The Hong Kong Institute of Building Information Modelling
香港建築信息模擬學會

BIM Conference 2013

How does BIM fit in the legal process of Plan Submission, Approval and Inspection in Hong Kong building industry

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B = Building 建築

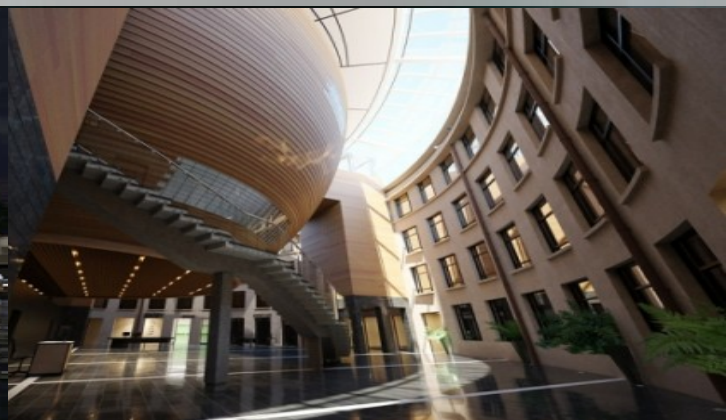
I = Information 資訊

M = Modelling 模型/ 模擬

Fake BIM

M + ?

JUST 3D MODEL – NOT BIM



HALF-BIM

I <> M

3D MODEL >> QTO , CLASH ANALYSIS

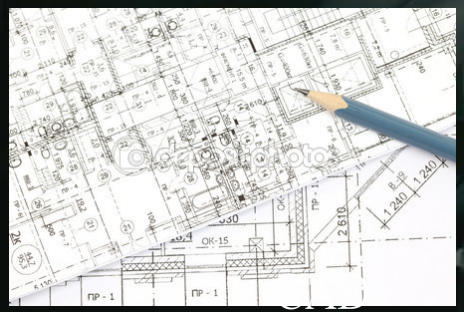
HALF BIM

DESIGN

CAD

CAD

REVIT / NAVISWORKS



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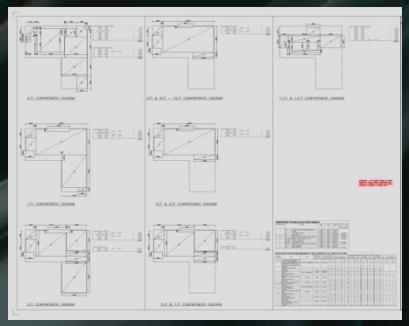

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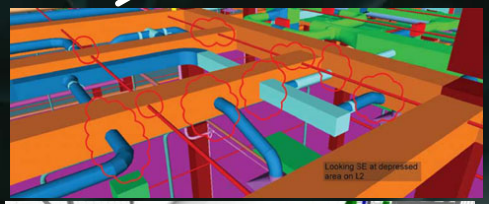
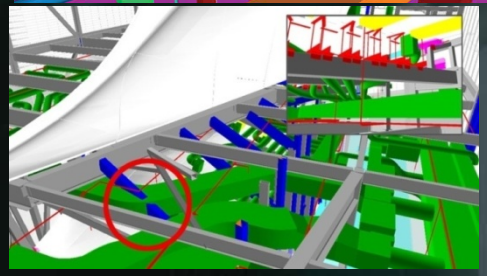


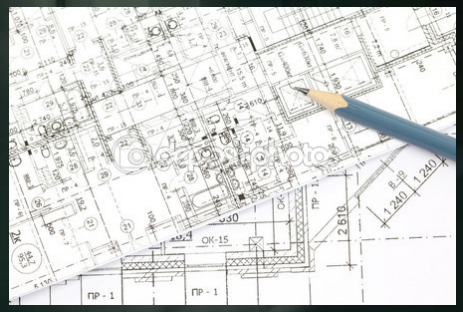


CONSTRUCTION INFORMATOIN

STATUTORY SUBMISSION

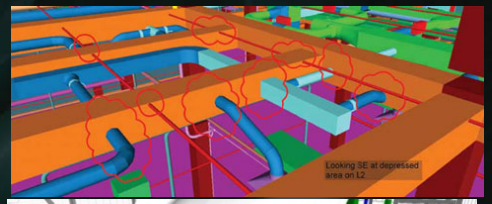
CLASH DETECTION

REAL BIM

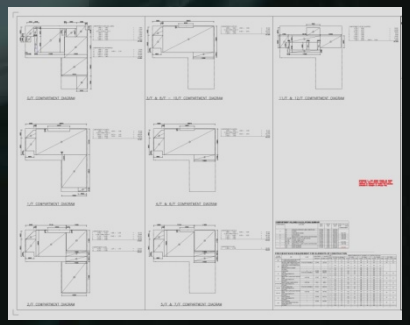


CONSTRUCTION
INFORMATOIN

DESIGN
in
BIM



CLASH
DETECTION



STATUTORY
SUBMISSION

REAL BIM

I = M

I > M

INFORMATION FROM MODEL,

INFORMATION MORE IMPORTANT

B I M

Modelling Information Business

REAL BIM

M + I = B

BIM is a process, Business is the objective

Detailed Design
Analysis
Conceptual Design
Documentation
VISUALIZATION
Programming
building type
*commercial
*residential
sq footage
# of rooms
lobby
Building Information Modeling
GOVERNMENT SUBMISSION/ APPROVAL ? INSPECTION?
Fabrication
Renovation
Construction 4D/5D
Operation and Maintenance
Construction Logistics
Demolition

REAL BIM

M + I = B (Statutory Submission)

GOVERNMENT SUBMISSION IN HONG KONG

Purpose:

To demonstrate a development complies with statutory requirement and seek government approval using BIM

Applicable Development:

Applied to new building & alteration and addition works in Hong Kong

Content of Submission:

Plans, sections, elevations, calculations and other relevant documents

TODAY’S TOPIC: ANOTHER WAY TO PREPARE THE CALCULATION FOR GOVERNMENT SUBMISSION

An area based calculation

convert areas into following figures through checking of regulations & codes of practice:

plot ratio
site coverage
room capacity
width of escape route
fire compartment
fire resisting period
sanitary fitment provision etc.

COMMON WAY:
STEP 2: CHECKING OF REGULATIONS & CODES

Height of building in metres	Domestic buildings						Non-domestic buildings					
	Percentage site coverage			Plot ratio			Percentage site coverage			Plot ratio		
	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site
Not exceeding 15 m	66.6	75	80	3.3	3.75	4.0	100	100	100	5	5	5
Over 15 m but not exceeding 18 m	60	67	72	3.6	4.0	4.3	97.5	97.5	97.5	5.8	5.8	5.8
Over 18 m but not exceeding 21 m	56	62	67	3.9	4.3	4.7	95	95	95	6.7	6.7	6.7
Over 21 m but not exceeding 24 m	52	58	63	4.2	4.6	5.0	92	92	92	7.4	7.4	7.4
Over 24 m but not exceeding 27 m	49	55	59	4.4	4.9	5.3	89	90	90	8.0	8.1	8.1
Over 27 m but not exceeding 30 m	46	52	55	4.6	5.2	5.5	85	87	88	8.5	8.7	8.8
Over 30 m but not exceeding 36 m	42	47.5	50	5.0	5.7	6.0	80	82.5	85	9.5	9.9	10.2
Over 36 m but not exceeding 43 m	39	44	47	5.4	6.1	6.5	75	77.5	80	10.5	10.8	11.2
Over 43 m but not exceeding 49 m	37	41	44	5.9	6.5	7.0	69	72.5	75	11.0	11.6	12.0
Over 49 m but not exceeding 55 m	35	39	42	6.3	7.0	7.5	64	67.5	70	11.5	12.1	12.6
Over 55 m but not exceeding 61 m	34	38	41	6.8	7.6	8.0	60	62.5	65	12.2	12.5	13.0
Over 61 m	33.33	37.5	40	8.0	9.0	10.0	60	62.5	65	15	15	15

(L.N. 294 of 1976)

Table 1

Intended use of storey	Factor representing usable floor area in m^2 per person
(a) Assembly halls, auditoria and stadia without seating or with movable seating	0.5
(b) Areas accessible to the public in viewing galleries, banking halls, betting centres and places where public service counters are provided	0.5
(c) Dance halls (calculated on dancing area), disco and reception area for restaurant.	0.75
(d) Restaurants(calculated on dining area), dining area, lounges, committee rooms, conference rooms, meeting rooms, common rooms, function room and waiting rooms	1
(e) Kitchens attached to restaurants	4.5
(f) Museums, exhibition halls, trademarts and display areas	2
(g) Supermarkets, showrooms, jewellery and goldsmith shops, pawn shops and money changers.	2
(h) Shopping arcades, department stores and shopping areas	
- basement, G/F, 1/F & 2/F	3
- 3/F & above	4.5
(i) Offices	9
(j) Tenement houses, barracks, dormitories, and self-contained flats comprising a single room or having the main living area subdivided by rooms	3
(k) Self-contained flats with corridor or balcony access having five or more flats on each floor served by each staircase	4.5
(l) Flats not covered by (j) or (k)	9
(m) Flatted factories	4.5
(n) Warehouses, godowns and storage areas	30
(o) Classrooms of school not covered by Education Ordinance and other lecture rooms, library, and study rooms	2

Table 2

Table showing minimum number of exit doors from a room, or exit routes from a storey, and required minimum width thereof

Capacity of room or storey	Min. No. of exit doors (from room) or exit routes (from storey)	Min. Total Width of		Min. Width of each	
		exit doors	exit routes	exit door	exit route
4 - 30	1			750 mm	1050 mm
31 - 200	2	1750 mm	2100 mm	850 mm	1050 mm
201 - 300	2	2500 mm	2500 mm	1050 mm	1050 mm
301 - 500	2	3000 mm	3000 mm	1050 mm	1050 mm
501 - 750	3	4500 mm	4500 mm	1200 mm	1200 mm
751 - 1000	4	6000 mm	6000 mm	1200 mm	1200 mm
1001 - 1250	5	7500 mm	7500 mm	1350 mm	1350 mm
1251 - 1500	6	9000 mm	9000 mm	1350 mm	1350 mm
over 1500	7 or such greater number as the Building Authority may require	to be calculated at the rate of 300mm per 50 persons		1500 mm	1500 mm

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Table 5 : Discharge Value of a Staircase in a Non-sprinklered Building

No. of Storey served	Width of Staircase						
	1050mm but under 1200mm	1200mm but under 1350mm	1350mm but under 1500mm	1500mm but under 1600mm	1600mm but under 1700mm	1700mm but under 1800mm	1800mm but under 1900mm
1	210	240	270	300	320	340	360
2	242	278	315	351	377	402	428
3	274	316	360	402	434	464	496
4	306	354	405	453	491	526	564
5	338	392	450	504	548	588	632
6	370	430	495	555	605	650	700
7	402	468	540	606	662	712	768
8	434	506	585	657	719	774	836
9	466	544	630	708	776	836	904
10	498	582	675	759	833	898	972
Each additional storey add	32	38	45	51	57	62	68

TABLE A

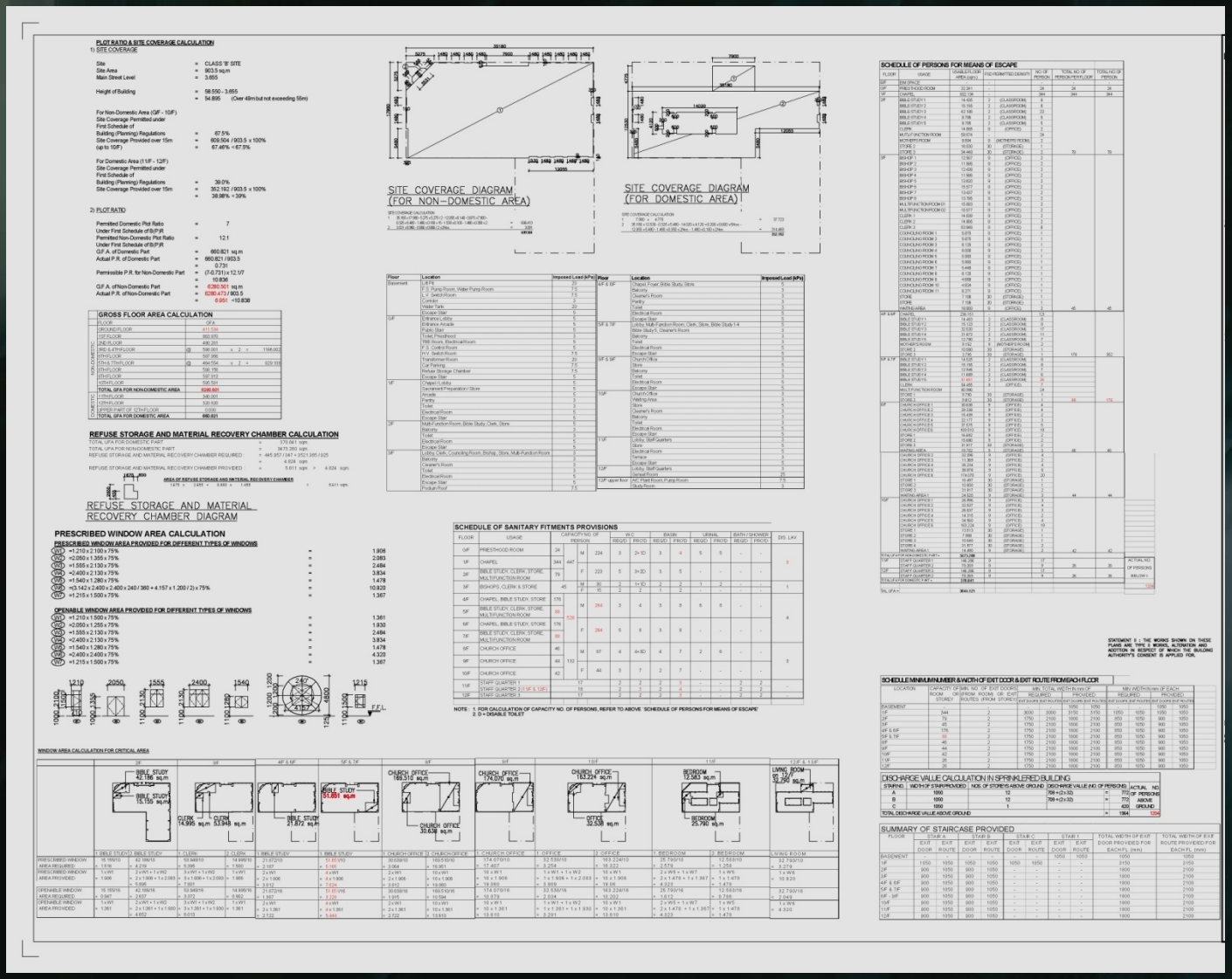
WALLS CONSTRUCTED WHOLLY OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness in mm (excluding plaster) for period of		
	4 hrs.	2 hrs.	1 hr.
SOLID CONSTRUCTION			
Solid bricks of clay, concrete or sand lithe without plaster	225	225*	100
Reinforced concrete -			
(a) containing not less than 1 per cent of vertical reinforcement	180	100	75
Concrete cover to main reinforcement	25	25	15
(b) containing less than 1 per cent of vertical reinforcement	240	160	120
Concrete cover to main reinforcement	25	25	25
HOLLOW BLOCK CONSTRUCTION			
Clay blocks (outer web not less than 13 mm thick) of 2 cells not less than 50 per cent solid finished with 13 mm gypsum plaster on each side		100	100
Concrete blocks of one cell in wall thickness not less than 50 per cent solid finished with 13 mm gypsum plaster on each side			190

* Where finished with 13 mm gypsum plaster on each side, the thickness may be reduced to 100 mm.

COMMON WAY:
STEP 2: CHECKING OF REGULATIONS & CODES

COMMON WAY:
PROJECT EXAMPLE



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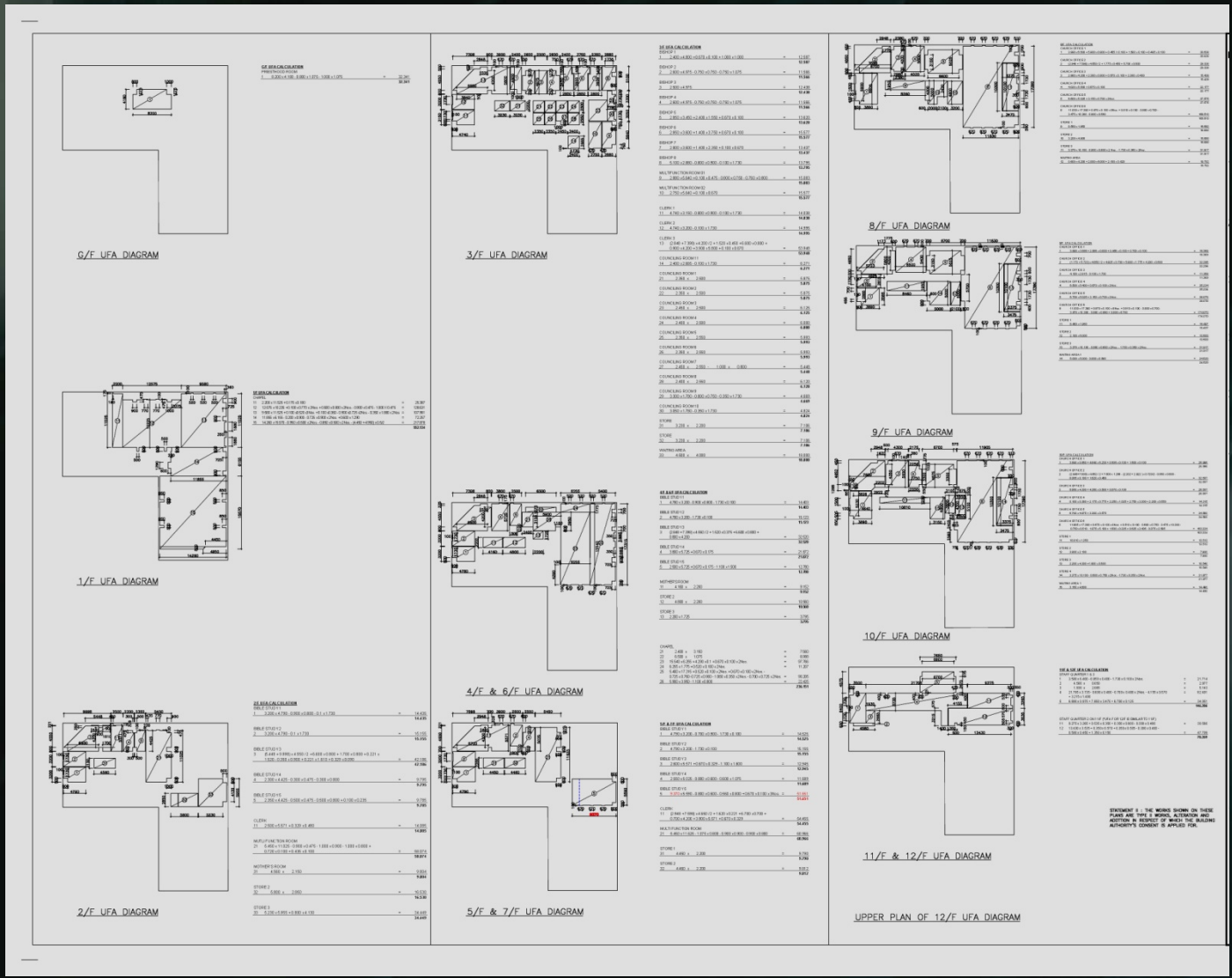


COMMON WAY:
STEP 1: CALCULATE AREA

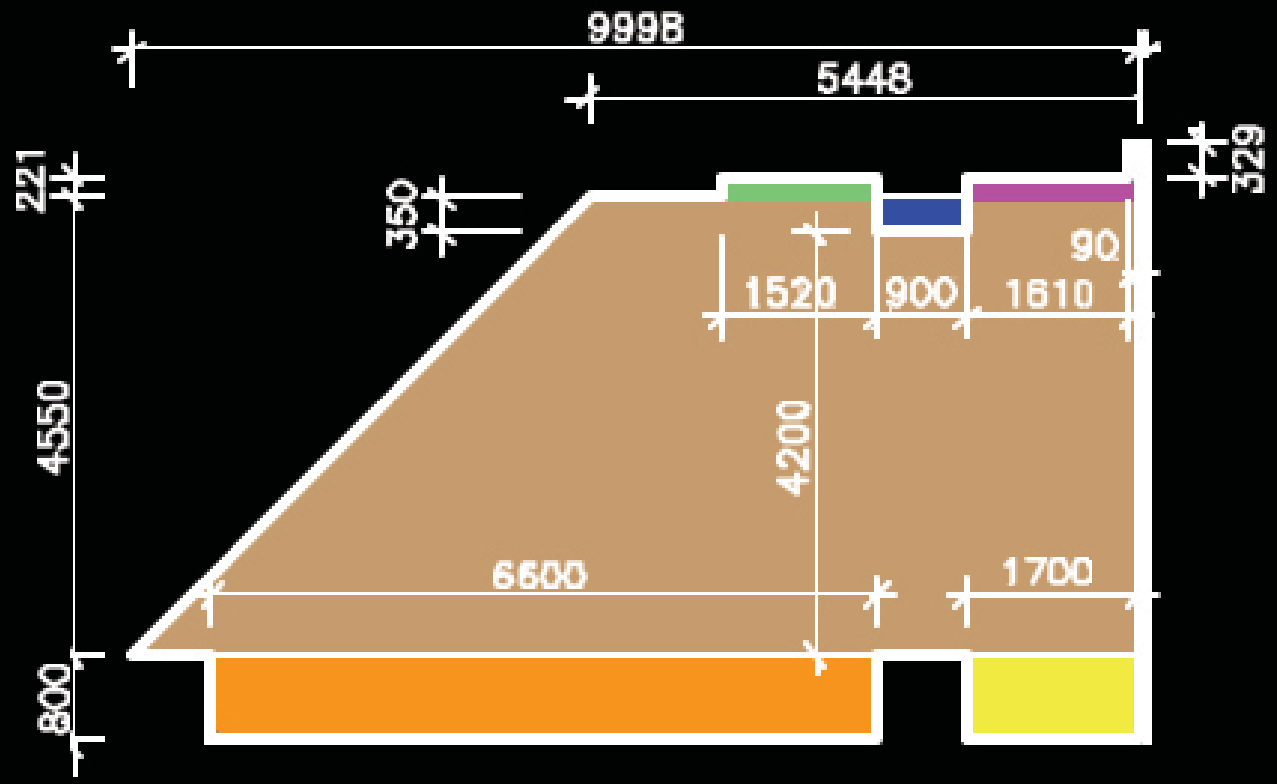
Outline area

COMMON WAY:
STEP 1: CALCULATE AREA

Subdivide area into simple geometry such as rectangle, triangle, circle, etc.

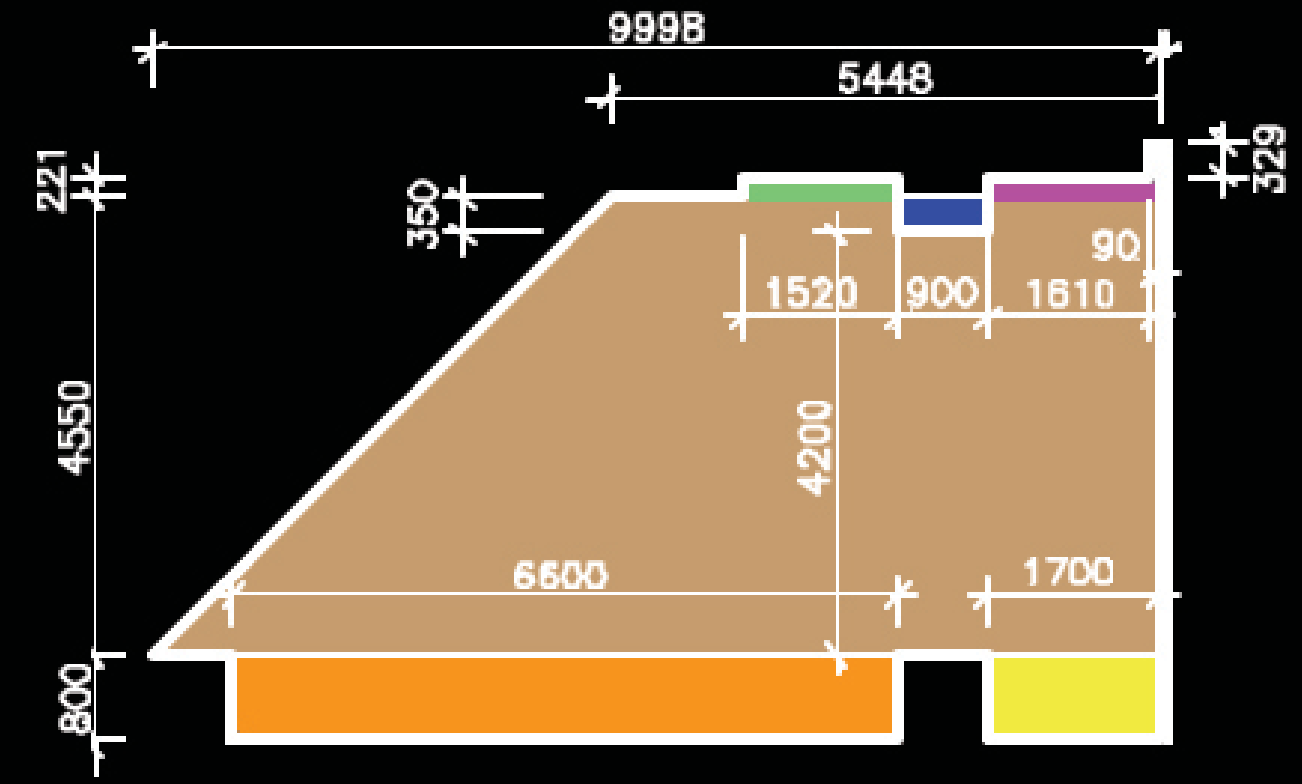
COMMON WAY:
STEP 1: CALCULATE AREA

Measure dimension



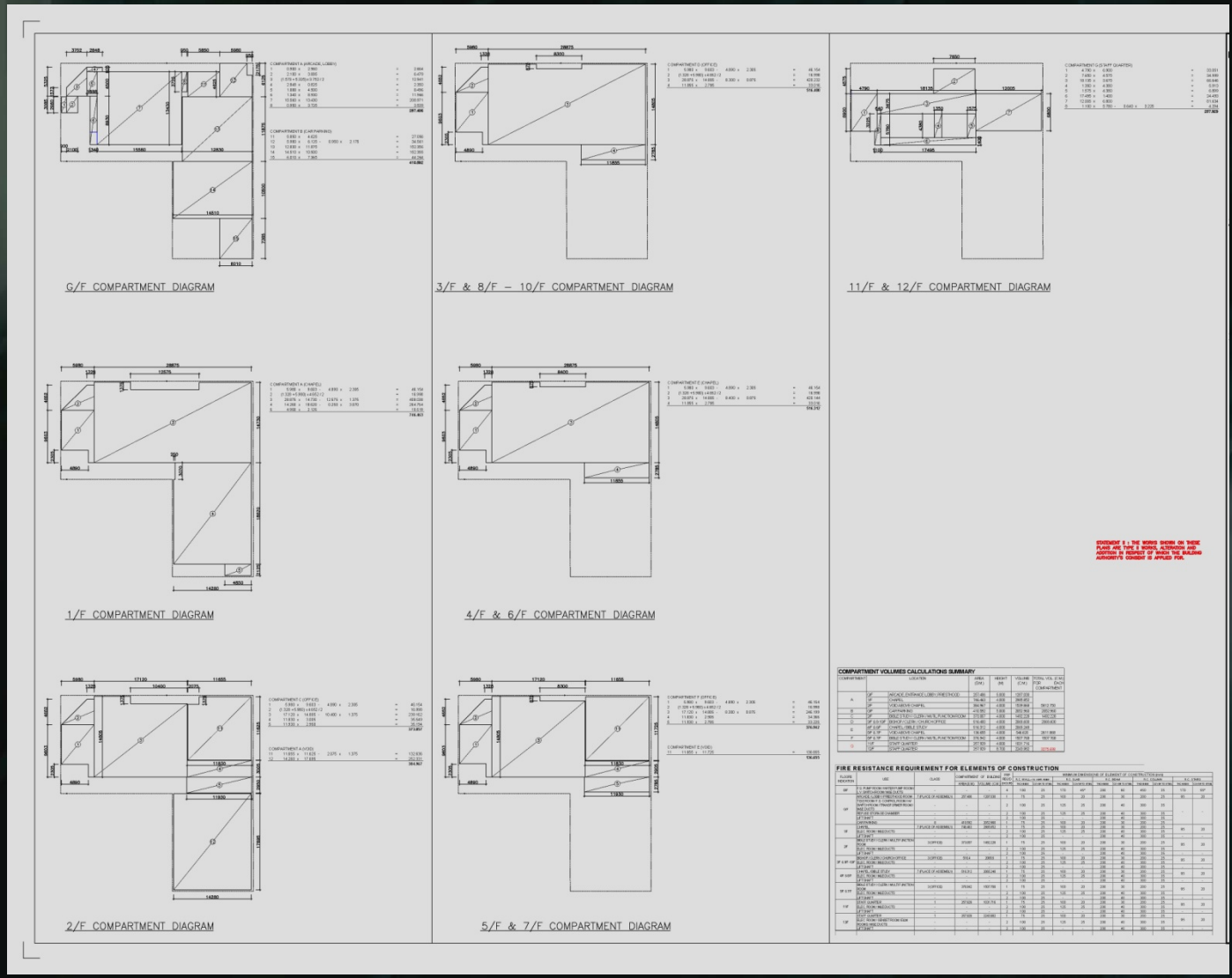
COMMON WAY:
STEP 1: CALCULATE AREA

Calculate area by applying geometric formula



(5.448+9.998)x4.550/2 + 6.600x0.800 + 1.700x0.800 +
0.221x1.520 - 0.350x0.900 + 0.221x1.610 + 0.329x0.090 =42.186

COMMON WAY:
PROJECT EXAMPLE



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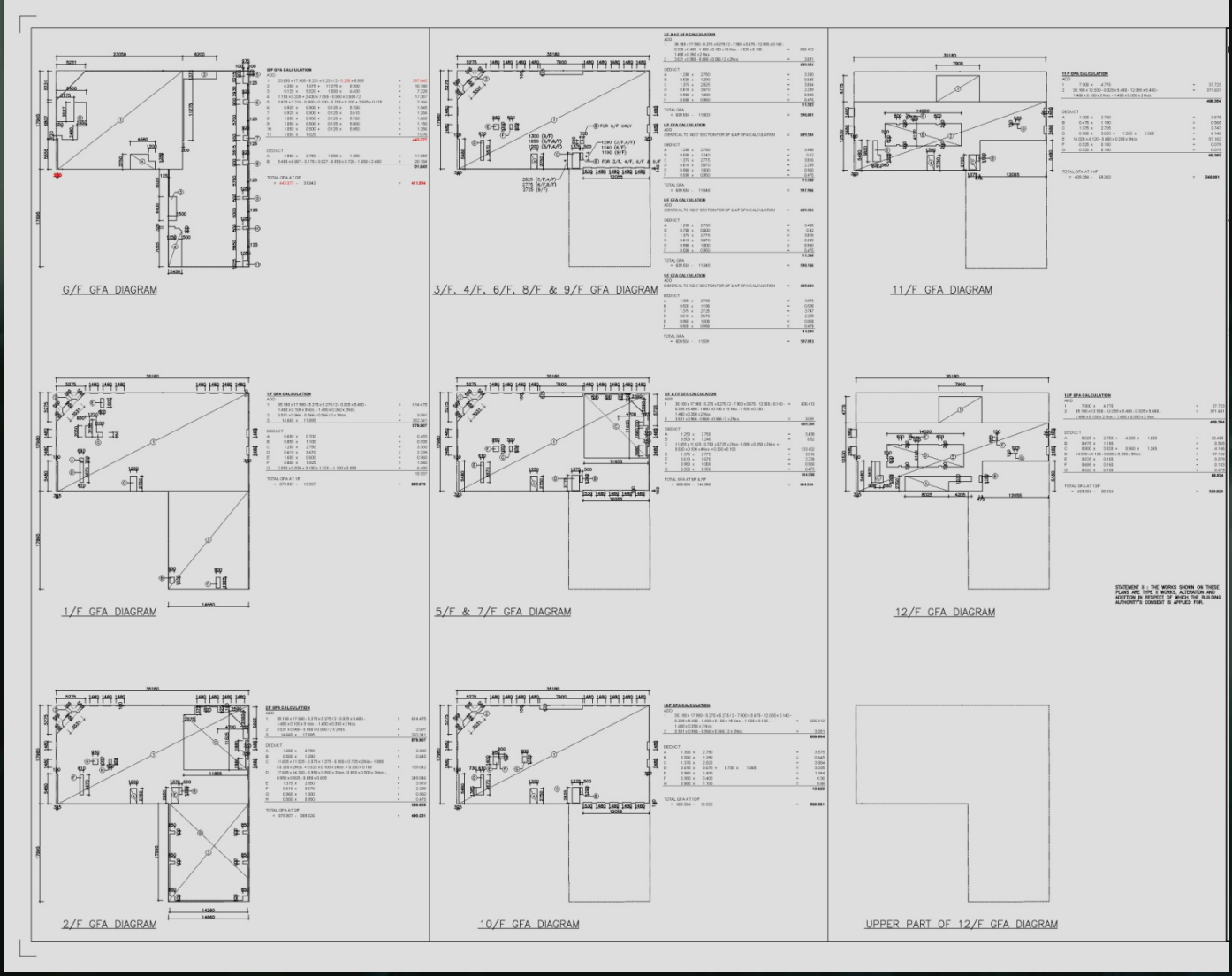
PROJECT EXAMPLE



COMMON WAY:
HOW LONG DOES IT TAKE?

Previous Submission Involves

~1200 raw data

~1700 mathematical operations

~1000 statutory checking

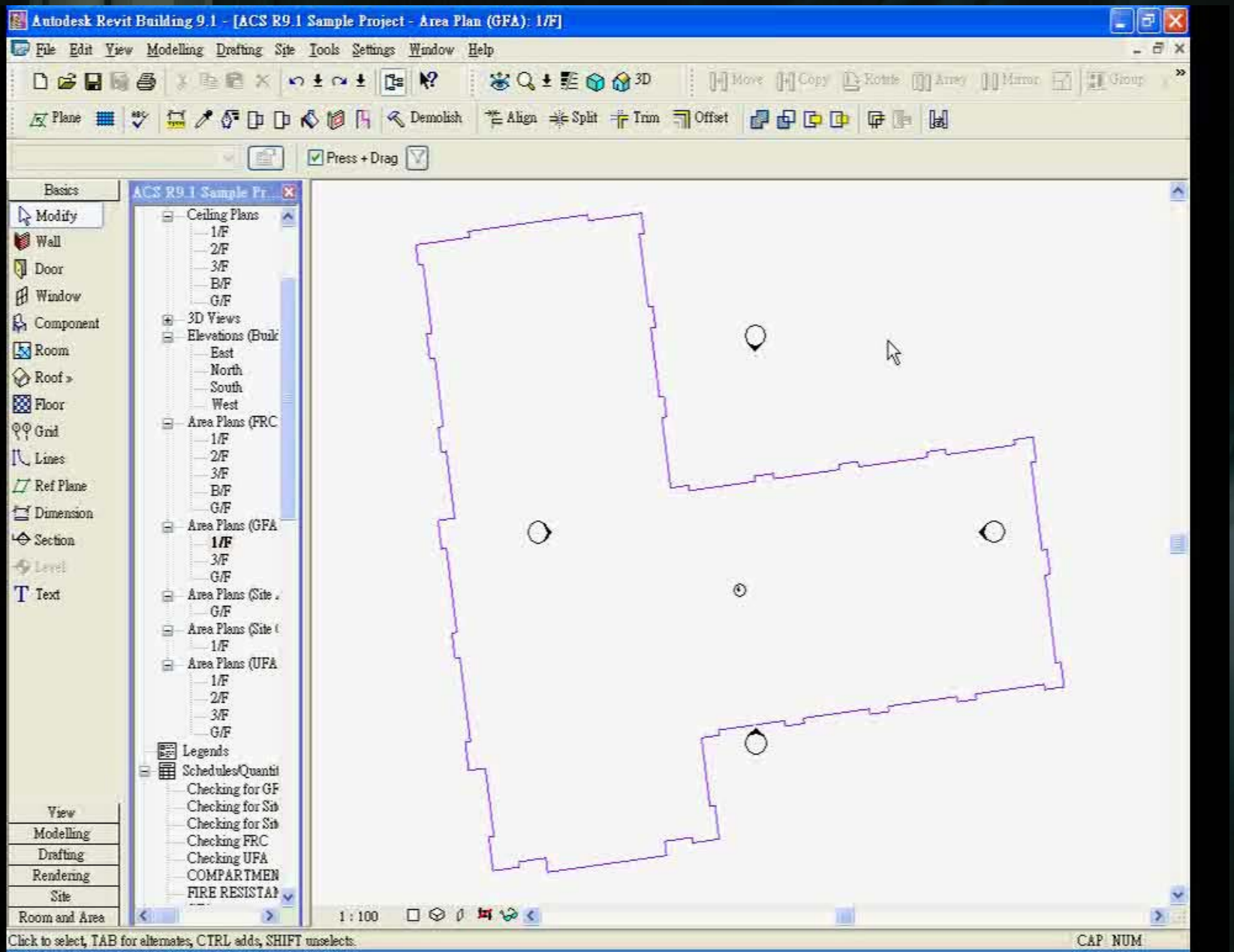
~5000 data input

Require 2 weeks to complete

a step by step calculation: any change in layout will affect the calculation significantly

Takes another 1 week in average for every amendment submission

BIM method: GFA CALCULATION



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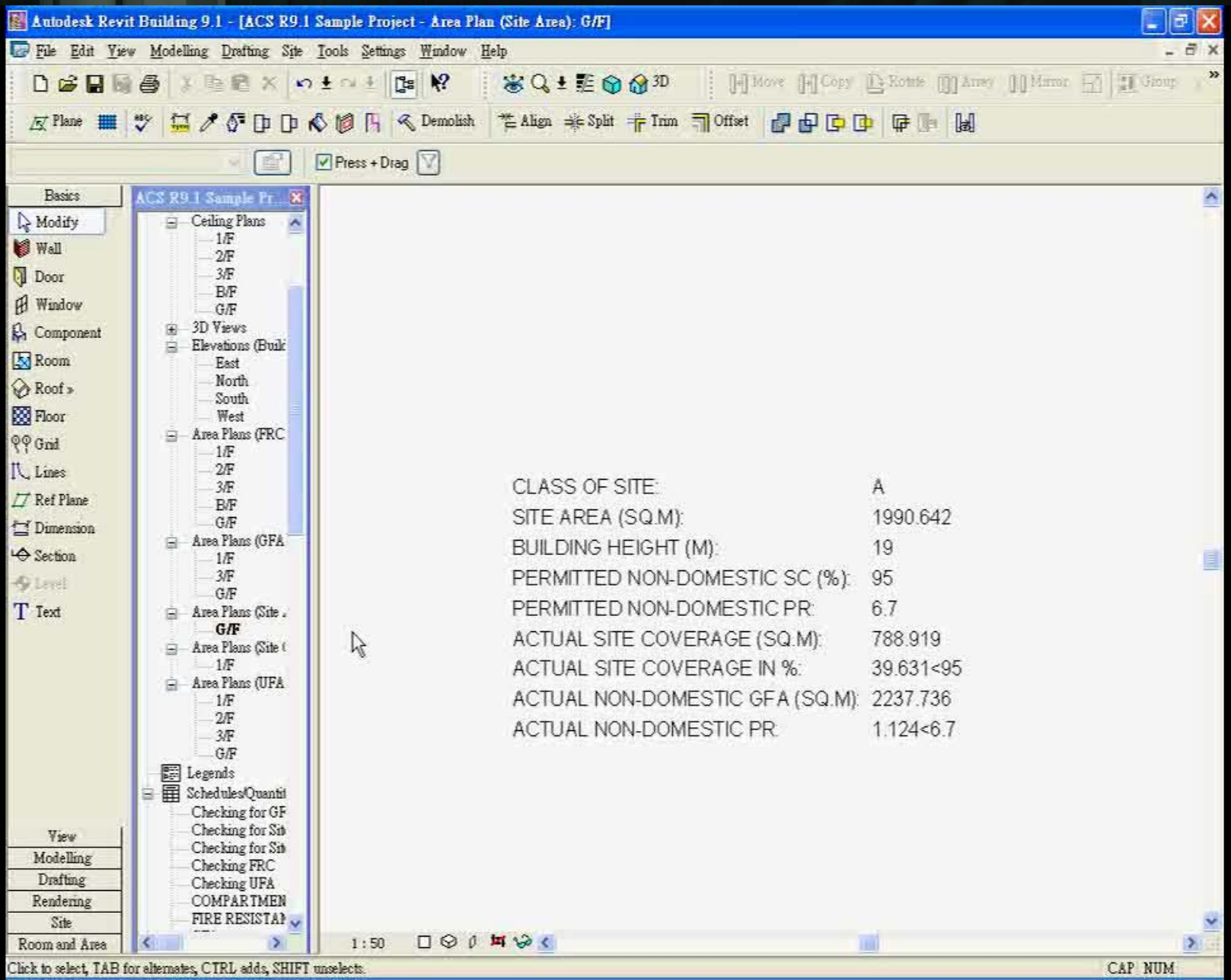
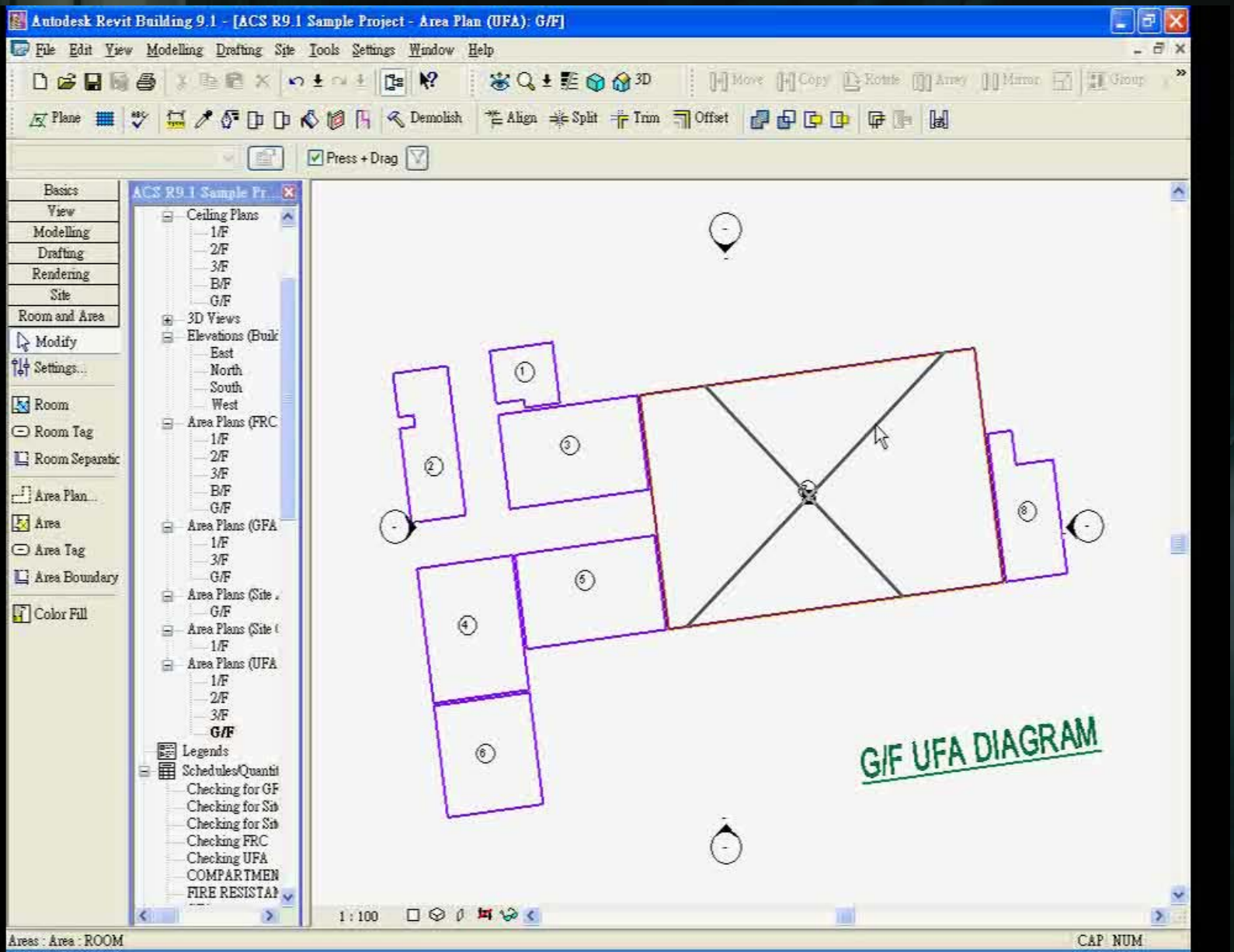


MEANS OF ESCAPE & SANITARY FITMENT PROVISION



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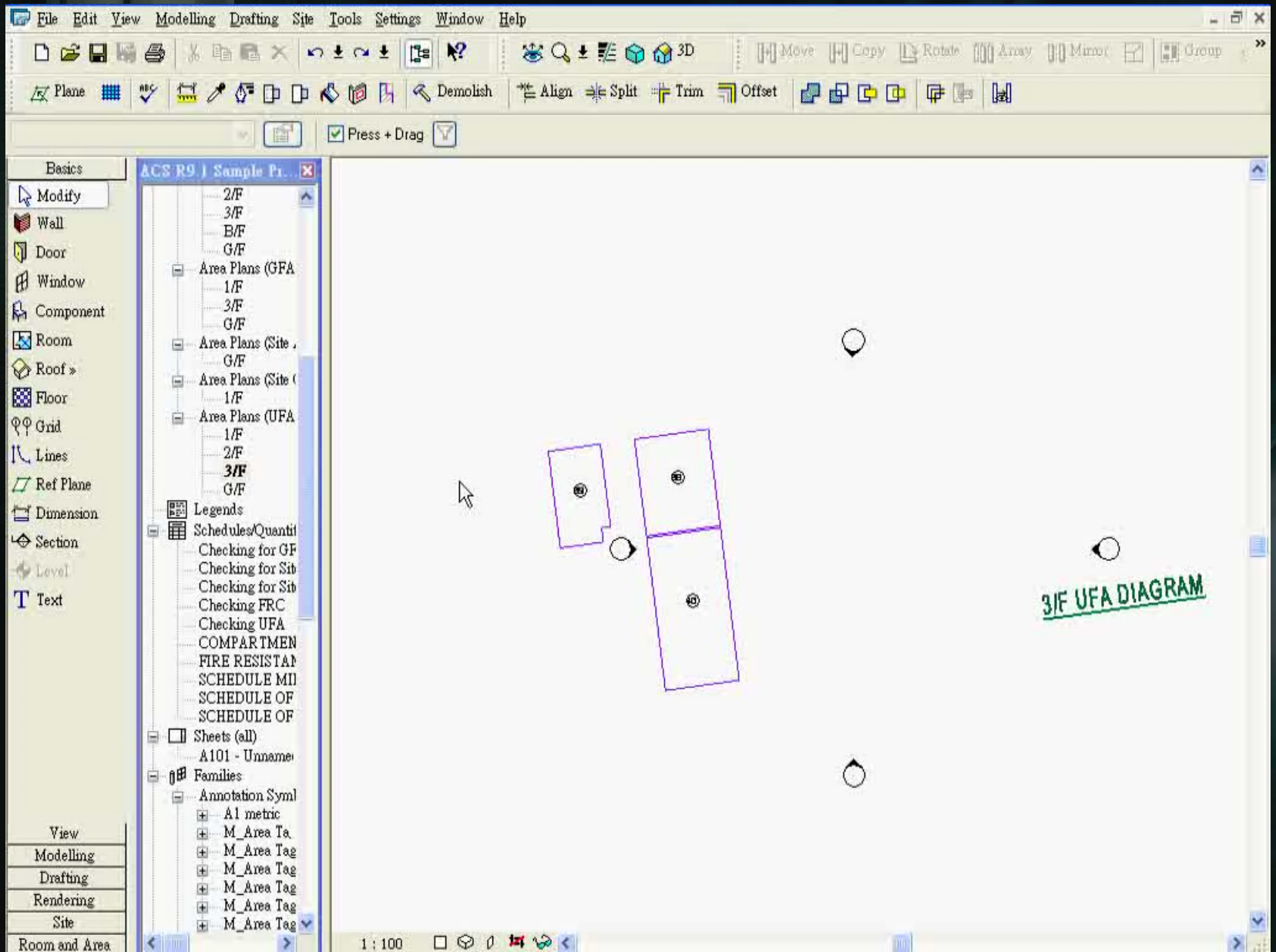
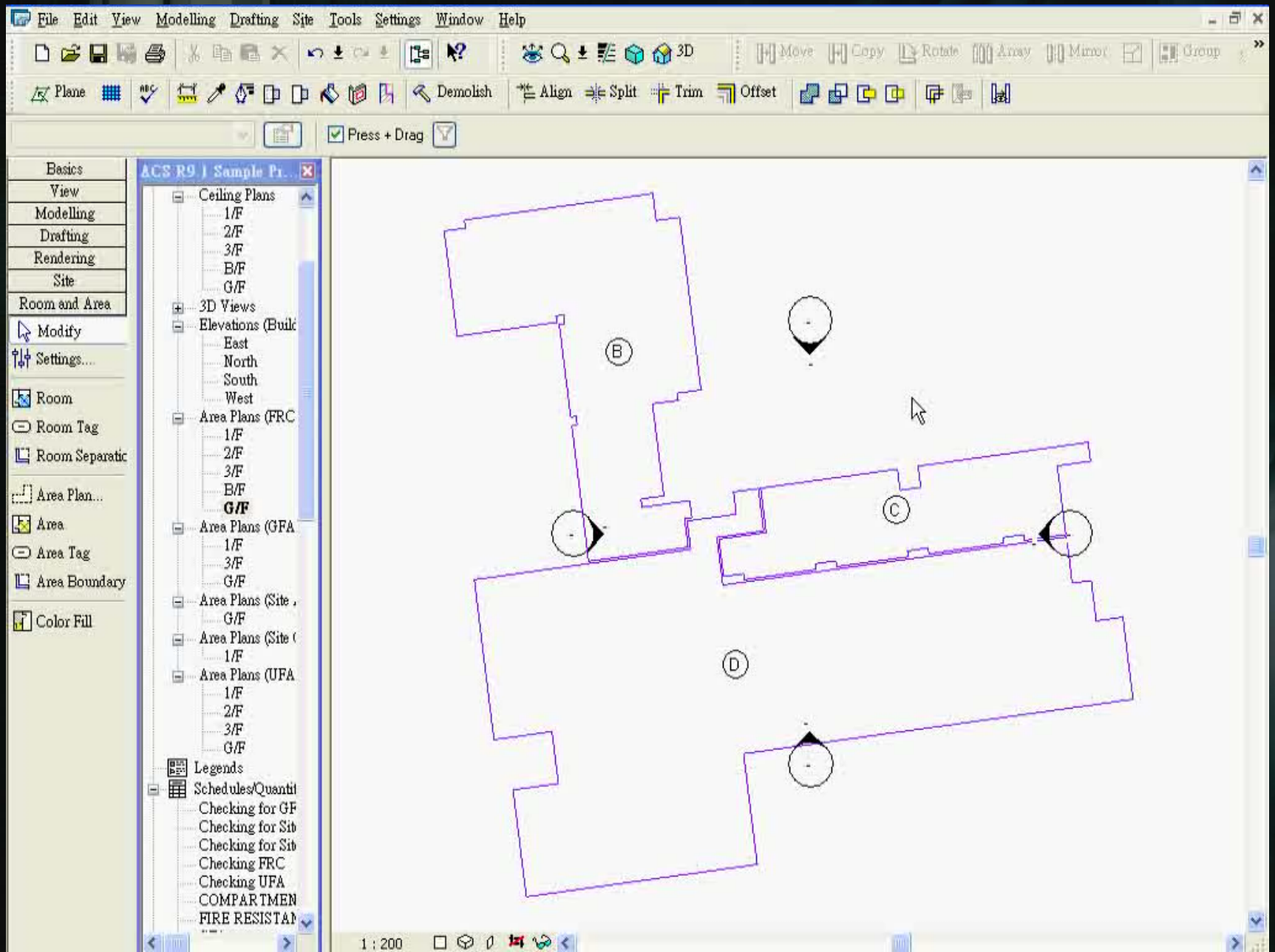


FIRE RESISTING CONSTRUCTION



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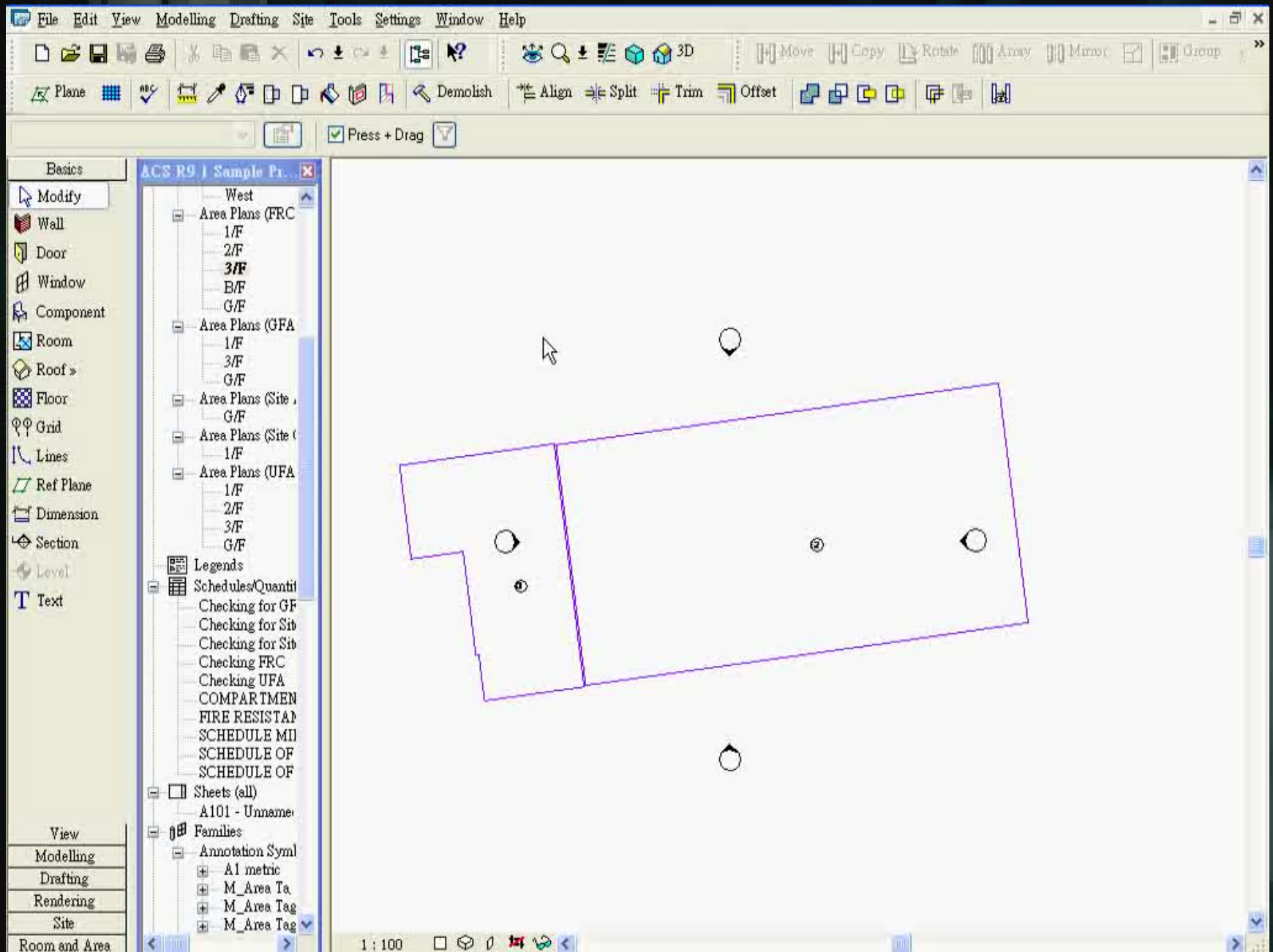
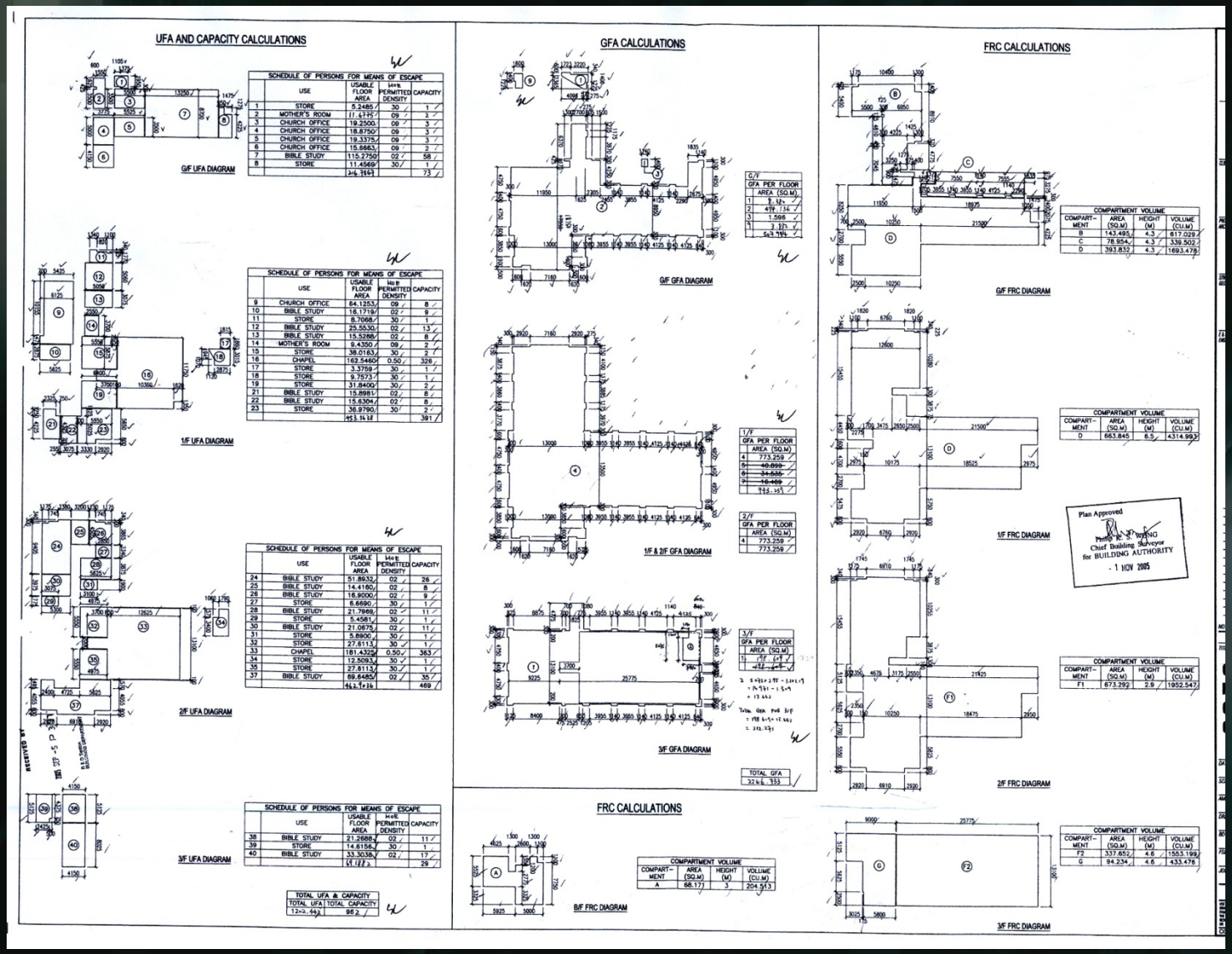


EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM



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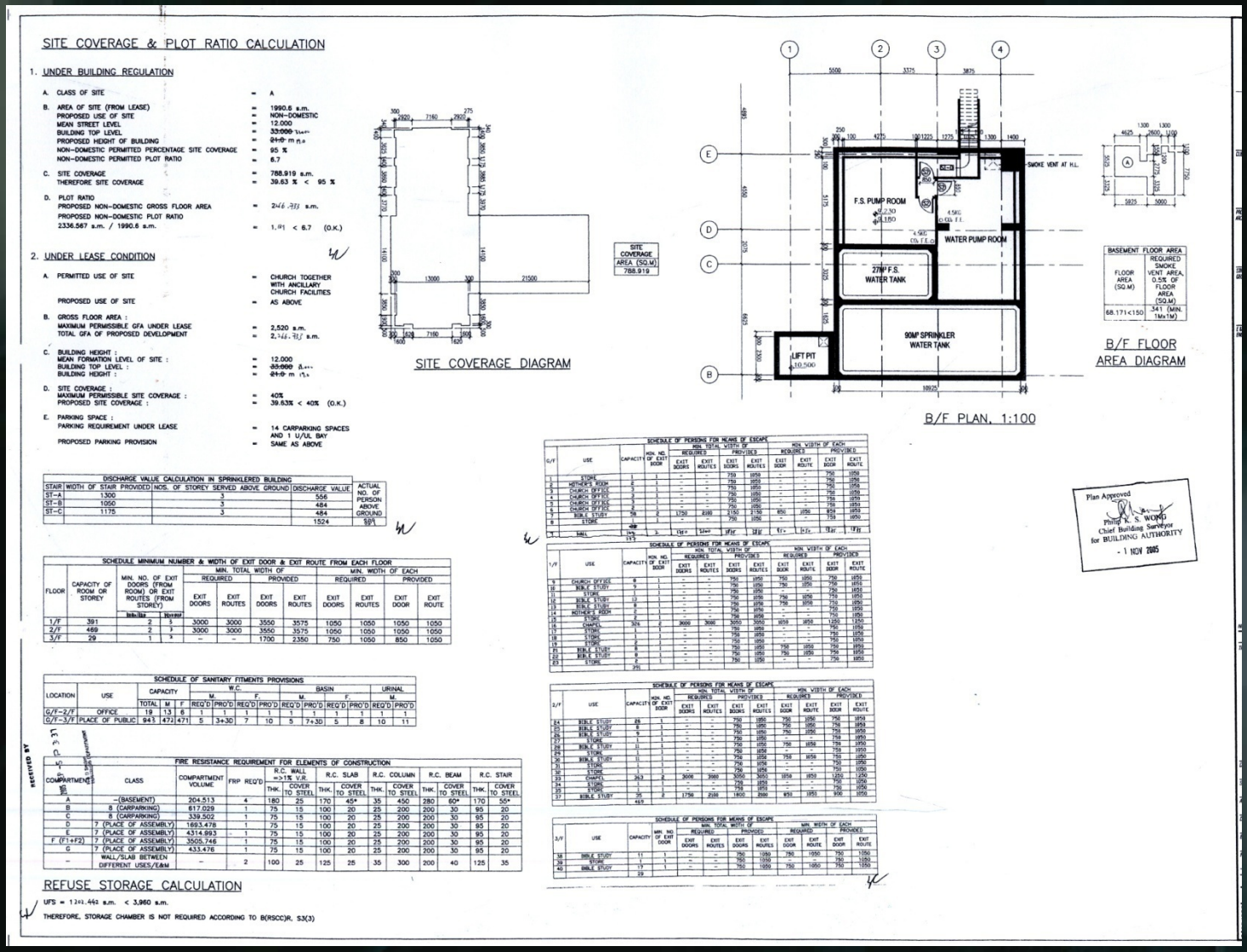


SITE COVERAGE & PLOT RATIO CALCULATION

1. UNDER BUILDING REGULATION

A. CLASS OF SITE = A

B. AREA OF SITE (FROM LEASE) = 1990.6 s.m.
PROPOSED USE OF SITE = NON-DOMESTIC
MEAN STREET LEVEL = 12.000
BUILDING TOP LEVEL = ~~33.000~~ mPD
PROPOSED HEIGHT OF BUILDING = ~~21.0~~ m
NON-DOMESTIC PERMITTED PERCENTAGE SITE COVERAGE = 95 %
NON-DOMESTIC PERMITTED PLOT RATIO = 6.7

C. SITE COVERAGE = 788.919 s.m.
THEREFORE SITE COVERAGE = 39.63 % < 95 %

D. PLOT RATIO
PROPOSED NON-DOMESTIC GROSS FLOOR AREA = 2446.733 s.m.
PROPOSED NON-DOMESTIC PLOT RATIO
2336.587 s.m. / 1990.6 s.m. = 1.23 < 6.7 (O.K.)

2. UNDER LEASE CONDITION

A. PERMITTED USE OF SITE = CHURCH TOGETHER WITH ANCILLARY CHURCH FACILITIES
PROPOSED USE OF SITE = AS ABOVE

B. GROSS FLOOR AREA :
MAXIMUM PERMISSIBLE GFA UNDER LEASE = 2,520 s.m.
TOTAL GFA OF PROPOSED DEVELOPMENT = 2,446.733 s.m.

C. BUILDING HEIGHT :
MEAN FORMATION LEVEL OF SITE : = 12.000
BUILDING TOP LEVEL : = ~~33.000~~ mPD
BUILDING HEIGHT : = ~~21.0~~ m

D. SITE COVERAGE :
MAXIMUM PERMISSIBLE SITE COVERAGE : = 40%
PROPOSED SITE COVERAGE : = 39.63% < 40% (O.K.)

E. PARKING SPACE :
PARKING REQUIREMENT UNDER LEASE = 14 CARPARKING SPACES AND 1 U/UL BAY
PROPOSED PARKING PROVISION = SAME AS ABOVE

SITE COVERAGE DIAGRAM

SITE COVERAGE AREA (SQ.M) 788.919

B/F PLAN, 1:100

F.S. PUMP ROOM
WATER PUMP ROOM
27MP F.S. WATER TANK
90MP SPRINKLER WATER TANK
LIFT PIT
SMOKE VENT AT H.L.

BASEMENT FLOOR AREA

FLOOR AREA (SQ.M)	REQUIRED SMOKE VENT AREA, 0.5% OF FLOOR AREA (SQ.M)
68.171<150	341 (MIN. 1Mx1M)

B/F FLOOR AREA DIAGRAM

DISCHARGE VALUE CALCULATION IN SPRINKLERED BUILDING

STAIR	WIDTH OF STAIR PROVIDED	NOS. OF STOREY SERVED ABOVE GROUND	DISCHARGE VALUE	ACTUAL NO. OF PERSON ABOVE GROUND
ST-A	1300	3	556	
ST-B	1050	3	484	
ST-C	1175	3	484	
			1524	991

SCHEDULE MINIMUM NUMBER & WIDTH OF EXIT DOOR & EXIT ROUTE FROM EACH FLOOR

FLOOR	CAPACITY OF ROOM OR STOREY	MIN. NO. OF EXIT DOORS (FROM ROOM) OR EXIT ROUTES (FROM STOREY)		MIN. TOTAL WIDTH OF REQUIRED		MIN. TOTAL WIDTH OF PROVIDED		MIN. WIDTH OF EACH REQUIRED		MIN. WIDTH OF EACH PROVIDED	
				EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOOR	EXIT ROUTE
		min/no	Number								
1/F	381	2	3	3000	3000	3550	3575	1050	1050	1050	1050
2/F	469	2	3	3000	3000	3550	3575	1050	1050	1050	1050
3/F	29	1	3	–	–	1700	2350	750	1050	850	1050

SCHEDULE OF SANITARY FITMENTS PROVISIONS

LOCATION	USE	CAPACITY			W.C. M. REQ'D	W.C. M. PRO'D	W.C. F. REQ'D	W.C. F. PRO'D	BASIN M. REQ'D	BASIN M. PRO'D	BASIN F. REQ'D	BASIN F. PRO'D	URINAL M. REQ'D	URINAL M. PRO'D
		TOTAL	M	F										
G/F-2/F	OFFICE	19	13	6	1	1	1	1	1	1	1	1	1	1
G/F-3/F	PLACE OF PUBLIC	943	472	471	5	3+3D	7	10	5	7+3D	5	8	10	11

FIRE RESISTANCE REQUIREMENT FOR ELEMENTS OF CONSTRUCTION

COMPARTMENT	CLASS	COMPARTMENT VOLUME	FRP REQ'D	R.C. WALL =>1% V.R. THK.	R.C. WALL =>1% V.R. COVER TO STEEL	R.C. SLAB THK.	R.C. SLAB COVER TO STEEL	R.C. COLUMN THK.	R.C. COLUMN COVER TO STEEL	R.C. BEAM THK.	R.C. BEAM COVER TO STEEL	R.C. STAIR THK.	R.C. STAIR COVER TO STEEL
A	–(BASEMENT)	204.513	4	180	25	170	45*	35	450	280	60*	170	55*
B	B (CARPARKING)	617.029	1	75	15	100	20	25	200	200	30	95	20
C	B (CARPARKING)	339.502	1	75	15	100	20	25	200	200	30	95	20
D	7 (PLACE OF ASSEMBLY)	1693.478	1	75	15	100	20	25	200	200	30	95	20
E	7 (PLACE OF ASSEMBLY)	4314.893	1	75	15	100	20	25	200	200	30	95	20
F (F1+F2)	7 (PLACE OF ASSEMBLY)	3505.746	1	75	15	100	20	25	200	200	30	95	20
G	7 (PLACE OF ASSEMBLY)	433.476	1	75	15	100	20	25	200	200	30	95	20
–	WALL/SLAB BETWEEN DIFFERENT USES/E&M	–	2	100	25	125	25	35	300	200	40	125	35

REFUSE STORAGE CALCULATION

UFS = 1241.462 s.m. < 3,960 s.m.

THEREFORE, STORAGE CHAMBER IS NOT REQUIRED ACCORDING TO B(RSCC)R, S3(3)

SCHEDULE OF PERSONS FOR MEANS OF ESCAPE

G/F	USE	CAPACITY	MIN. NO. OF EXIT DOOR	MIN. TOTAL WIDTH OF REQUIRED EXIT DOORS	MIN. TOTAL WIDTH OF REQUIRED EXIT ROUTES	MIN. TOTAL WIDTH OF PROVIDED EXIT DOORS	MIN. TOTAL WIDTH OF PROVIDED EXIT ROUTES	MIN. WIDTH OF EACH REQUIRED EXIT DOOR	MIN. WIDTH OF EACH REQUIRED EXIT ROUTE	MIN. WIDTH OF EACH PROVIDED EXIT DOOR	MIN. WIDTH OF EACH PROVIDED EXIT ROUTE
1	STORE	1	1	–	–	750	1050	–	–	750	1050
2	MOTHER'S ROOM	2	1	–	–	750	1050	–	–	750	1050
3	CHURCH OFFICE	3	1	–	–	750	1050	–	–	750	1050
4	CHURCH OFFICE	3	1	–	–	750	1050	–	–	750	1050
5	CHURCH OFFICE	3	1	–	–	750	1050	–	–	750	1050
6	CHURCH OFFICE	3	1	–	–	750	1050	–	–	750	1050
7	BIBLE STUDY	38	1	1750	2100	1750	2100	850	1050	850	1050
8	STORE	2	1	–	–	750	1050	–	–	750	1050
9	HALL	469	3	1750	2100	2850	3150	850	1050	950	1050
		515									

1/F	USE	CAPACITY	MIN. NO. OF EXIT DOOR	MIN. TOTAL WIDTH OF REQUIRED EXIT DOORS	MIN. TOTAL WIDTH OF REQUIRED EXIT ROUTES	MIN. TOTAL WIDTH OF PROVIDED EXIT DOORS	MIN. TOTAL WIDTH OF PROVIDED EXIT ROUTES	MIN. WIDTH OF EACH REQUIRED EXIT DOOR	MIN. WIDTH OF EACH REQUIRED EXIT ROUTE	MIN. WIDTH OF EACH PROVIDED EXIT DOOR	MIN. WIDTH OF EACH PROVIDED EXIT ROUTE
8	CHURCH OFFICE	6	1	–	–	750	1050	750	1050	750	1050
10	BIBLE STUDY	9	1	–	–	750	1050	750	1050	750	1050
11	STORE	1	1	–	–	750	1050	–	–	750	1050
12	BIBLE STUDY	13	1	–	–	750	1050	750	1050	750	1050
13	BIBLE STUDY	8	1	–	–	750	1050	750	1050	750	1050
14	MOTHER'S ROOM	2	1	–	–	750	1050	–	–	750	1050
15	STORE	2	1	–	–	750	1050	–	–	750	1050
16	CHAPEL	376	2	3000	3000	3050	3050	1050	1050	1250	1250
17	STORE	1	1	–	–	750	1050	–	–	750	1050
18	STORE	1	1	–	–	750	1050	–	–	750	1050
19	STORE	2	1	–	–	750	1050	–	–	750	1050
F1	BIBLE STUDY	8	1	–	–	750	1050	750	1050	750	1050
22	BIBLE STUDY	8	1	–	–	750	1050	750	1050	750	1050
23	STORE	2	1	–	–	750	1050	–	–	750	1050
		391									

2/F	USE	CAPACITY	MIN. NO. OF EXIT DOOR	MIN. TOTAL WIDTH OF REQUIRED EXIT DOORS	MIN. TOTAL WIDTH OF REQUIRED EXIT ROUTES	MIN. TOTAL WIDTH OF PROVIDED EXIT DOORS	MIN. TOTAL WIDTH OF PROVIDED EXIT ROUTES	MIN. WIDTH OF EACH REQUIRED EXIT DOOR	MIN. WIDTH OF EACH REQUIRED EXIT ROUTE	MIN. WIDTH OF EACH PROVIDED EXIT DOOR	MIN. WIDTH OF EACH PROVIDED EXIT ROUTE
24	BIBLE STUDY	28	1	–	–	750	1050	750	1050	750	1050
25	BIBLE STUDY	8	1	–	–	750	1050	750	1050	750	1050
26	BIBLE STUDY	9	1	–	–	750	1050	750	1050	750	1050
27	STORE	1	1	–	–	750	1050	–	–	750	1050
28	BIBLE STUDY	11	1	–	–	750	1050	750	1050	750	1050
29	STORE	1	1	–	–	750	1050	–	–	750	1050
30	BIBLE STUDY	11	1	–	–	750	1050	750	1050	750	1050
31	STORE	1	1	–	–	750	1050	–	–	750	1050
32	STORE	1	1	–	–	750	1050	–	–	750	1050
33	CHAPEL	343	2	3000	3980	3050	3650	1050	1250	1250	1250
34	STORE	1	1	–	–	750	1050	–	–	750	1050
35	STORE	1	1	–	–	750	1050	–	–	750	1050
37	BIBLE STUDY	25	2	1750	2100	1800	2100	850	1050	900	1050
		469									

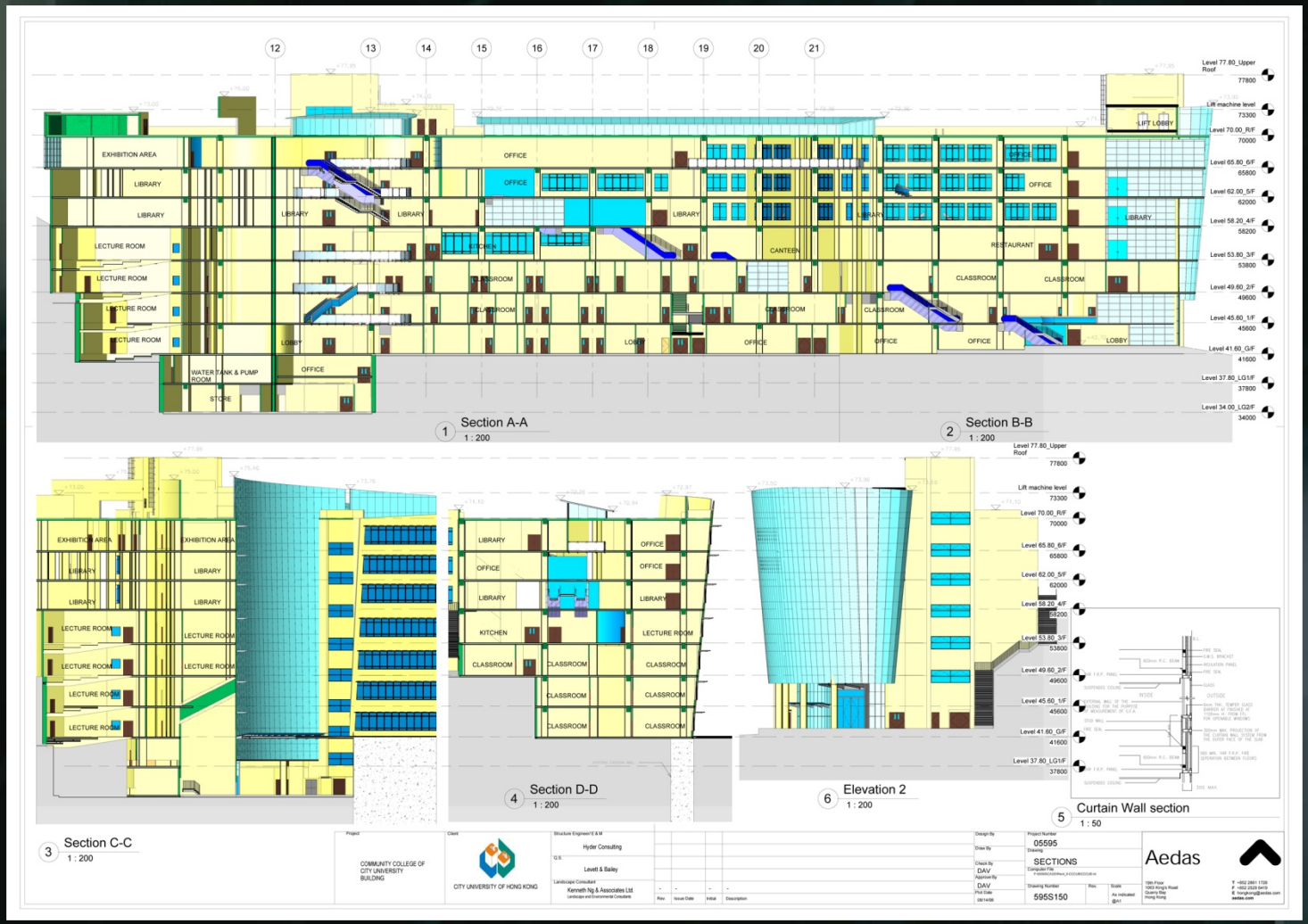
3/F	USE	CAPACITY	MIN. NO. OF EXIT DOOR	MIN. TOTAL WIDTH OF REQUIRED EXIT DOORS	MIN. TOTAL WIDTH OF REQUIRED EXIT ROUTES	MIN. TOTAL WIDTH OF PROVIDED EXIT DOORS	MIN. TOTAL WIDTH OF PROVIDED EXIT ROUTES	MIN. WIDTH OF EACH REQUIRED EXIT DOOR	MIN. WIDTH OF EACH REQUIRED EXIT ROUTE	MIN. WIDTH OF EACH PROVIDED EXIT DOOR	MIN. WIDTH OF EACH PROVIDED EXIT ROUTE
38	BIBLE STUDY	11	1	–	–	750	1050	750	1050	750	1050
39	STORE	1	1	–	–	750	1050			750	1050
40	BIBLE STUDY	17	1	–	–	750	1050	750	1050	750	1050
		29									

Plan Approved
Philip K. S. WONG
Chief Building Surveyor
for BUILDING AUTHORITY
- 1 NOV 2005

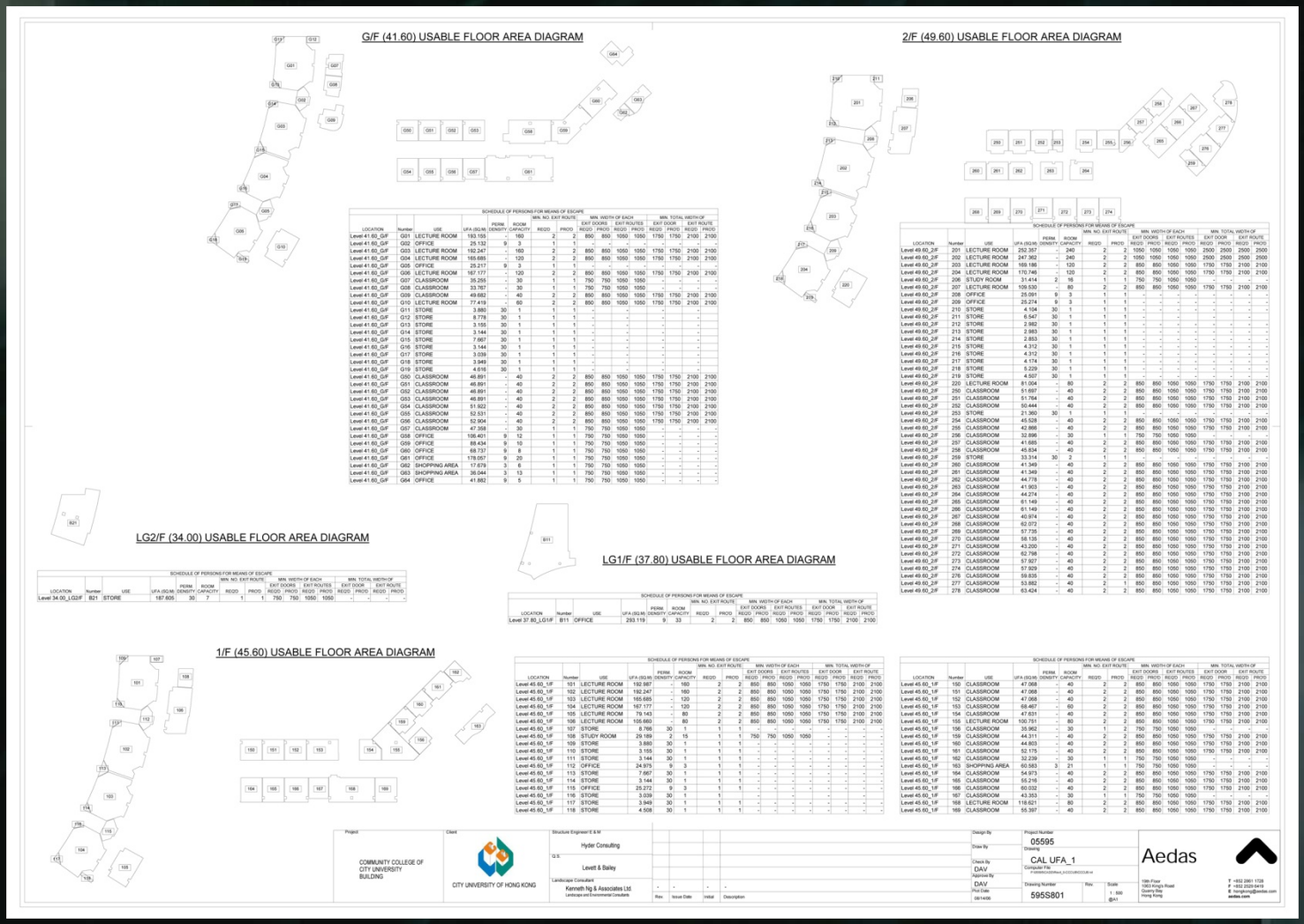
RECEIVED BY

EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM

EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM



EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM



G/F (41.60) USABLE FLOOR AREA DIAGRAM

2/F (49.60) USABLE FLOOR AREA DIAGRAM

LG2/F (34.00) USABLE FLOOR AREA DIAGRAM

LG1/F (37.80) USABLE FLOOR AREA DIAGRAM

1/F (45.60) USABLE FLOOR AREA DIAGRAM

COMMUNITY COLLEGE OF CITY UNIVERSITY BUILDING

CITY UNIVERSITY OF HONG KONG

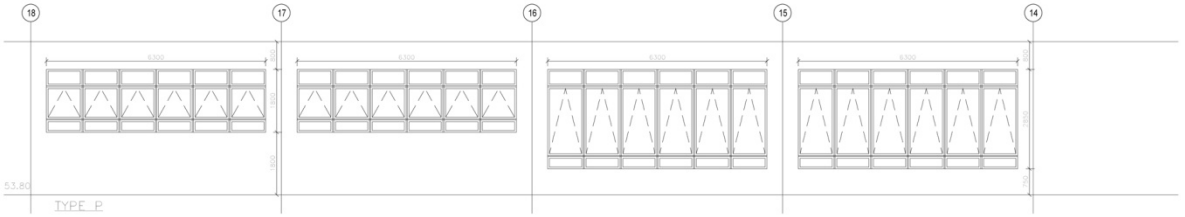
Hyder Consulting

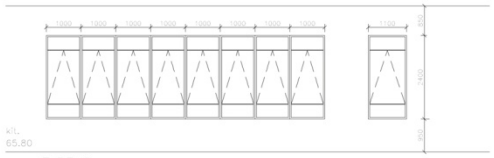
Levett & Bailey

Kenneth Ng & Associates Ltd

Aedas

EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM





TYPE	KITCHEN LOCATION	UFA (sq.m)	GLAZED WINDOW AREA TOTAL WIDTH	HEIGHT	PROVIDED (85% EFFECTIVE)		REQUIRED (1/10 of UFA)	OPENABLE WINDOW AREA TOTAL WIDTH	HEIGHT	PROVIDED (85% EFFECTIVE)		REQUIRED (1/16 of UFA)
			12.600	2.850	30.524			12.600	2.030	21.741		
			12.600	1.800	19.278			12.600	0.980	10.496		
P	LEVEL +53.80 Gridline 14-18/C-D	472.540		sub-total	49.802	>	47.254		sub-total	32.237	>	29.534
Q	LEVEL +65.80 Gridline 2-11/HH-JJ	182.511	9.100	2.400	18.564	>	18.251	9.100	1.570	12.144	>	11.407

OFFICE LOCATION	GLAZED WINDOW AREA UFA (sq.m)	TOTAL LENGTH (m)	HEIGHT (m)	PROVIDED (85% EFFECTIVE) (sq.m.)		REQUIRED (1/10 of UFA) (sq. m.)	OPENABLE WINDOW AREA TOTAL LENGTH (m)	HEIGHT (m)	PROVIDED (85% EFFECTIVE) (sq. m.)		REQUIRED (1/16 of UFA) (sq. m.)
LEVEL +37.80 Gridline 12-13/A-C	293.119	13.380	3.800	43.217	>	29.3119	Application for modificaiton					
LEVEL +41.60 Gridline 18-21/A-B	178.057	21.950	2.330	43.472	>	17.8057	21.950	1.520	28.359	>	11.129	
LEVEL +62.00 Gridline 13-29/F-J	2615.380	43.900	2.440	91.049								
		10.500	2.700	24.098								
		46.300	2.250	88.549								
	(curtain wall)	43.000	3.800	138.890								
			sub-total	342.585	>	261.538	Application for modificaiton					
LEVEL +65.80 Grindline 13-18/F-H, 19-29/F-J	2022.023	43.900	2.440	91.049								
		10.500	2.700	24.098								
		30.450	2.250	58.236								
	(curtain wall)	43.000	3.800	138.890								
			sub-total	312.272	>	202.202	Application for modificaiton					

Discharge Value Calculation

Staircase No.	No. of storey served	Width of Staircase (mm)	Discharge Value (Person)	Factor
ST-01	6	2400	1480	
ST-02	6	1800	1060	
ST-03	4	1800	739	*0.8
ST-04	8	1800	1196	
ST-05	8	1800	1196	
ST-06	8	1800	1196	
ST-07	8	2400	1688	
ST-08	2	1800	788	
Permitted discharge value			**9175**	
Actual capacity of CCCUB			8788	

Therefore, Permitted Discharge Value (Person) > Actual Capacity (Person)

OFFICE (CURTAIN WALL) LOCATION	OPENABLE WINDOW AREA UFA (sq. m.)	TOTAL LENGTH (m)	HEIGHT (m)	NUMBER	PROVIDED (85% EFFECTIVE) (sq. m.)		REQUIRED (1/100 of UFA) (sq. m.)
LEVEL +37.80 Gridline 12-13/A-C	293.119	1.115	0.900	12	10.236	>	2.931
LEVEL +62.00 Gridline 14-29/E-J	2615.38	1.240	1.800	15	28.458	>	26.154
LEVEL +65.80 Gridline 14-29/E-J	2022.023	1.240	1.800	15	28.458	>	20.220

SCHEDULE OF A/C PLANT ROOM AREA

LOCATION	LOCATION OF THE PLANT ROOM	TOTAL G.F.A. OF FLOOR WHERE THE PLANT ROOM SITUATED	TOTAL AHU AREA		PERCENTAGE OF AREA OF PAU/PLANT RM AT EACH FLOOR	
	GRID 1/8-HH		24.369			
	GRID 2/CC-DD		24.479			
G/F (+41.60)	GRID 22/A-B	4511.267	38.316	87.164	1.93%	<4%
	GRID 1/8-HH		24.369			
	GRID 2/CC-DD		24.479			
1/F (+45.60)	GRID 22/A-B	4532.375	35.873	84.721	1.87%	<4%
	GRID 27/I		16.049			
	GRID 2/CC-DD		24.526			
	GRID 1/II-HH		33.390			
2/F (+49.60)	GRID 22/A-B	5235.757	38.851	112.816	2.15%	<4%
	GRID 23/F-E		12.554			
	GRID 1/CC-DD		25.176			
	GRID 27/I-H		29.857			
3/F (+53.80)	GRID 3/JJ	5387.226	44.131	111.718	2.07%	<4%
	GRID 23/F-E		19.303			
	GRID 3/JJ		25.394			
	GRID 2/AA-BB		25.716			
4/F (+58.20)	GRID 27/I	5616.292	30.089	100.492	1.79%	<4%
	GRID 3/JJ		21.294			
	GRID 2/AA-BB		25.366			
	GRID 27/I		25.725			
5/F (+62.00)	GRID 22/A-B	5548.517	29.845	102.232	1.84%	<4%
	GRID 3/JJ-KK		17.823			
	GRID 22/A-B		23.378			
	GRID 2/AA-BB		25.489			
6/F (+65.80)	GRID 27/I-H	5416.730	30.373	97.063	1.79%	<4%

SCHEDULE OF SANITARY FITMENTS PROVISIONS

LOCATION	USE	CAPACITY TOTAL	M.	F.	WC M REQ'D	WC M PRO'D	WC F REQ'D	WC F PRO'D	BASIN M REQ'D	BASIN M PRO'D	BASIN F REQ'D	BASIN F PRO'D	URINAL REQ'D	URINAL PRO'D
3/F	RESTAURANT	1465	733	732	6	6	10	12	6	8	9	9	15	15
3/F	WORKPLACE	106	53	53	3	4	4	5	3	5	3	3	2	2
6/F	OFFICE	225	150	75	5	8	4	10	5	8	3	4	3	6
6/F	PLACE OF PUBLIC	350	175	175	2	2	4	4	2	2	2	2	4	4
6/F	RESTAURANT	175	88	87	1	2	2	4	1	2	2	3	2	3
6/F	WORKPLACE	41	21	20	1	2	2	2	1	3	1	2	1	2
G/F	SHOP/DEPARTMENT STORE	40	20	20	1	1	2	2	1	3	1	1	1	2
G/F - 6/F	OFFICE	386	258	128	8	8	7	9	8	10	5	5	6	6
G/F - 6/F	SCHOOL	6000	3000	3000	100	121	150	184	100	113	150	150	200	200

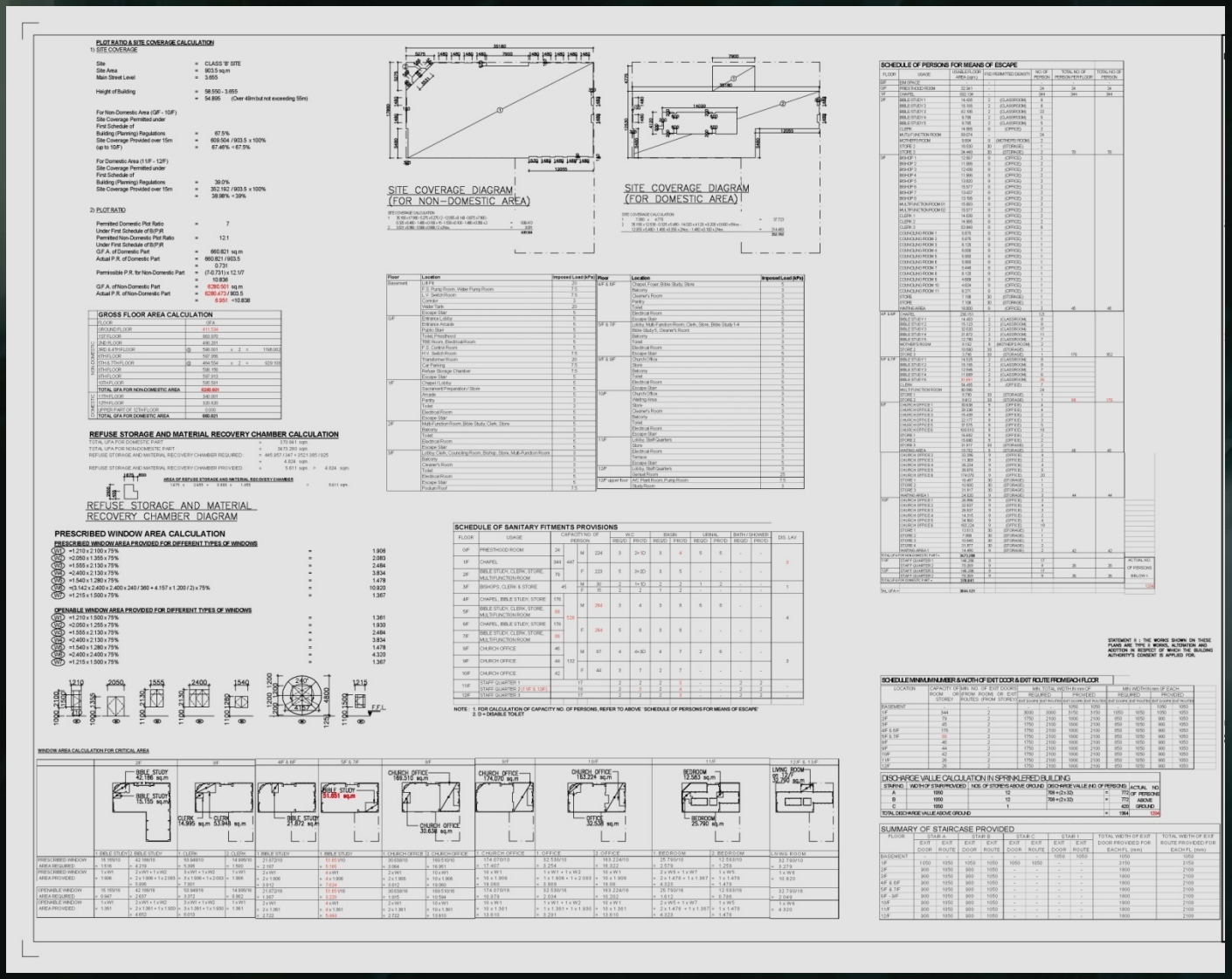
Education Ordinance Reg. 43 (Latrines & urinals in school premises other than boarding school premises)
1. For latrines and urinals connected a flush system to the requirement shall be -

a) For boys - Two urinals for every 30 pupils

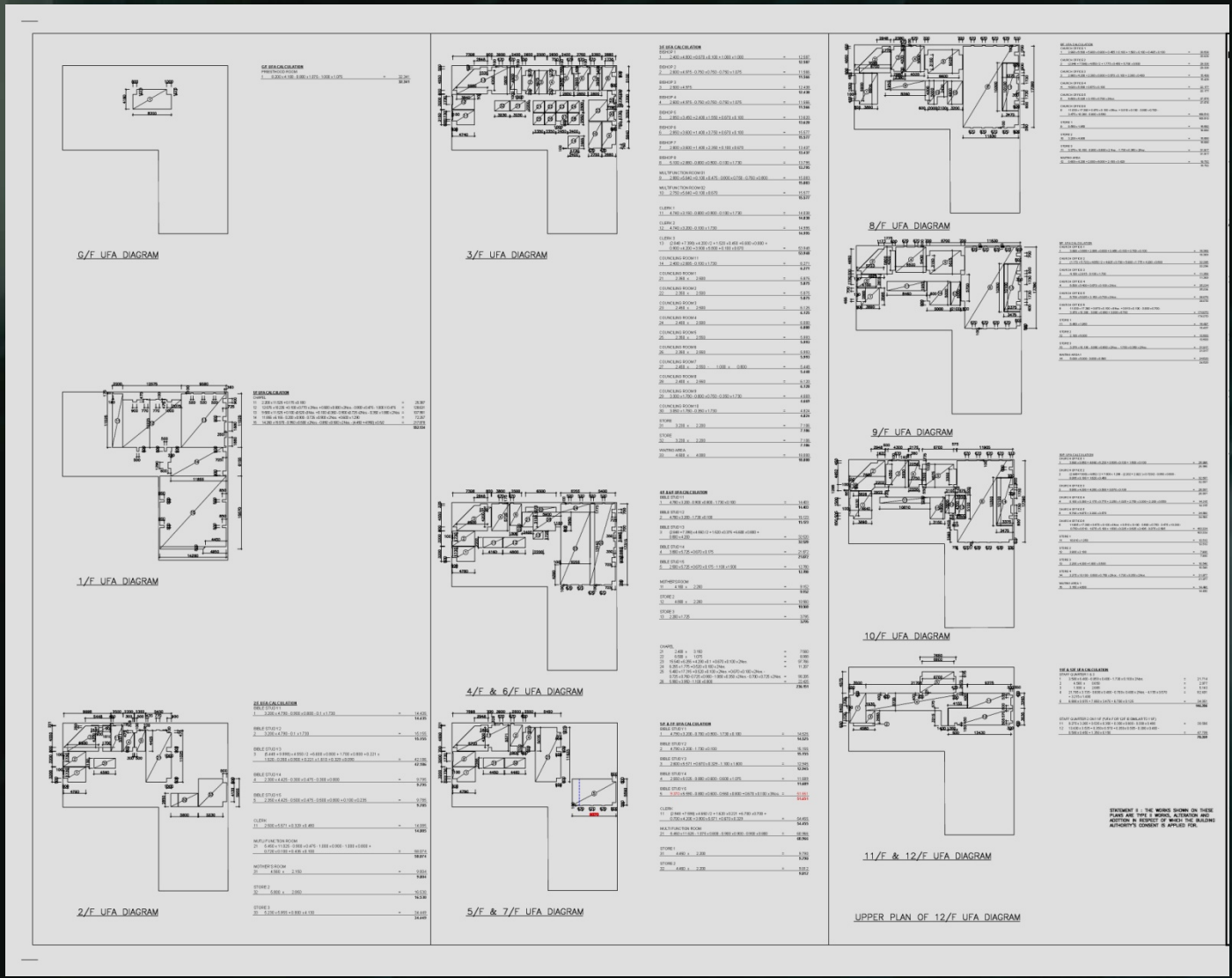
b) For girls - One pan for every 20 pupils

Project: COMMUNITY COLLEGE OF CITY UNIVERSITY BUILDING
Client: CITY UNIVERSITY OF HONG KONG
Structure Engineer/ E & M: Hyder Consulting
Q.S.: Levett & Bailey
Landscape Consultant: Kenneth Ng & Associates Ltd
Design By / Draw By / Check By / Approved By: DAV
Project Number: 05595
Drawing: Windows Calculation
Drawing Number: 595S803
Aedas

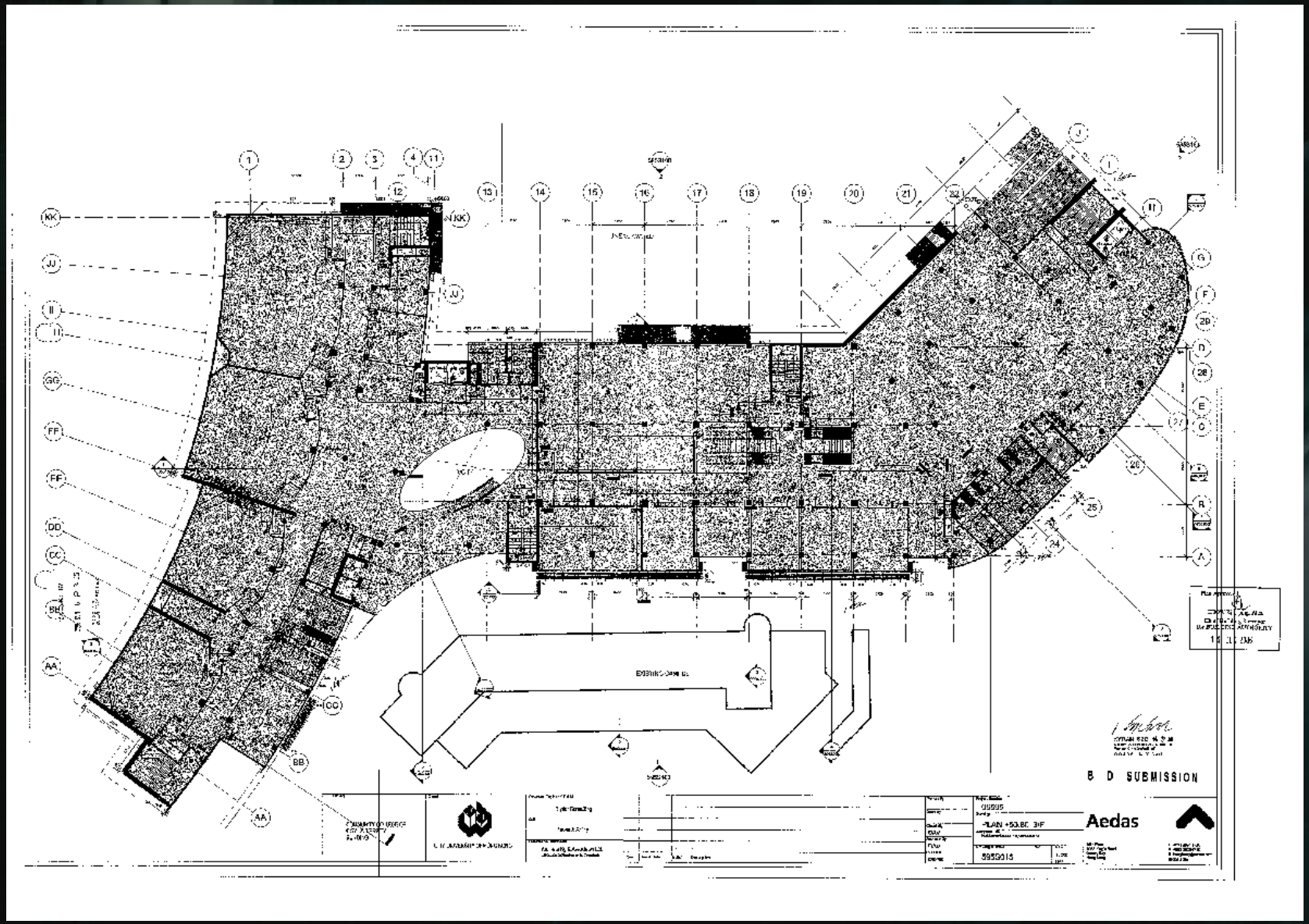
COMMON WAY:
PROJECT EXAMPLE



COMMON WAY:
PROJECT EXAMPLE



STATUTORY SUBMISSION



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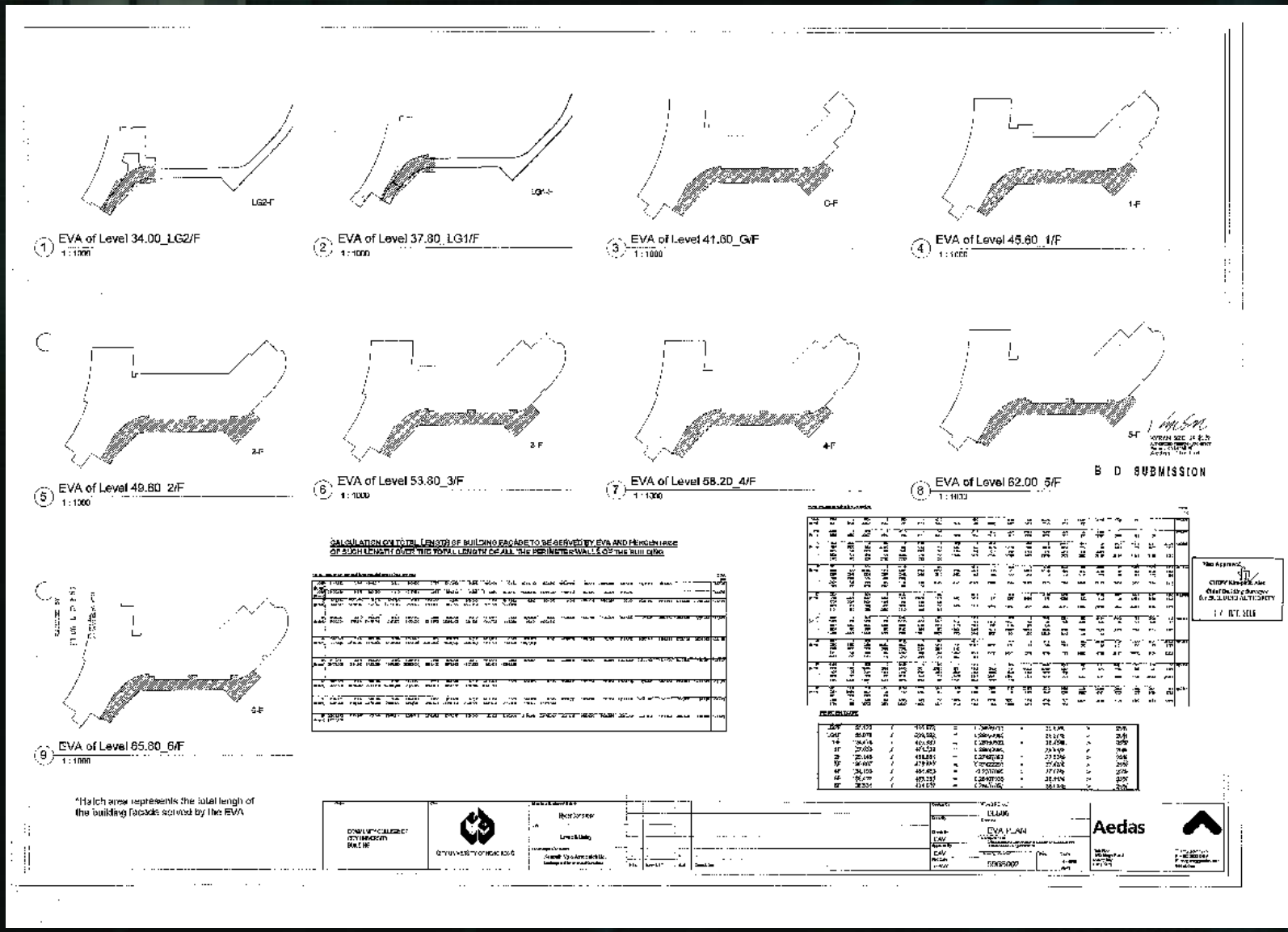

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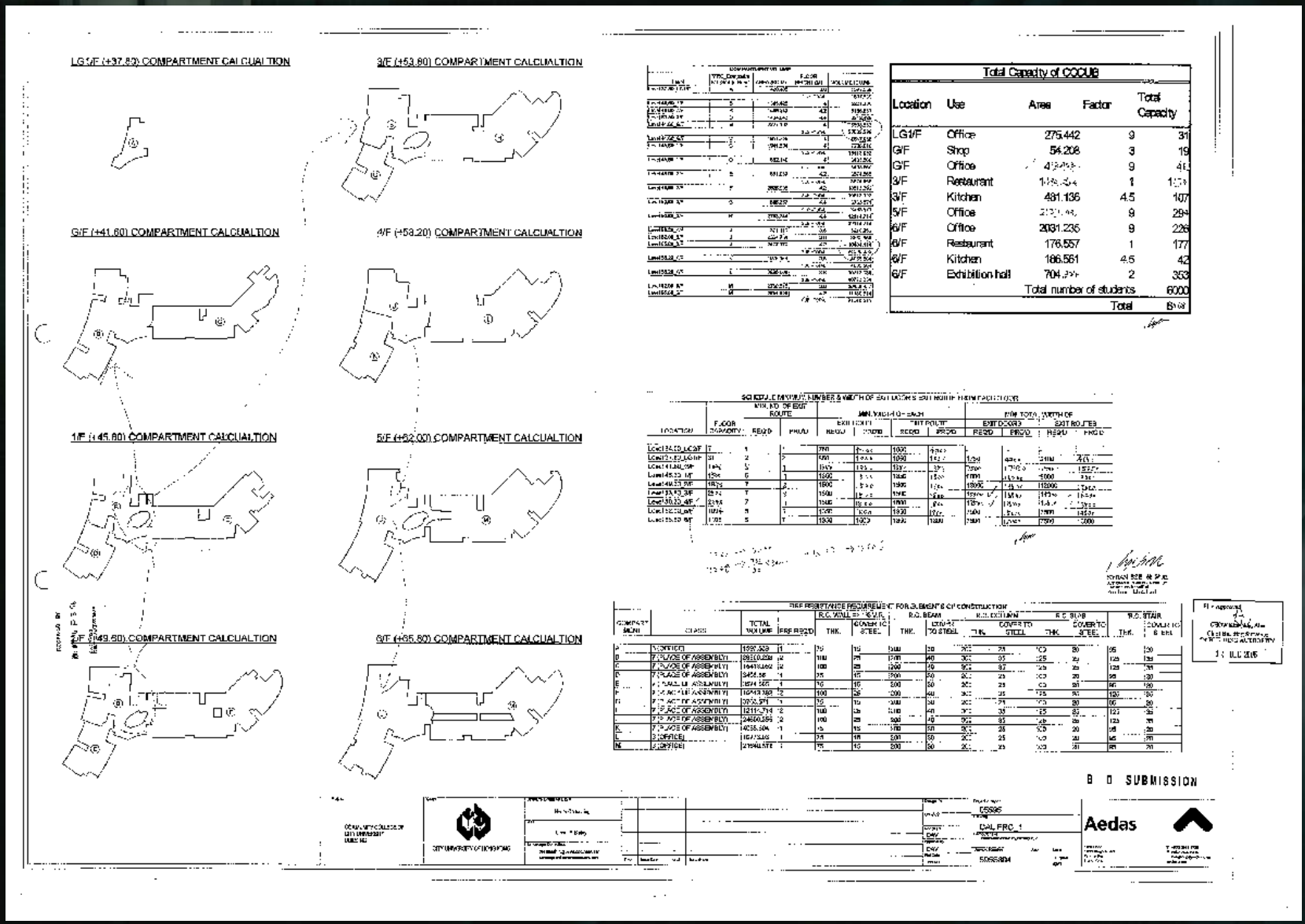
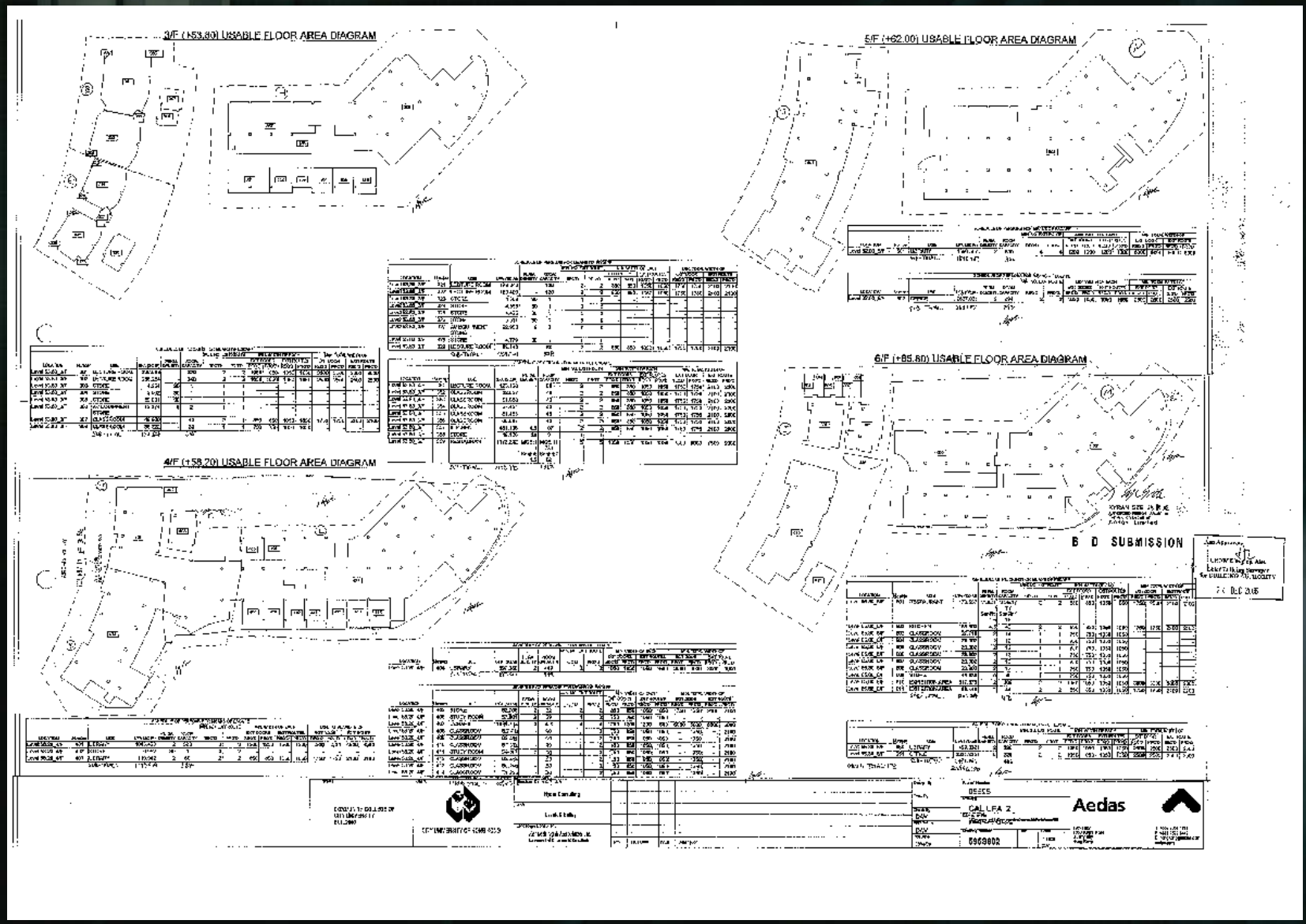


STATUTORY SUBMISSION



SUMMARY:
WHAT ARE THE DIFFERENCES?

Efficiency:

2 weeks vs 1 day

Consistency:

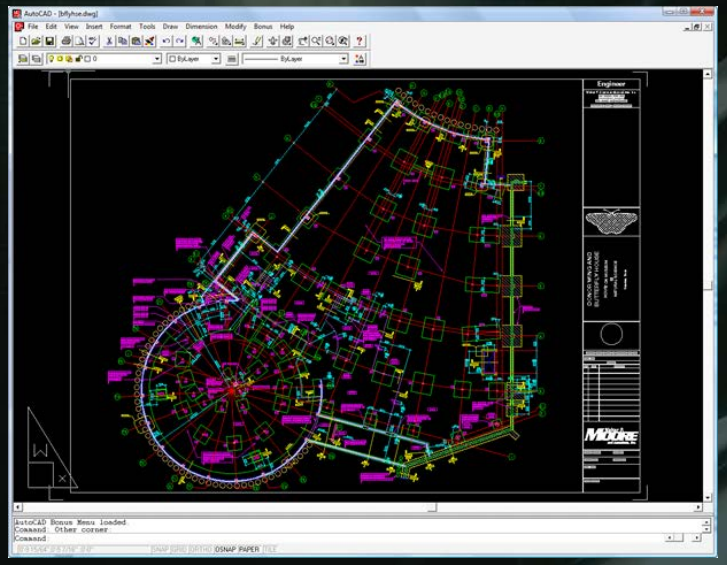
update automatically according to any change in layout, minimize error and mistakes

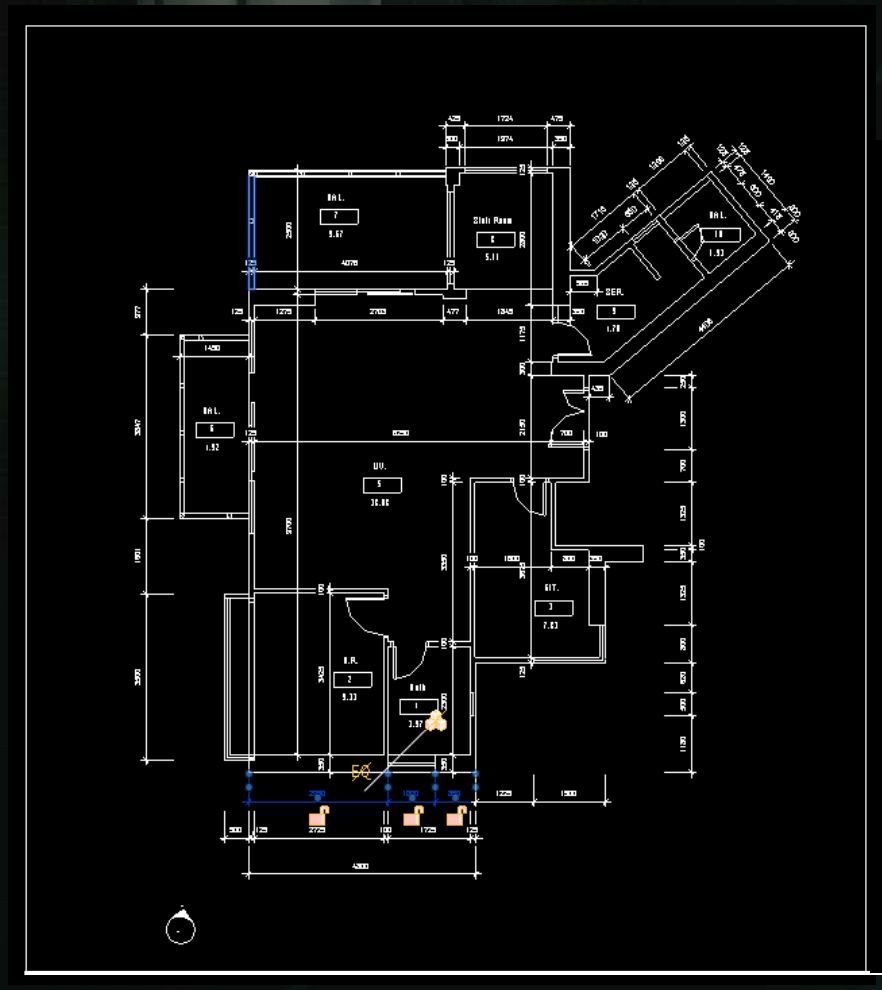
CHALLENGES?

1. Government Acceptance – Another way (Better way) than CAD AutoCAD / Microstation

   PNAP 272 Appendix F only accepts AutoCAD / Microstation, not BIM
2. Paradigm Shift – alternative way (more efficient way) of submission. Automatic calculation & Checking
3. Co-operation of other disciplines – all consultants adopt similar system
4. Future – automatic submission/checking system e.g. Singapore ?

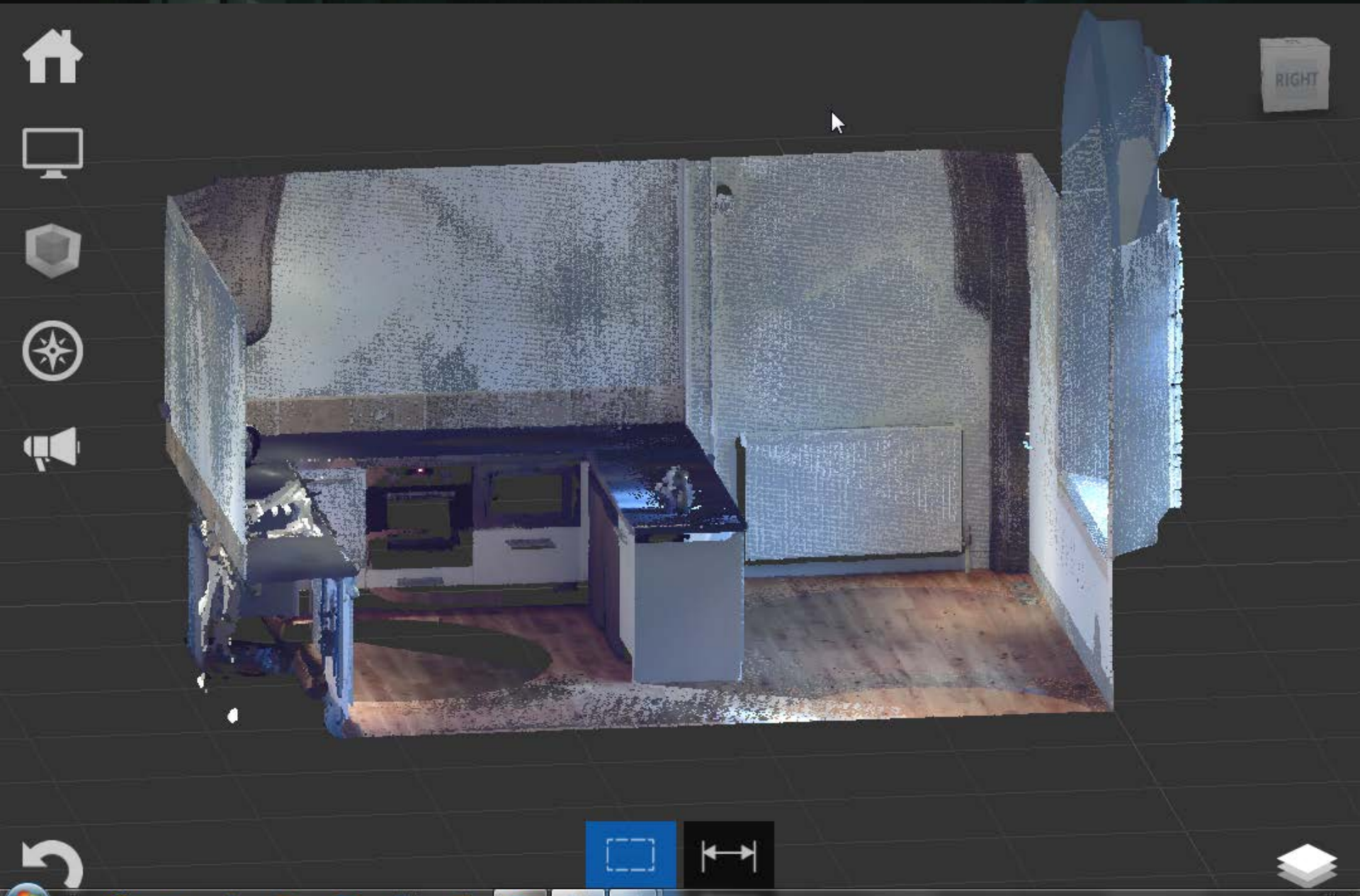
Design / Approved Information = As built Information?



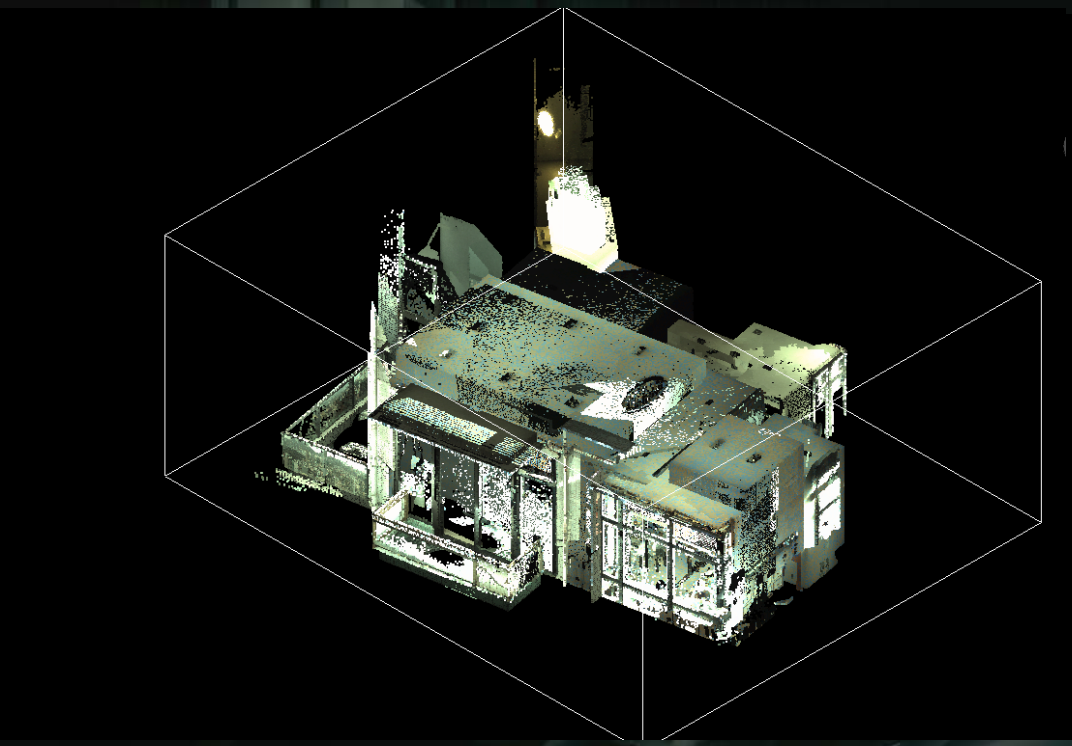


Design / Approved drawing information

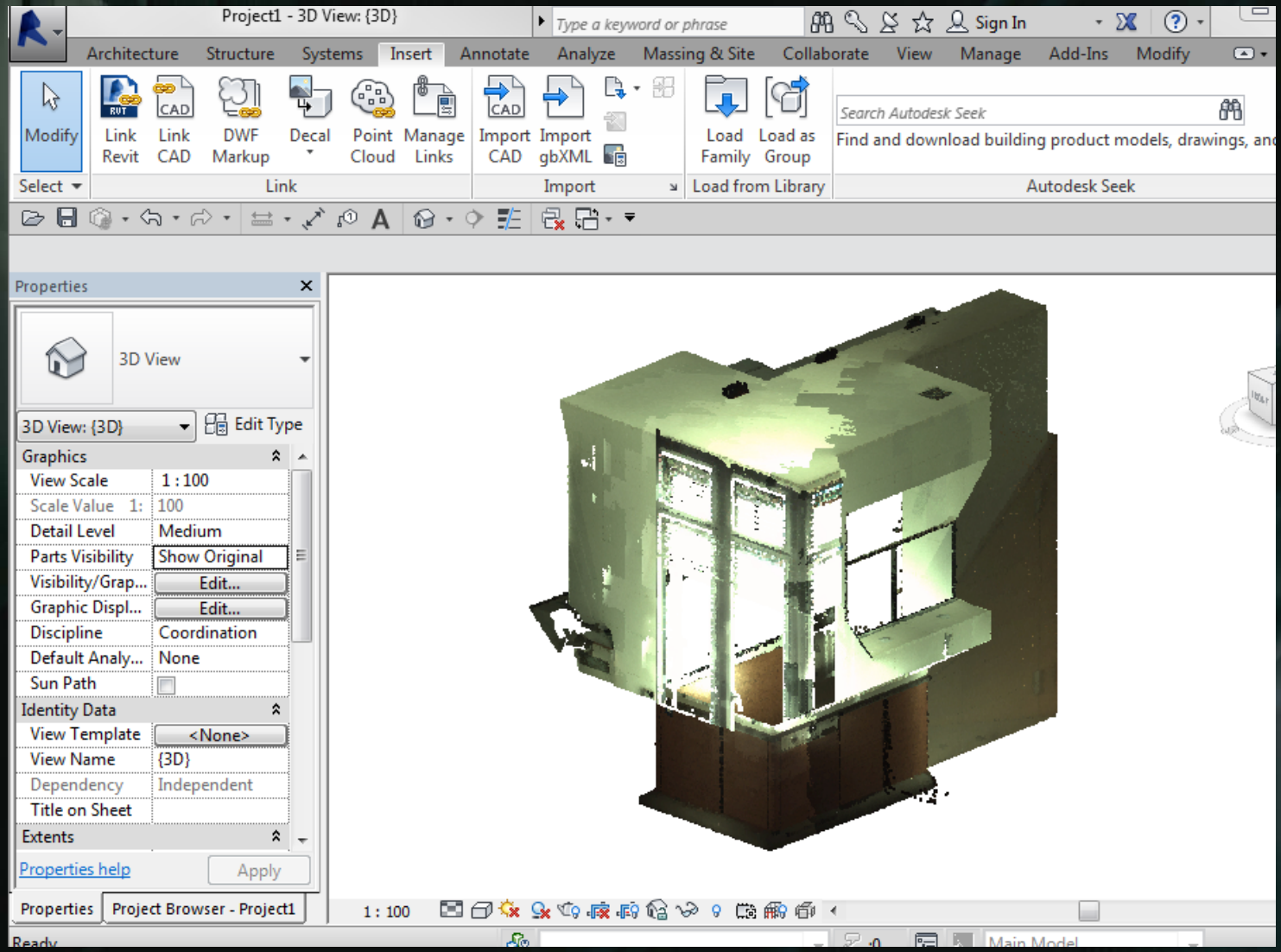
Laser Scanner - 50,000 pts /s; Range: 300m; Accuracy 6mm



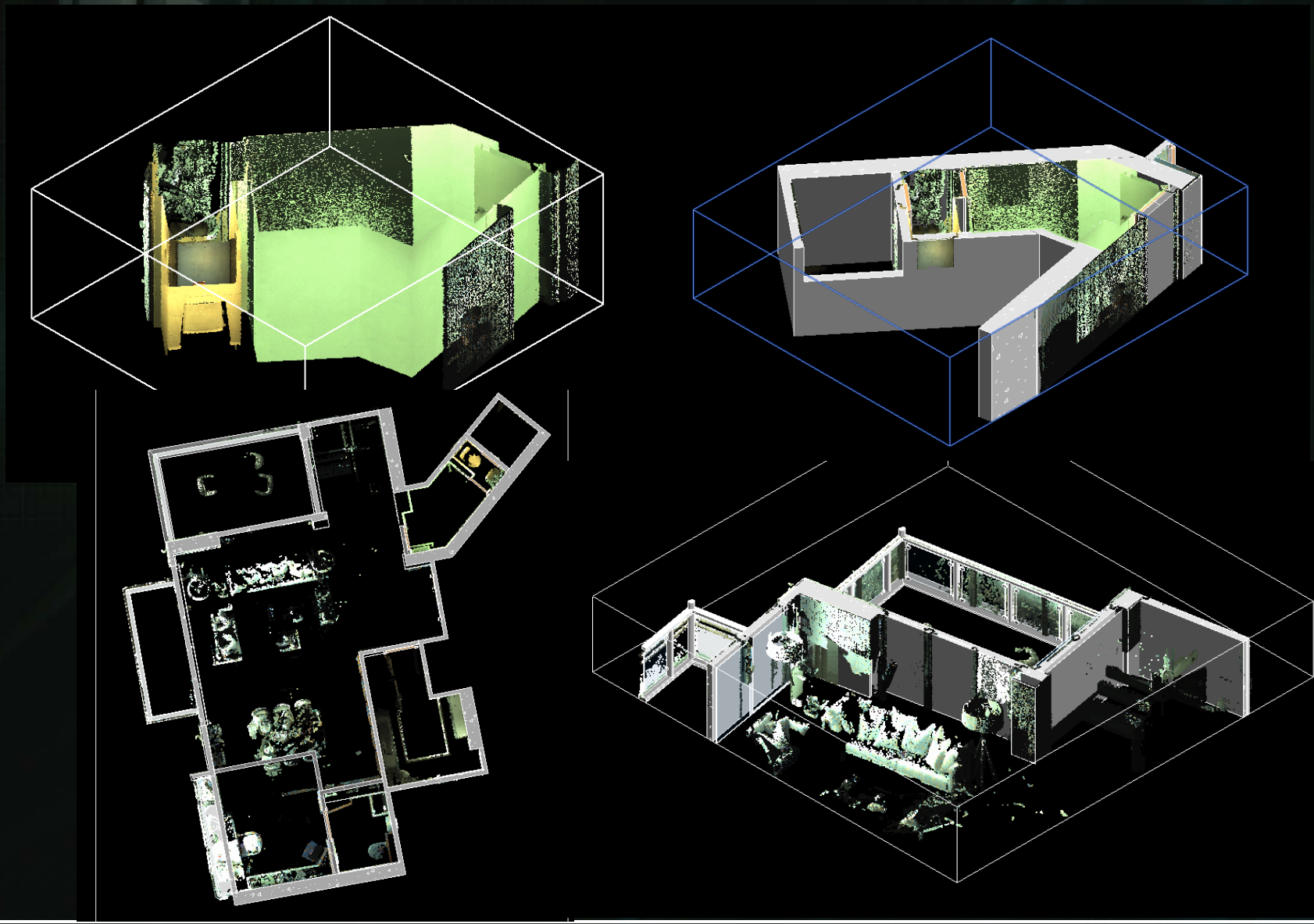
Point Cloud



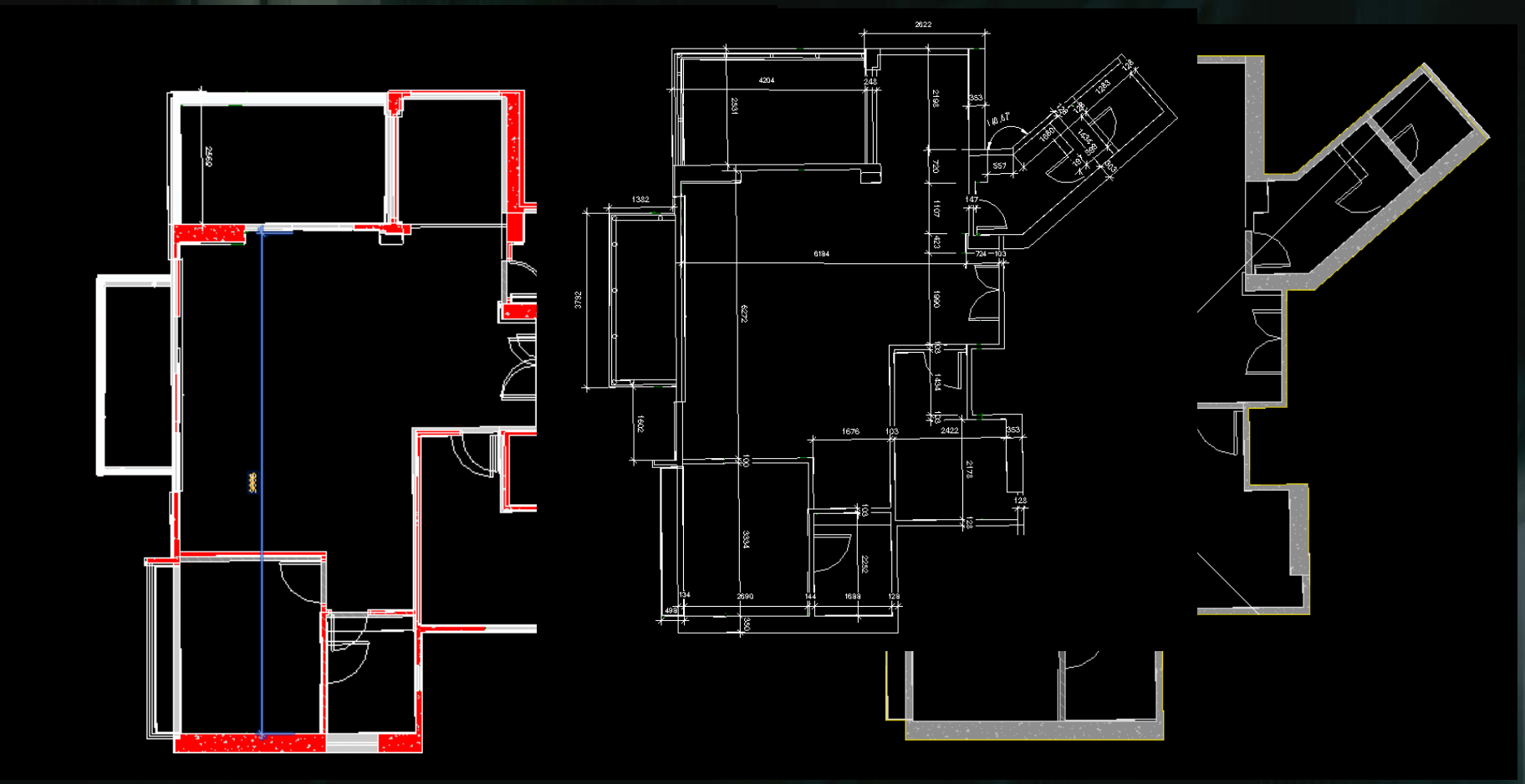
Point Cloud Data



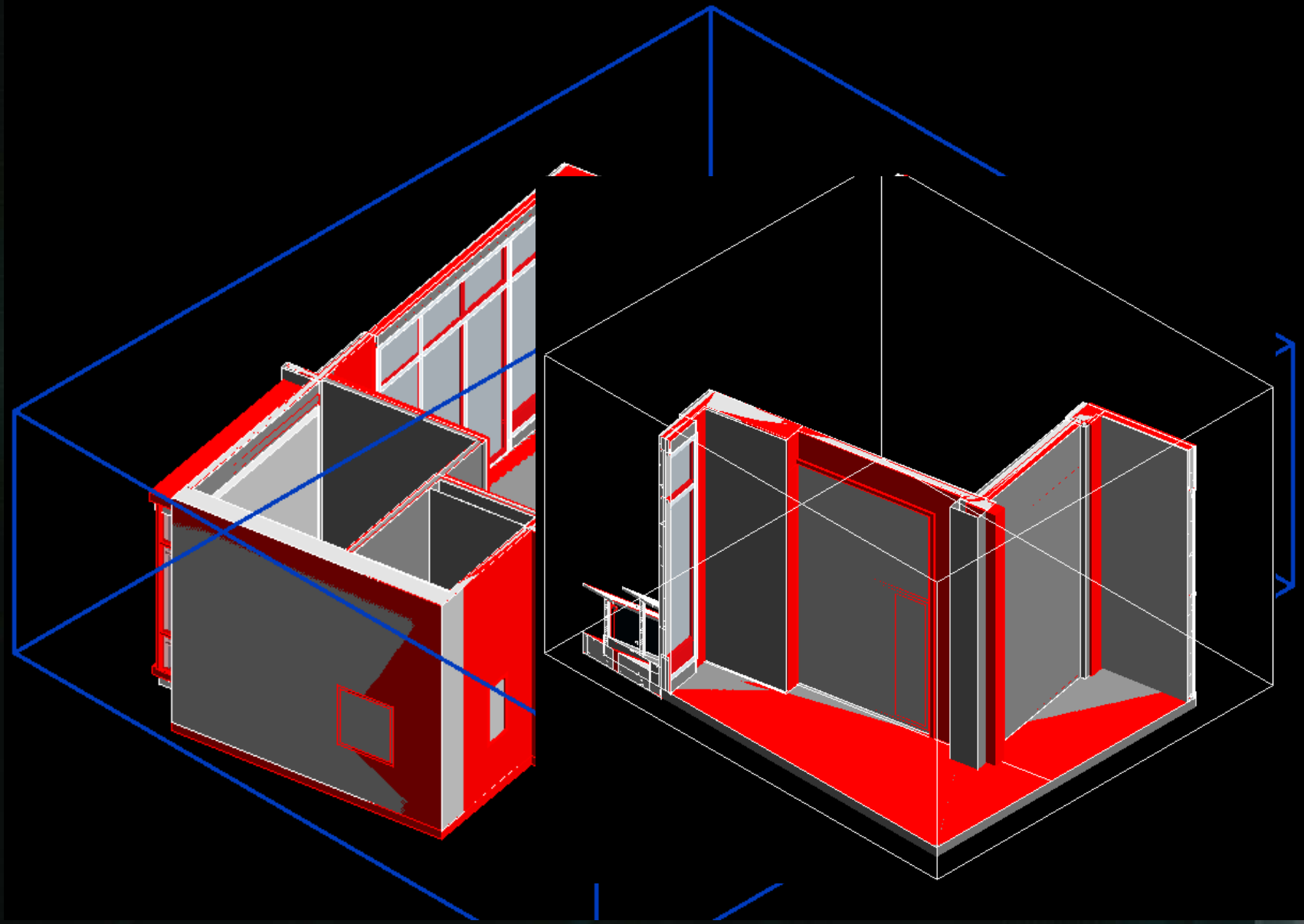
Point Cloud to BIM Model



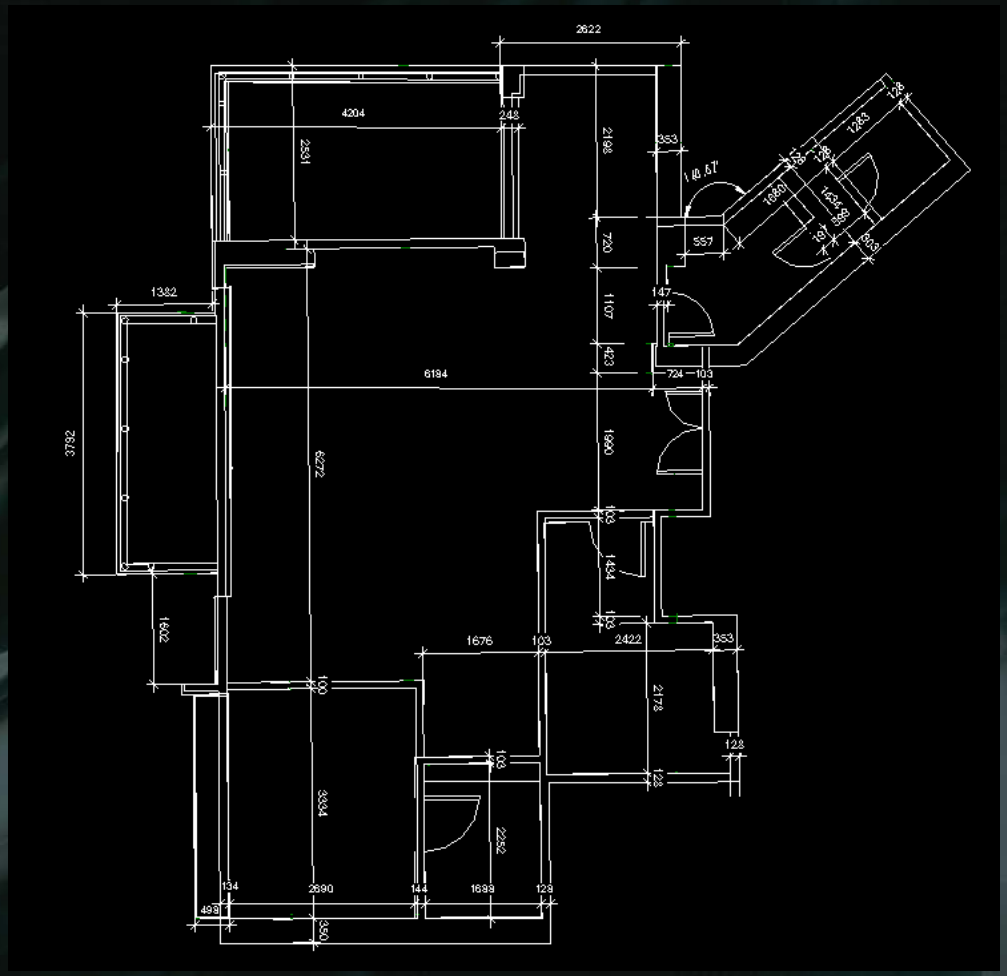
Point Cloud to BIM Model



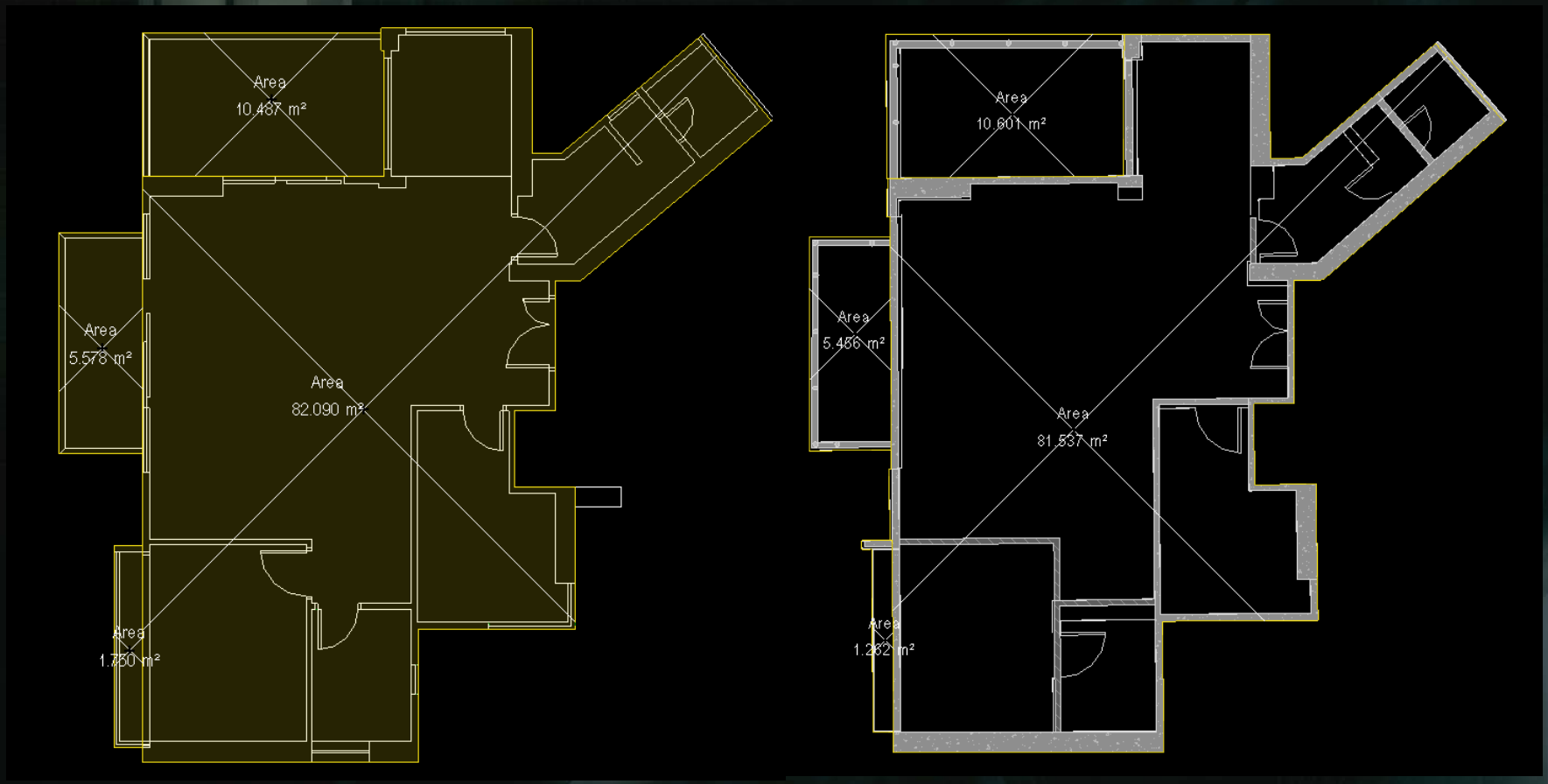
Design / Approved Model + As-built Model



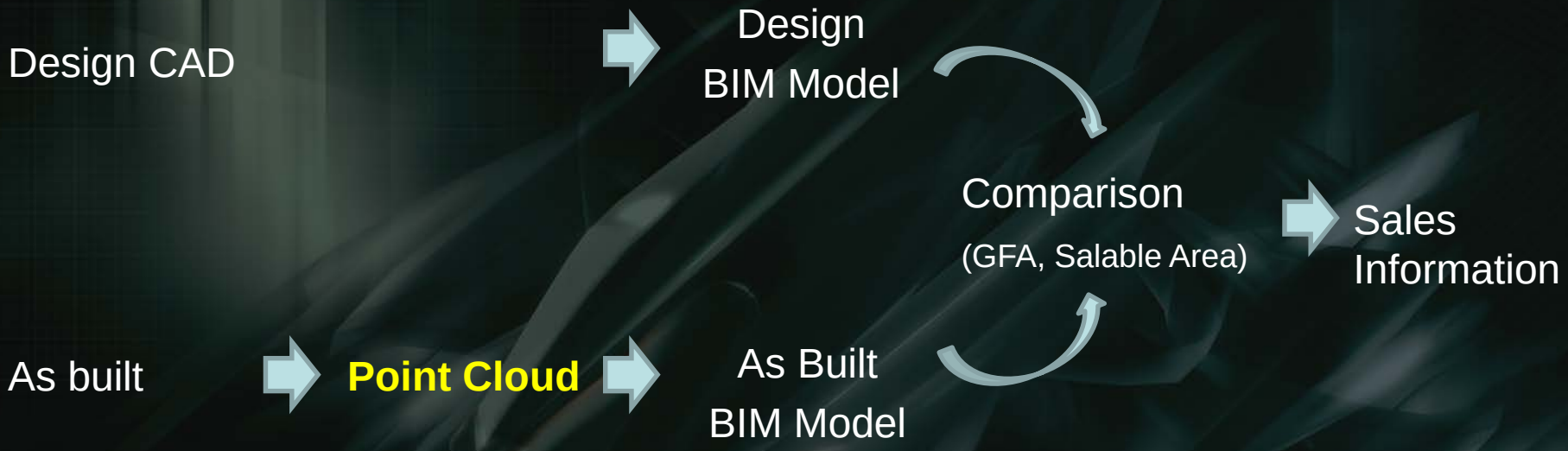
Building Information Modelling



As-built Model > As-built Plan



Area Comparison As-built Model > As-built Plan


Design CAD
Design
BIM Model
Comparison
(GFA, Salable Area)
Sales
Information
As built
Point Cloud
As Built
BIM Model

Difference is …. -0.9 % (As-Built is less than Approved Information)

Assuming an average unit in HK is 700 sq.ft, and say $8000/ sq ft

Less 0.9% = 700 x $8000 x 0.9 = $50,400

Assuming HK has 45,000 new units/ year

Then $50,400 x 45,000 = HK$2.3 Billion (23億)

Design / Approved Information <> As built Information?

Unknown **Known**

Implications

As owner – sales information vs actual as-built, legal liability?

As buyer – has ability to tell the actual area, any legal implications?
“rescission of agreement” 踢契 during down times?

As A.P., rethink about the certified area?

As Contractor, any process to arrive better precision?

As legislative body, is there a benchmark for tolerance? 0.4%, 0.5%, 0.6%....?

As Inspection Authority, is the current practice sufficient to safeguard deviation?

As professionals... New opportunities… Point Cloud scanning, BIM Process?

BIM Technology → **Change in Practices**

Implications

THANK YOU!