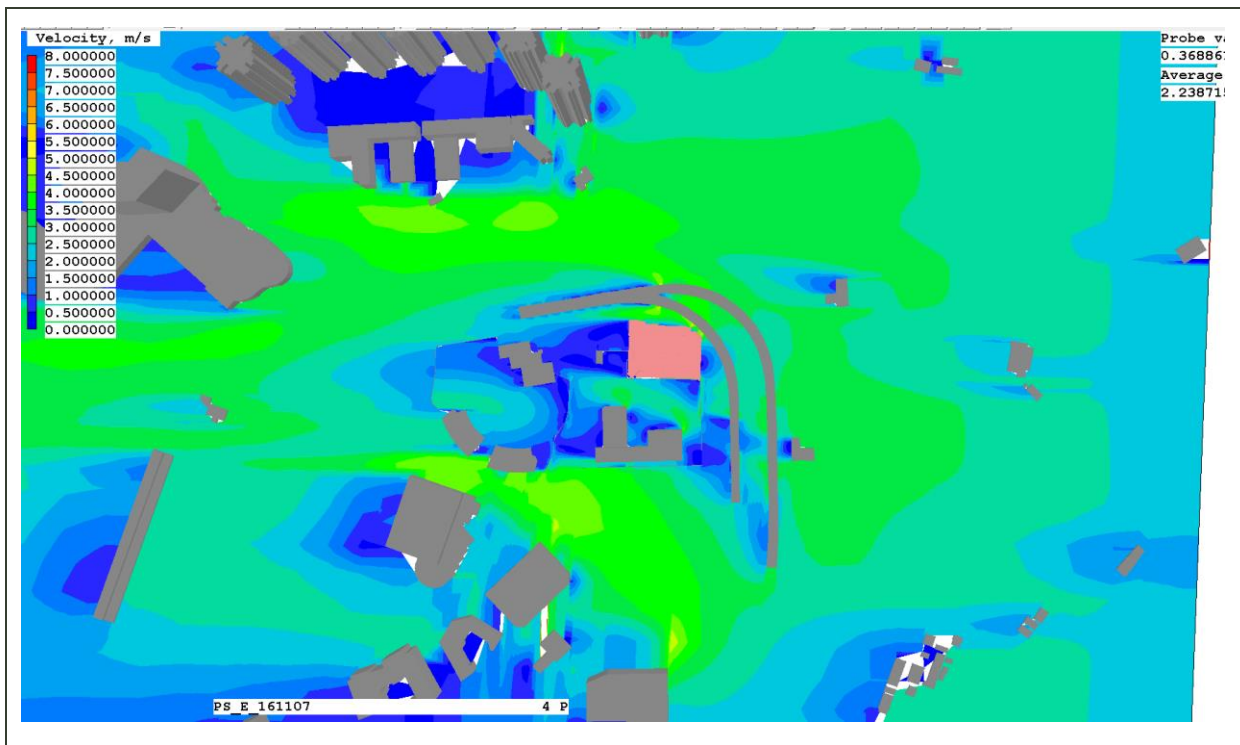
Appendix E

Vector / Wind Velocity Ratio (VR) Contour Results

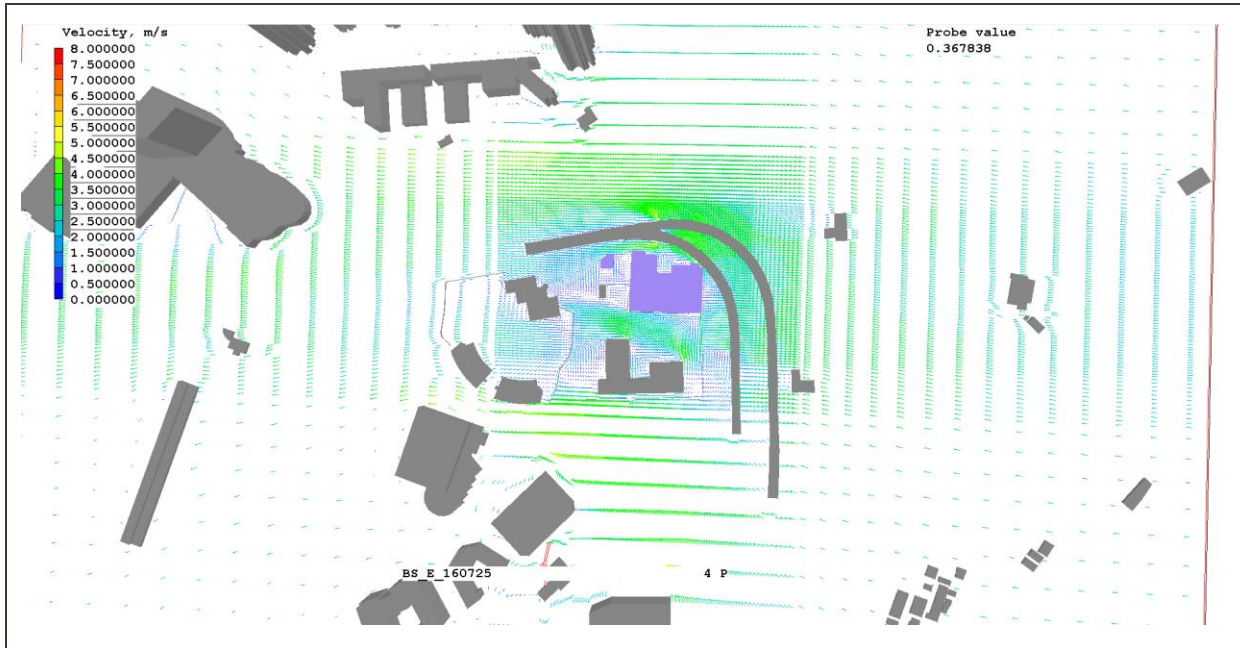
Detailed CFD Modelling Result



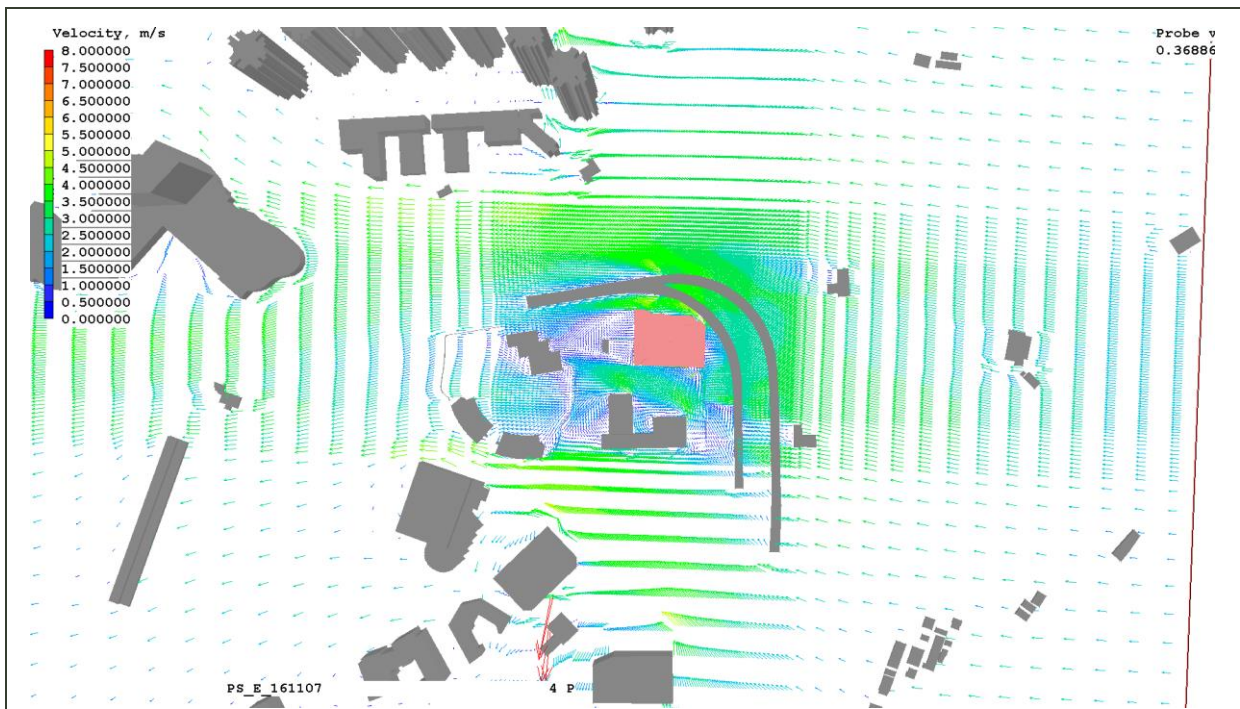
Contour Plot of Wind Velocity in Baseline Development Scenario (E)



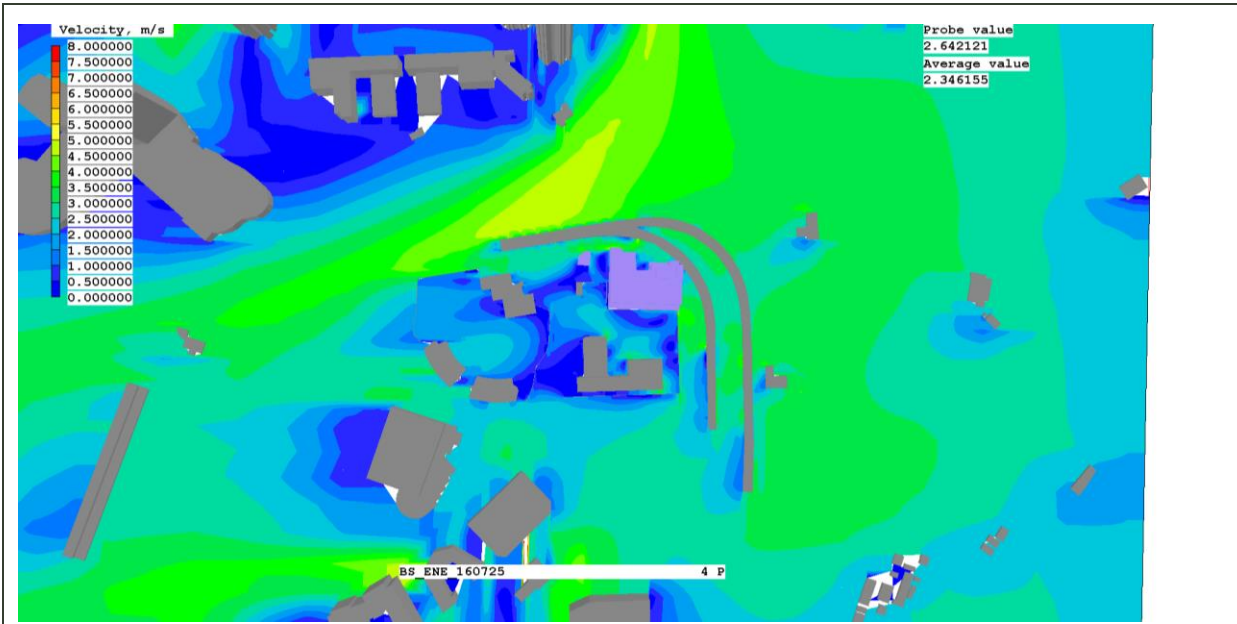
Contour Plot of Wind Velocity in Proposed Development Scenario (E)



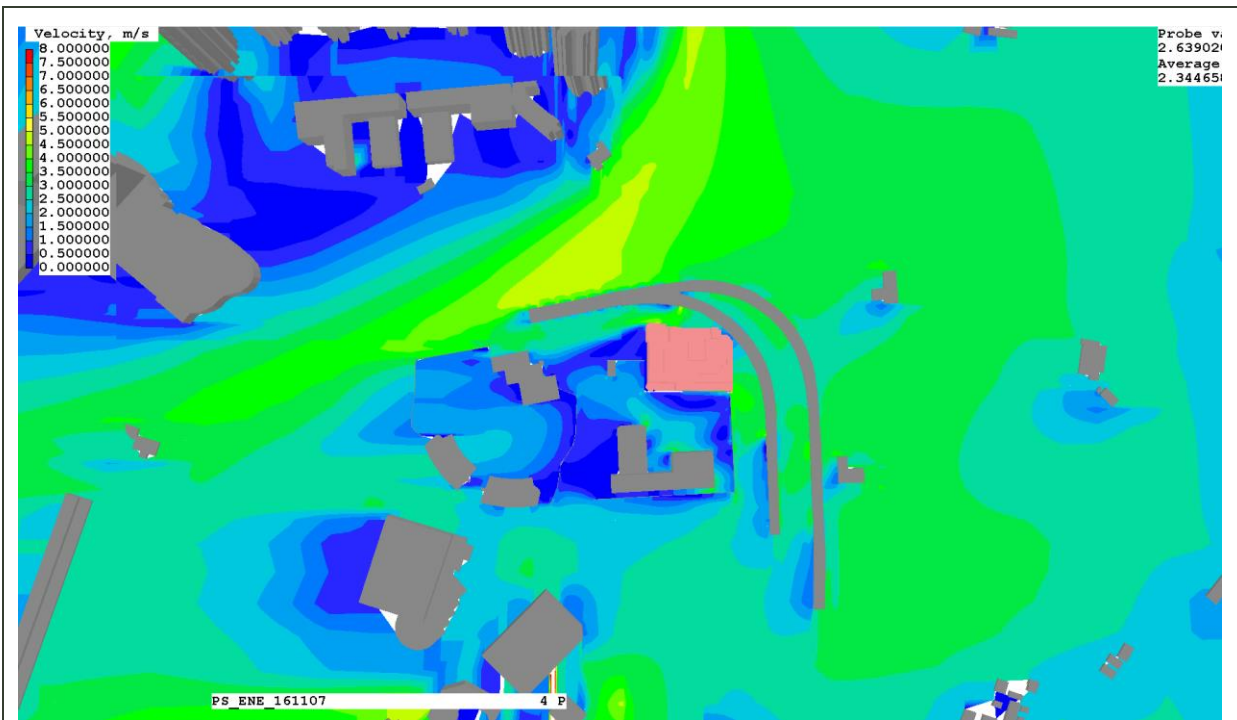
Vector Plot of Wind Velocity in Baseline Development Scenario (E)



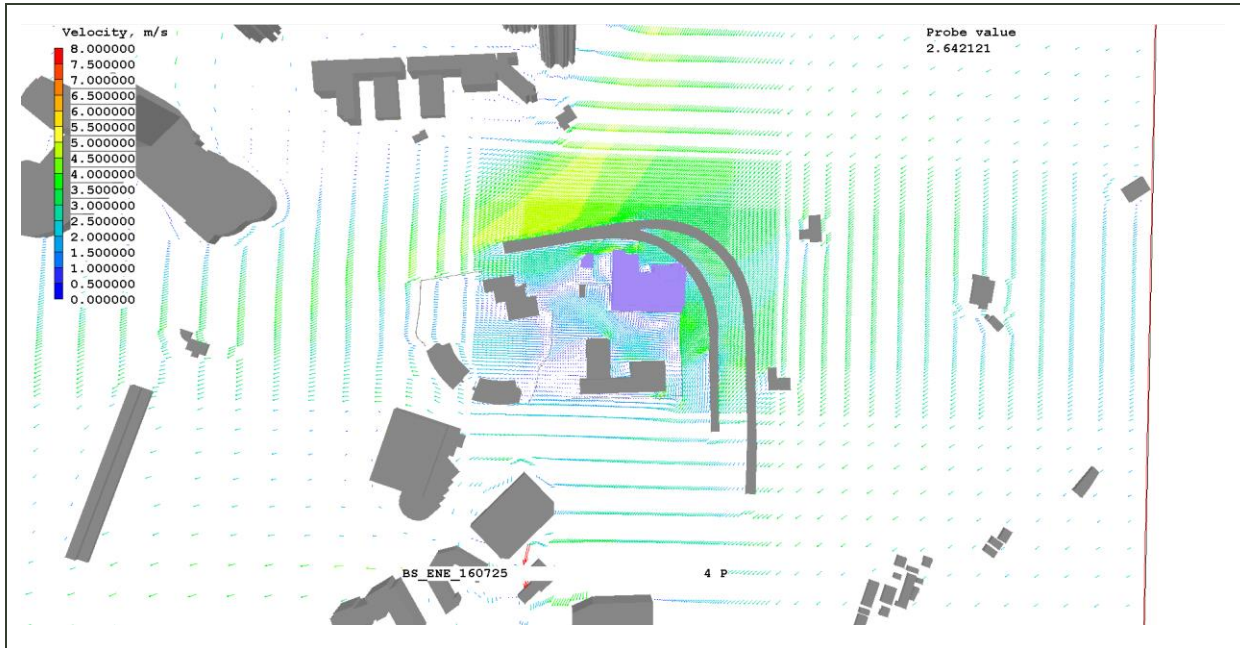
Vector Plot of Wind Velocity in Proposed Development Scenario (E)



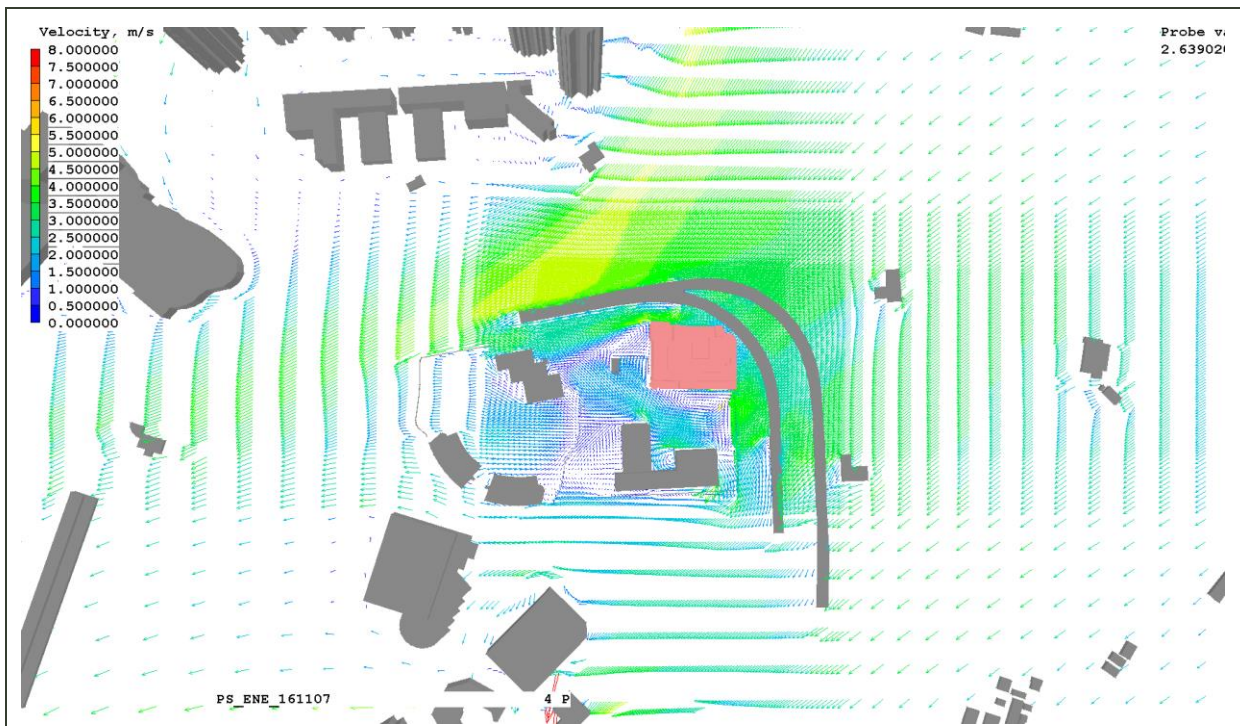
Contour Plot of Wind Velocity in Baseline Development Scenario (ENE)



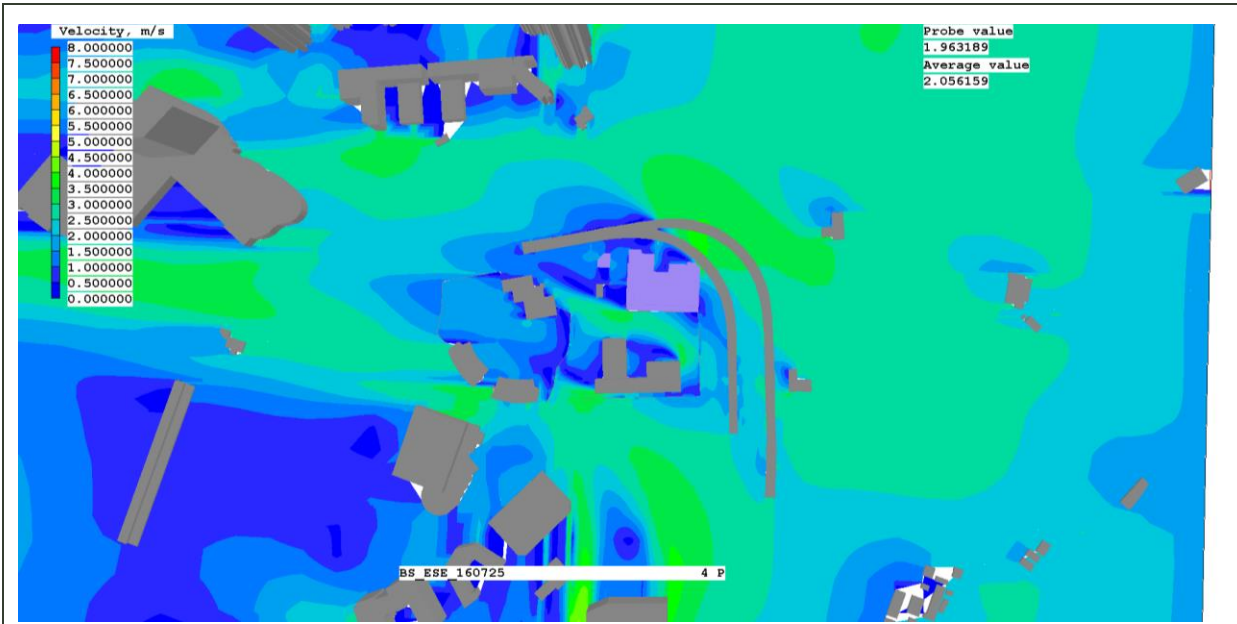
Contour Plot of Wind Velocity in Proposed Development Scenario (ENE)



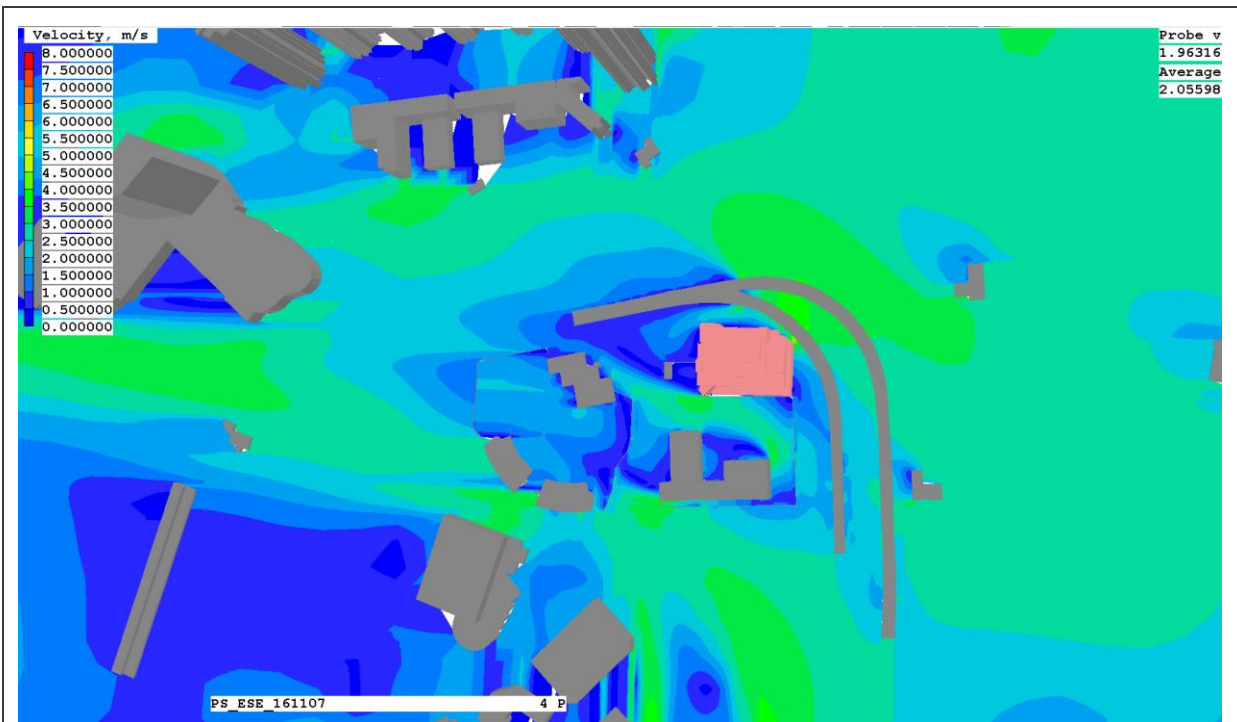
Vector Plot of Wind Velocity in Baseline Development Scenario (ENE)



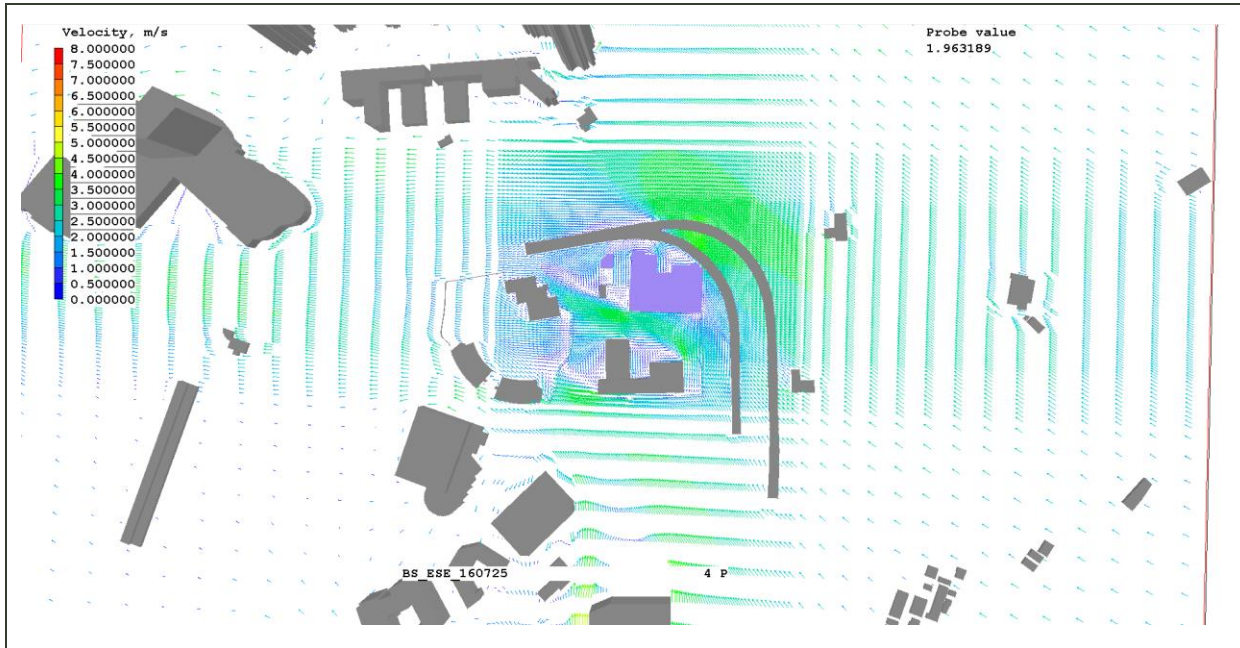
Vector Plot of Wind Velocity in Proposed Development Scenario (ENE)



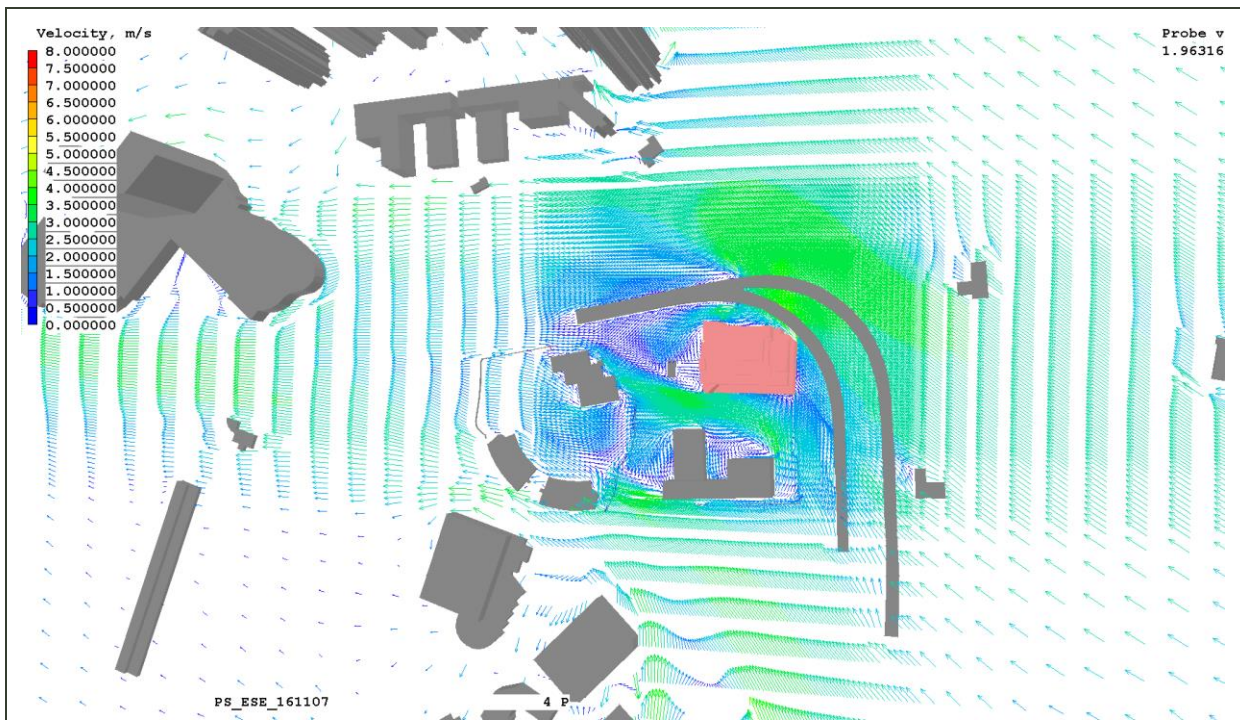
Contour Plot of Wind Velocity in Baseline Development Scenario (ESE)



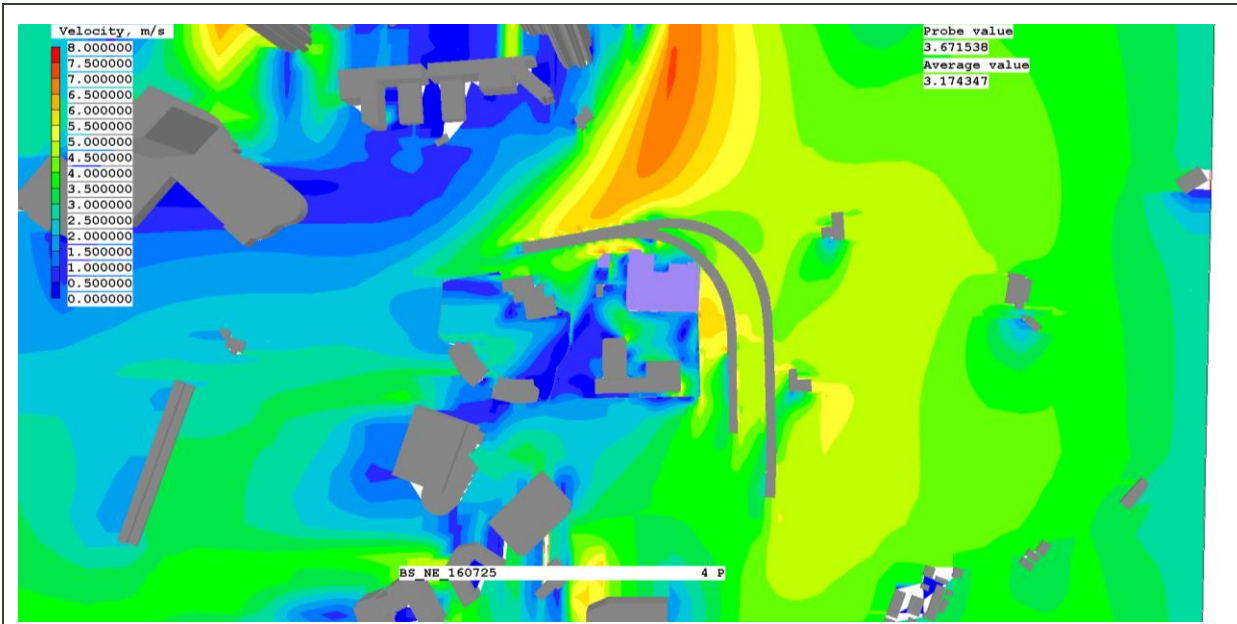
Contour Plot of Wind Velocity in Proposed Development Scenario (ESE)



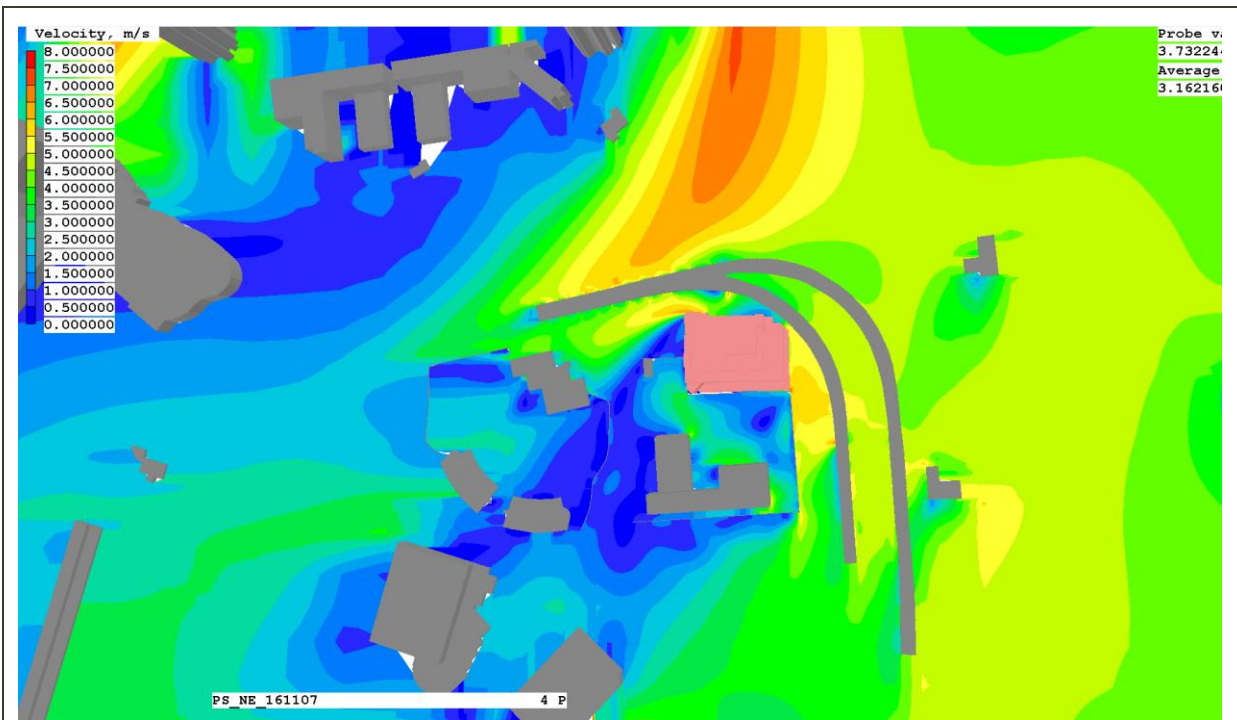
Vector Plot of Wind Velocity in Baseline Development Scenario (ESE)



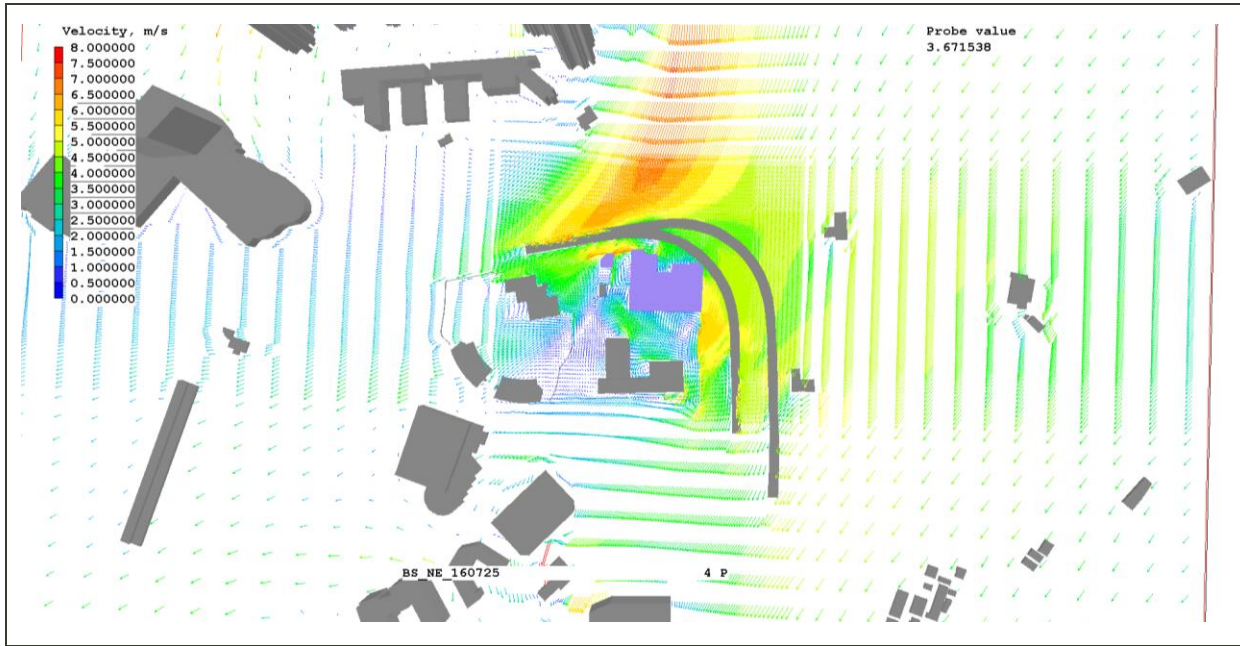
Vector Plot of Wind Velocity in Proposed Development Scenario (ESE)



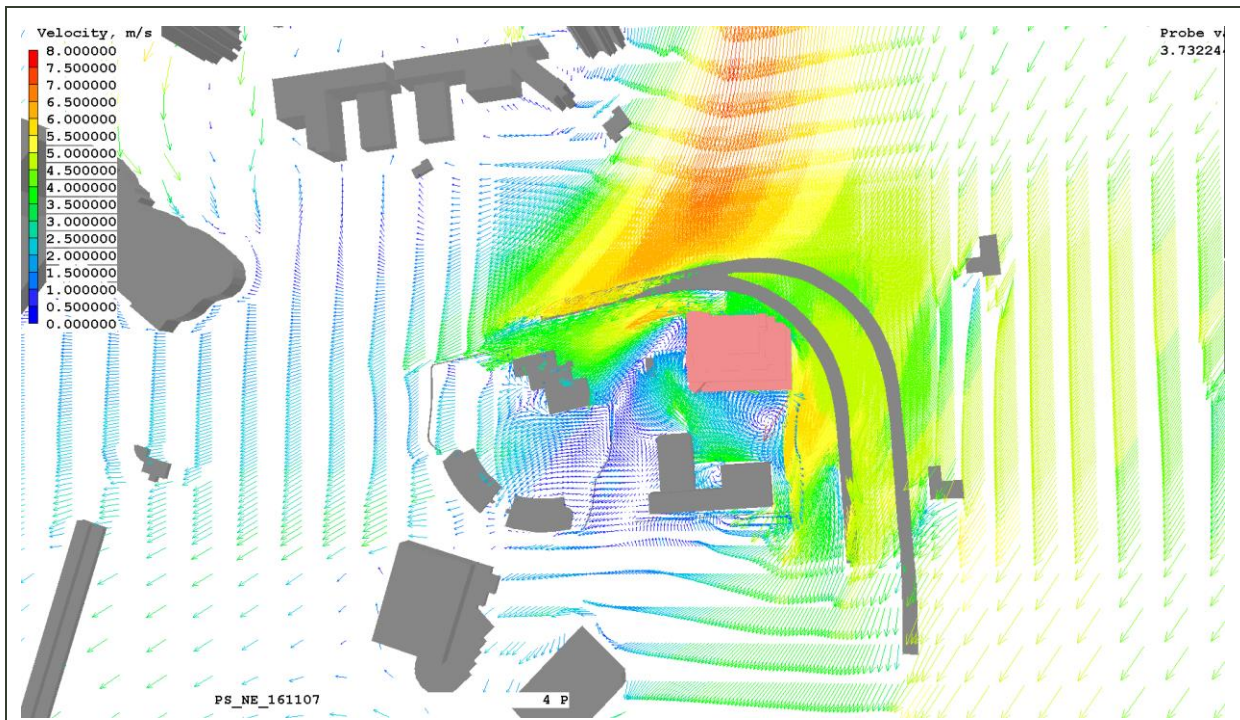
Contour Plot of Wind Velocity in Baseline Development Scenario (NE)



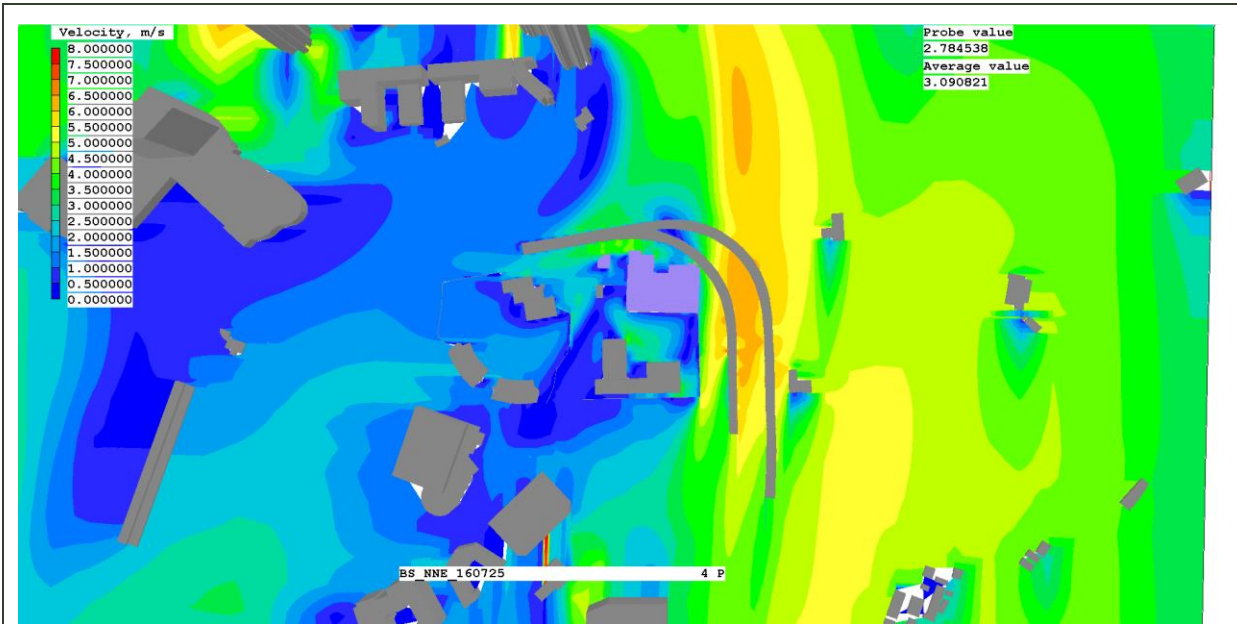
Contour Plot of Wind Velocity in Proposed Development Scenario (NE)



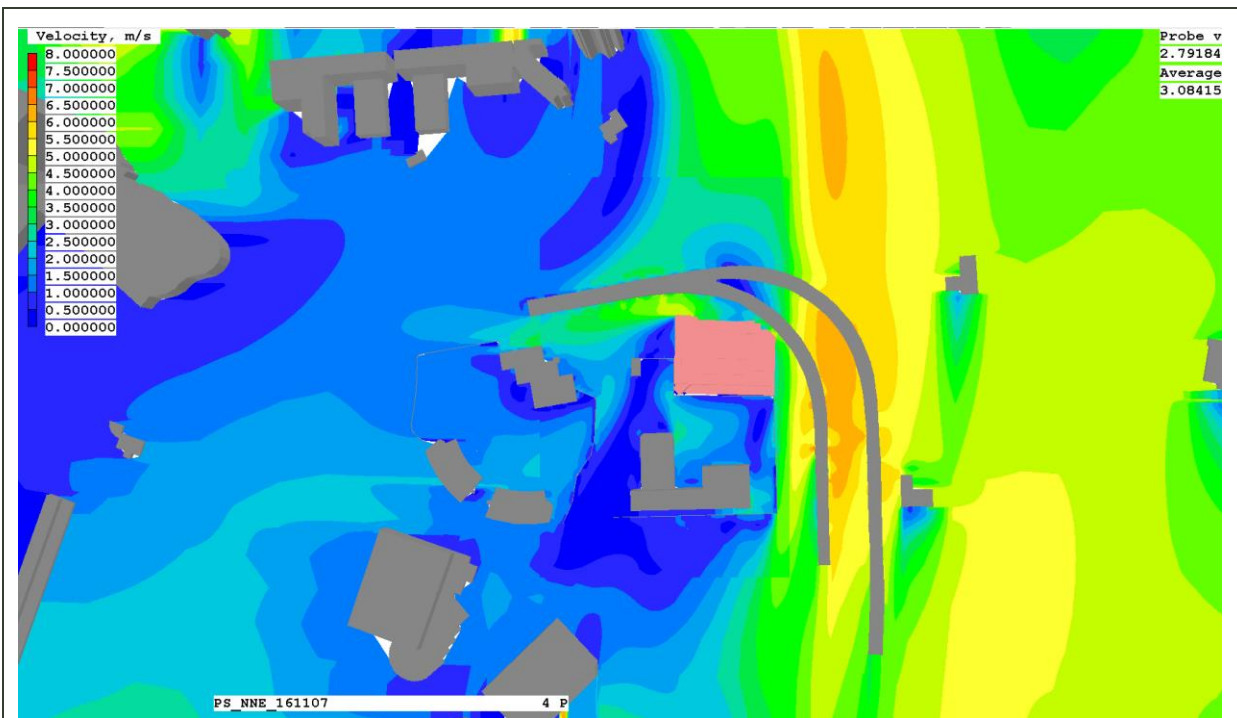
Vector Plot of Wind Velocity in Baseline Development Scenario (NE)



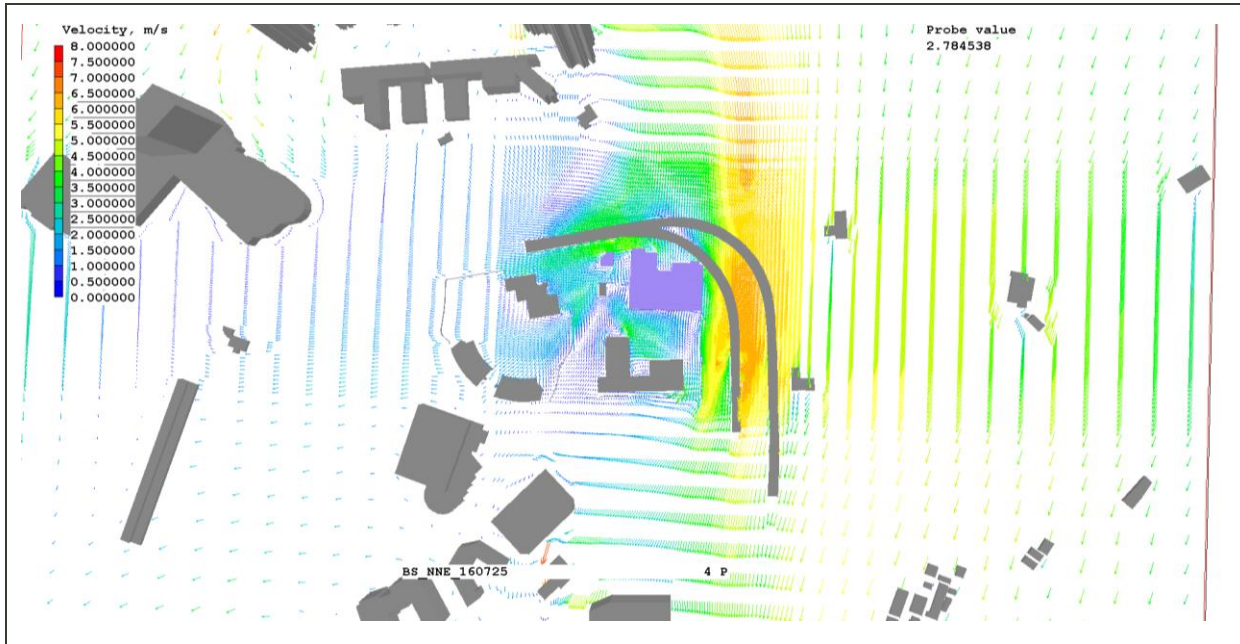
Vector Plot of Wind Velocity in Proposed Development Scenario (NE)



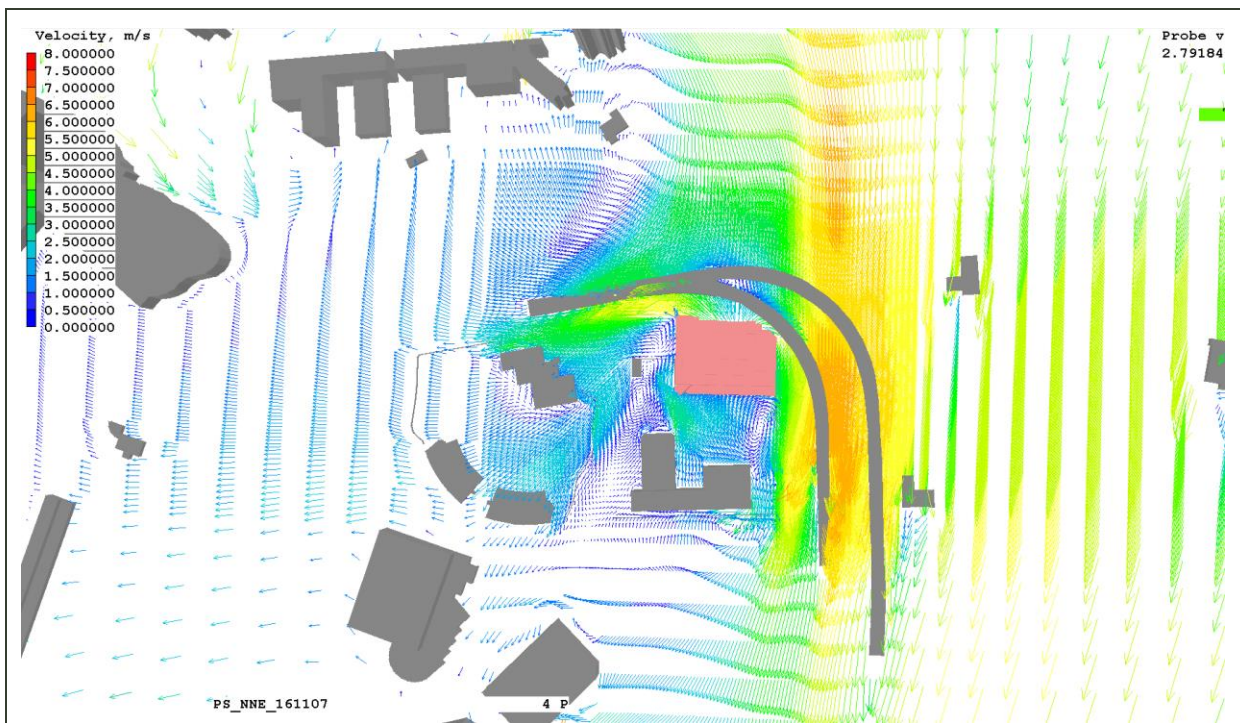
Contour Plot of Wind Velocity in Baseline Development Scenario (NNE)



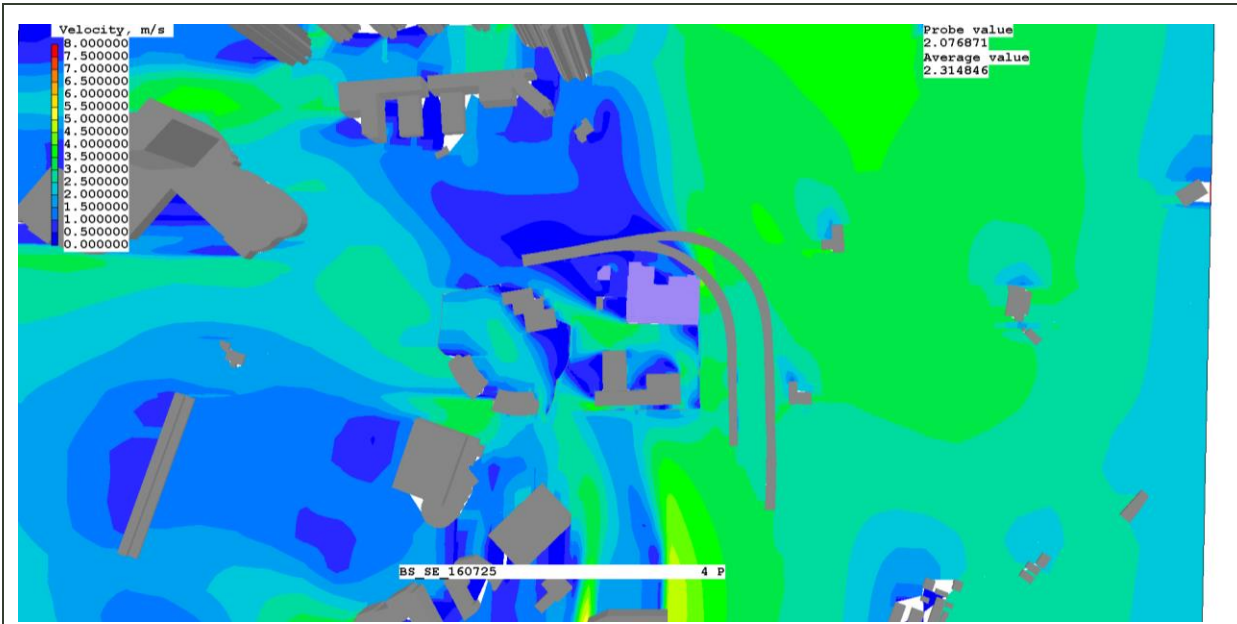
Contour Plot of Wind Velocity in Proposed Development Scenario (NNE)



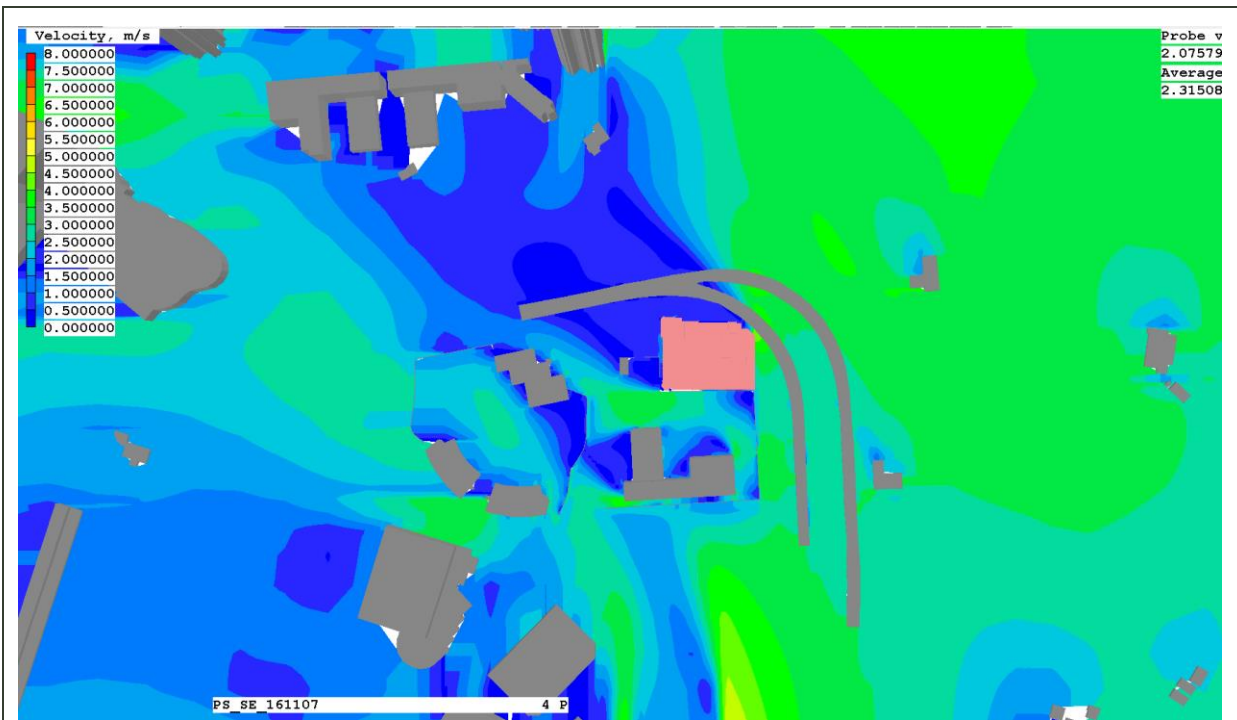
Vector Plot of Wind Velocity in Baseline Development Scenario (NNE)



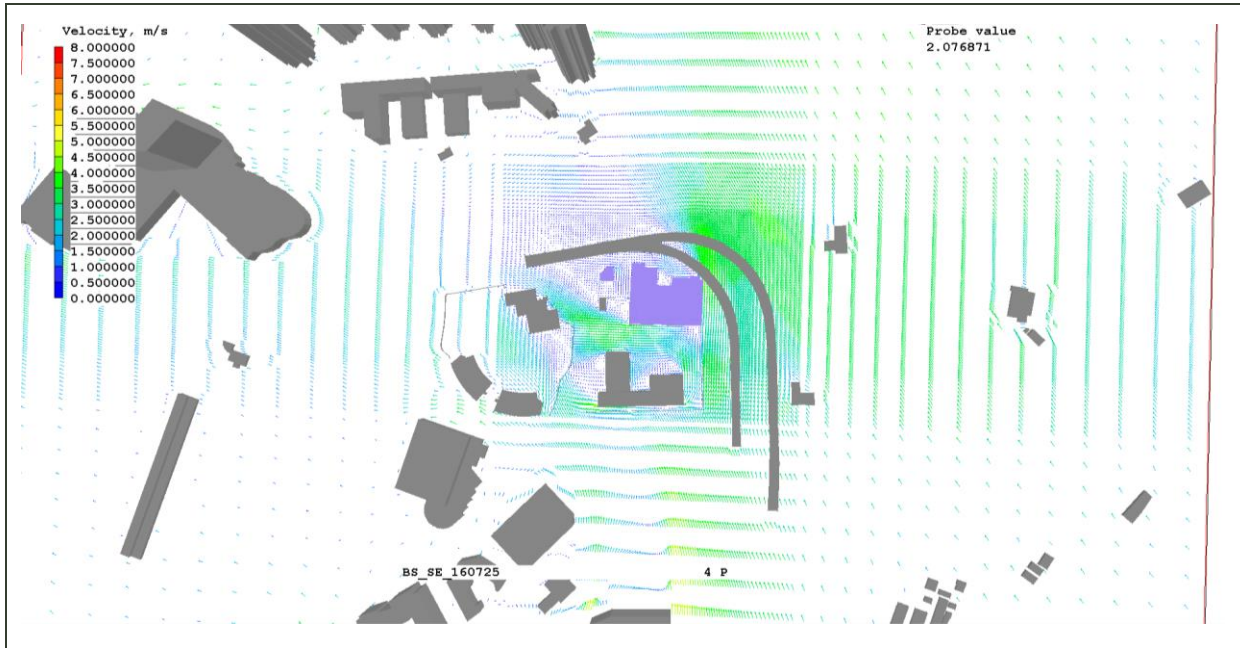
Vector Plot of Wind Velocity in Proposed Development Scenario (NNE)



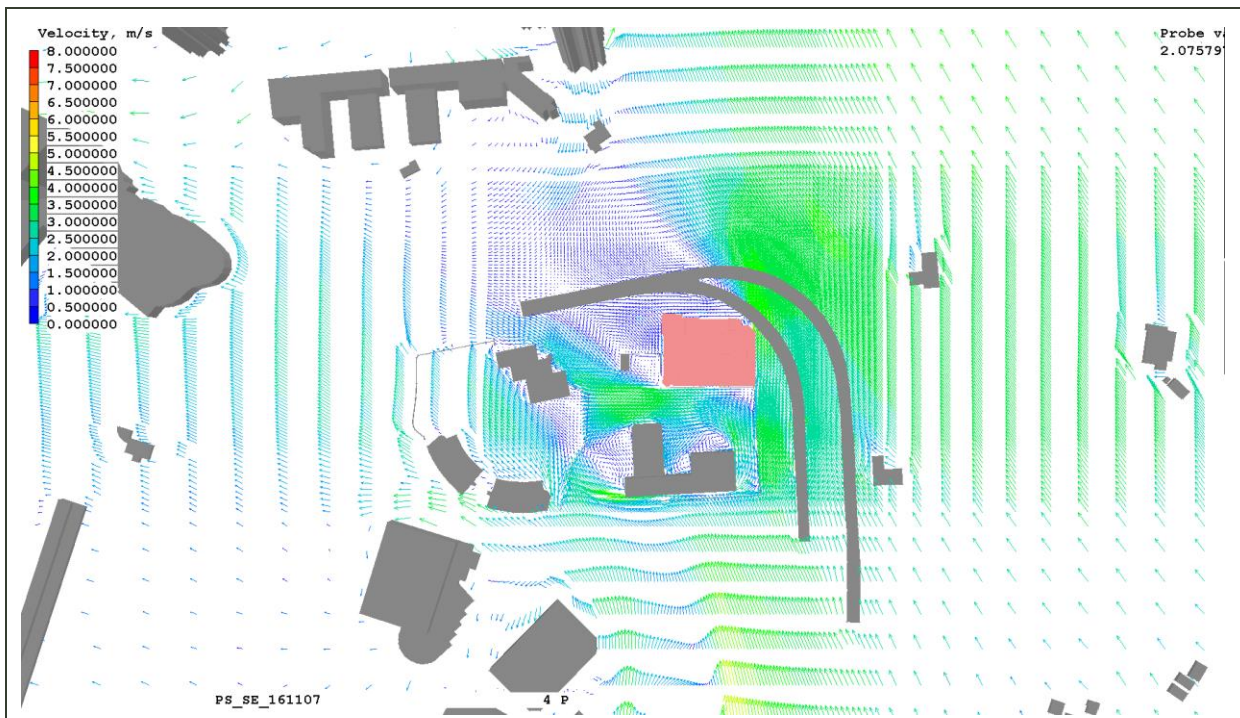
Contour Plot of Wind Velocity in Baseline Development Scenario (SE)



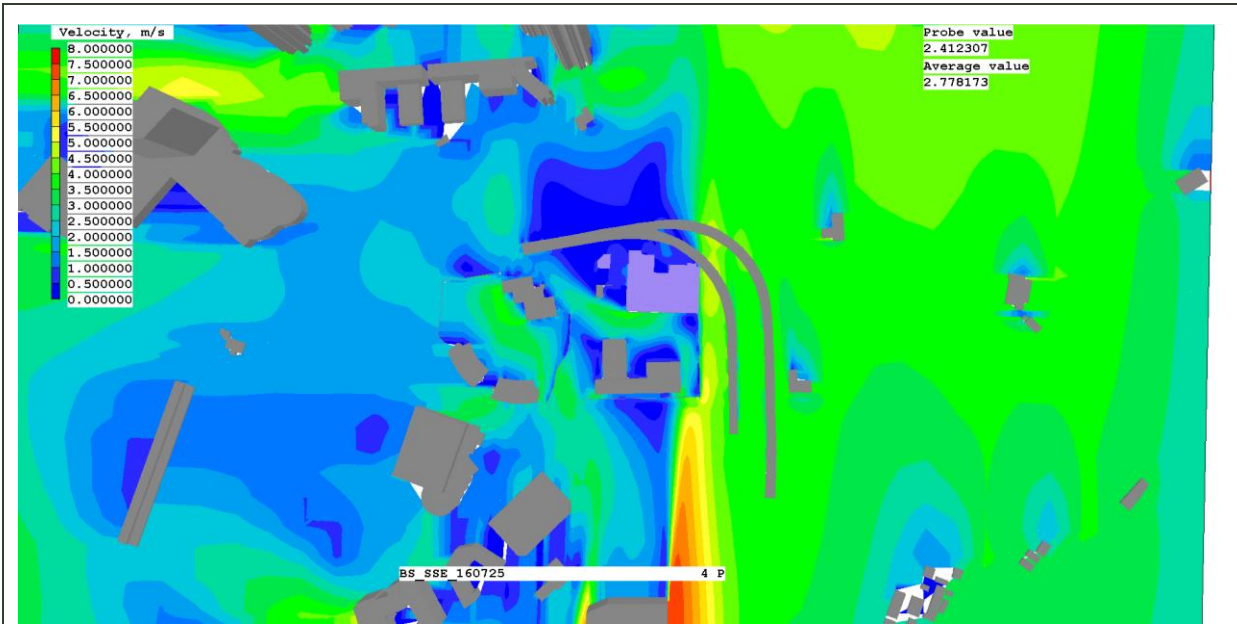
Contour Plot of Wind Velocity in Proposed Development Scenario (SE)



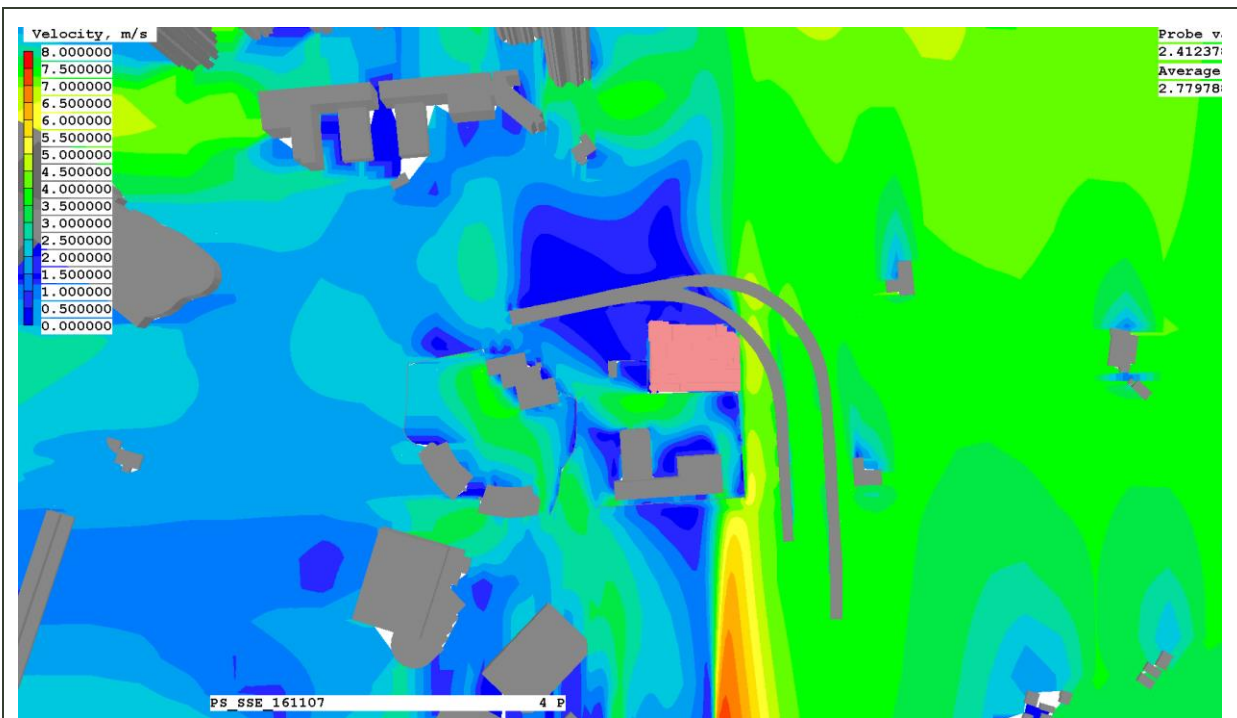
Vector Plot of Wind Velocity in Baseline Development Scenario (SE)



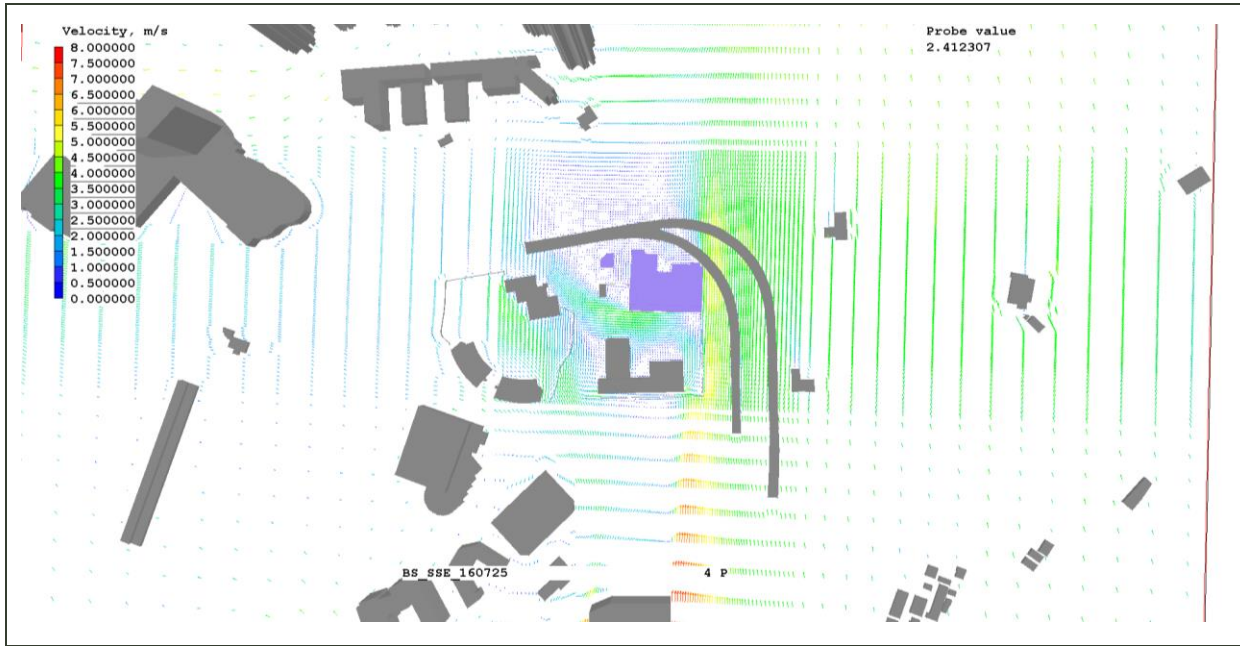
Vector Plot of Wind Velocity in Proposed Development Scenario (SE)



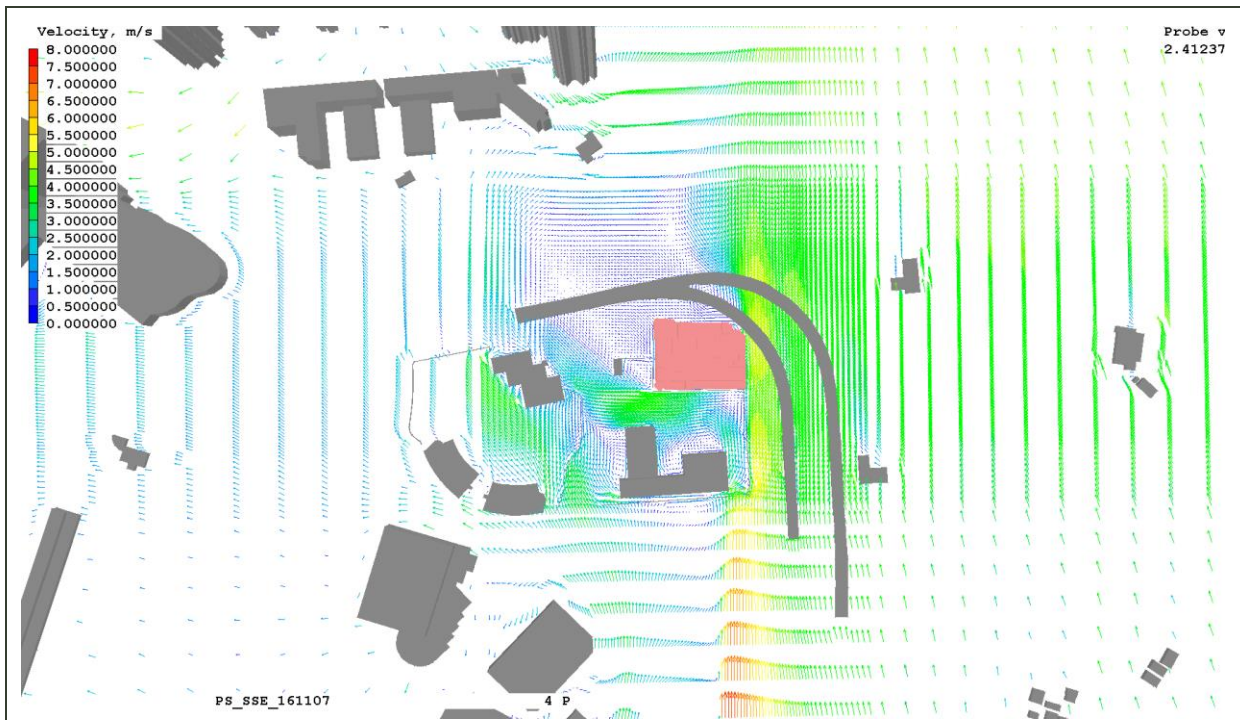
Contour Plot of Wind Velocity in Baseline Development Scenario (SSE)



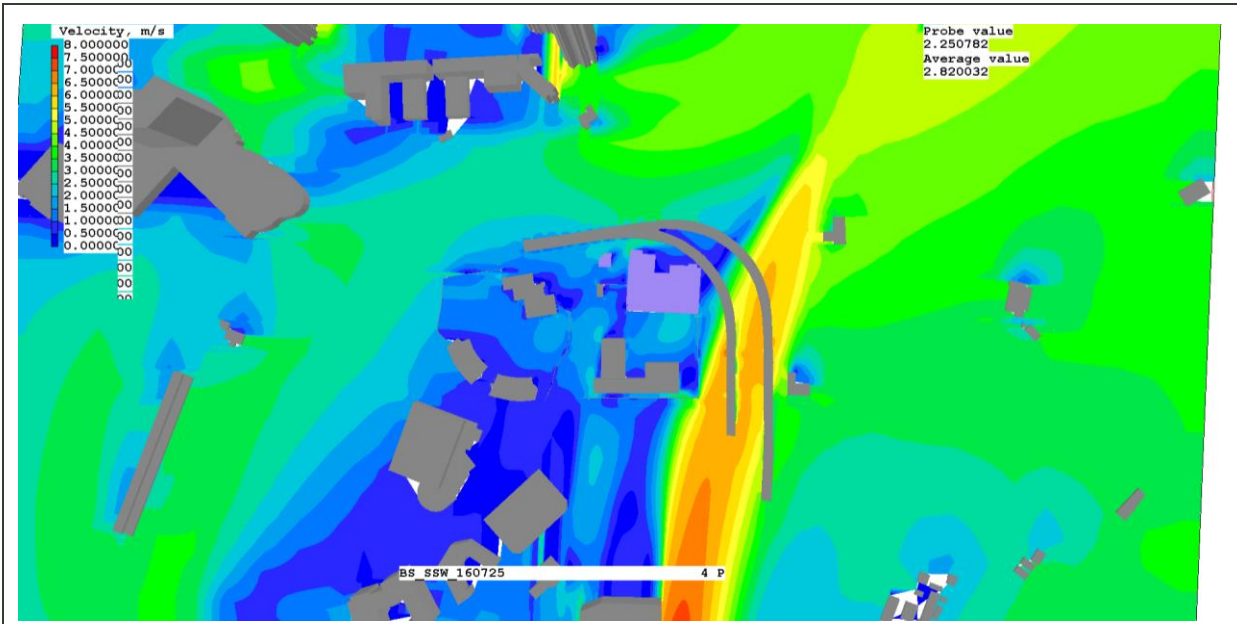
Contour Plot of Wind Velocity in Proposed Development Scenario (SSE)



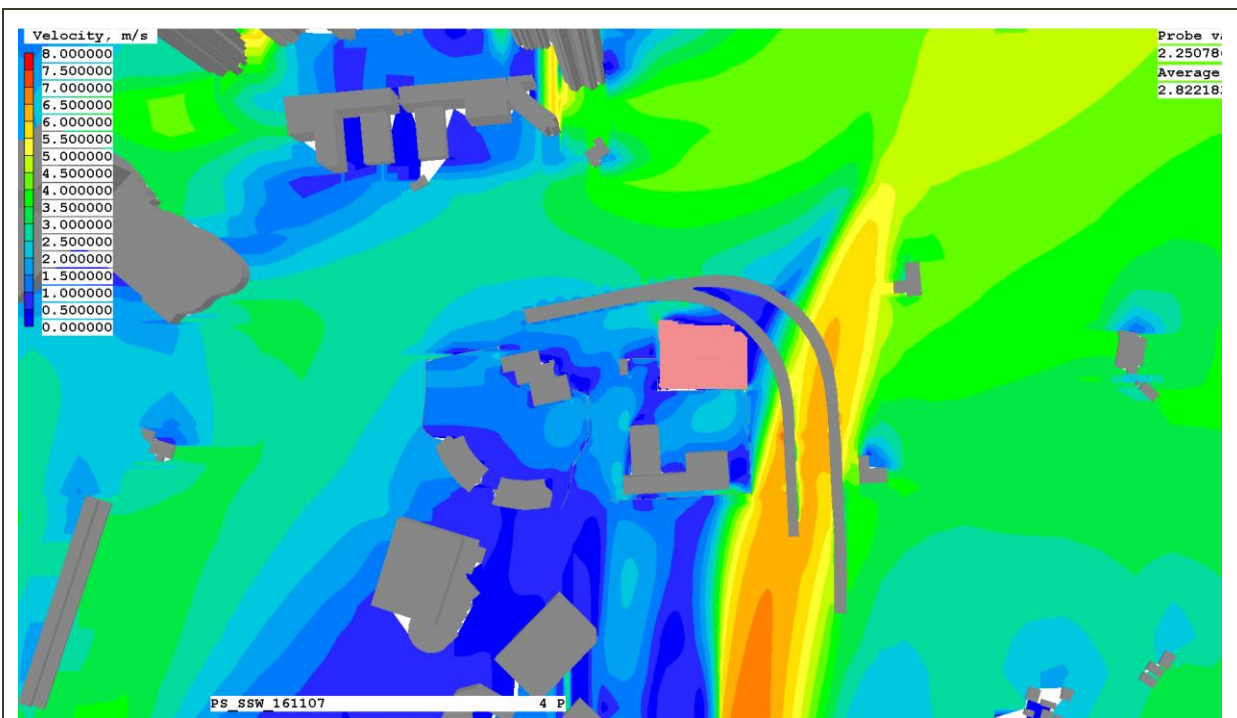
Vector Plot of Wind Velocity in Baseline Development Scenario (SSE)



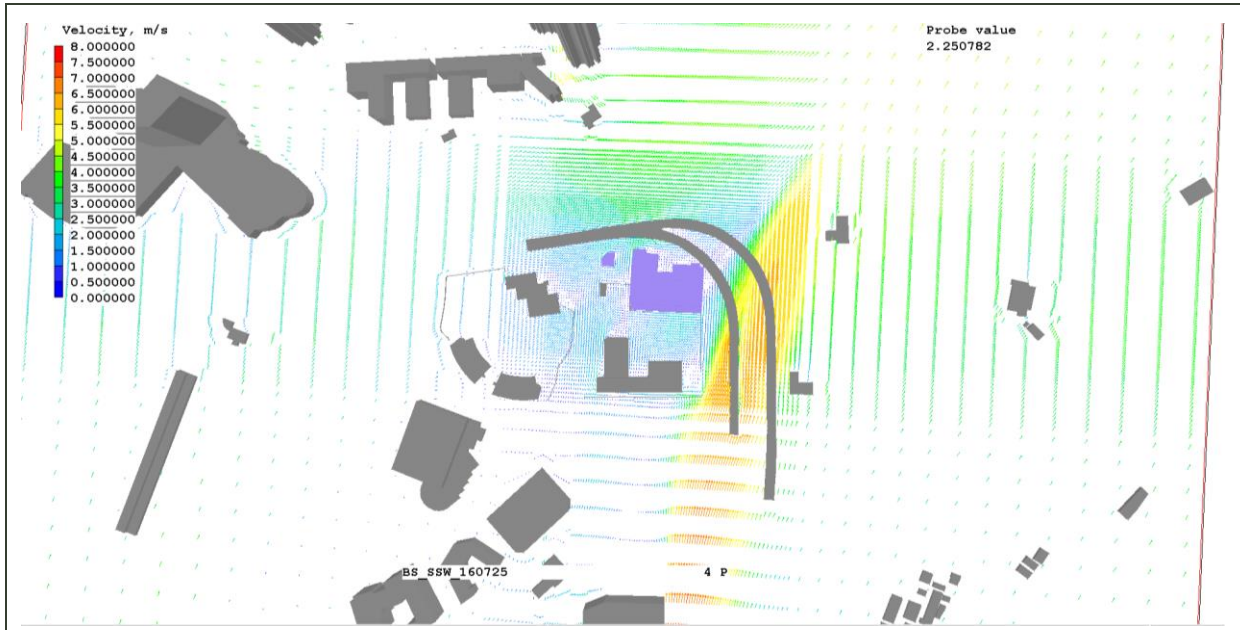
Vector Plot of Wind Velocity in Proposed Development Scenario (SSE)



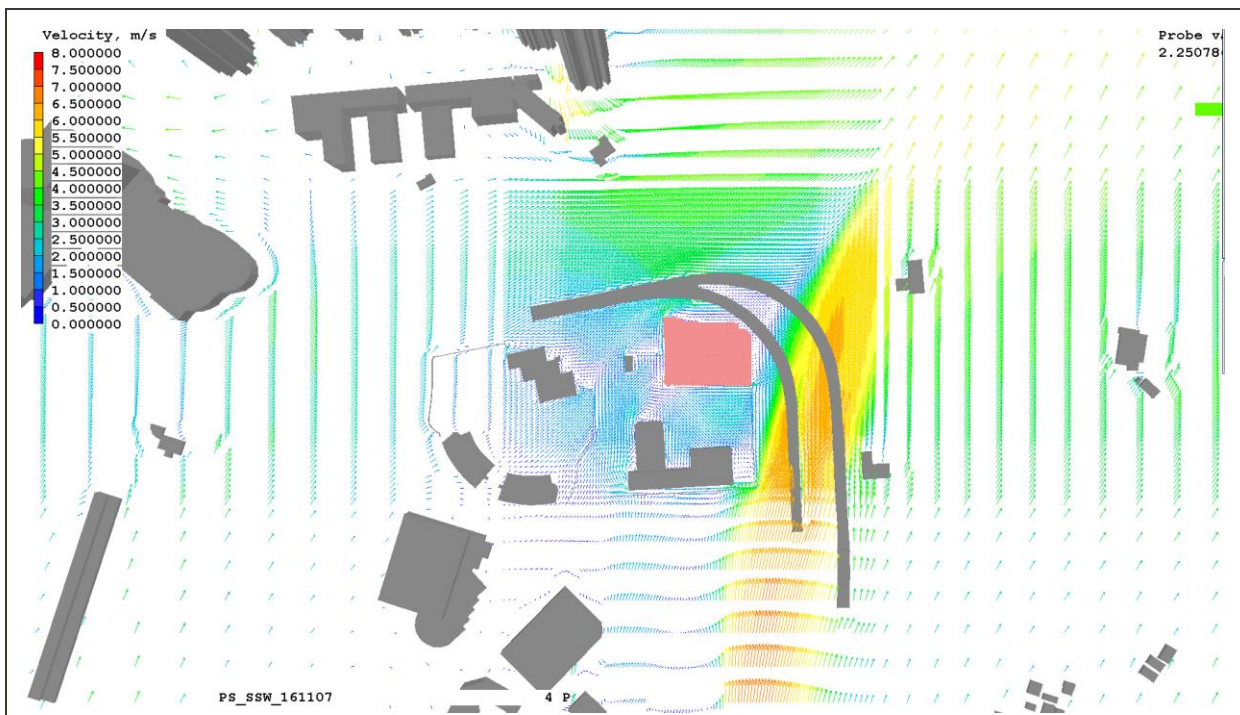
Contour Plot of Wind Velocity in Baseline Development Scenario (SSW)



Contour Plot of Wind Velocity in Proposed Development Scenario (SSW)



Vector Plot of Wind Velocity in Baseline Development Scenario (SSW)



Vector Plot of Wind Velocity in Proposed Development Scenario (SSW)



Appendix F

Detailed Wind Velocity Ratio (VR) Results for Tested Wind Directions

**New Territories West Regional Office & Water Resources Education Centre at Tin Shui Wai,
New Territories – Air Ventilation Assessment (AVA)
Appendix F – Predicted Wind Velocity Ratio (VR) Results under the Prevailing Wind Directions**

Test Point ⁽¹⁾	Wind Velocity Ratio (VR) at Wind Direction for Baseline Scheme ⁽²⁾								
	E	NE	ESE	ENE	SSW	SE	SSE	NNE	Overall
P1	0.178	0.236	0.187	0.092	0.223	0.054	0.015	0.335	0.130
P2	0.192	0.210	0.212	0.123	0.219	0.100	0.041	0.284	0.137
P3	0.196	0.264	0.235	0.188	0.213	0.140	0.067	0.196	0.150
P4	0.194	0.338	0.253	0.252	0.213	0.123	0.067	0.117	0.159
P5	0.172	0.350	0.251	0.268	0.271	0.110	0.086	0.111	0.163
P6	0.189	0.438	0.214	0.340	0.239	0.059	0.038	0.253	0.178
P7	0.392	0.897	0.205	0.708	0.344	0.149	0.060	0.566	0.334
P8	0.433	0.812	0.160	0.625	0.330	0.150	0.080	0.565	0.319
P9	0.414	0.761	0.183	0.632	0.246	0.158	0.110	0.523	0.306
P10	0.413	0.823	0.209	0.705	0.265	0.142	0.107	0.556	0.325
P11	0.527	0.832	0.192	0.677	0.365	0.097	0.077	0.593	0.345
P12	0.532	0.870	0.214	0.725	0.495	0.075	0.053	0.610	0.366
P13	0.545	0.820	0.178	0.743	0.312	0.102	0.058	0.589	0.346
P14	0.542	0.751	0.169	0.734	0.162	0.137	0.076	0.558	0.325
P15	0.379	0.524	0.154	0.627	0.072	0.182	0.089	0.356	0.245
P16	0.402	0.472	0.171	0.639	0.042	0.204	0.109	0.387	0.248
P17	0.365	0.445	0.284	0.560	0.099	0.207	0.123	0.488	0.257
P18	0.188	0.421	0.243	0.470	0.123	0.230	0.149	0.434	0.215
P19	0.137	0.400	0.140	0.464	0.131	0.229	0.156	0.381	0.191
P20	0.163	0.379	0.114	0.473	0.135	0.226	0.158	0.323	0.187
P21	0.290	0.349	0.096	0.480	0.138	0.210	0.148	0.286	0.199
P22	0.432	0.324	0.055	0.490	0.134	0.163	0.120	0.310	0.211
P23	0.624	0.366	0.390	0.481	0.141	0.080	0.090	0.334	0.273
P24	0.171	0.088	0.015	0.204	0.262	0.055	0.063	0.027	0.092
P25	0.066	0.251	0.109	0.345	0.331	0.101	0.144	0.149	0.139
P26	0.091	0.270	0.175	0.341	0.357	0.163	0.168	0.143	0.160
P27	0.123	0.263	0.261	0.355	0.356	0.269	0.279	0.111	0.189
P28	0.163	0.239	0.311	0.349	0.343	0.330	0.351	0.100	0.205
P29	0.218	0.195	0.376	0.306	0.316	0.404	0.434	0.099	0.221
P30	0.250	0.170	0.412	0.259	0.293	0.441	0.473	0.101	0.226
P31	0.291	0.151	0.455	0.173	0.253	0.483	0.513	0.104	0.230
P32	0.317	0.153	0.480	0.113	0.225	0.507	0.532	0.106	0.232
P33	0.357	0.176	0.515	0.063	0.184	0.539	0.553	0.117	0.241
P34	0.386	0.209	0.542	0.115	0.164	0.563	0.565	0.135	0.259
P35	0.449	0.366	0.616	0.293	0.164	0.625	0.605	0.246	0.327
P36	0.466	0.594	0.656	0.500	0.182	0.663	0.638	0.411	0.396
P37	0.094	0.278	0.127	0.237	0.020	0.172	0.167	0.185	0.121
P38	0.113	0.147	0.057	0.185	0.089	0.048	0.045	0.069	0.077
P39	0.085	0.081	0.023	0.118	0.122	0.024	0.022	0.044	0.053
P40	0.028	0.101	0.045	0.068	0.137	0.031	0.010	0.070	0.047
P41	0.012	0.165	0.080	0.059	0.169	0.054	0.050	0.116	0.064
P42	0.036	0.226	0.113	0.156	0.149	0.071	0.088	0.142	0.091
P43	0.081	0.144	0.120	0.178	0.149	0.100	0.117	0.075	0.092
P44	0.085	0.073	0.096	0.214	0.109	0.098	0.110	0.045	0.080
P45	0.134	0.205	0.157	0.044	0.268	0.045	0.036	0.300	0.115
O46	0.421	0.770	0.318	0.852	0.361	0.043	0.027	0.243	0.318

Test Point ⁽¹⁾	Wind Velocity Ratio (VR) at Wind Direction for Baseline Scheme ⁽²⁾								
	E	NE	ESE	ENE	SSW	SE	SSE	NNE	Overall
O47	0.431	0.812	0.276	0.851	0.376	0.065	0.015	0.322	0.327
O48	0.444	0.842	0.238	0.851	0.396	0.084	0.036	0.398	0.339
O49	0.446	0.853	0.198	0.835	0.415	0.102	0.051	0.459	0.344
O50	0.442	0.864	0.196	0.824	0.441	0.115	0.059	0.487	0.349
O51	0.430	0.863	0.214	0.812	0.461	0.120	0.064	0.487	0.350
O52	0.419	0.820	0.210	0.785	0.487	0.103	0.068	0.457	0.340
O53	0.528	0.761	0.229	0.752	0.494	0.071	0.069	0.408	0.344
O54	0.658	0.729	0.438	0.729	0.498	0.064	0.061	0.366	0.377
O55	0.670	0.710	0.603	0.672	0.482	0.209	0.046	0.294	0.392
O56	0.623	0.734	0.624	0.649	0.466	0.329	0.113	0.294	0.400
O57	0.598	0.739	0.630	0.650	0.449	0.468	0.241	0.346	0.420
O58	0.300	0.589	0.241	0.506	0.266	0.052	0.116	0.422	0.250
O59	0.269	0.597	0.251	0.483	0.280	0.058	0.045	0.373	0.238
O60	0.192	0.478	0.105	0.235	0.223	0.151	0.195	0.316	0.183
O61	0.060	0.422	0.312	0.152	0.129	0.424	0.410	0.359	0.201
O62	0.352	0.330	0.519	0.312	0.158	0.547	0.409	0.365	0.287
O63	0.336	0.215	0.393	0.291	0.237	0.426	0.257	0.331	0.241
O64	0.262	0.039	0.328	0.232	0.257	0.387	0.189	0.134	0.178
O65	0.237	0.094	0.331	0.188	0.257	0.201	0.277	0.047	0.161
O66	0.171	0.078	0.171	0.153	0.174	0.140	0.317	0.031	0.119
O67	0.109	0.172	0.034	0.161	0.198	0.151	0.157	0.267	0.114
O68	0.307	0.154	0.530	0.348	0.230	0.562	0.503	0.119	0.262
O69	0.464	0.116	0.516	0.349	0.279	0.565	0.409	0.033	0.273
O70	0.267	0.105	0.345	0.210	0.312	0.445	0.156	0.144	0.193
O71	0.196	0.125	0.240	0.085	0.284	0.073	0.097	0.150	0.126
O72	0.486	0.427	0.536	0.279	0.201	0.517	0.492	0.334	0.323
O73	0.379	0.452	0.265	0.388	0.240	0.354	0.326	0.466	0.279
O74	0.146	0.291	0.186	0.305	0.238	0.303	0.174	0.394	0.188
O75	0.440	0.352	0.522	0.161	0.285	0.473	0.449	0.291	0.292
O76	0.477	0.351	0.432	0.359	0.309	0.364	0.310	0.385	0.298
O77	0.252	0.388	0.090	0.450	0.255	0.164	0.074	0.397	0.203
O78	0.287	0.231	0.396	0.068	0.352	0.311	0.239	0.218	0.206
O79	0.484	0.184	0.533	0.318	0.328	0.432	0.310	0.266	0.286
O80	0.493	0.254	0.397	0.295	0.233	0.243	0.083	0.212	0.235
O81	0.499	0.406	0.602	0.405	0.210	0.606	0.542	0.277	0.348
O82	0.529	0.297	0.522	0.376	0.142	0.557	0.441	0.108	0.301

Note:

- (1) The location of test points can be referred to Figure 2.
- (2) Wind Velocity Ratio (VR), which defined as the V_p/V_∞ . V_p is the wind velocity at the pedestrian level (2m above ground) while V_∞ is the wind velocity at the top of the development which is unaffected by the building. VR gives an idea how the wind velocity is affected by the urban roughness. As VR is the ratio of wind velocity, it is dimensionless.

Test Point ⁽¹⁾	Wind Velocity Ratio (VR) at Wind Direction for Proposed Scheme ⁽²⁾								
	E	NE	ESE	ENE	SSW	SE	SSE	NNE	Overall
P1	0.103	0.226	0.195	0.081	0.247	0.043	0.063	0.310	0.120
P2	0.092	0.318	0.223	0.020	0.252	0.042	0.042	0.311	0.124
P3	0.072	0.438	0.246	0.126	0.266	0.075	0.035	0.335	0.151
P4	0.064	0.573	0.257	0.305	0.287	0.106	0.039	0.395	0.191
P5	0.096	0.669	0.267	0.469	0.306	0.140	0.056	0.464	0.234
P6	0.225	0.747	0.264	0.582	0.324	0.162	0.074	0.560	0.285
P7	0.458	0.776	0.263	0.605	0.339	0.173	0.092	0.684	0.340
P8	0.549	0.762	0.257	0.585	0.346	0.170	0.097	0.703	0.352
P9	0.578	0.802	0.325	0.623	0.354	0.165	0.106	0.742	0.376
P10	0.595	0.824	0.363	0.655	0.373	0.155	0.106	0.767	0.390
P11	0.624	0.795	0.387	0.623	0.412	0.132	0.093	0.770	0.392
P12	0.638	0.788	0.410	0.654	0.466	0.121	0.077	0.775	0.402
P13	0.663	0.752	0.410	0.683	0.396	0.134	0.074	0.755	0.398
P14	0.680	0.691	0.412	0.693	0.302	0.151	0.078	0.708	0.385
P15	0.620	0.598	0.340	0.690	0.101	0.168	0.080	0.589	0.333
P16	0.628	0.573	0.342	0.700	0.129	0.173	0.084	0.539	0.333
P17	0.624	0.546	0.342	0.676	0.146	0.174	0.091	0.500	0.326
P18	0.525	0.407	0.242	0.545	0.107	0.172	0.106	0.421	0.265
P19	0.442	0.292	0.153	0.481	0.078	0.159	0.108	0.328	0.214
P20	0.461	0.267	0.205	0.480	0.085	0.149	0.123	0.328	0.220
P21	0.500	0.240	0.285	0.472	0.087	0.134	0.124	0.342	0.231
P22	0.626	0.245	0.437	0.463	0.090	0.115	0.130	0.447	0.273
P23	0.755	0.338	0.635	0.448	0.105	0.054	0.140	0.478	0.321
P24	0.053	0.212	0.044	0.219	0.286	0.017	0.140	0.092	0.100
P25	0.093	0.332	0.122	0.398	0.318	0.099	0.160	0.205	0.163
P26	0.095	0.287	0.180	0.312	0.333	0.170	0.189	0.190	0.164
P27	0.138	0.260	0.262	0.249	0.310	0.276	0.294	0.157	0.182
P28	0.177	0.239	0.313	0.230	0.287	0.334	0.367	0.140	0.196
P29	0.240	0.204	0.380	0.228	0.231	0.412	0.456	0.124	0.215
P30	0.350	0.158	0.458	0.217	0.210	0.458	0.484	0.122	0.238
P31	0.322	0.124	0.475	0.134	0.212	0.462	0.501	0.111	0.225
P32	0.333	0.123	0.488	0.100	0.188	0.473	0.517	0.117	0.225
P33	0.358	0.134	0.513	0.055	0.126	0.509	0.543	0.119	0.228
P34	0.373	0.166	0.542	0.075	0.103	0.554	0.577	0.139	0.244
P35	0.445	0.342	0.629	0.227	0.125	0.606	0.599	0.273	0.315
P36	0.446	0.612	0.633	0.450	0.137	0.627	0.624	0.501	0.386
P37	0.118	0.339	0.134	0.258	0.005	0.134	0.158	0.321	0.139
P38	0.108	0.196	0.114	0.195	0.091	0.030	0.074	0.231	0.100
P39	0.076	0.135	0.077	0.170	0.122	0.011	0.075	0.202	0.082
P40	0.037	0.086	0.055	0.130	0.135	0.022	0.056	0.174	0.063
P41	0.022	0.187	0.060	0.172	0.172	0.053	0.041	0.164	0.080
P42	0.051	0.202	0.083	0.177	0.154	0.078	0.125	0.100	0.091
P43	0.083	0.219	0.086	0.223	0.158	0.102	0.134	0.027	0.100
P44	0.084	0.223	0.060	0.258	0.120	0.091	0.119	0.041	0.097
P45	0.096	0.116	0.189	0.114	0.296	0.027	0.059	0.256	0.108
O46	0.418	0.773	0.284	0.853	0.361	0.022	0.019	0.261	0.313
O47	0.431	0.814	0.262	0.850	0.376	0.067	0.012	0.339	0.327
O48	0.445	0.842	0.255	0.849	0.396	0.097	0.030	0.407	0.342
O49	0.445	0.853	0.261	0.833	0.417	0.121	0.049	0.456	0.351
O50	0.437	0.864	0.276	0.822	0.444	0.133	0.067	0.482	0.358

Test Point ⁽¹⁾	Wind Velocity Ratio (VR) at Wind Direction for Proposed Scheme ⁽²⁾								
	E	NE	ESE	ENE	SSW	SE	SSE	NNE	Overall
O51	0.422	0.863	0.285	0.811	0.467	0.133	0.077	0.481	0.358
O52	0.415	0.822	0.264	0.786	0.495	0.116	0.082	0.452	0.347
O53	0.535	0.763	0.260	0.754	0.503	0.080	0.079	0.403	0.351
O54	0.662	0.729	0.473	0.732	0.509	0.019	0.068	0.361	0.379
O55	0.672	0.706	0.642	0.673	0.496	0.205	0.027	0.296	0.395
O56	0.627	0.726	0.634	0.647	0.481	0.368	0.196	0.299	0.411
O57	0.604	0.730	0.630	0.645	0.465	0.506	0.332	0.345	0.430
O58	0.322	0.606	0.165	0.532	0.268	0.105	0.109	0.534	0.262
O59	0.195	0.678	0.176	0.536	0.285	0.085	0.080	0.511	0.247
O60	0.116	0.509	0.096	0.117	0.228	0.231	0.190	0.358	0.172
O61	0.060	0.312	0.262	0.203	0.132	0.384	0.317	0.326	0.177
O62	0.295	0.080	0.498	0.297	0.167	0.511	0.429	0.346	0.245
O63	0.330	0.055	0.383	0.241	0.241	0.431	0.330	0.372	0.226
O64	0.261	0.115	0.323	0.165	0.257	0.398	0.171	0.291	0.190
O65	0.245	0.127	0.332	0.141	0.255	0.199	0.250	0.172	0.168
O66	0.180	0.110	0.170	0.120	0.173	0.144	0.311	0.102	0.126
O67	0.086	0.034	0.035	0.214	0.213	0.175	0.151	0.247	0.102
O68	0.235	0.204	0.459	0.330	0.234	0.458	0.415	0.184	0.237
O69	0.447	0.215	0.501	0.290	0.280	0.573	0.488	0.115	0.286
O70	0.265	0.085	0.336	0.139	0.310	0.450	0.228	0.069	0.183
O71	0.207	0.071	0.243	0.086	0.283	0.072	0.107	0.054	0.116
O72	0.484	0.368	0.547	0.287	0.199	0.532	0.534	0.334	0.322
O73	0.381	0.413	0.274	0.409	0.255	0.367	0.376	0.416	0.280
O74	0.148	0.348	0.180	0.310	0.259	0.315	0.217	0.315	0.195
O75	0.442	0.261	0.532	0.137	0.291	0.476	0.466	0.280	0.282
O76	0.481	0.283	0.442	0.386	0.327	0.379	0.361	0.327	0.297
O77	0.257	0.449	0.085	0.452	0.274	0.170	0.098	0.252	0.204
O78	0.280	0.162	0.391	0.031	0.341	0.304	0.228	0.199	0.189
O79	0.481	0.114	0.532	0.299	0.349	0.432	0.312	0.222	0.274
O80	0.496	0.290	0.397	0.268	0.261	0.247	0.112	0.195	0.241
O81	0.469	0.405	0.596	0.364	0.202	0.606	0.566	0.147	0.331
O82	0.516	0.311	0.518	0.341	0.118	0.580	0.520	0.110	0.303

Note:

- (1) The location of test points can be referred to Figure 2.
- (2) Wind Velocity Ratio (VR), which defined as the V_p/V_∞ . V_p is the wind velocity at the pedestrian level (2m above ground) while V_∞ is the wind velocity at the top of the development which is unaffected by the building. VR gives an idea how the wind velocity is affected by the urban roughness. As VR is the ratio of wind velocity, it is dimensionless.



Appendix G

Wind Probability Table from the Planning Department

**New Territories West Regional Office & Water Resources Education Centre at Tin Shui Wai, New Territories – Air Ventilation Assessment (AVA)
Appendix G – Wind Probability Table from the Planning Department**

		V _∞ ⁽¹⁾ at corresponding wind direction															
d_00046	Wind_direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
V_infinity(m/s)	Sum	0.023	0.070	0.109	0.094	0.161	0.100	0.080	0.072	0.068	0.088	0.052	0.023	0.022	0.012	0.012	0.013
00_to_01		0.023	0.001	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001
01_to_02		0.058	0.003	0.003	0.004	0.005	0.008	0.005	0.004	0.004	0.003	0.003	0.003	0.004	0.002	0.002	0.002
02_to_03		0.093	0.003	0.005	0.006	0.008	0.013	0.011	0.008	0.007	0.006	0.007	0.005	0.003	0.004	0.003	0.002
03_to_04		0.122	0.003	0.007	0.009	0.012	0.018	0.016	0.010	0.008	0.010	0.009	0.006	0.003	0.004	0.002	0.002
04_to_05		0.130	0.003	0.008	0.011	0.015	0.022	0.018	0.013	0.008	0.009	0.009	0.006	0.003	0.002	0.001	0.002
05_to_06		0.129	0.002	0.007	0.013	0.015	0.023	0.016	0.013	0.008	0.008	0.011	0.006	0.002	0.001	0.001	0.001
06_to_07		0.112	0.002	0.007	0.012	0.012	0.020	0.012	0.011	0.008	0.007	0.011	0.006	0.002	0.001	0.001	0.001
07_to_08		0.093	0.001	0.006	0.011	0.009	0.018	0.008	0.008	0.007	0.006	0.011	0.005	0.002	0.001	0.000	0.001
08_to_09		0.073	0.001	0.006	0.009	0.006	0.013	0.005	0.004	0.006	0.006	0.009	0.004	0.001	0.000	0.000	0.000
09_to_10		0.054	0.001	0.005	0.008	0.004	0.009	0.004	0.003	0.006	0.005	0.006	0.003	0.001	0.000	0.000	0.000
10_to_11		0.037	0.000	0.004	0.007	0.002	0.005	0.002	0.002	0.004	0.003	0.004	0.002	0.001	0.000	0.000	0.000
11_to_12		0.025	0.000	0.003	0.005	0.001	0.003	0.001	0.001	0.002	0.002	0.003	0.002	0.000	0.000	0.000	0.000
12_to_13		0.018	0.000	0.003	0.004	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.001	0.000	0.000	0.000	0.000
13_to_14		0.011	0.000	0.002	0.003	0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000
14_to_15		0.007	0.000	0.001	0.002	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000
15_to_16		0.004	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16_to_17		0.003	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17_to_18		0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18_to_19		0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19_to_20		0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20_to_21		0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21_to_22		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22_to_23		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23_to_24		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note:

(1) V_∞ is the wind velocity at the top of the development which is unaffected by the building.