

Presentation:

68th AIPH Annual Congress

International Green City Conference

@AIPH Expo Conference,

Antalya, Turkey.

27 September 2016

Title:

Green Building Exteriors:

Key To Comfort & Cost-Efficient Operations

Green Architecture via Integrated Design

Speaker:

Kelvin Kan

Singapore

Green City?

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What started it off...!

The Garden City begins with the Launch of Tree Planting Campaign in 1963













1960s- early 2000s

Greening of streetscapes

- 440 trees in 1962 to 1.1m trees in 2005
- Flowering shrubs introduced in 1980s
- Safeguarding roadside spaces for trees, including highways like East Coast Parkway
- Greening of bridges, flyovers

Providing parks for communities

- Integration of parks into residential estates
- Basic amenities: playgrounds, shelters, benches, footpaths, lighting, toilets, etc

Mid 2000s-2010

Lifestyle Programming

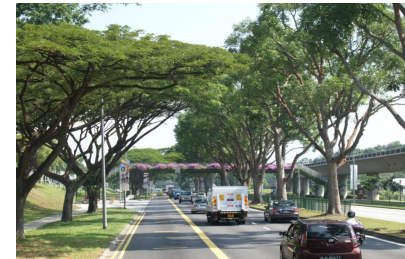
- Beyond mere infrastructure

Enhancing Green Infrastructure

- Park Connector Network
- State-of-the-art parks, e.g., Southern Ridges, Bishan-AMK Park

Natural Heritage Conservation

- Conservation of biodiversity within city



From "Garden City" to.....

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Singapore City in a Garden



Distinctive Global City

X-Factor that contributes to Singapore's distinctiveness and competitive advantage

Changes here 'dwarf those of New York'

By CHEONG SUK-WAI
SENIOR WRITER

HAVING never visited Singapore, New York City's parks and recreation chief Adrian Benepe expected to land on an island crowded with tall, grey buildings.

But a weekend jaunt on the Forest and Canopy Walks linking Henderson Waves with HortPark off Alexandra Road left him struck by how green Singapore is.

"We don't have anything that spectacularly beautiful and fun in New York, so it's spurring me to want to do the same," he said.

"The only thing is we worry about people doing dumb things, like jumping off tall structures while high on drugs, which we unfortunately have to deal with."

Mr Benepe was no less impressed by the newly opened Gardens by the Bay, which he found "astounding".

The 55-year-old, who started as a park ranger, took in these sights before he received the Lee Kuan Yew World City Prize on behalf of New York City last night from Deputy Prime Minister Teo Chee Hean at an awards dinner held in conjunction with the ongoing World Cities Summit.

The award, for cities transformed into epitomes of sustainable living, was given to New York City for its nifty use of abandoned industrial and wharf land.

Among other things, Mr Benepe and his team transformed a disused elevated railway that was an eyesore into a popular sky park 30m above the ground.

Still, he envied Singapore's commitment to greening.

"There is even greenery on your bridges. Back home, they would be horrified because they'd say all that soil from roots overhead would dirty everything."

He was also impressed by "the sense of energy and entrepreneurialism" in the streets of Singapore



New York City's parks and recreation chief Adrian Benepe received the Lee Kuan Yew World City Prize at the Marina Bay Sands last night. The US city won the award for its nifty use of abandoned industrial and wharf land. ST PHOTO: NURIA LING

“ IMPRESSED

"It makes me very happy to see so many young families in Singapore out having a great time; that tells me this is a happy, healthy and safe city."

— New York City's parks and recreation chief Adrian Benepe

which mirror that of his home.

But, he added: "Singapore's extraordinary changes in the last 40 years dwarf those of New York."

Like his city, he and his team are not standing still.

They are creating Freshkills Park on what was once the world's biggest rubbish dump.

It will have an amphitheatre and community seed farm that will "use goats as lawn mowers" to eat up the weeds.

He is also encouraging New Yorkers to plant vegetables and fruit on the roofs of their apartment blocks, to add to the city's 600 community gardens today.

But what can Singapore adopt from New York City? "I think Singapore should be more friendly to pedestrians and cyclists."

"I found it hard to walk safely in the downtown area here," he said, perhaps alluding to Manhattan's Times Square which has become a vibrant public plaza after it was closed to all vehicles.

Still, he said: "It makes me very happy to see so many young families in Singapore out having a great time; that tells me this is a happy, healthy and safe city."

✉ suk@sph.com.sg

The Straits Times, B06, 3rd July 2012

Need to keep cities liveable, sustainable

Impending urban explosion requires long-term planning, experts note

By FENG ZENGKUN

CITIES are the way of the future, so more thought needs to go into planning them and keeping them liveable and sustainable.

That was the key message from world leaders, who tossed up ideas yesterday at two environment meetings at the Marina Bay Sands convention centre.

The events were part of the Singapore International Water Week, World Cities Summit and the inaugural CleanEnviro Summit, which end by Thursday.

The number of megacities - urban areas with more than 10 million people - has grown from just four in 1980 to 21 today, said Minister for the Environment and Water Resources, Dr Vivian Balakrishnan.

By 2050, the United Nations estimates that 70 per cent of the world's population will live in cities.

Coping with the stresses on infrastructure that this impending urban explosion will bring will involve some long-term planning, said government, industry and international organisation representatives who spoke at the events.

Japan, for instance, is planning

to build a high-speed train that would ferry citizens between Tokyo and Osaka in about an hour, said Tokyo governor Shin-ichi Ishihara. The cities are about 500km apart.

This would revive the waning Osaka and ease the pressure on Tokyo, he said.

But cities also need to be self-sufficient, said the panelists.

Dr Balakrishnan gave the example of Singapore, which does not subsidise essentials such as power and water to impress upon citizens the need to conserve resources.

Instead, the Government gives the poor cash.

"People will then ask themselves, do I want to leave the tap running and pay more, and do I really want to buy more food if it will go to waste?" he said.

With large populations within a dense, urban environment, sustainability is vital. That involves everything from managing traffic to recycling and being prudent about energy use.

Dr Roland Busch, chief executive of infrastructure and cities at industrial conglomerate Siemens, said there could be road pricing systems that automatically respond to traffic conditions by

adjusting toll charges.

Studies have also shown that good practices such as switching off lights when they are not needed could reduce buildings' energy use by three times, said Mr Henri Proglio, chairman of global electric utility company Electricite de France.

Dr Balakrishnan said cities that provide a green and welcoming environment soothe their citizens and gain a competitive advantage.

"If you provide blue skies and clean streets, people will want to stay and invest in your economy," he said.

The two meetings yesterday were part of a slate of high-profile events throughout the day, which included the Water Lecture by Dutch professor Mark van Loosdrecht, winner of this year's Lee Kuan Yew Water Prize.

Prof van Loosdrecht was lauded for his work in removing pollutants from used water.

He received his award at a ceremony at Marina Bay Sands last night.

About 15,000 delegates are expected to attend the three summits this week, which will also include business forums and a round-table of water experts.

The closing dinner will be held in the Flower Dome conservatory at the new Gardens by the Bay tomorrow.

✉ zengkun@sph.com.sg

■ MORE REPORTS: HOME B6 & 7

The Straits Times, A09, 3rd July 2012





- 315 parks island-wide
 - 62 regional parks
 - 253 smaller neighbourhood parks
- Open Space Standard – 0.8 ha per 1,000 population







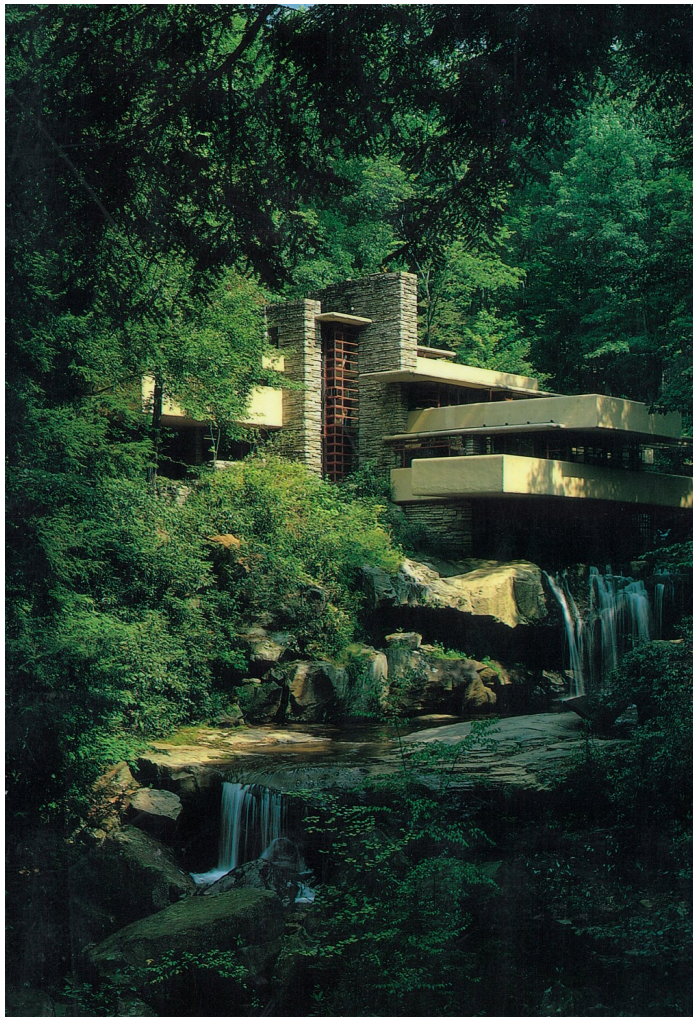
Biophilic Design and Well Being:

Why is it that when we imagine a place of inspiration, beauty, and respite, we nearly always think of a place in nature?

Our brains and bodies evolved over tens of thousands of years without buildings, and we now realize that we are at our best when we can recreate physical and psychological reminders of our most ancient home.

The aim is to explore into ways in which we can design and create “natural settings” in a modern building or build environment.

Integrating Nature & Technology – Fallingwater, Residence - USA





Background

- 14 Storey A&A
- To Replace Façade
- Improve blighted atrium

Concept

“Hanging-garden” with;

- Cathedral of Green
- Glowing Lantern

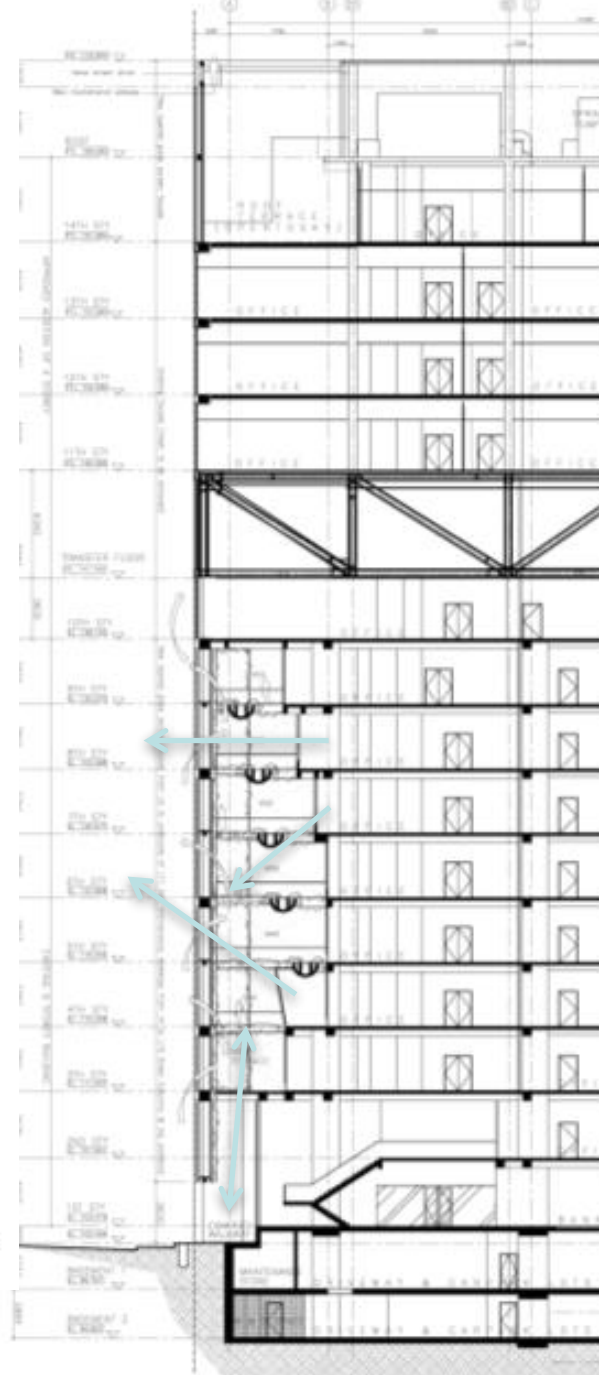
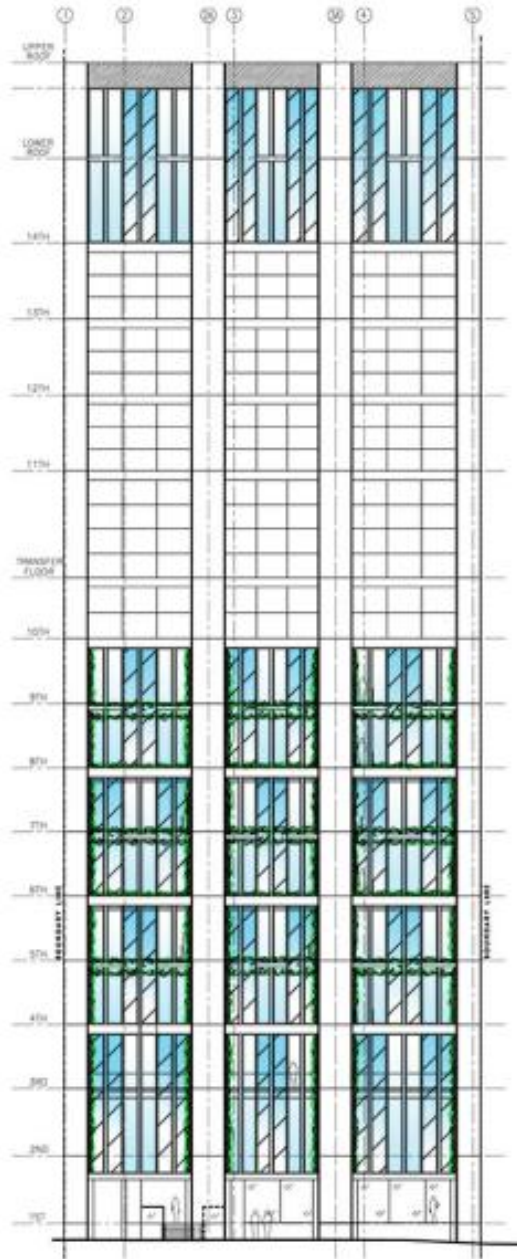
Approach

Liveliness,,
Greenery &
Connectivity

Integrated Design

- Architecture,
- Landscape,
- Interior Design &
- Façade design”

158 Cecil Street – Elevation & Section



Plant @ Roof

New Floors Added
L11-L14

Transfer Structure
and Columns

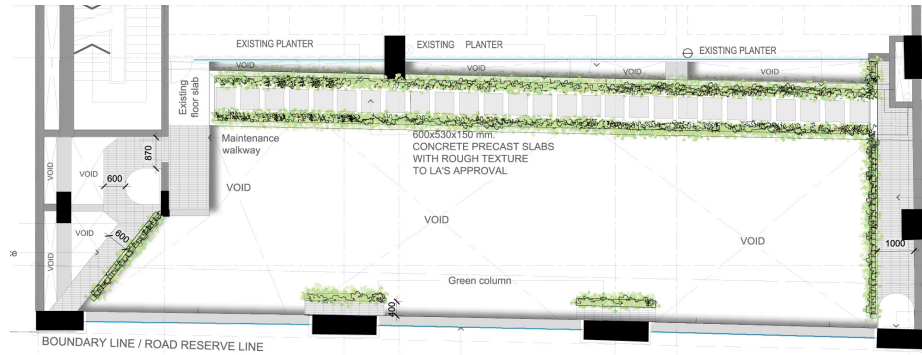
Original Building
10 story
L1-L10



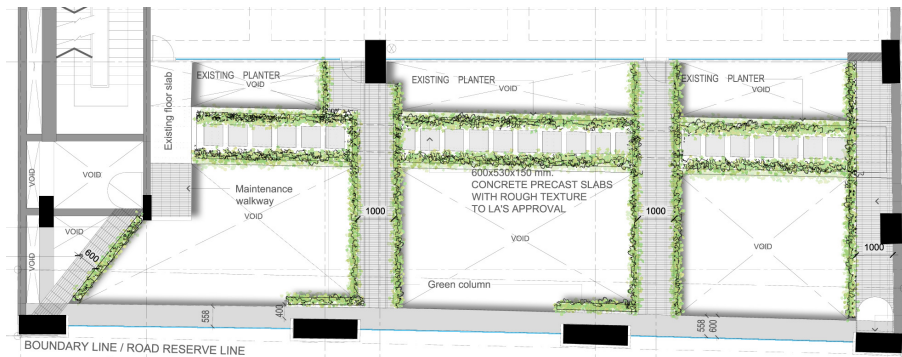
Before (Top) & After (Below)



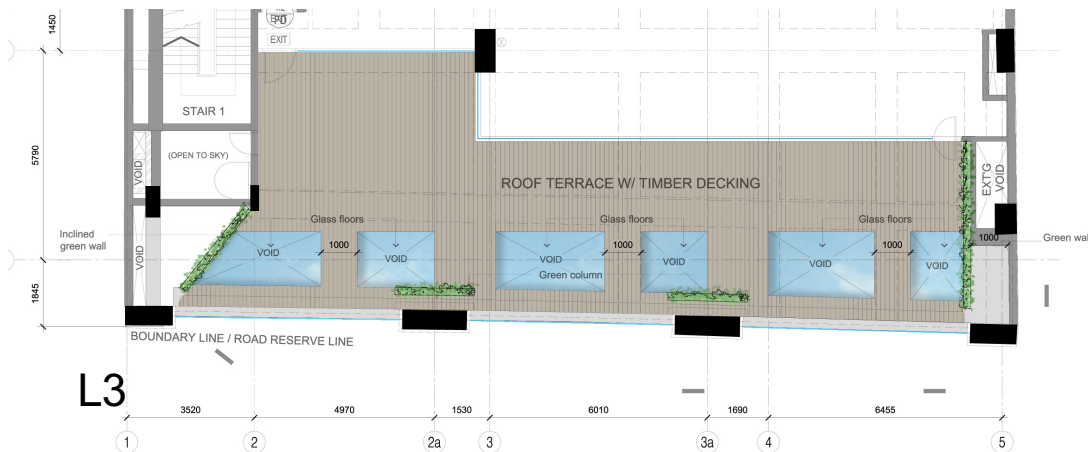
158 Cecil Street - Plans



L5,7 & 9



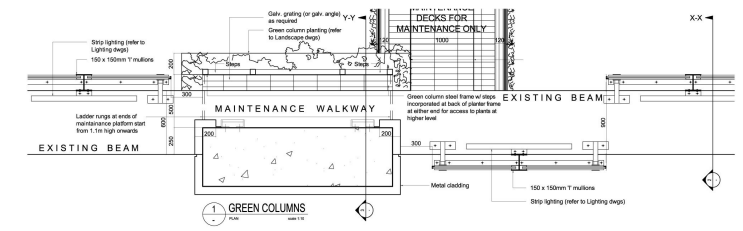
L4,6 & 8



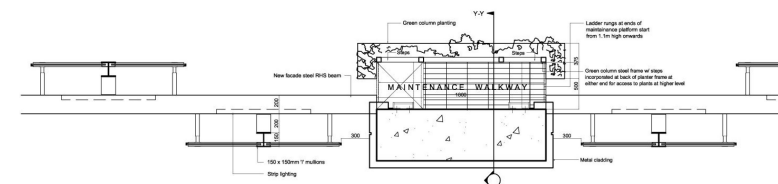
L3



Location Plan

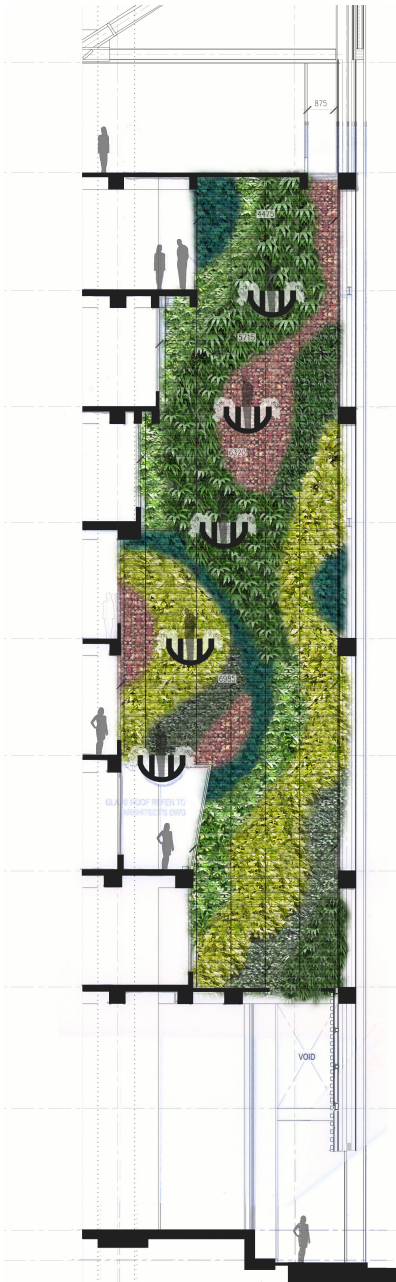


Layered-Façade on EVEN No. Floors

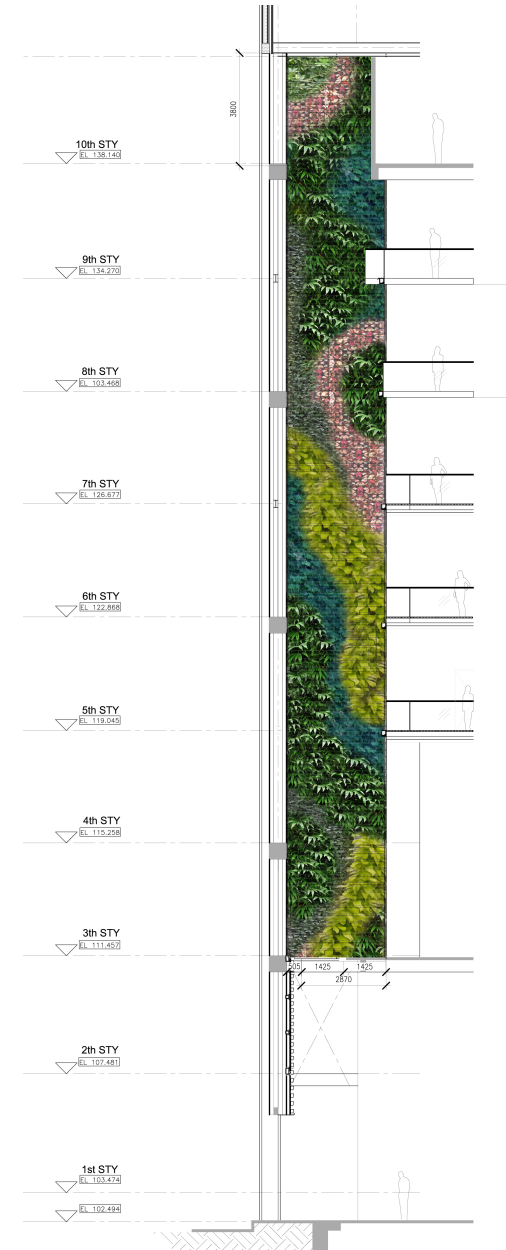
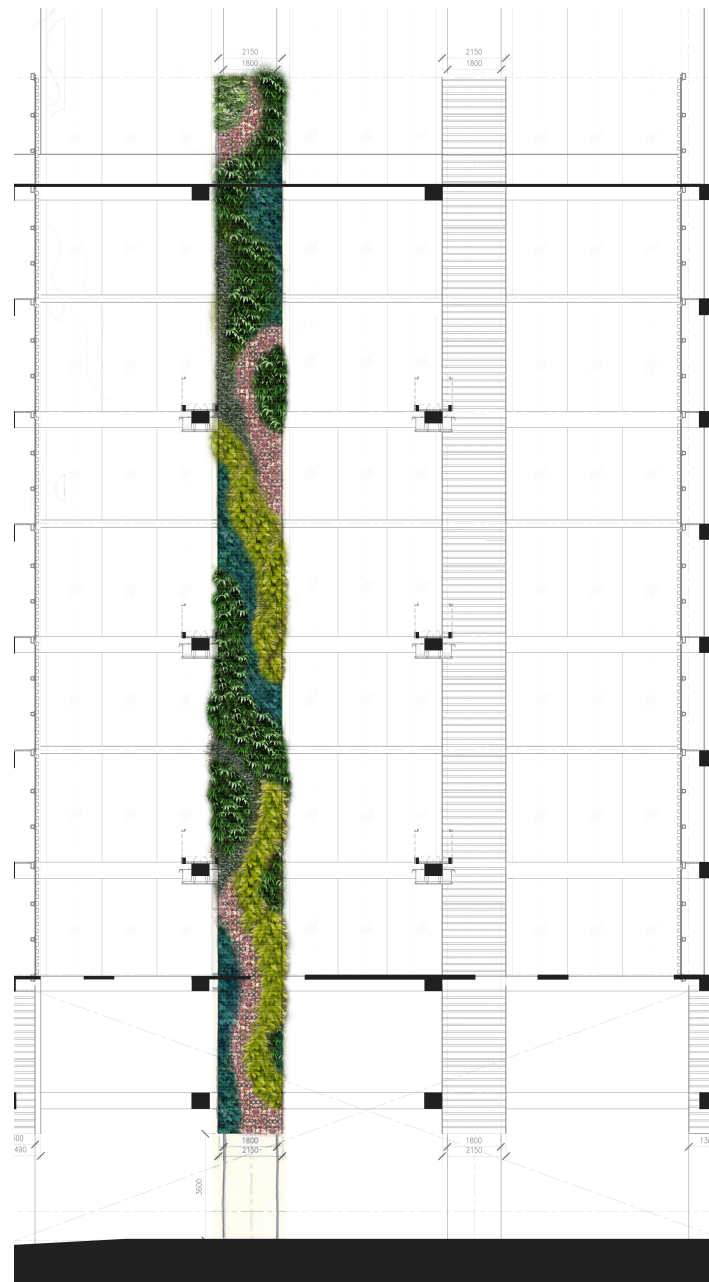


Layered-Façade on ODD No. Floors

158 Cecil Street – Green-walls Walls & Gree-columns Sections



L5, 7 & 9



Layered-Façade on ODD No. Floors

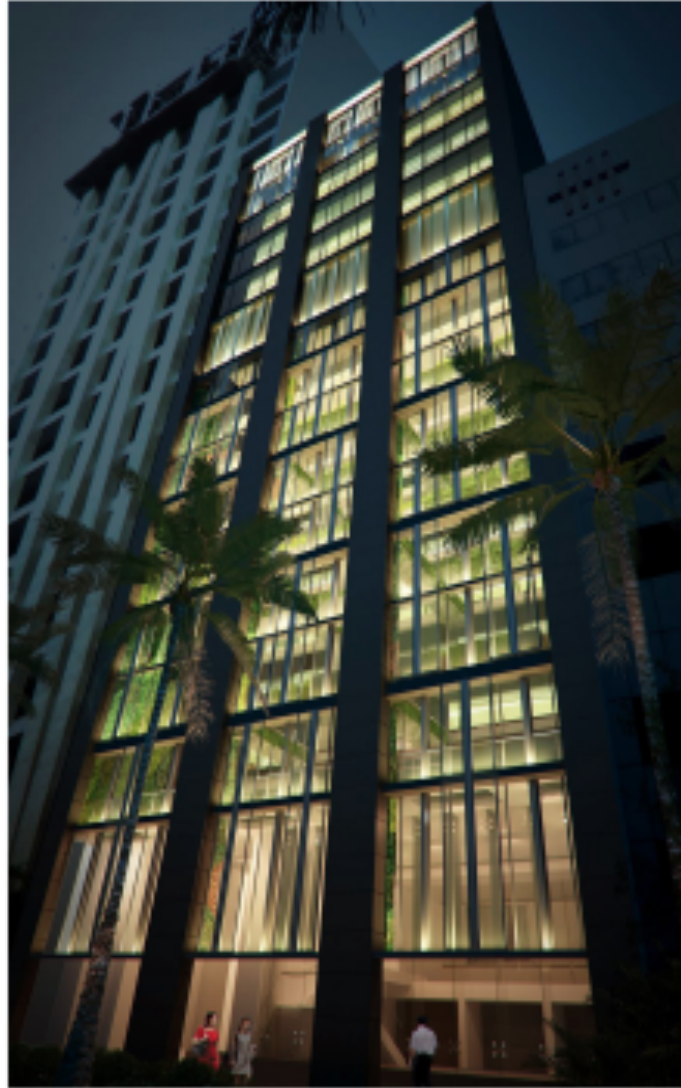
158 Cecil Street: External Elevation - Before, Render & After

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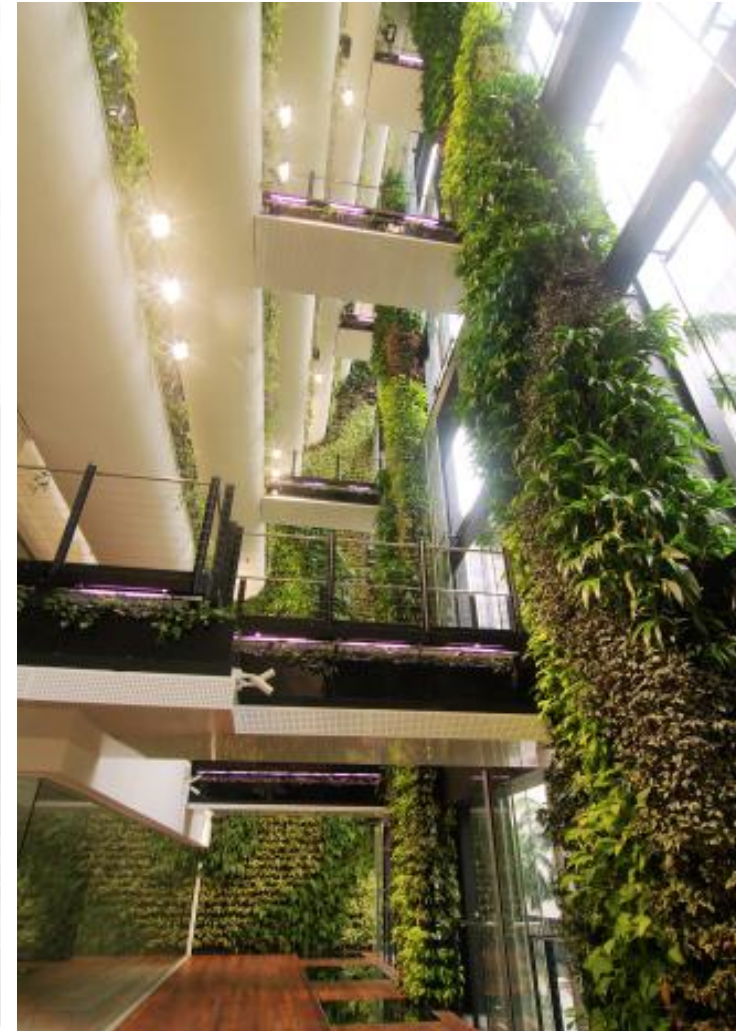
158 Cecil Street: External Elevation Night View - Before, Render & After

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158 Cecil Street: Atrium - Before, Render & After

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158 Cecil Street: L3 Terrace – View up to L10

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158 Cecil Street: View from Typical Office Floor – Before, Render & After

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158 Cecil Street: Integrated Design – “Biophilia” Day view from Office

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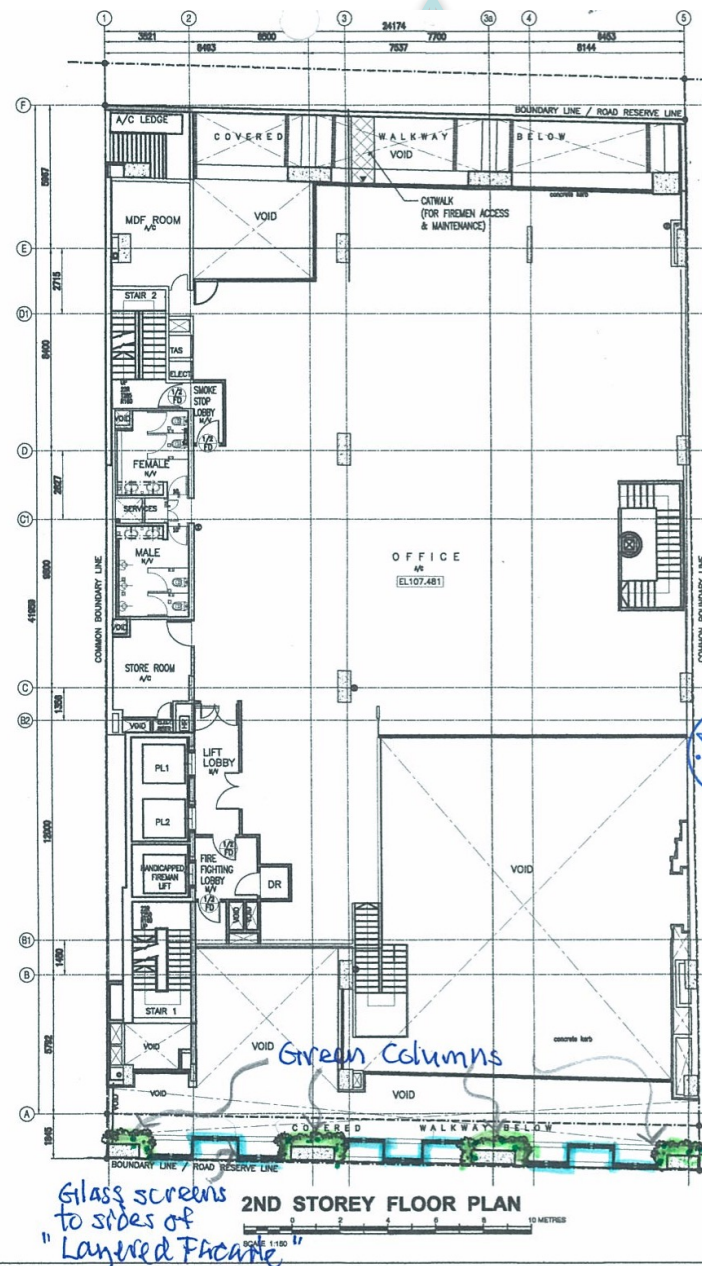
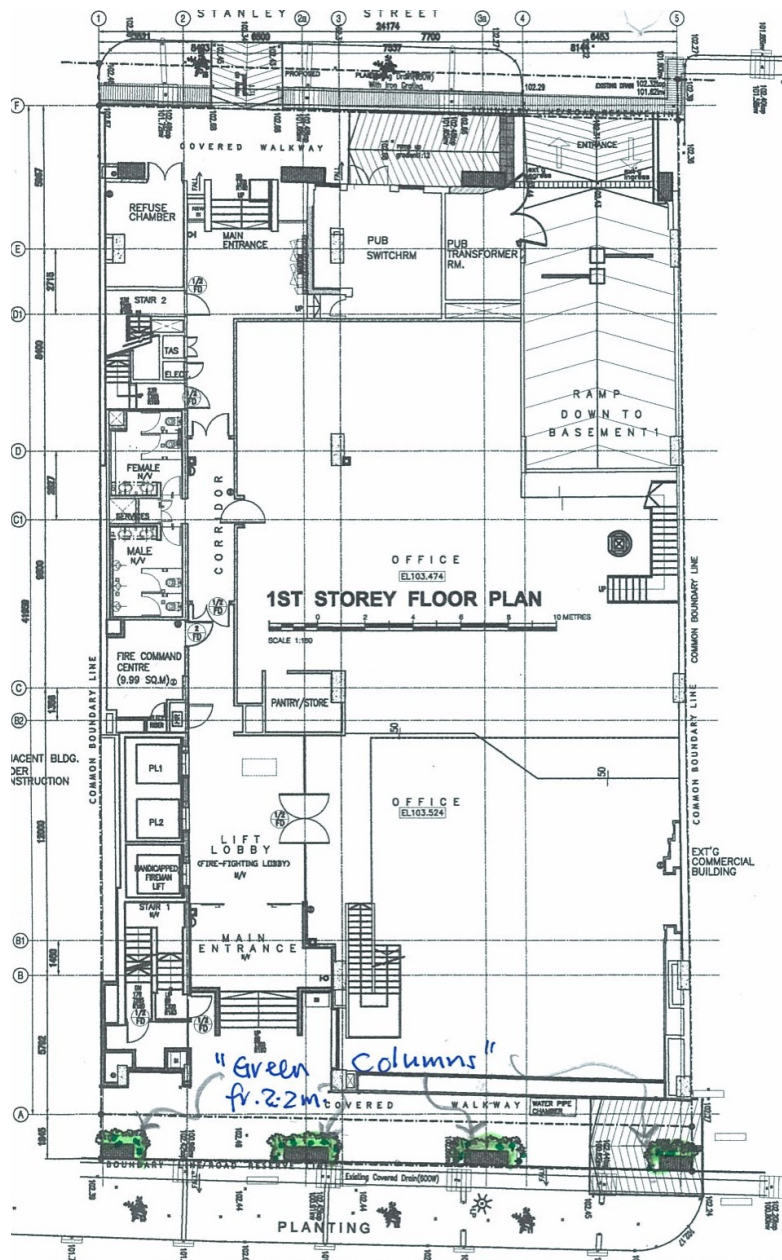


158 Cecil Street: Integrated Design – “Biophilia” night view from office

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158 Cecil Street – L1 Pavement Walkway & L2 High Ceiling Plans



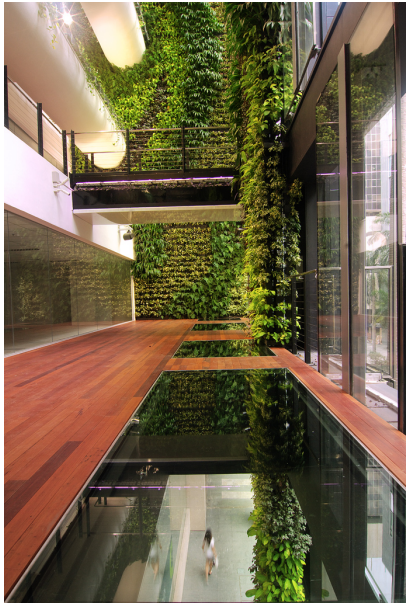
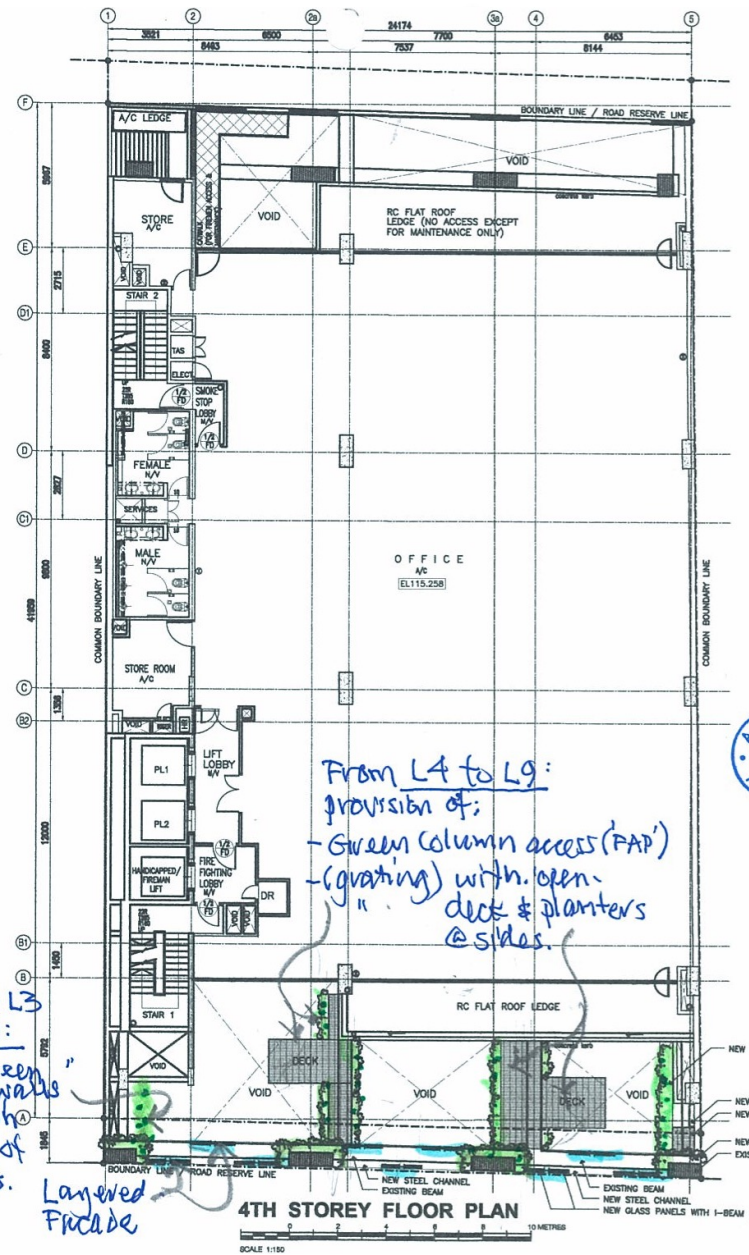
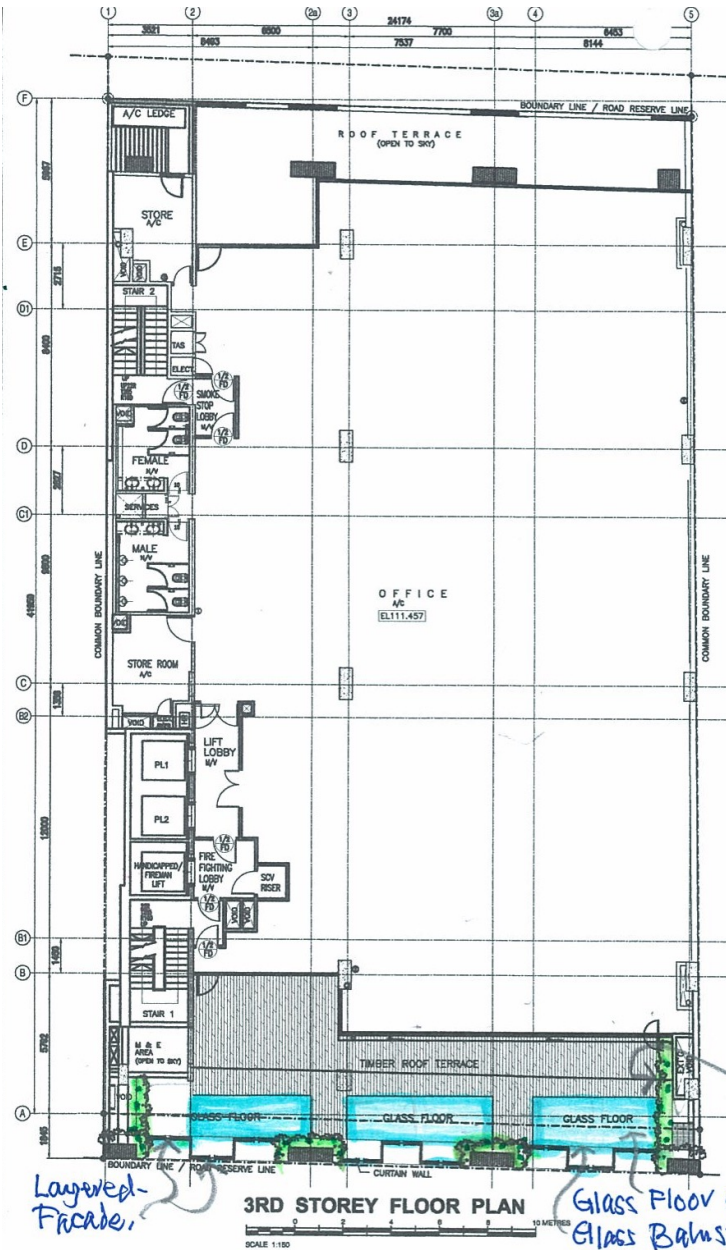
View through L3 Glass Panels



L1 Pavement Walkway)

158 Cecil Street – L3 Glass Floor & L4 Elevated Deck

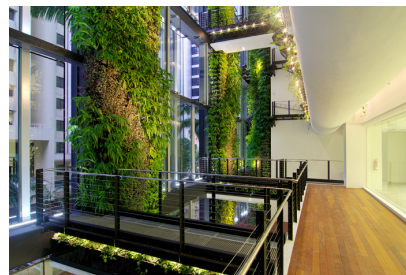
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L3 Deck & Glass Floor Panels



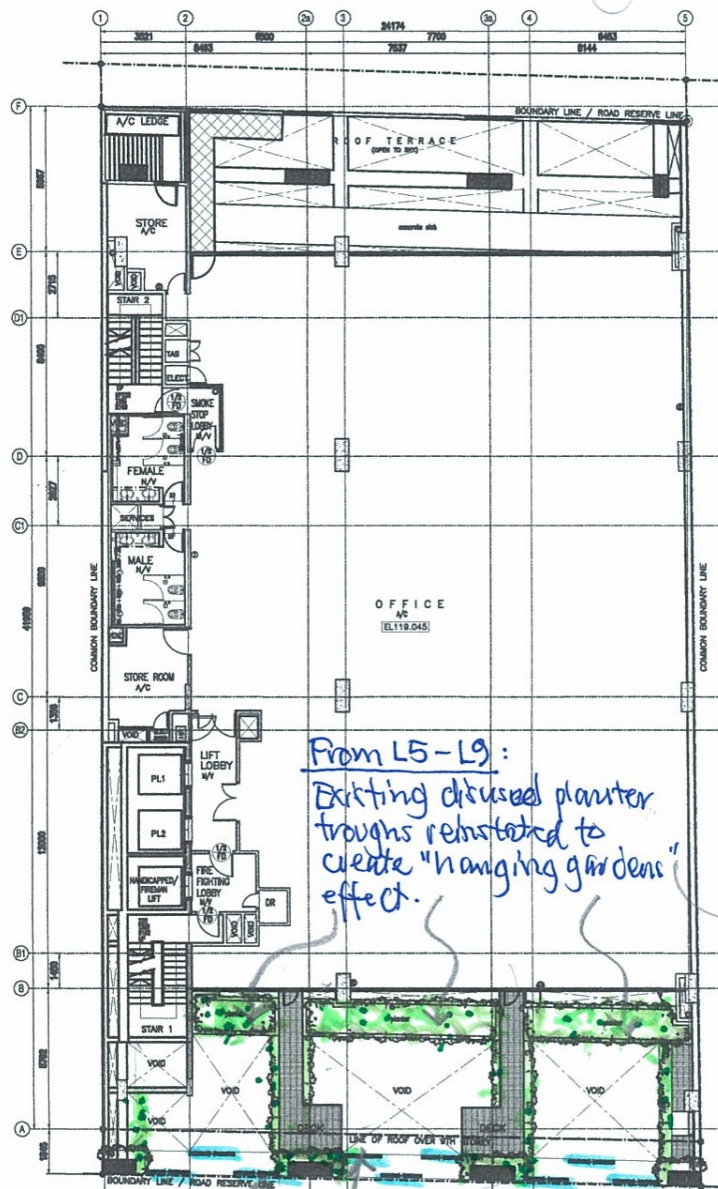
L4 Deck from Office Floor



L4 Deck from Atrium Space

158 Cecil Street – L5 & L6 "Maintenance Bridges" w "Aircraft Runway" access

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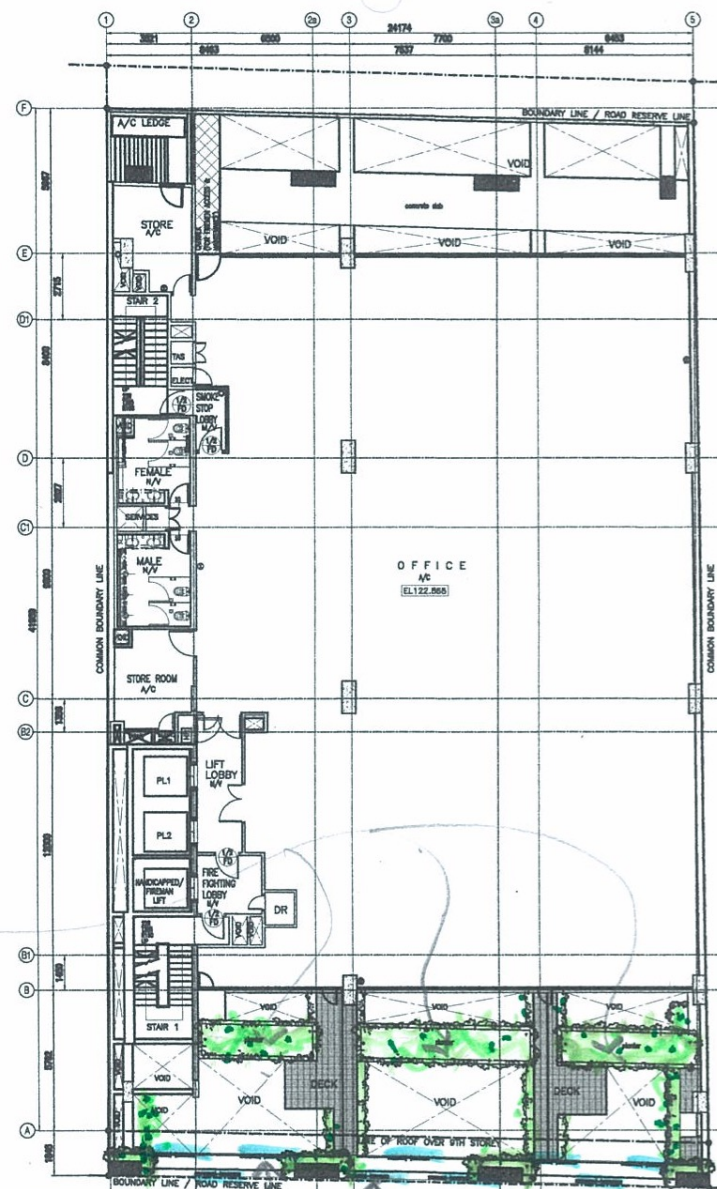


From L5-L9:
Existing circular planter
troughs reinstated to
create "hanging gardens"
effect.

Layered-Facade from L2 to L10

5TH STOREY FLOOR PLAN

SCALE 1:150

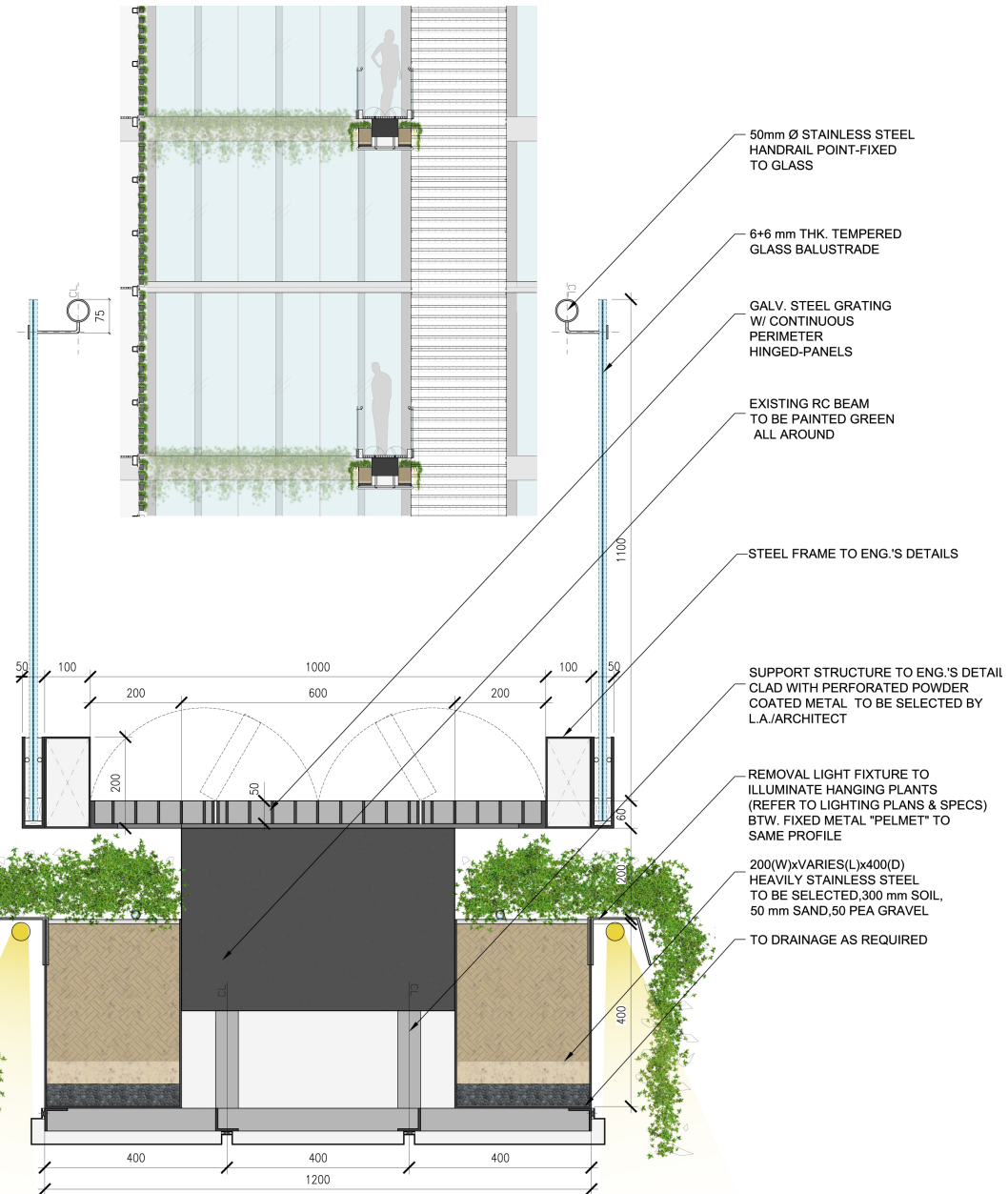
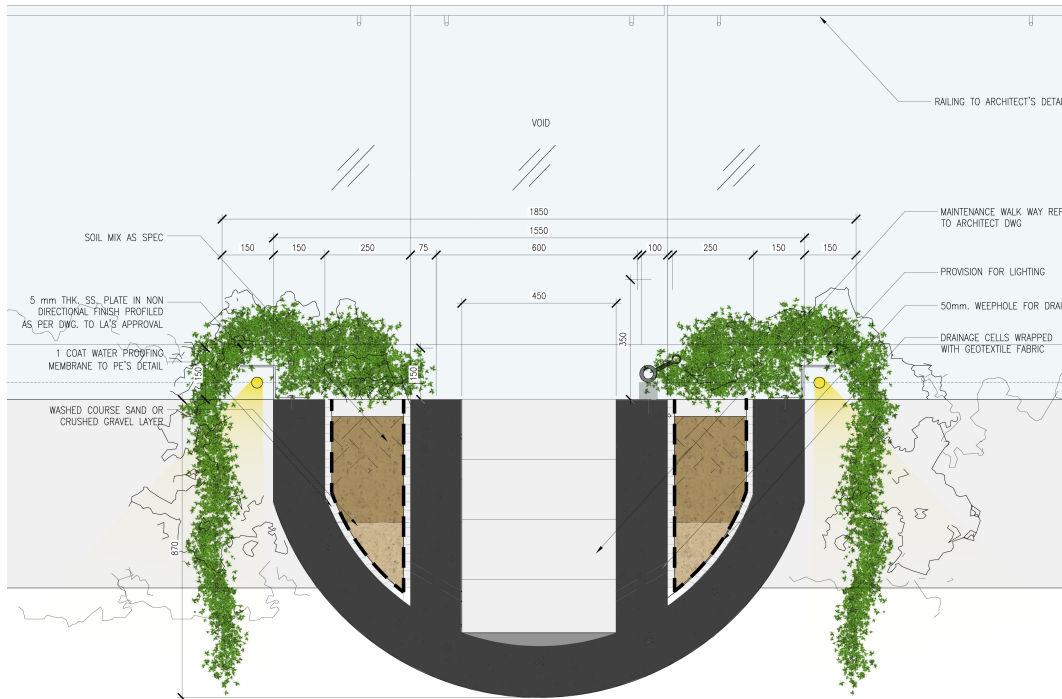
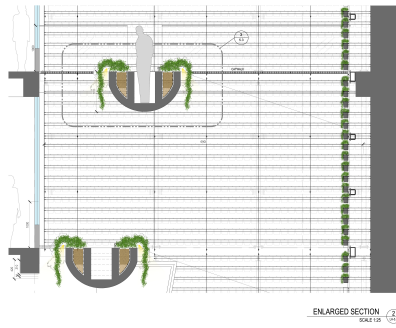


6TH STOREY FLOOR PLAN

SCALE 1:150

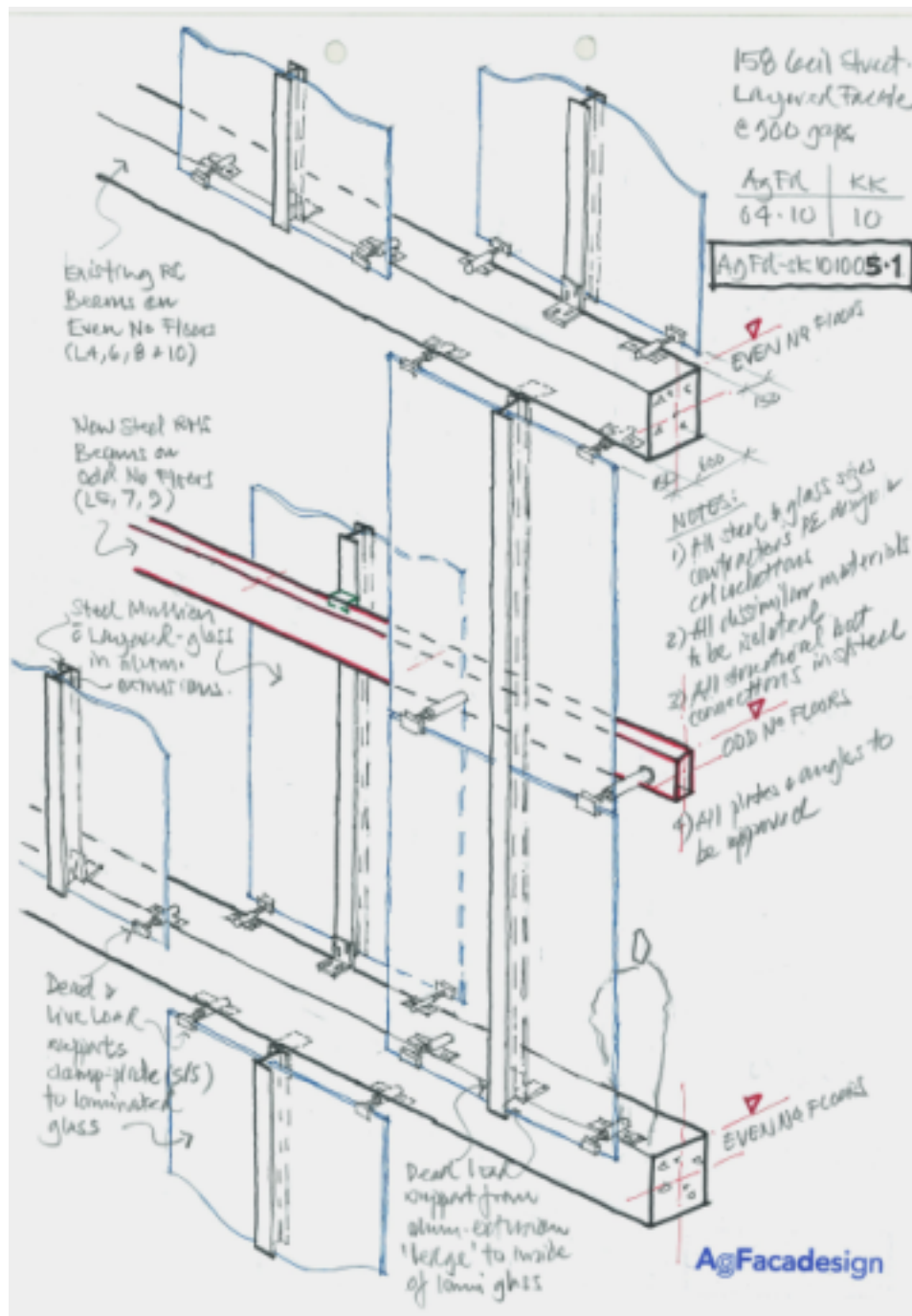


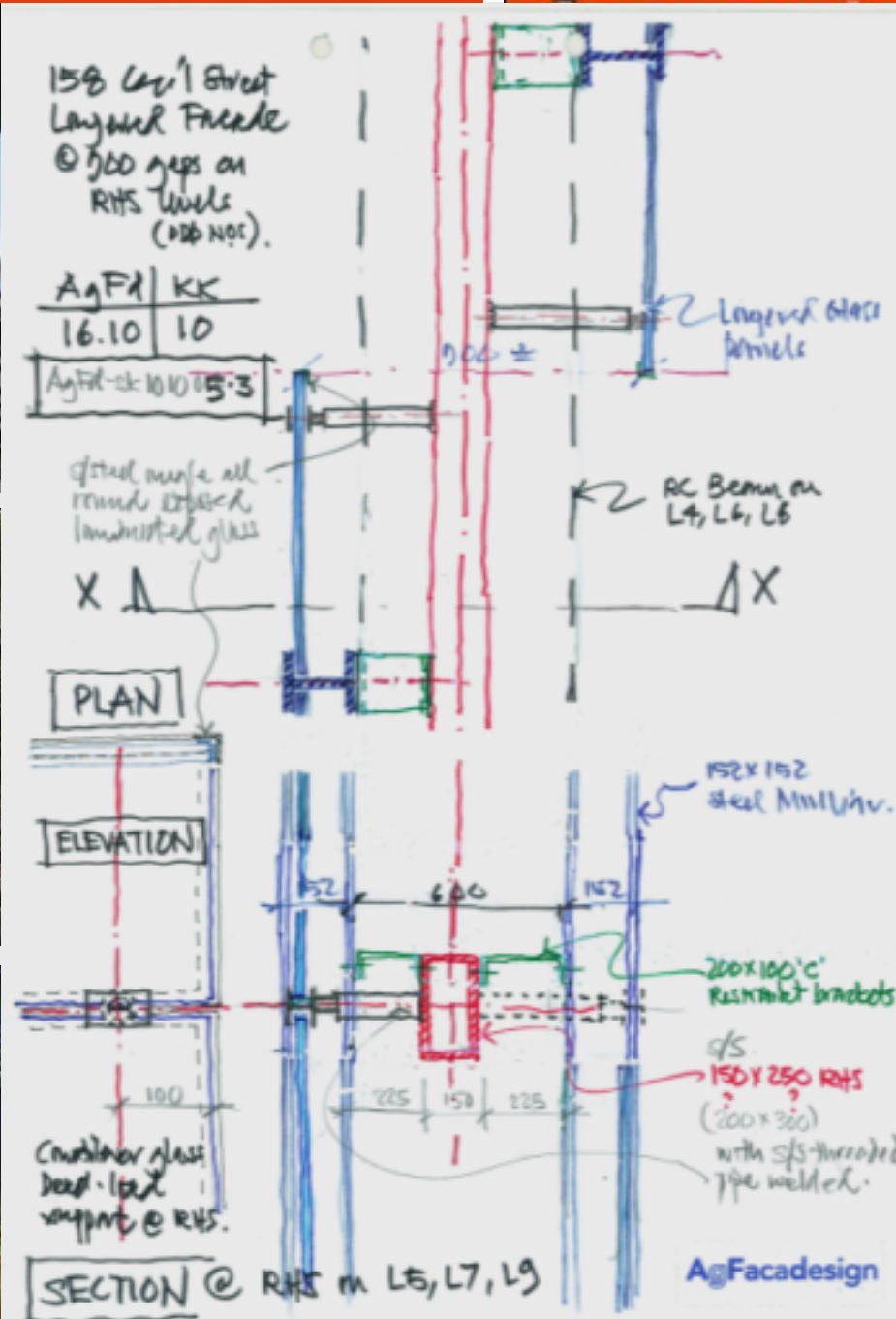
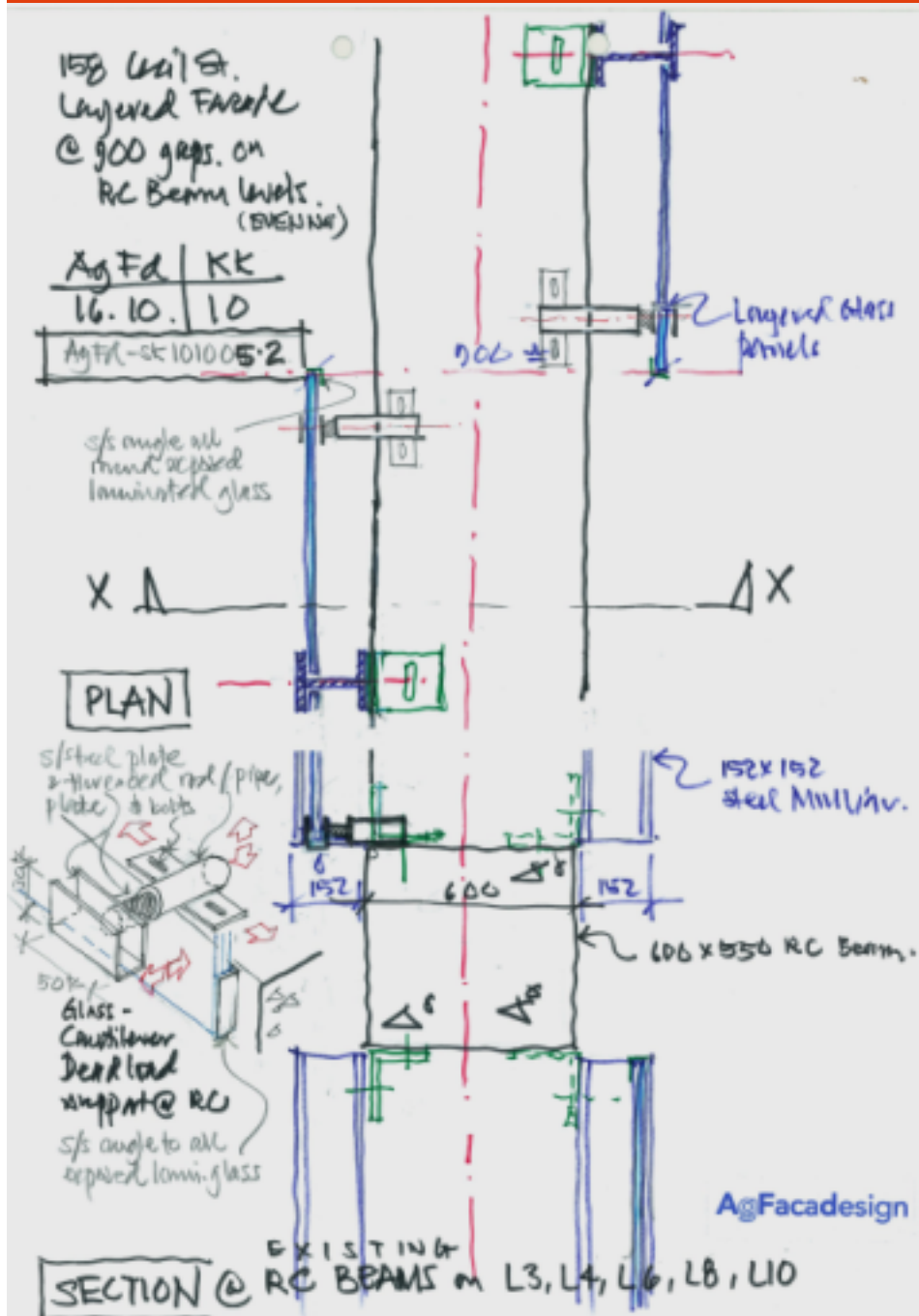
158 Cecil Street – Hanging Planters Detail Sections



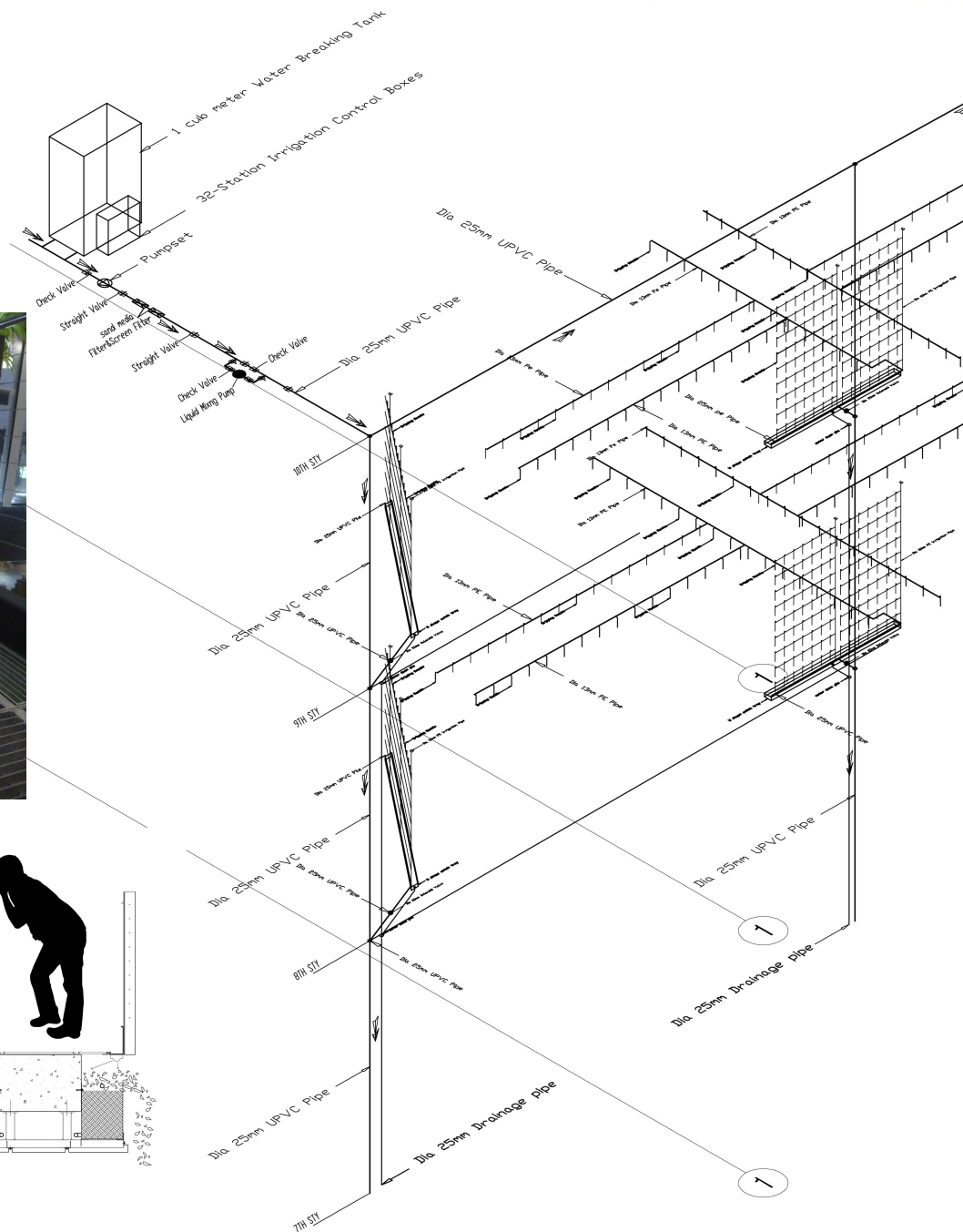
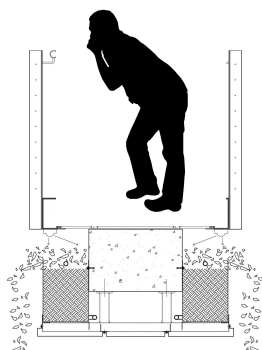
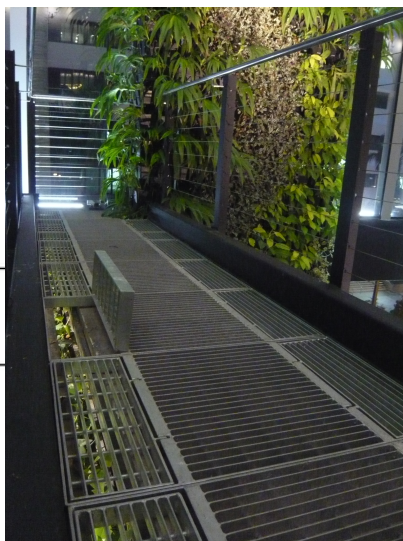
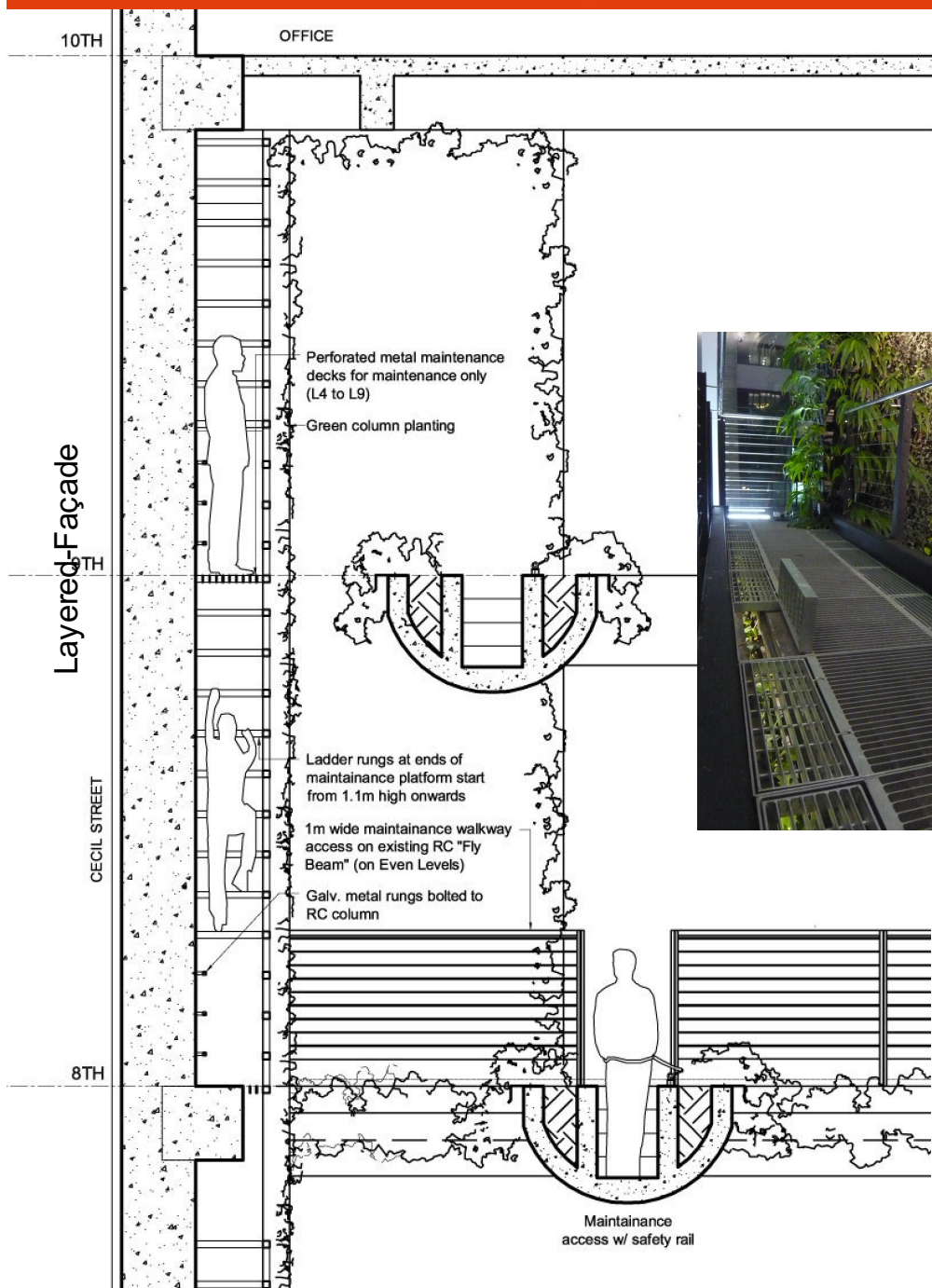
158 Cecil Street: Before & After Fly-Past or “Singapore: Biophilic City” (YouTube)



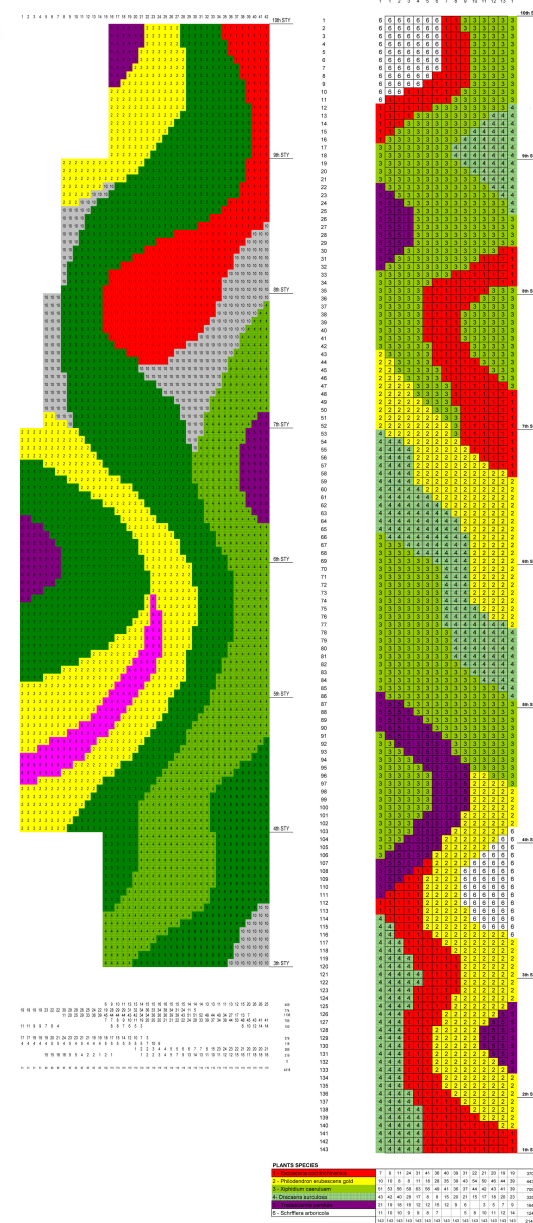
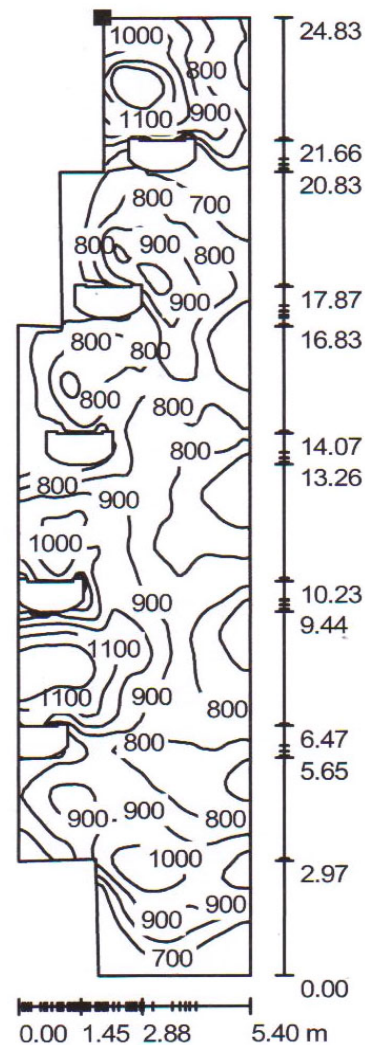
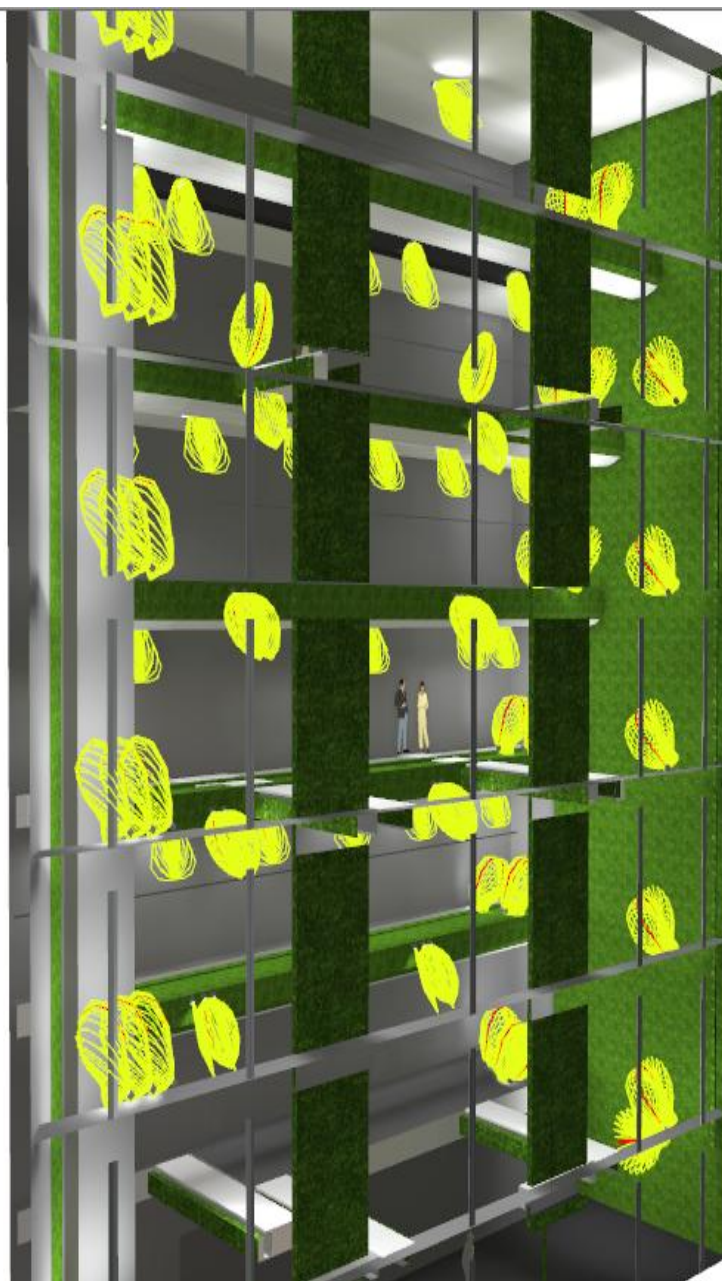




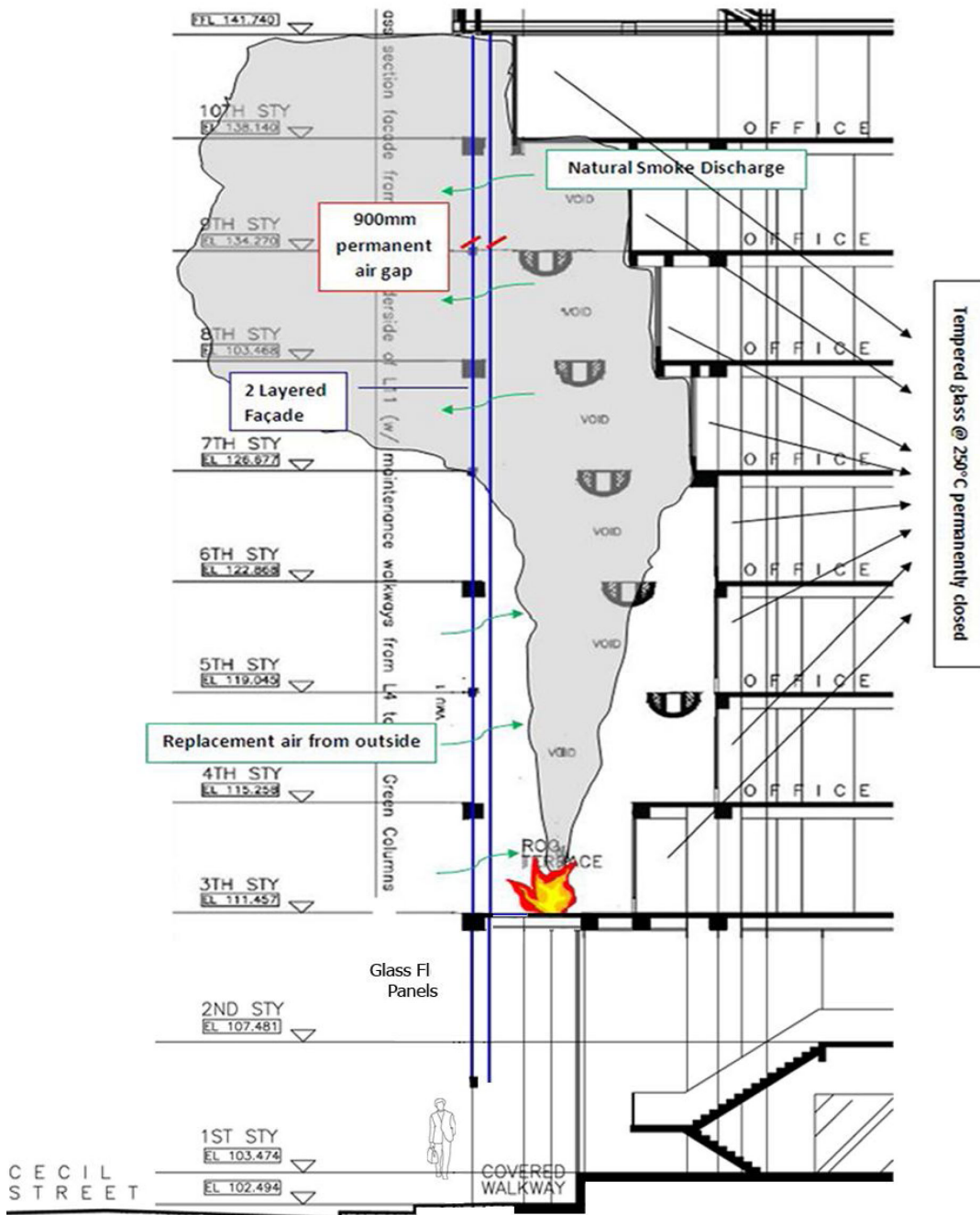
158 Cecil Street – Landscape Maintenance & Irrigation



158 Cecil Street – Lighting & Greenm-wall / Green-columns



158 Cecil Street – Fire & Smoke Control Study



158 Cecil Street: Integrated Design – Architecture & Facade

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158 Cecil Street: Integrated Design – Architecture & Façade Streetscape Context

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158 Cecil Street: Integrated Design – “Glowing Lantern” & Transparent Facade

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158 Cecil Street: Integrated Design – “Glowing Lantern” & Transparent Facade

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158 Cecil Street: Integrated Design – “Glowing Lantern” & “Cathedral of Green”

AgFacadesign



158 Cecil Street: Integrated Design – “Glowing Lantern” & “Cathedral of Green”

AgFacadesign



158 Cecil Street: Integrated Design – “Cathedral of Green”

AgFacadesign



158 Cecil Street: Integrated Design – “Cathedral of Green”

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158 Cecil Street: Integrated Design – Interior & Landscape (Day)

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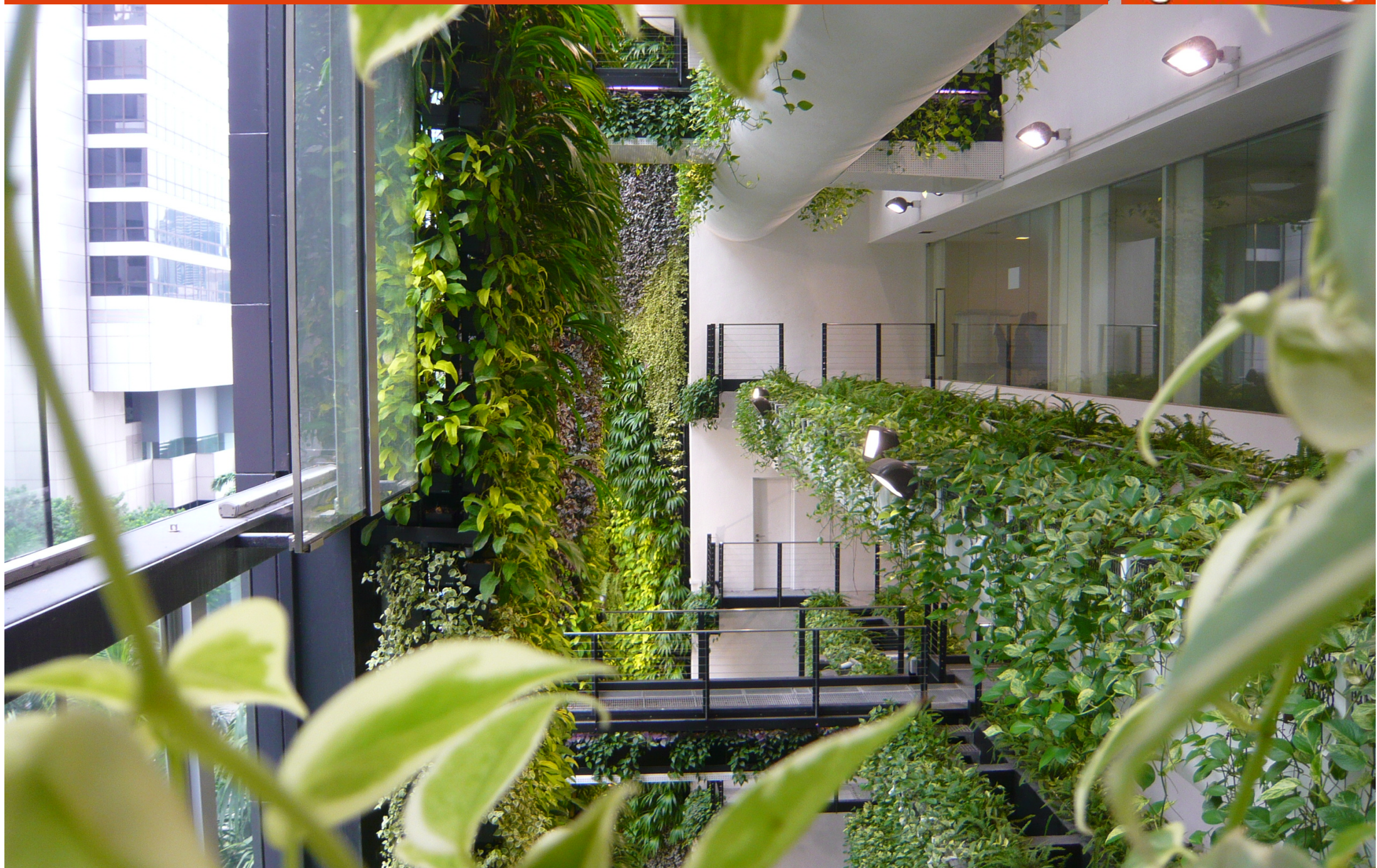
158 Cecil Street: Integrated Design – Interior & Landscape (Night)

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158 Cecil Street: Integrated Design – Landscape, Interior & Facade

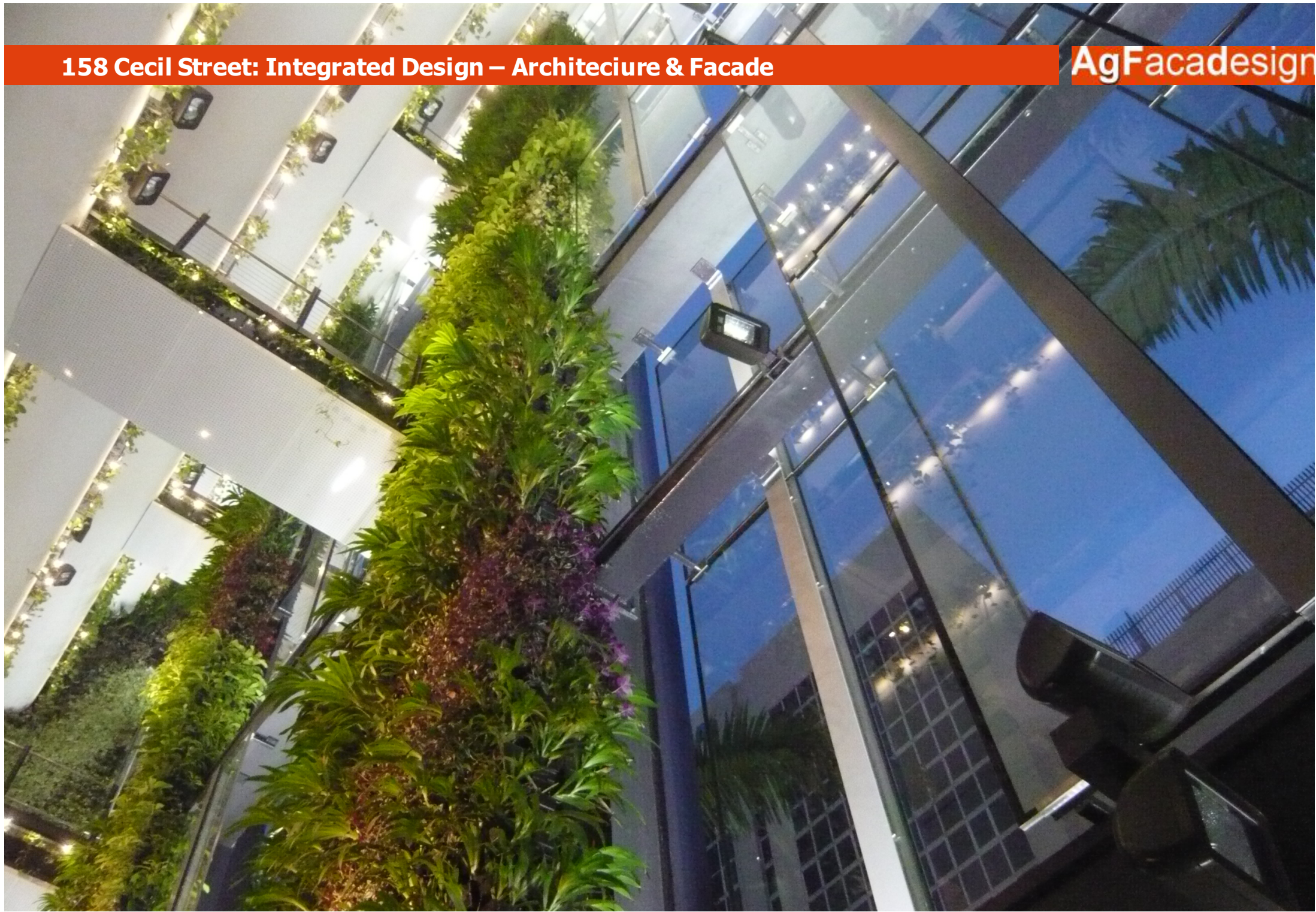
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158 Cecil Street: Integrated Design – Architecteure & Facade

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158 Cecil Street: Integrated Design - Landscape, Interior & Facade

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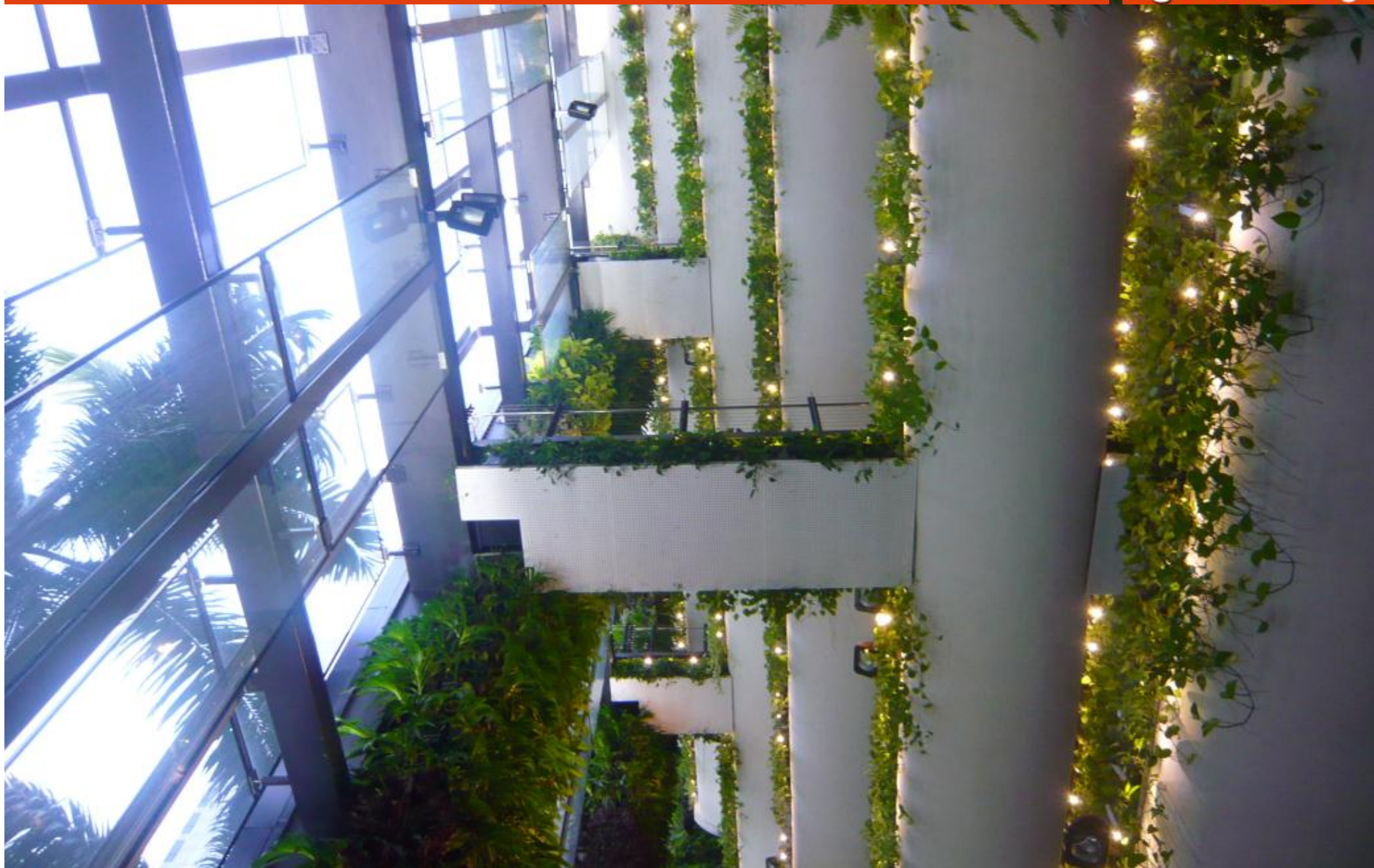
158 Cecil Street: Layered-glass Façade & Recycled Mesh

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158 Cecil Street: Layered-glass Façade & Hanging-garden

AgFacadesign



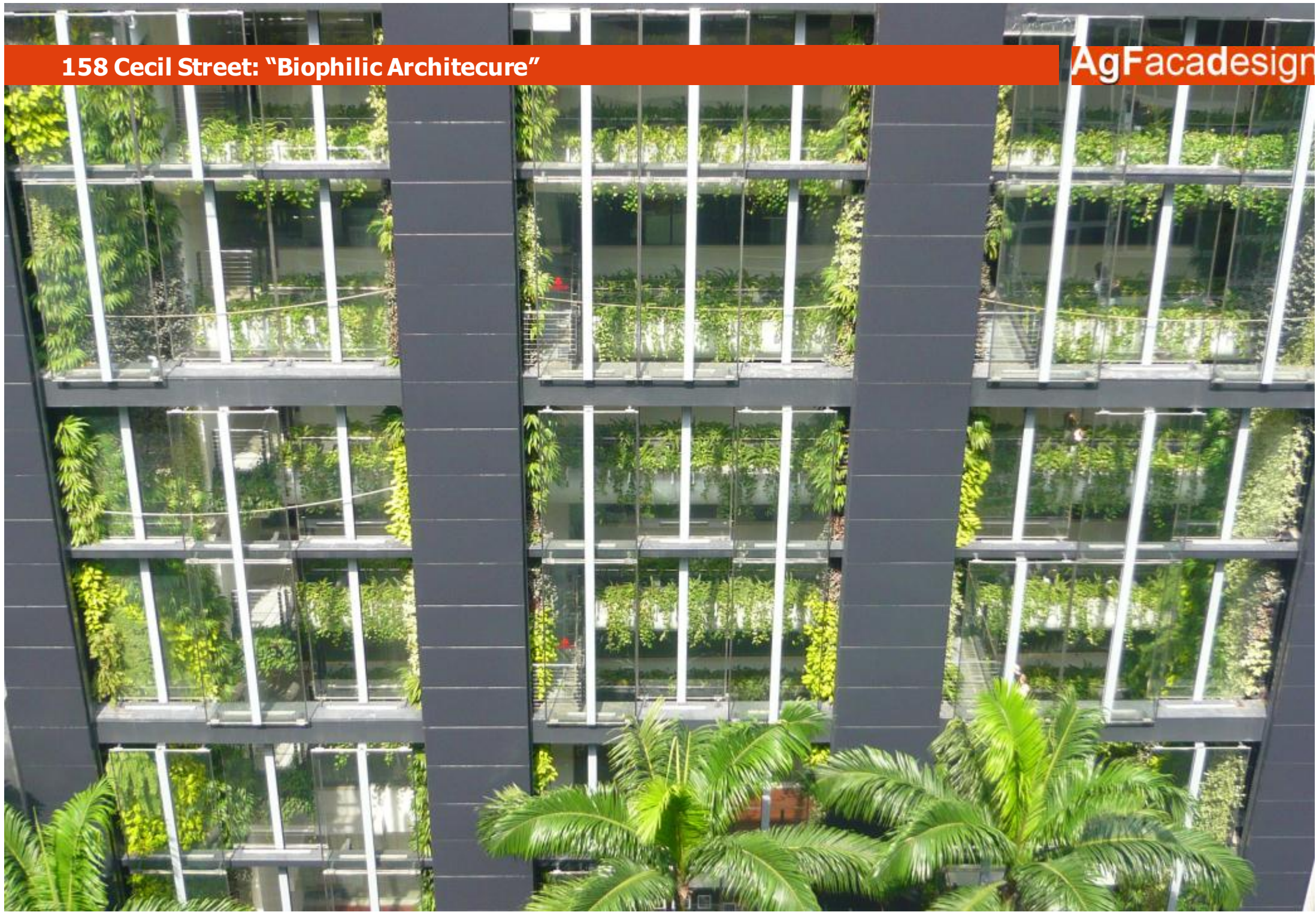
158 Cecil Street: Landscape, Façade & Interior Architecture – Vertical Connectivity

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158 Cecil Street: "Biophilic Architecture"

AgFacadesign



158 Cecil Street: "Crown" of Layered-glass Façade

AgFacadesign







The Awards

- 2011 SIA/NParks Skyrise Greenery Award – Winner
- 2012 12th SIA Design Award
- 2012 FuturArc Green Leadership award
- 2012 International Rooftop Landscaping Association:
World Best Vertical Garden Construction Quality – Gold
- 2012 World Architecture Festival (WAF) - Shortlist
- 2013 NParks Leaf Award
- 2013 Singapore President Design Award - Shortlist

The Publications:

- Magazines: Singapore, Indonesia, Dubai
- Newspapers: Straits Times, TODAY, LianheZaobao

The Films:

- 2012 "Singapore: Biophilic City" on YouTube
- 2012 Minister Khaw Boon Wan's Blog on YouTube
- 2013 TODAY Newspaper feature on YouTube
- 2014 Channel News Asia – City Time Traveller

Minister Khaw's visit to 158 Cecil Street

Minister Khaw Books Water



The image shows a YouTube video player interface. The main video area displays a red background with the word 'TODAY' in large, white, semi-transparent letters. Below the video player, the title 'A Green Makeover For 158 Cecil Street' is visible. The channel name 'TODAYdigital' is shown with a red 'T' logo and a subscriber count of 10,634. The video has 358 views. The player controls at the bottom show a progress bar at 0:00 / 3:06. To the right of the main video, there is a vertical list of recommended videos with their thumbnails, titles, and view counts.

Play

0:00 / 3:06

A Green Makeover For 158 Cecil Street

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- former 1 by Judge 14,600 views
- 'singapore city' by linda bl 7,918 views
- 30-Story Built In by MrBeel 972,905 v
- AgFacad Cecil St by AgFac 739 views
- Minister to 158 C by MNDs 927 views
- singapore city chap by linda bl 441 views
- How To An Arch by Barry B 324,298 v

Integrated design that merges the boundaries of;

The Architecture

- Respecting the streetscape and site context, the building sits calmly and sturdily against its neighbors.
- With a unique façade facilitating the needs of a “Hanging-garden”, a fusion of “*archi-nature*” was achieved through an integration of landscape, interior design and façade elements

The Landscape Design

- The greenery transforms all unsightly surfaces into green-features seamlessly merging the interior spaces, architecture and façade into a “green cathedral”.

The ID Design

- Cozy and intimate spaces created by the hanging-plants (from the planters and bridges) are dramatized with the soaring greens and cascading sparkling lights

The Façade Design

- A layer of glass mimics the effect of transparent “butterfly wings”, merges seamlessly with the greenery with its staggered arrangement.

Background:

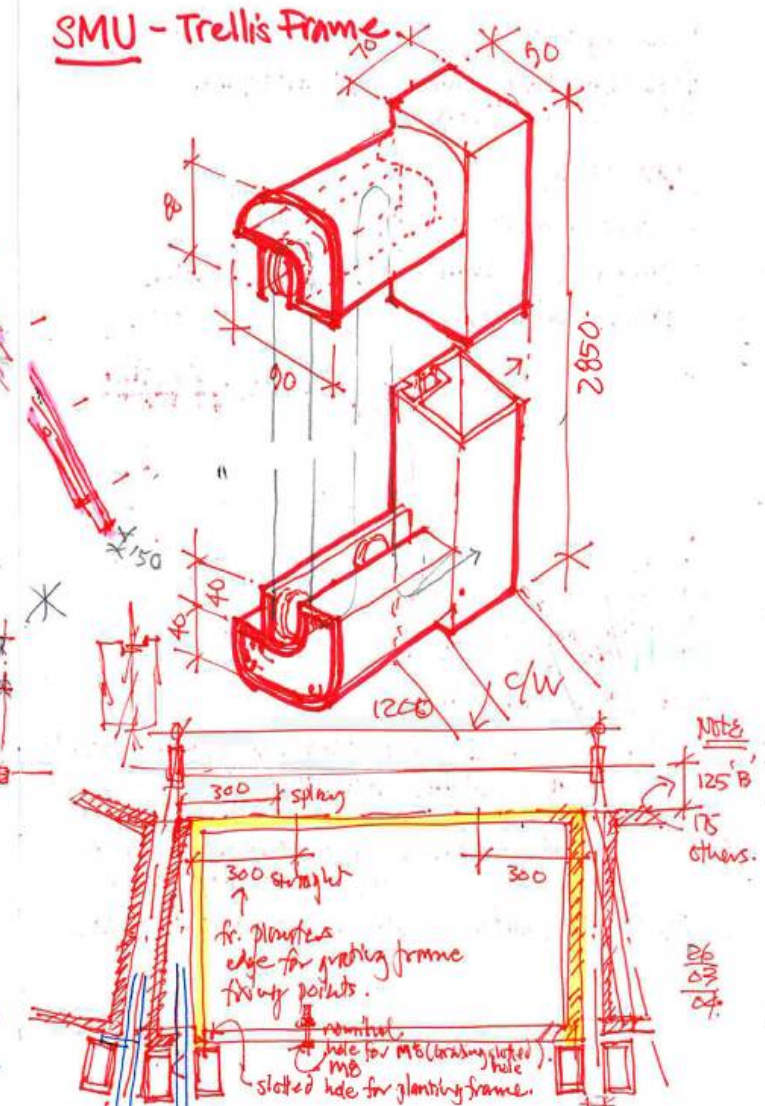
- An international architectural competition won by Ted Cullinan & KNTA
- Sited in a park area within the hub of major commercial district

Requirements:

- 5 low rise buildings to avoid dominating the “park”
- Selected existing trees to be maintained
- Buildings required to be completed in short time frame

Approach:

- Unitised curtain wall system adopted with a family of details to facilitate different profiles





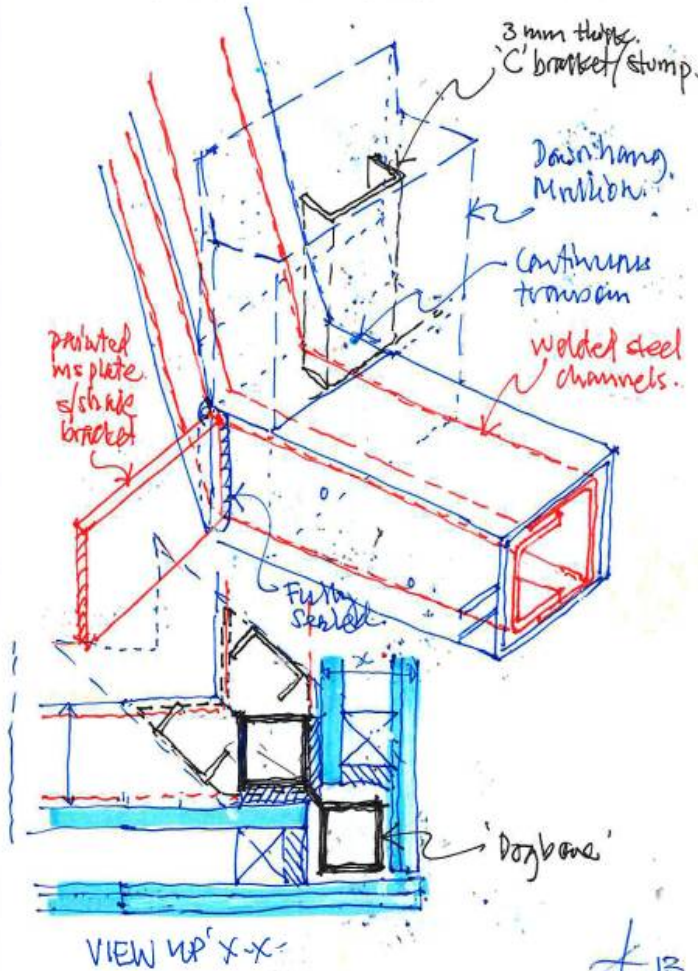
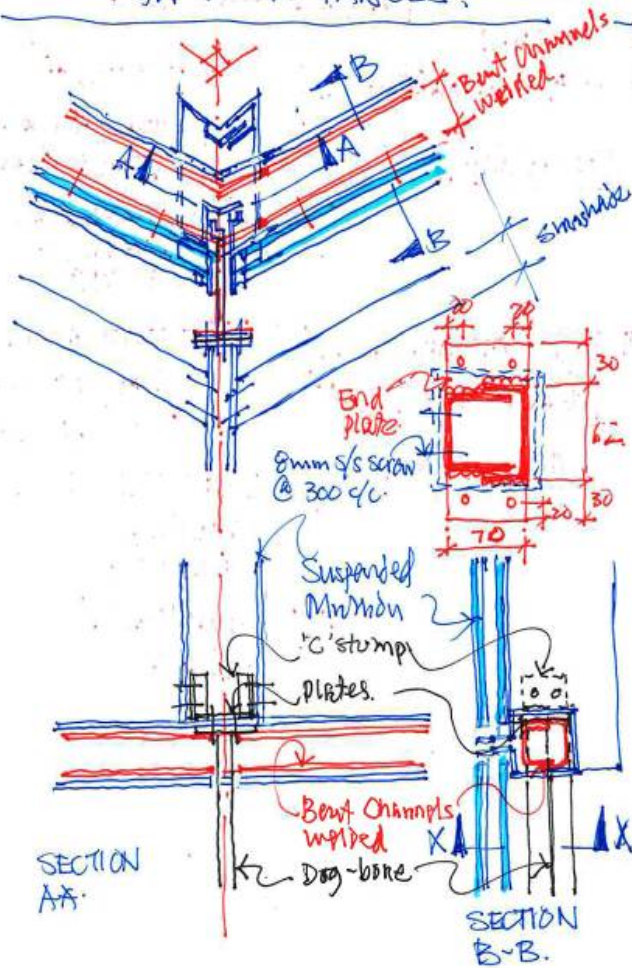


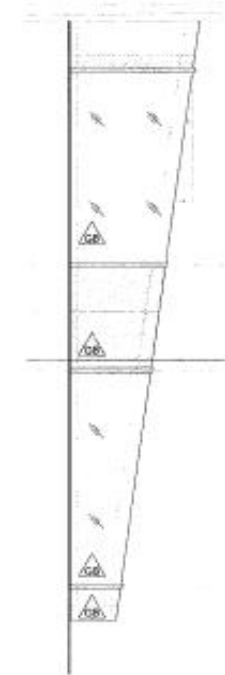




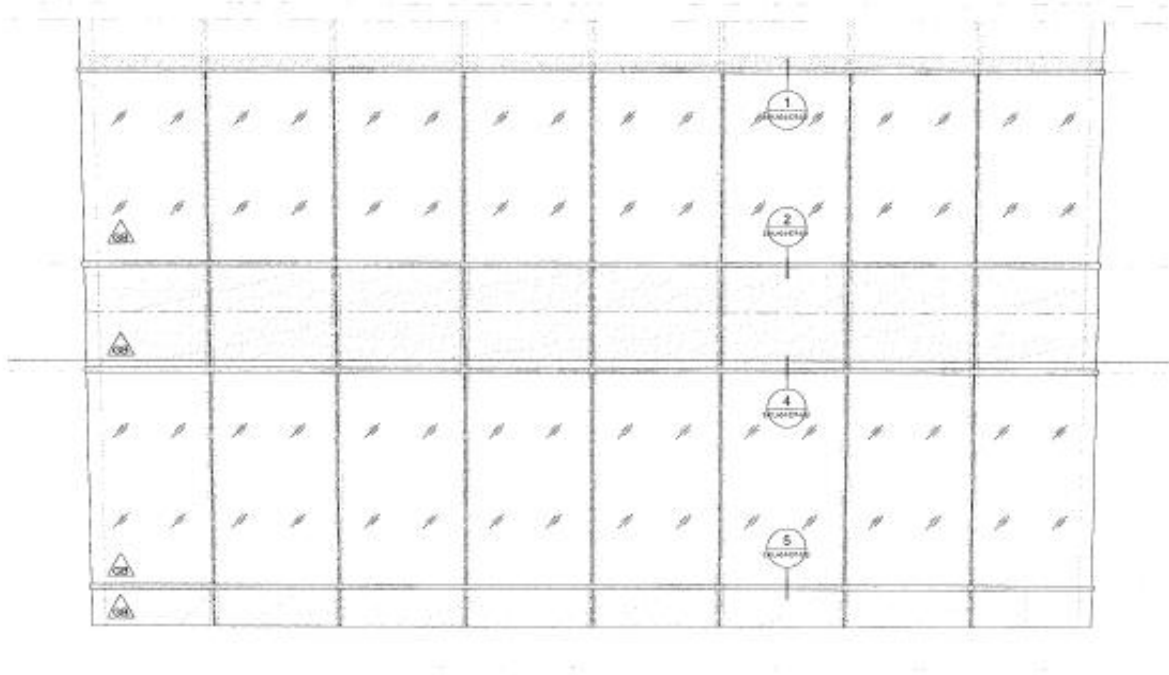


SMU - Type 1 & 2 - Dogbone Corner
for VISION PANELS

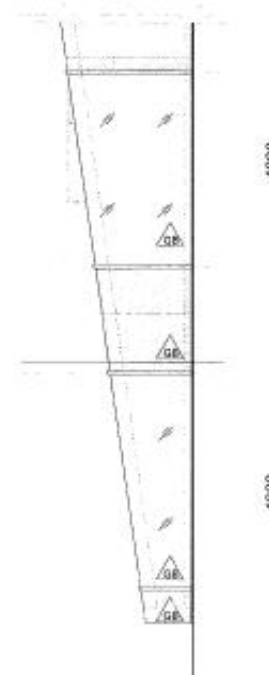




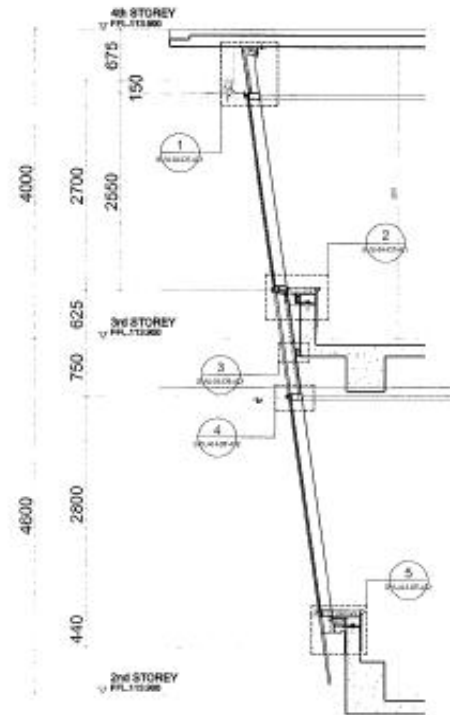
1 PARTIAL ELEVATION
SCALE 1:50



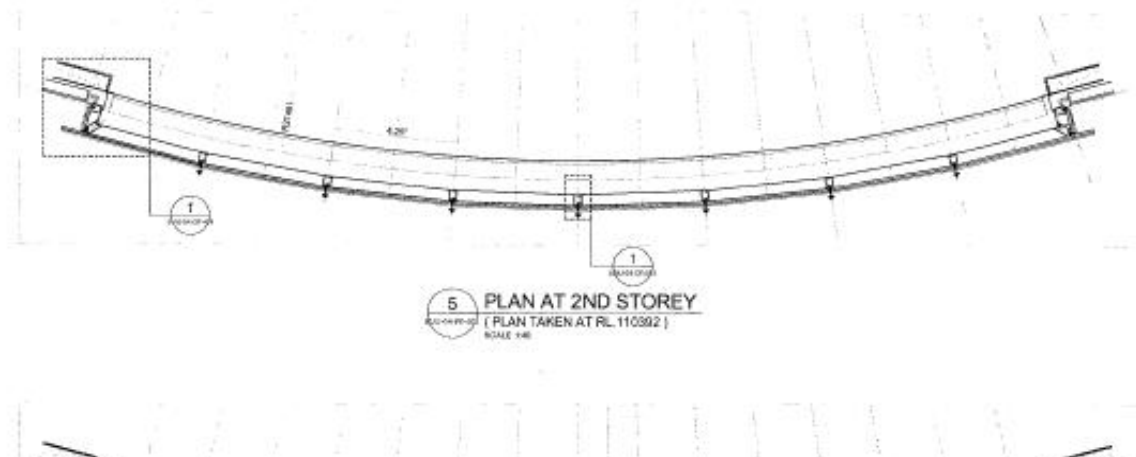
2 PARTIAL ELEVATION
SCALE 1:50



3 PARTIAL ELEVATION
SCALE 1:50

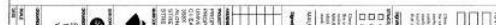


4 PARTIAL SECTION
SCALE 1:50



5 PLAN AT 2ND STOREY
(PLAN TAKEN AT RL 110.992)
SCALE 1:50





Biophilic Design and Well Being:

Why is it that when we imagine a place of inspiration, beauty, and respite, we nearly always think of a place in nature?

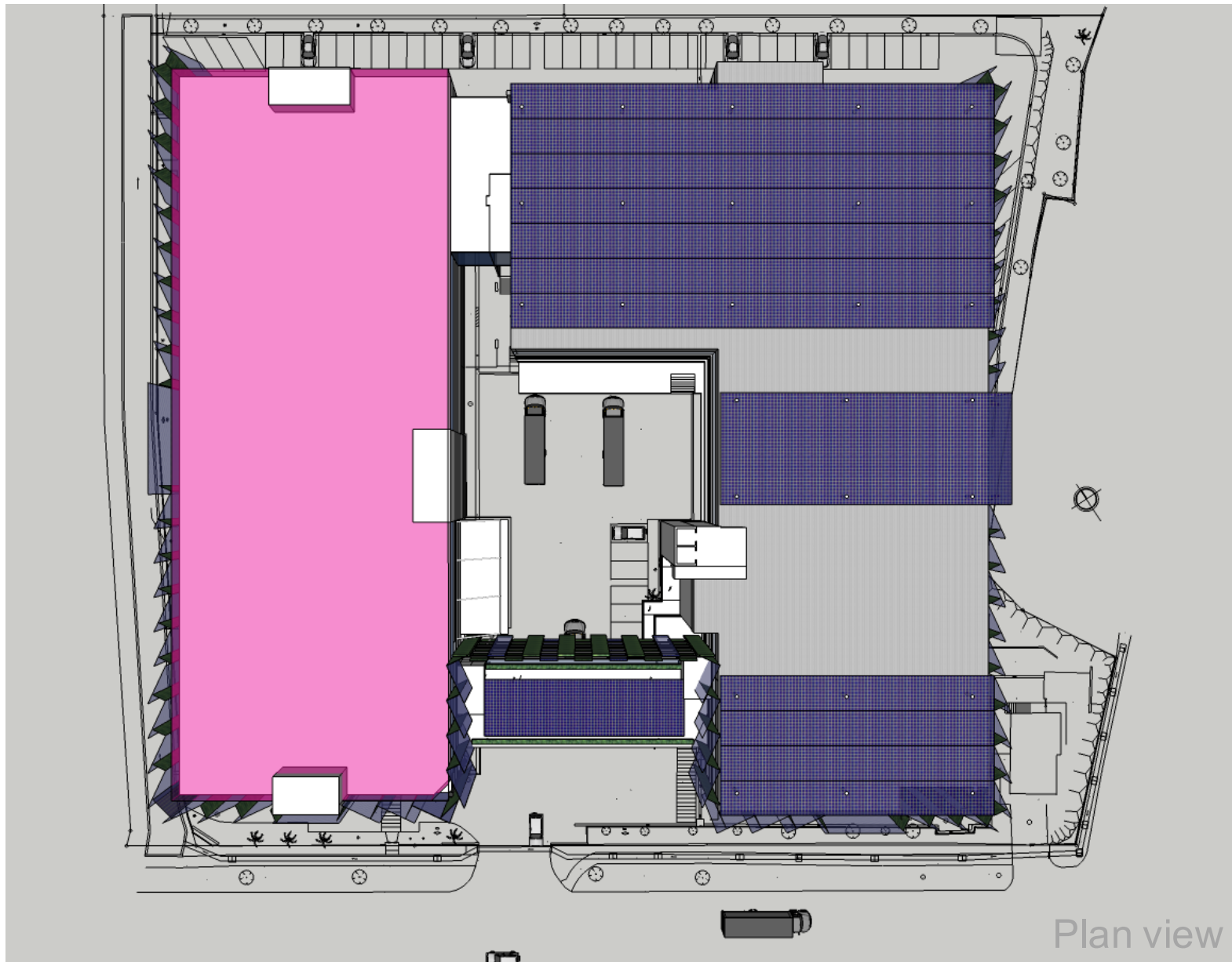
Our brains and bodies evolved over tens of thousands of years without buildings, and we now realize that we are at our best when we can recreate physical and psychological reminders of our most ancient home.

The aim is to explore into ways in which we can design and create “natural settings” in a modern building or build environment.

The approach is through the use and integration of;

- natural elements (plants, terrain etc) with,
- artificial materials (steel, glass, concrete etc)
- systems (façades, roof etc) and,
- IT and technology tools available (wind scope, sun scope etc)

The challenge is to create an architectural model by exploring how one can Integrate nature & technology to provide a natural environment in an urban setting.







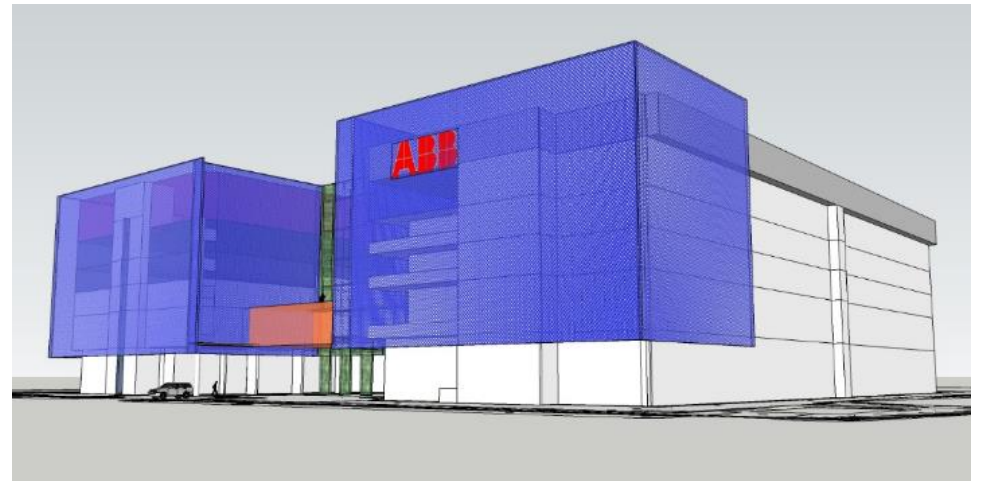
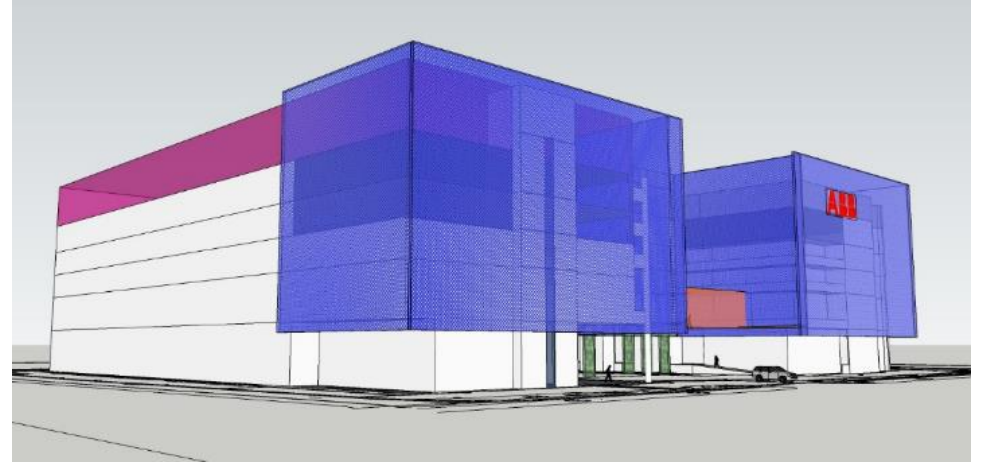


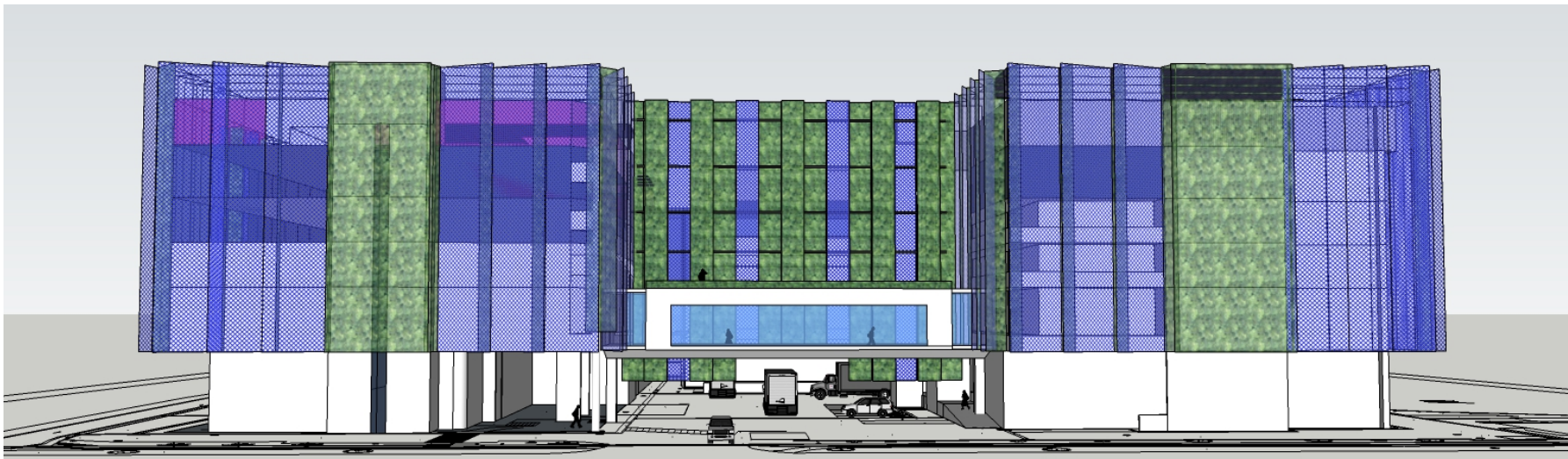
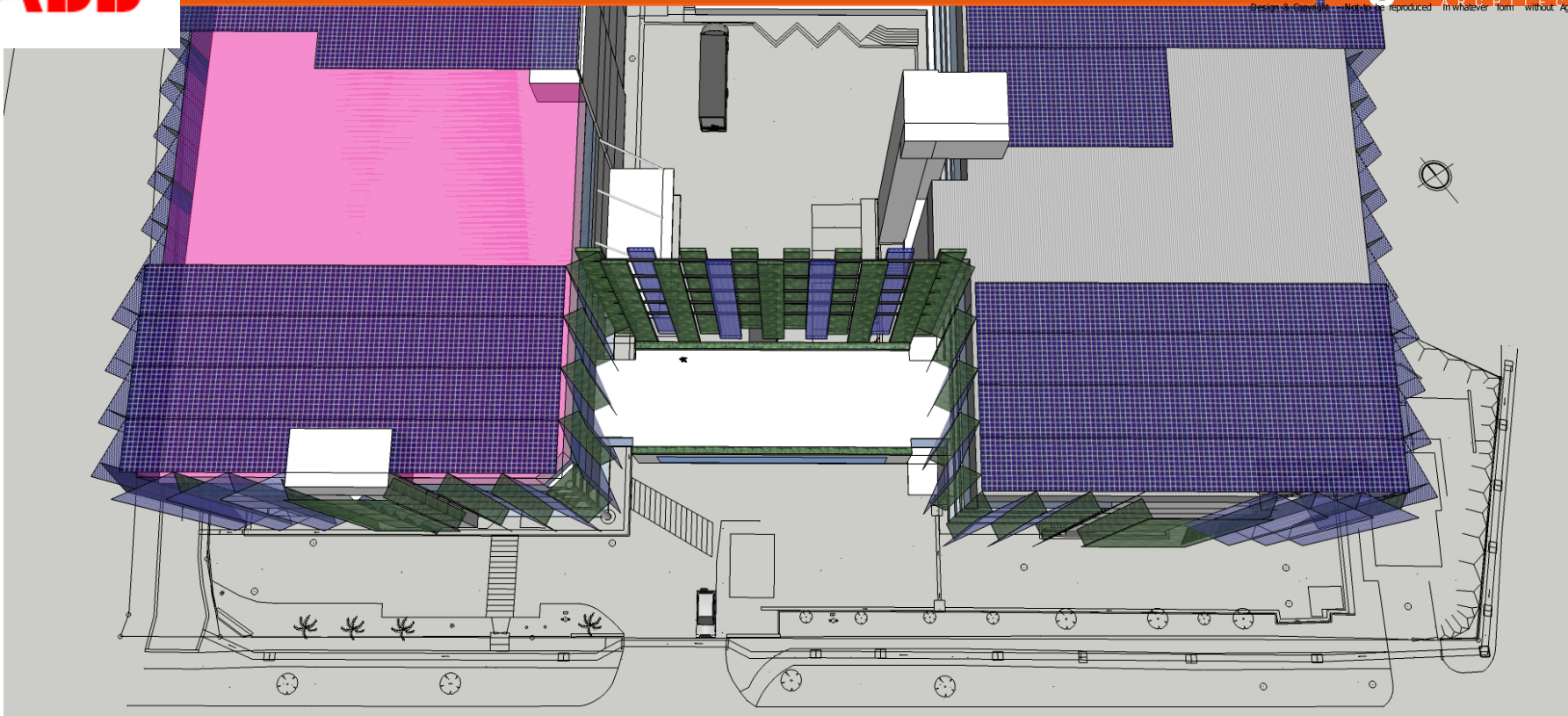


"Before & After" Concept Design

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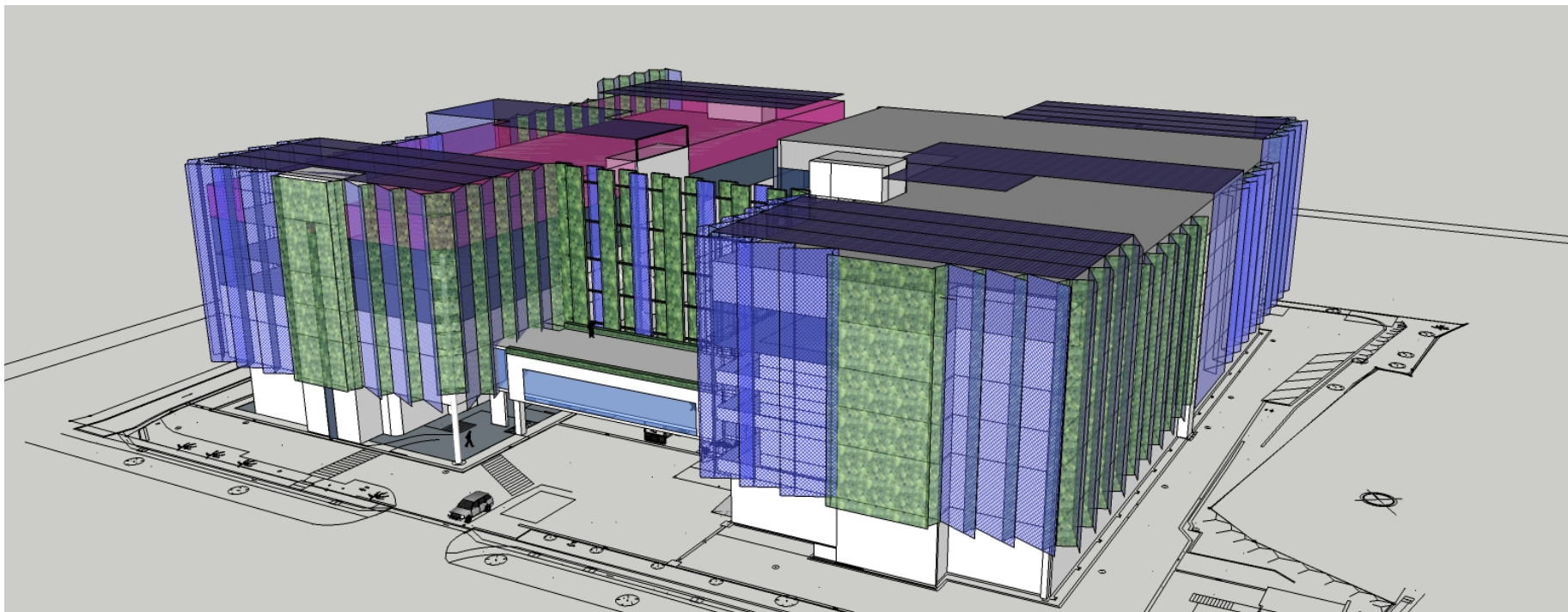
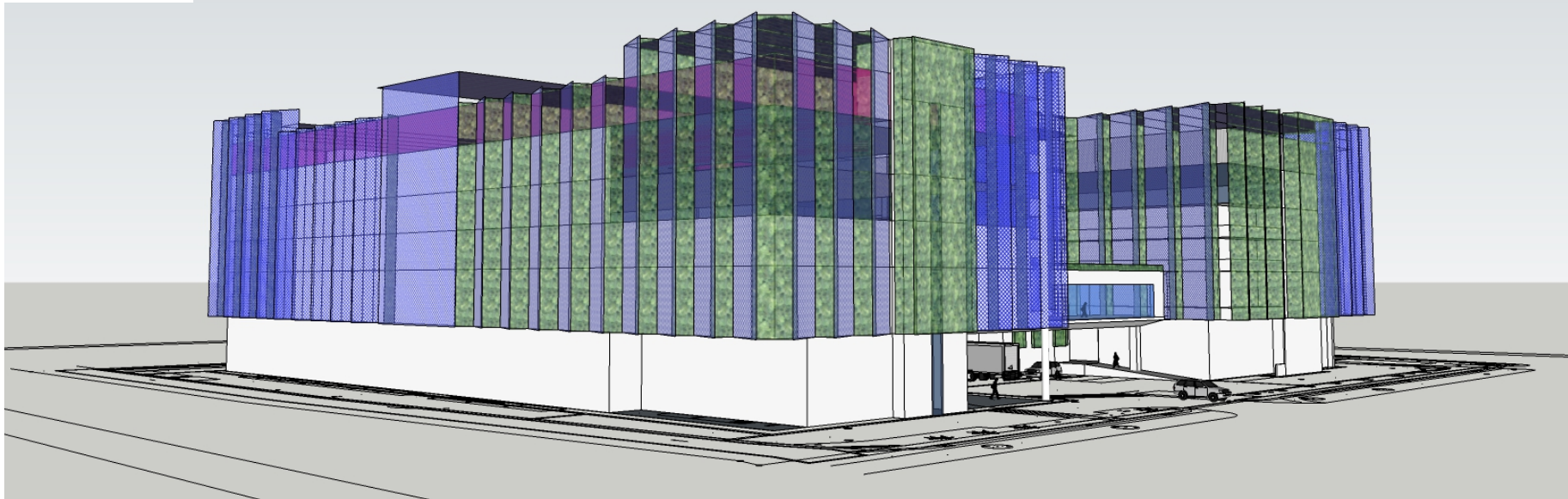


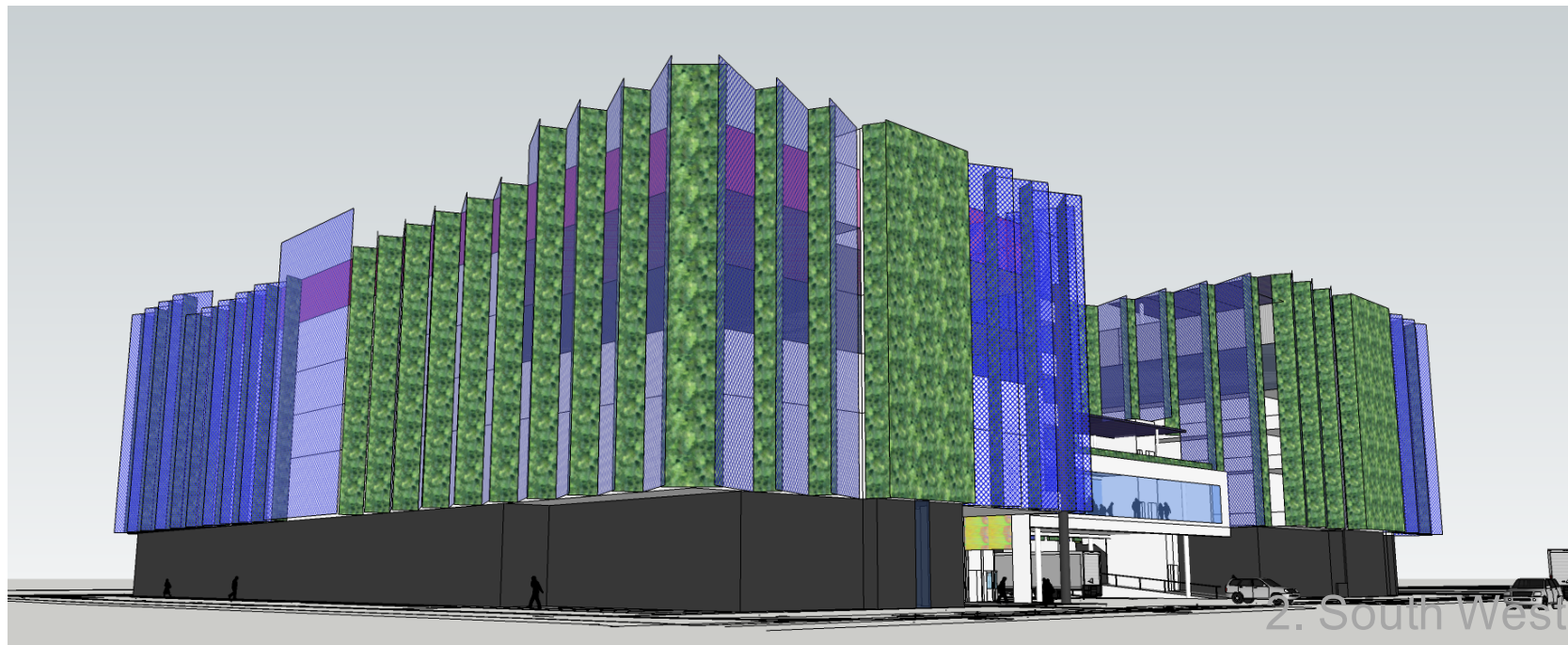
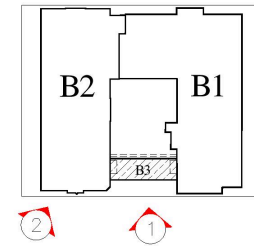




OPTION 1: South West & South East Corners

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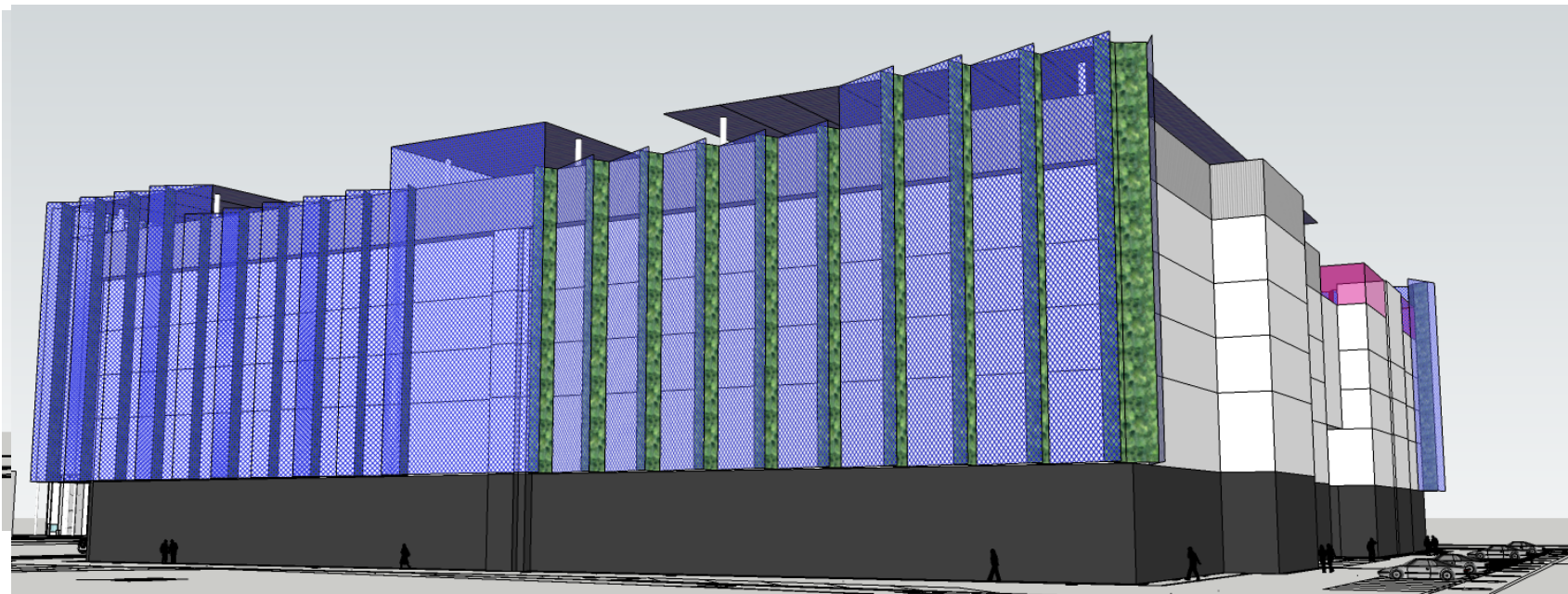
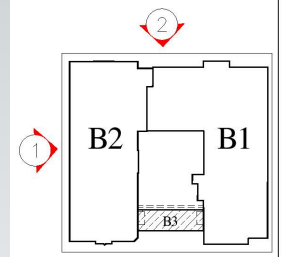
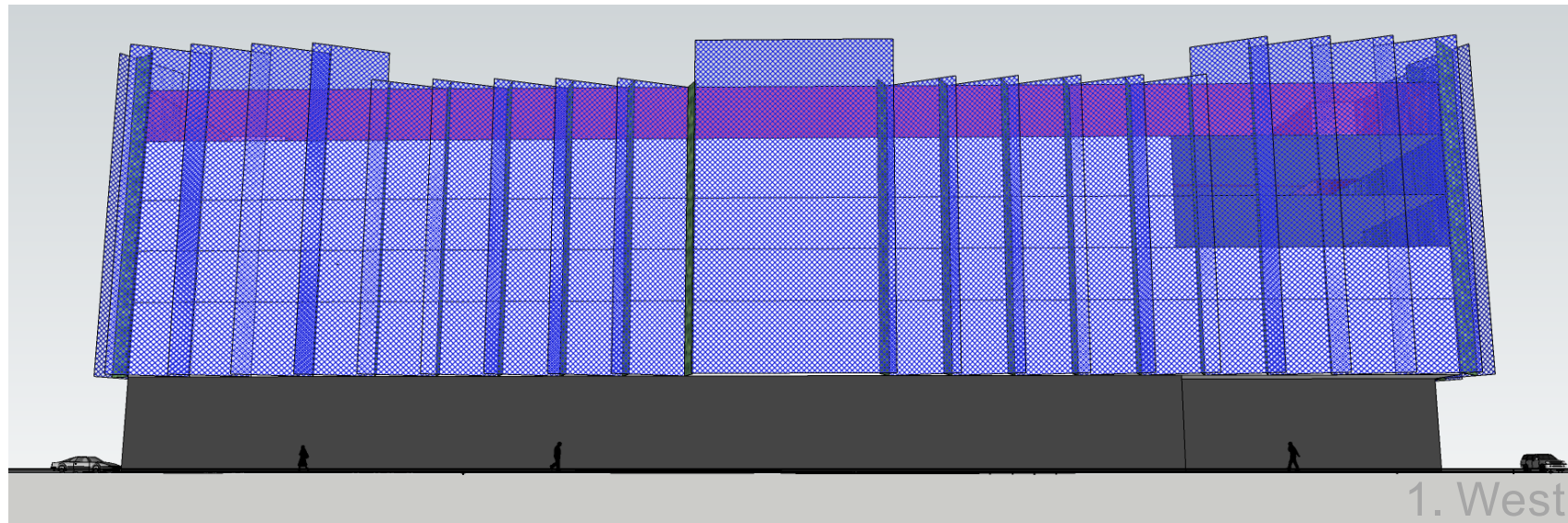




West/East (mirror) & North Elevations

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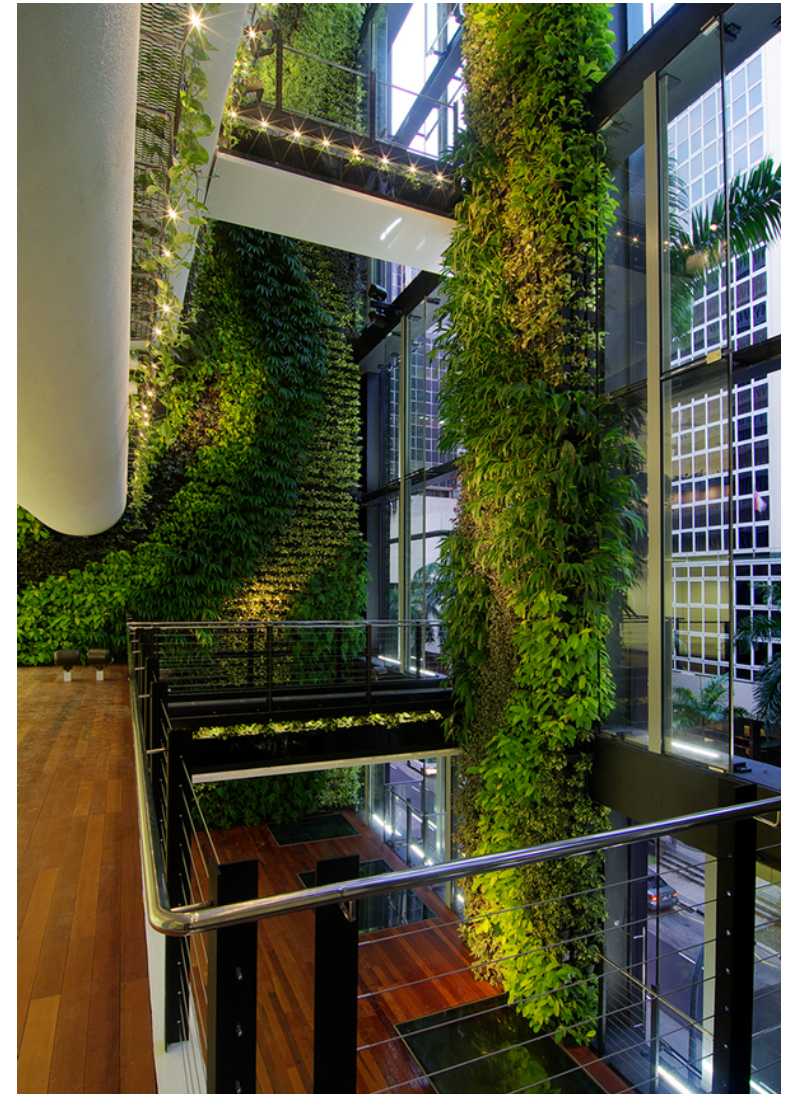
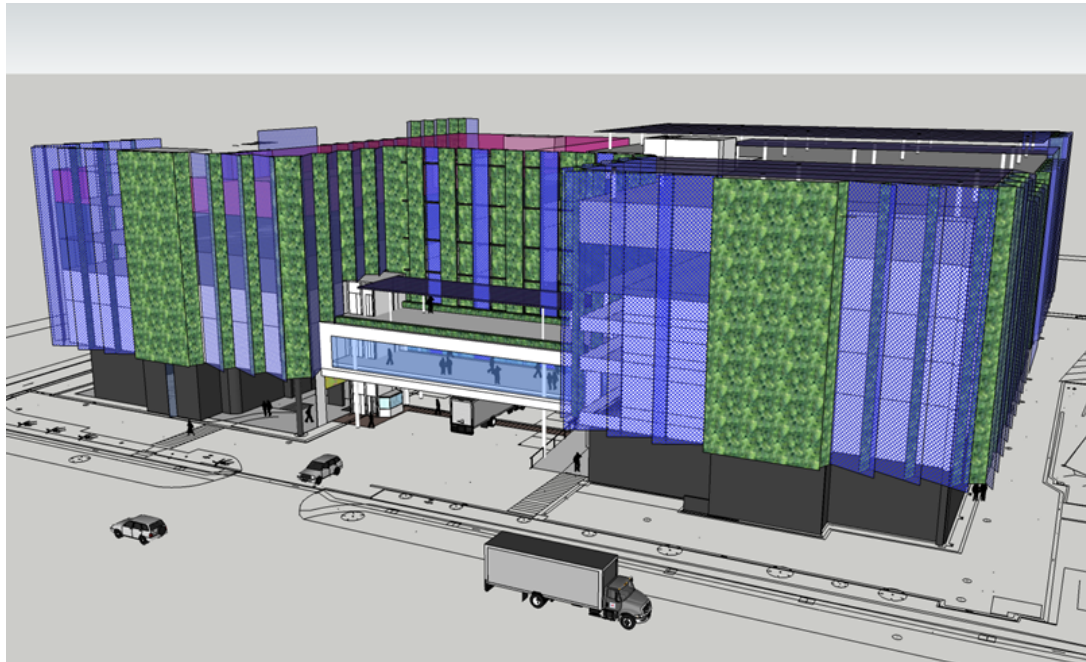




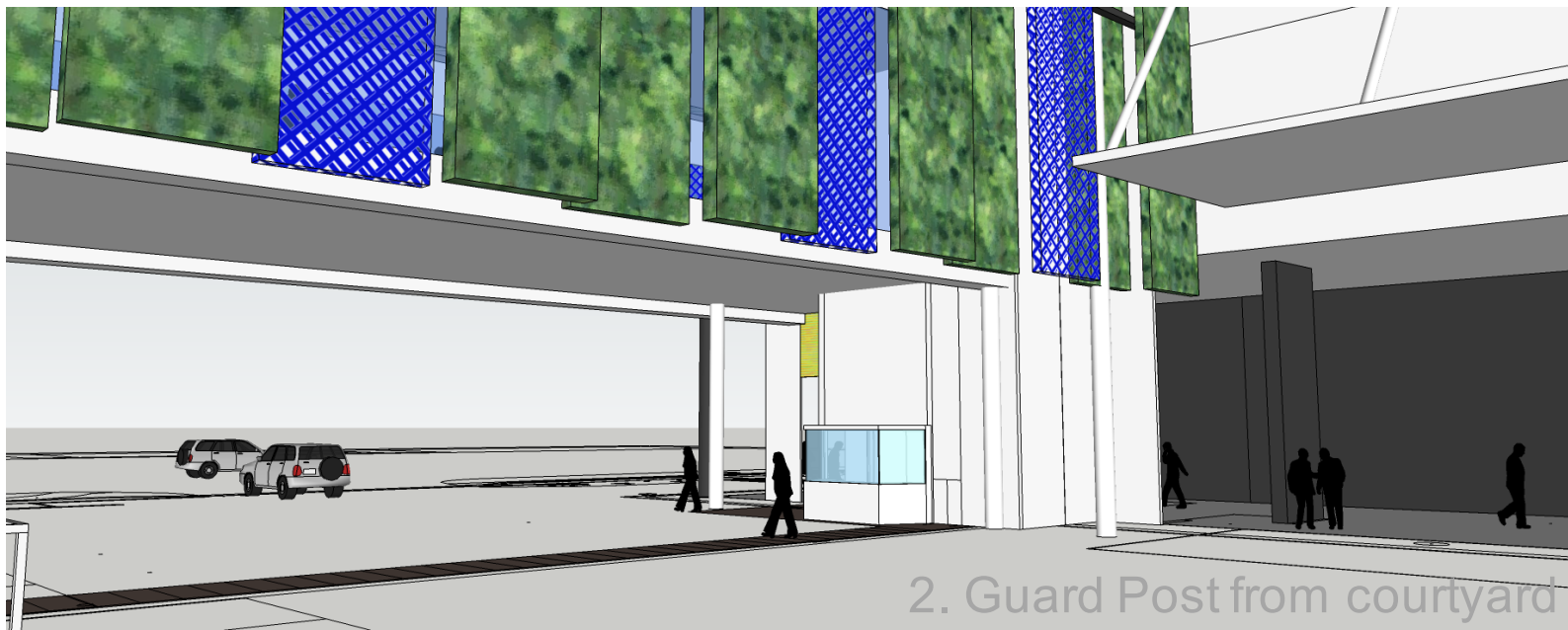
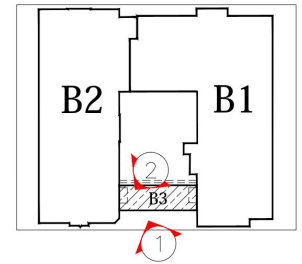
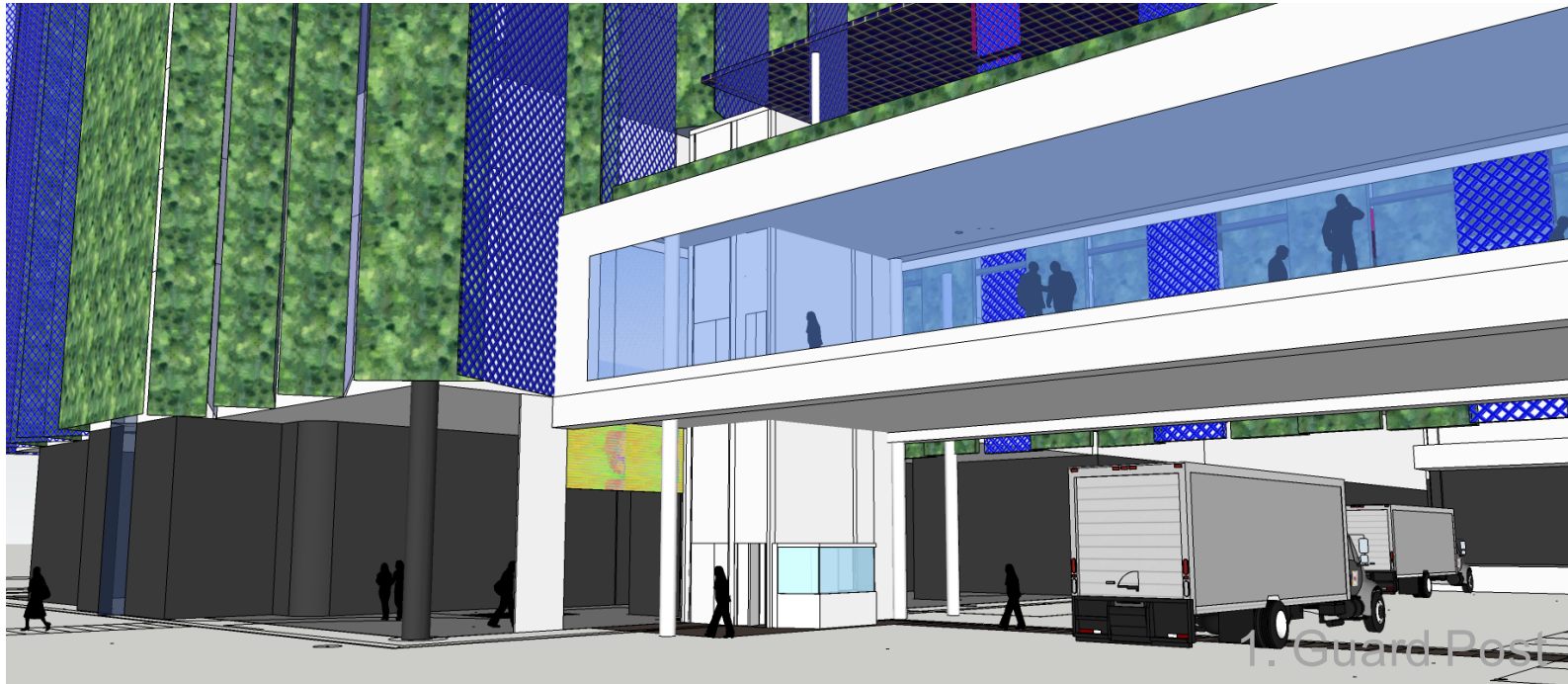
"Green-screen"

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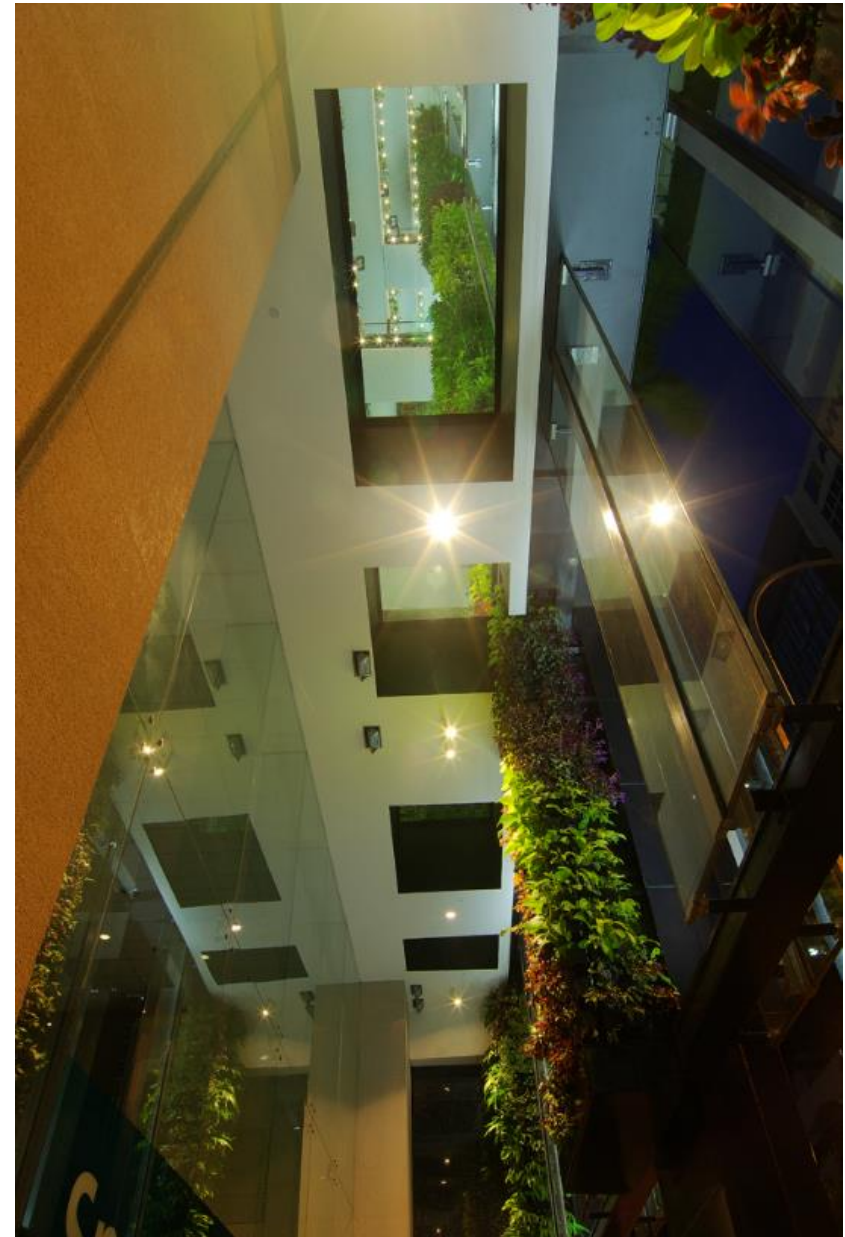
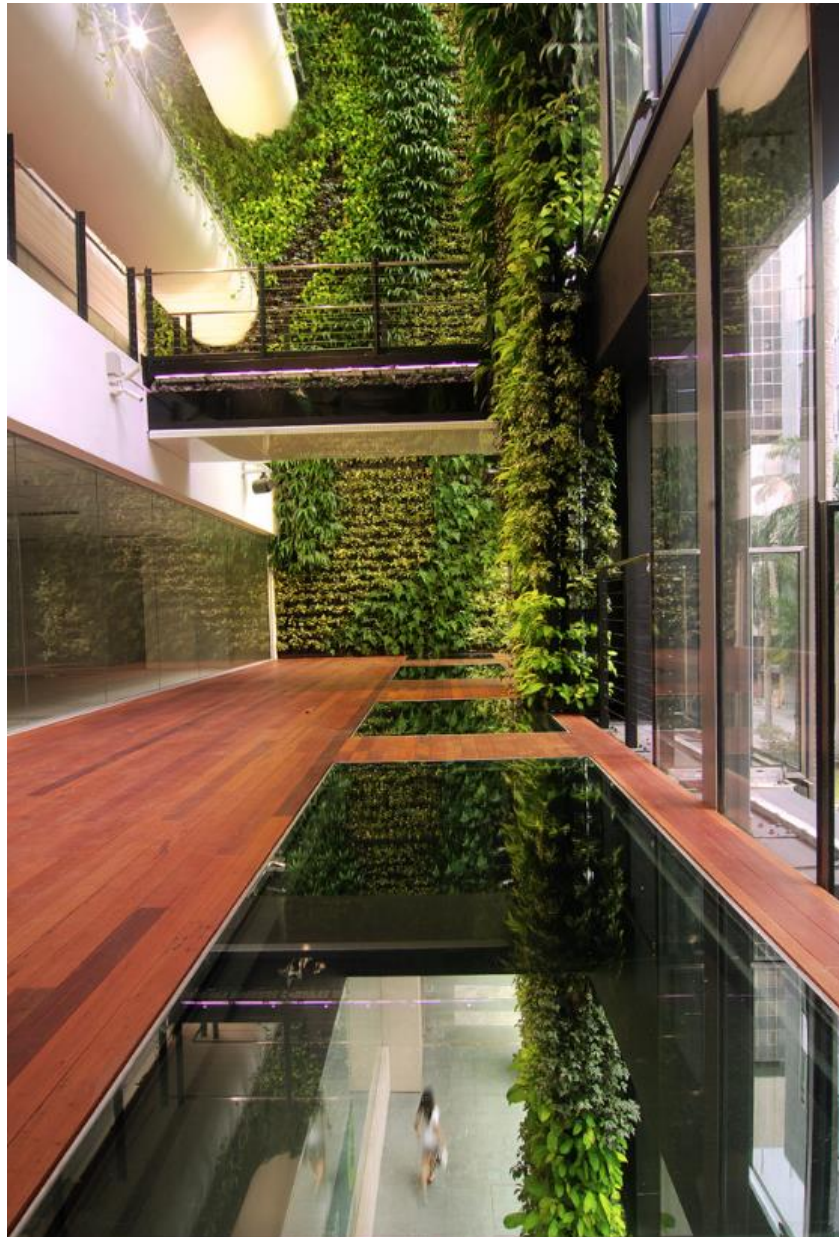


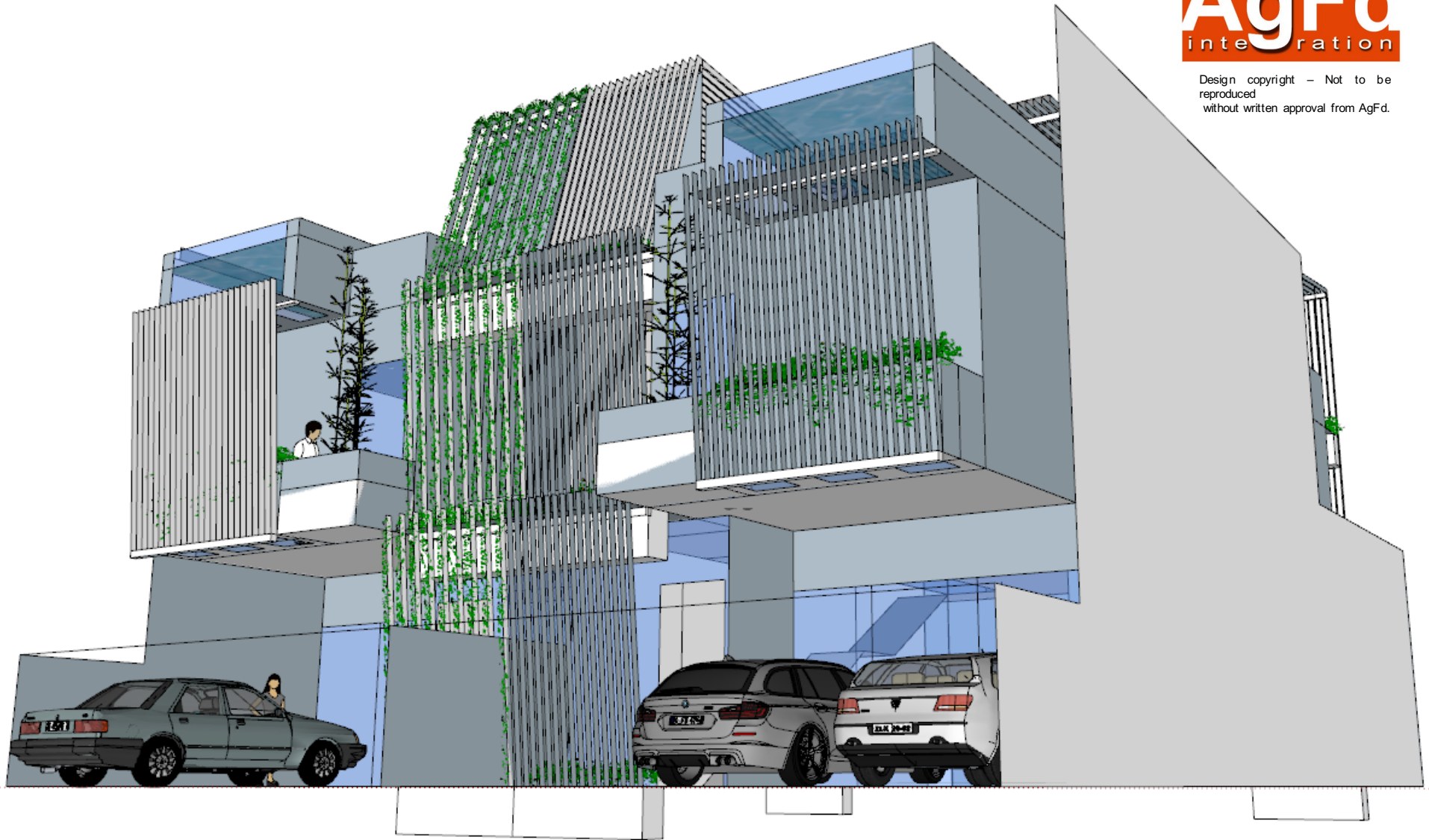


158 Cecil Street

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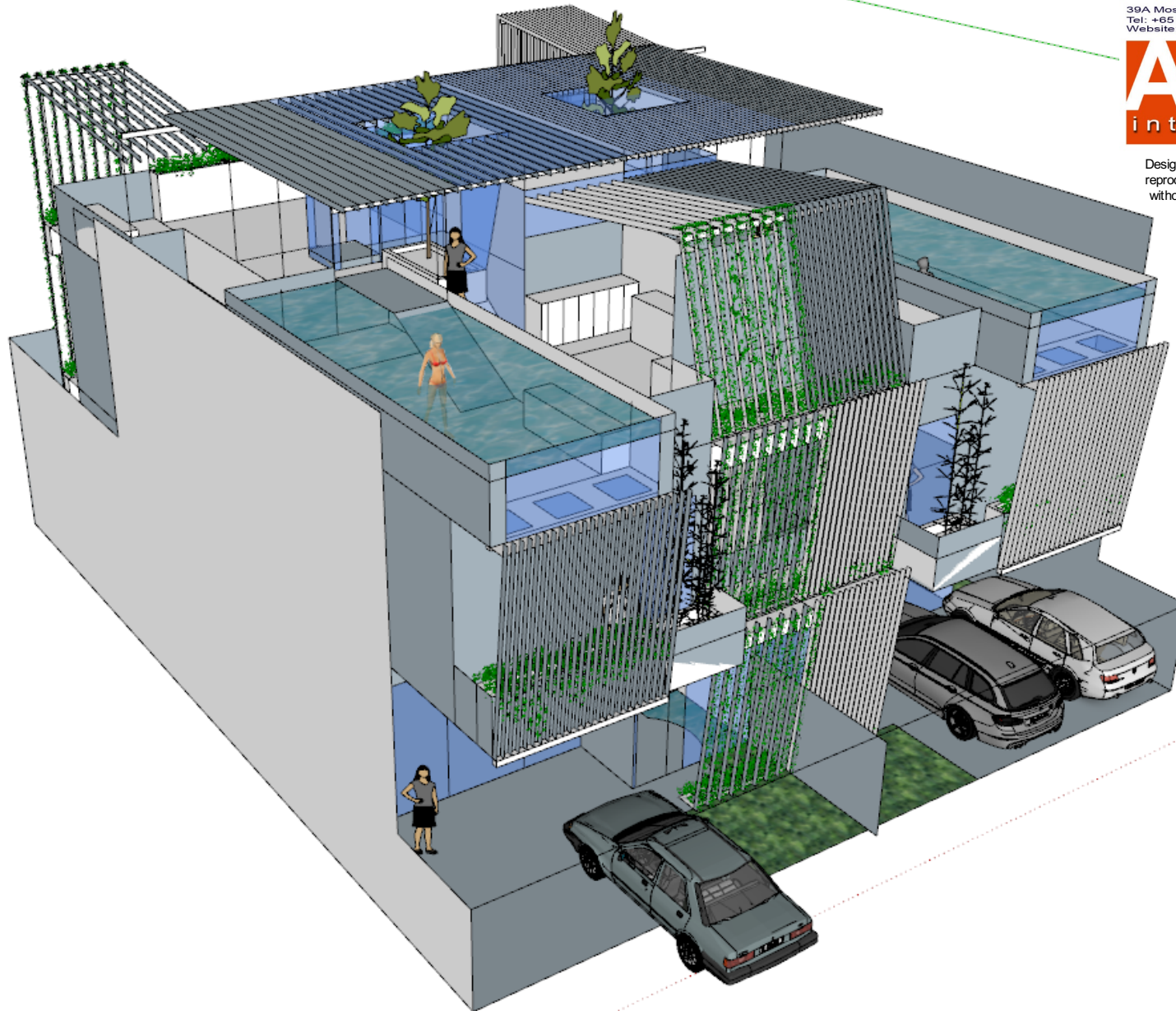
1 CAMBODIA TYPE 1 OPTION A
(ANGLED)
SCENE 1

AgFacadesign

39A Mosque Street Singapore 059517
Tel: +65 6226 1266 Fax: +65 6226 1265
Website: www.agfacadesign.com

AgFd
integration

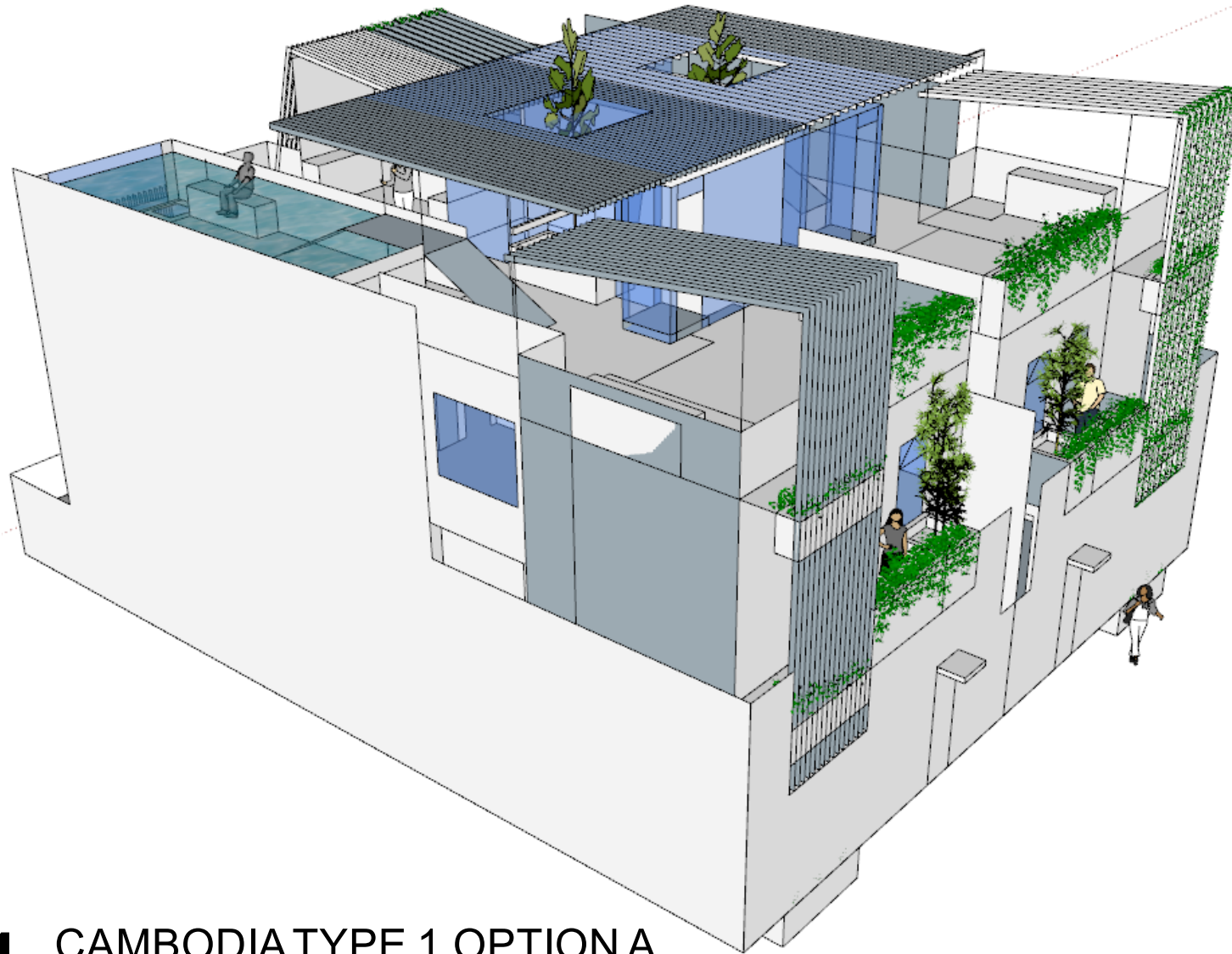
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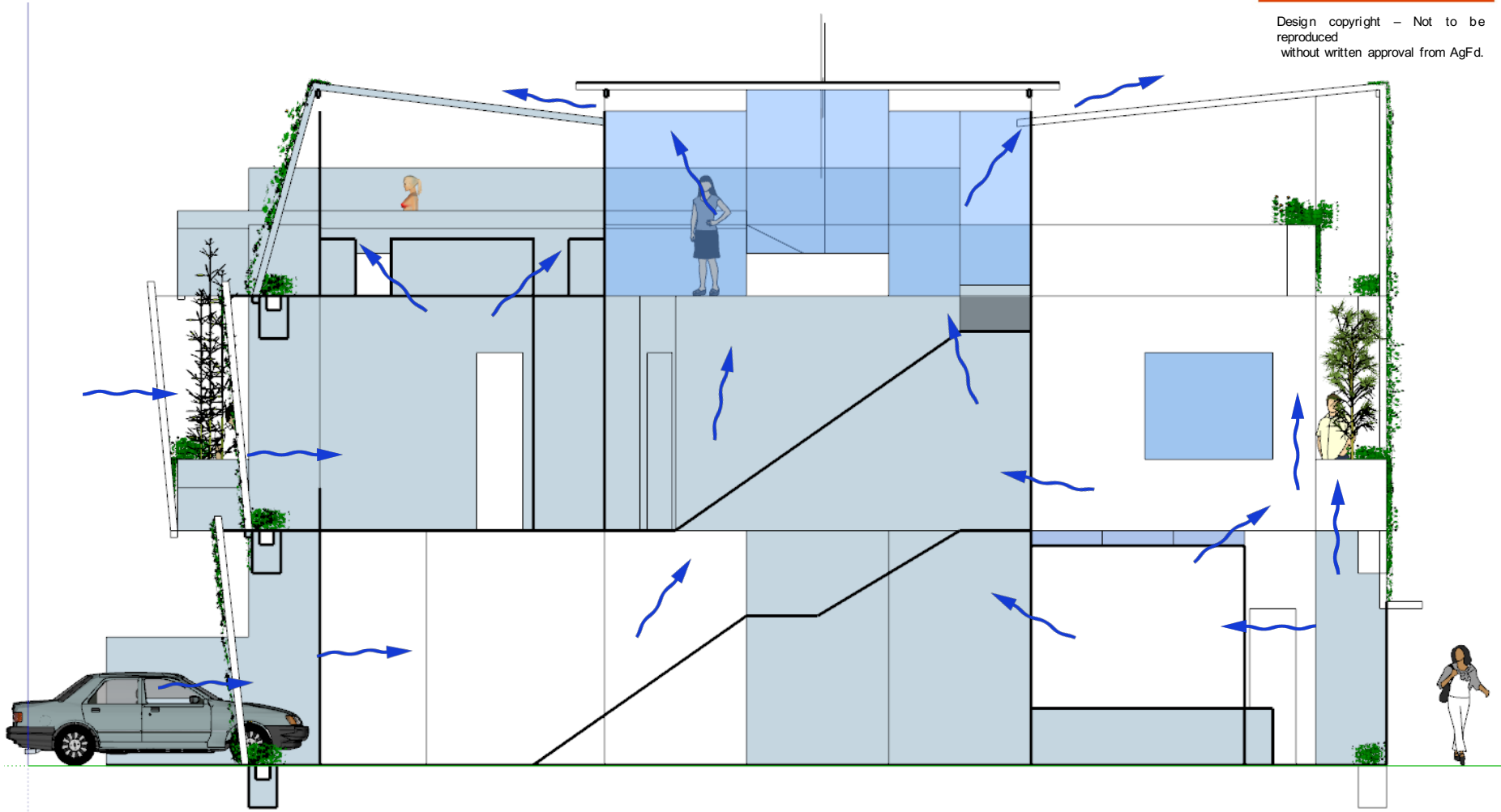
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(ANGLED)
SCENE 2



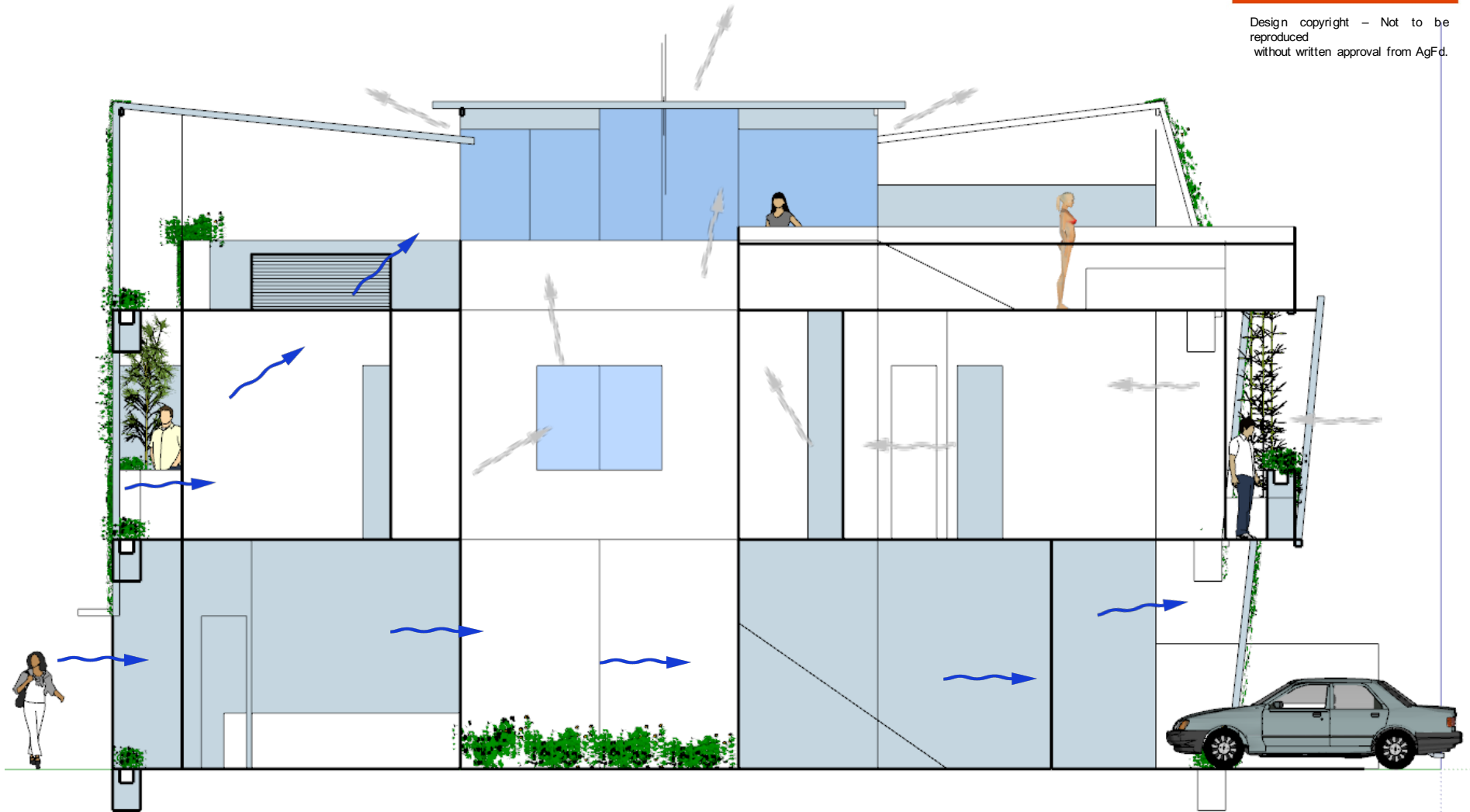
3 CAMBODIA TYPE 1 OPTION A
(ANGLED)
SCENE 3



4 CAMBODIA TYPE 1 OPTION A
(ANGLED)
SCENE 4



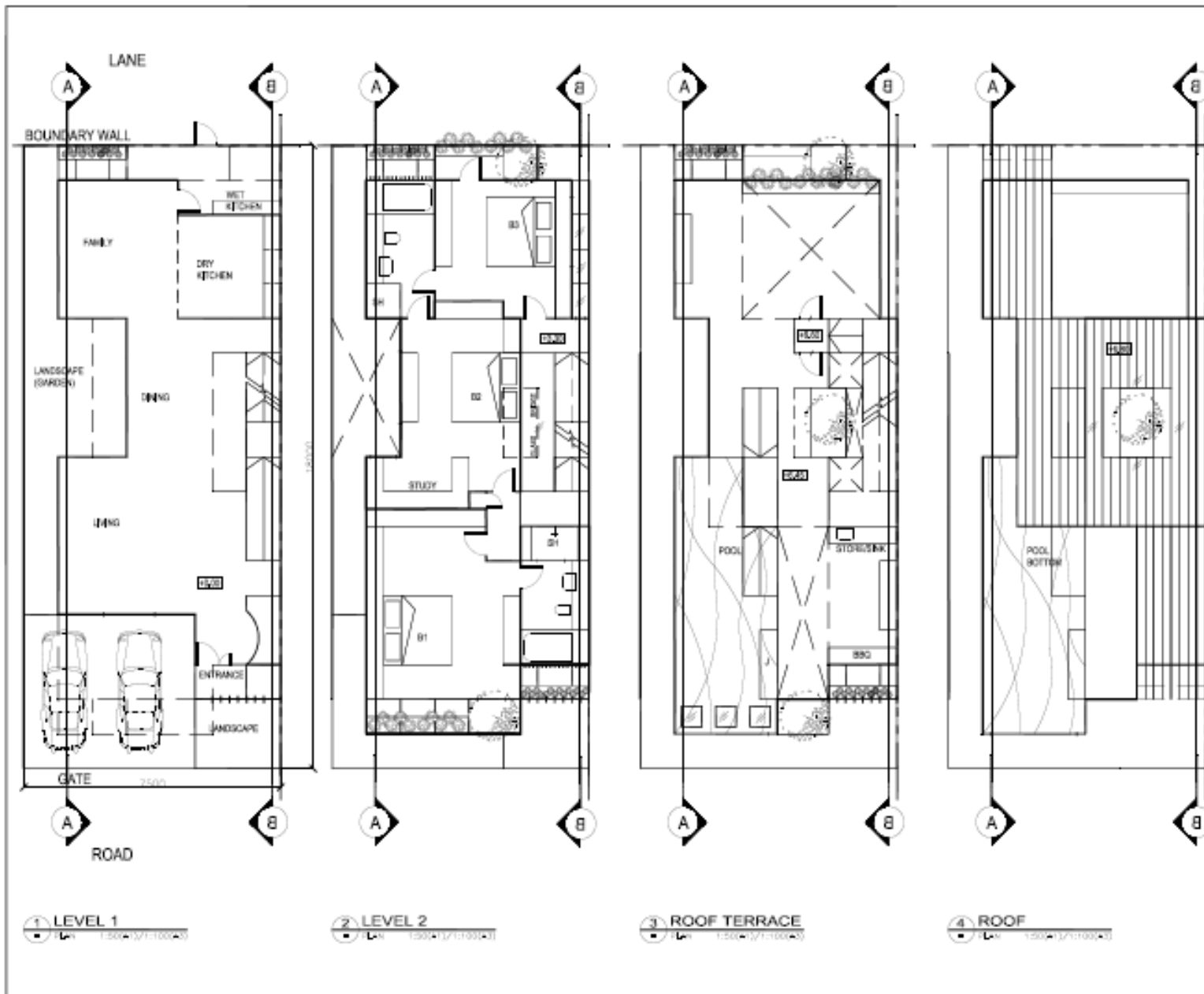
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(ANGLED)
SECTION B-B



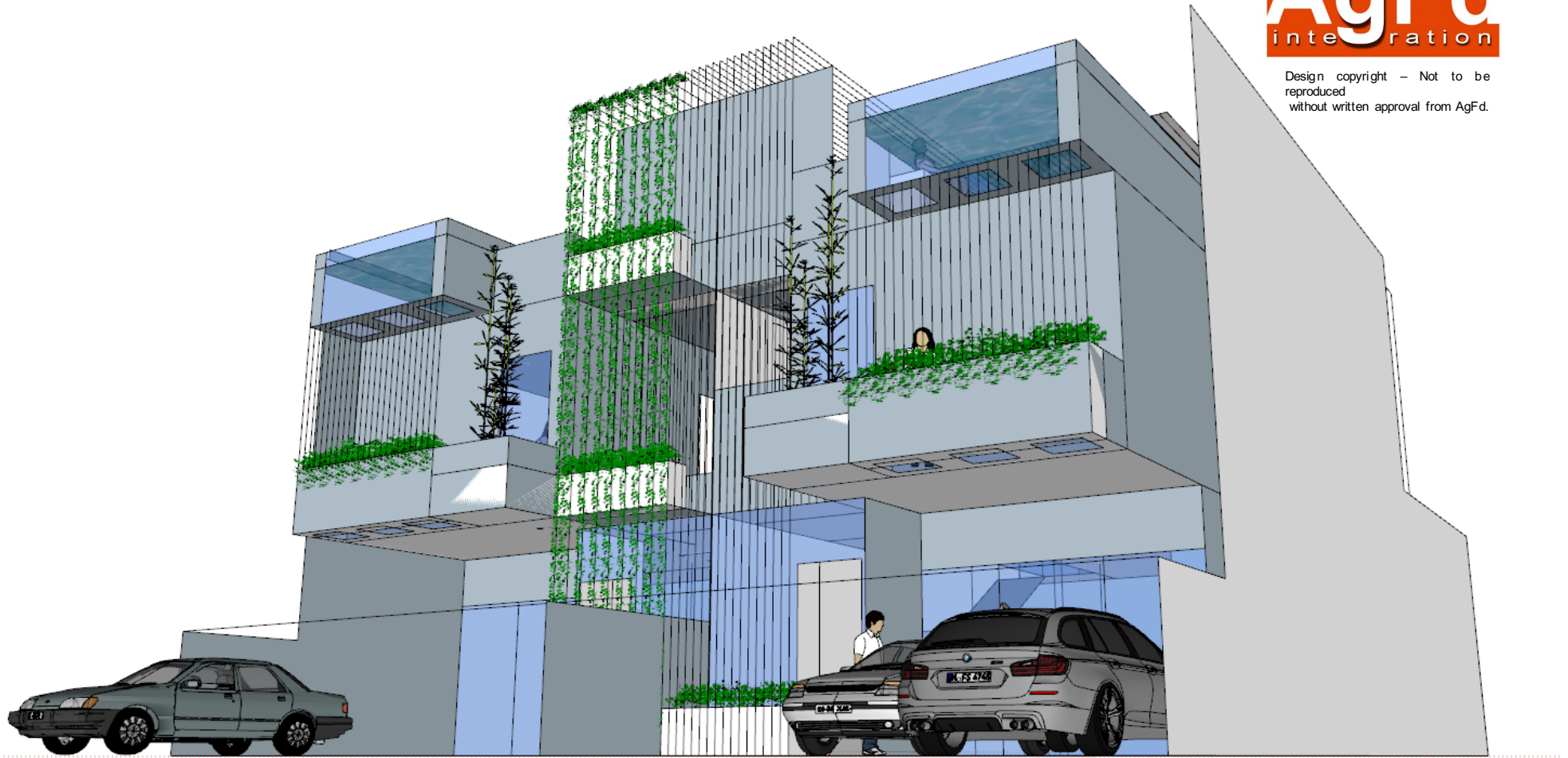
6 CAMBODIA TYPE 1 OPTION A
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SECTION A-A

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PROJECT:	
AgFacadesign	
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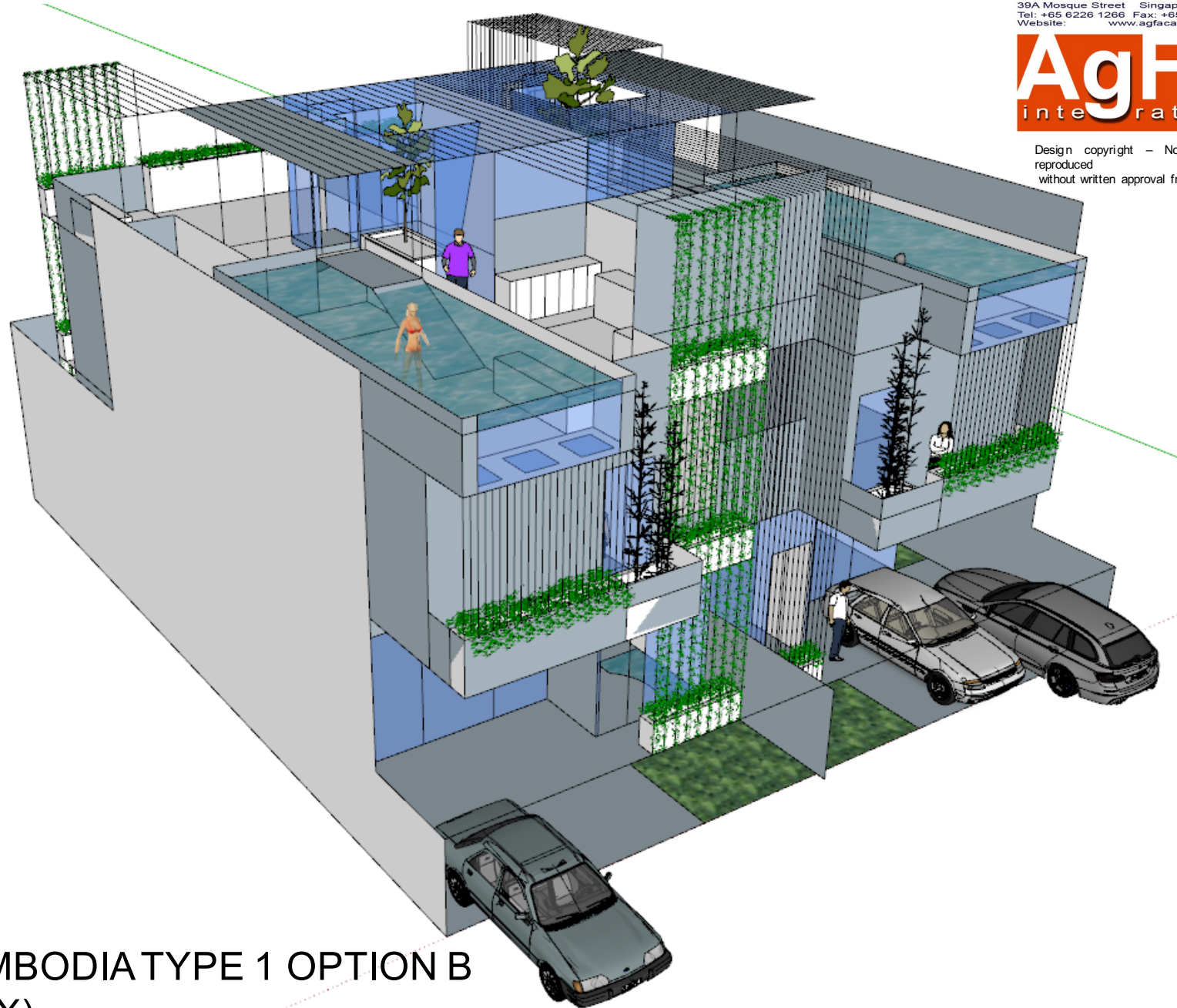
CAMBODIA HOUSING
TYPE 1
W/ CREEPERS



7 CAMBODIA TYPE 1
PLAN WITH CREEPERS
23 SEPTEMBER 2016



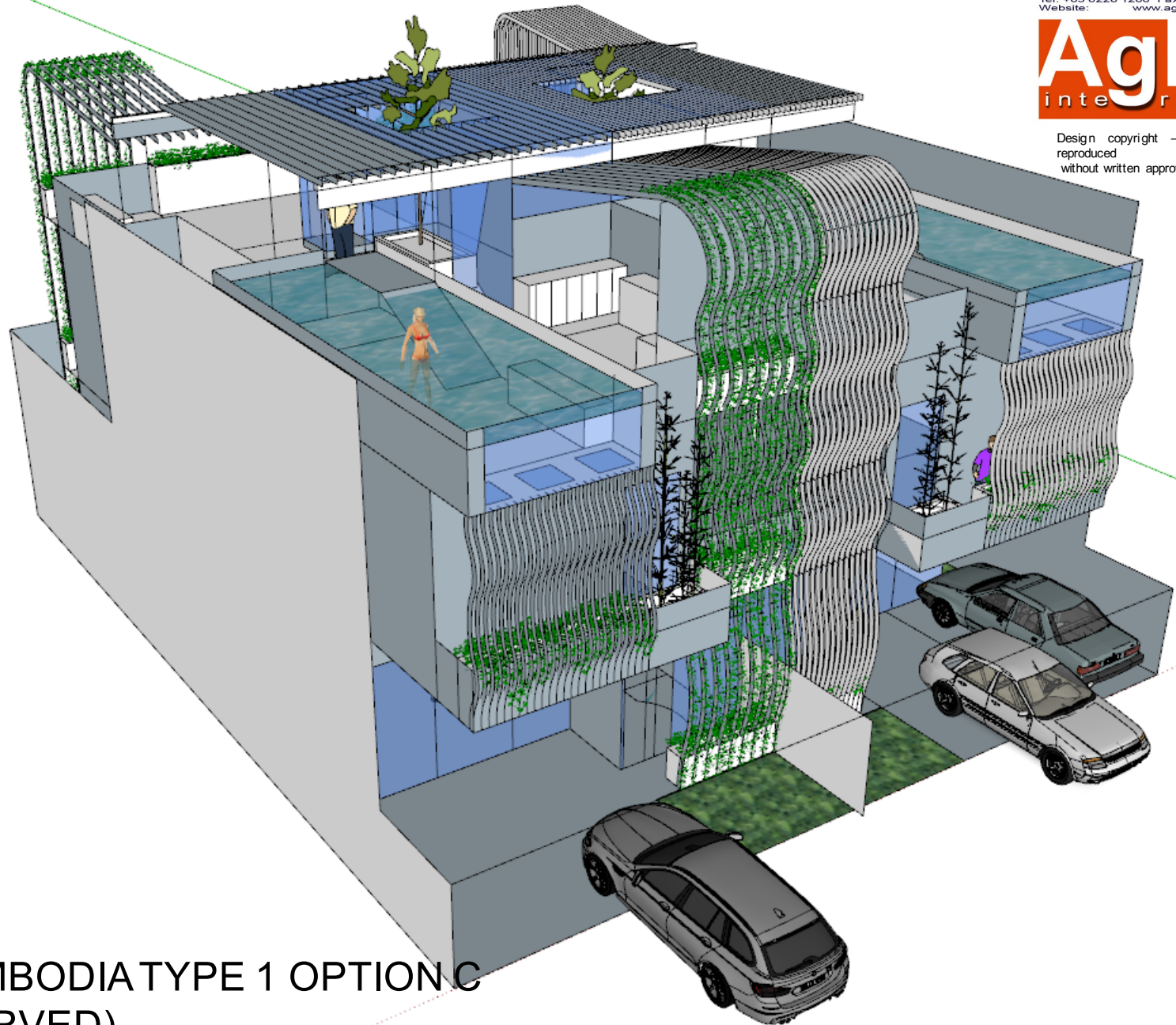
1 CAMBODIA TYPE 1 OPTION B (BOX) SCENE 1



2 CAMBODIA TYPE 1 OPTION B
(BOX)
SCENE 2



1 CAMBODIA TYPE 1 OPTION C (CURVED) SCENE 1



2 CAMBODIA TYPE 1 OPTION C
(CURVED)
SCENE 2

"O-HQ": Layered Façade – Radiating Sun Screens

ARCHITECTS
AgFacadesign



Top: Proposed;
Right: Existing Elevation; Right Bottom: Existing Offices fully closed with internal blinds

"O-HQ": Entrance



"O-HQ": Entrance



"O-HQ": Layered Façade – Radiating Sun Screens



Background:

- A leading health equipment company wanted to upgrade its corporate identity.

Requirements:

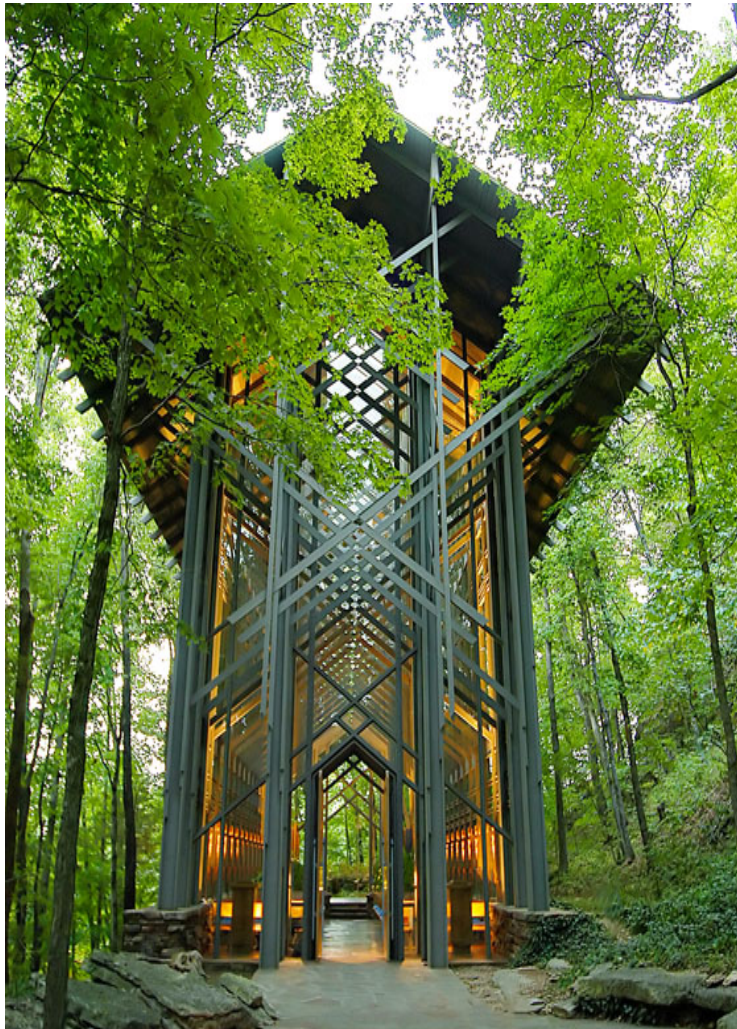
- To replace the “tired” façade and improve on some internal areas & external works.

Approach:

- To create an eco-façade to shade all office areas and maximize views in/out

Top: Proposed;
Right: Existing Elevation;

Integrating Nature & Technology – Thorncrown Chapel, USA



Integrating Nature & Technology – Park Royal Hotel, Singapore



Integrating Nature & Technology – Khoo Teck Puat Hospital, Singapore



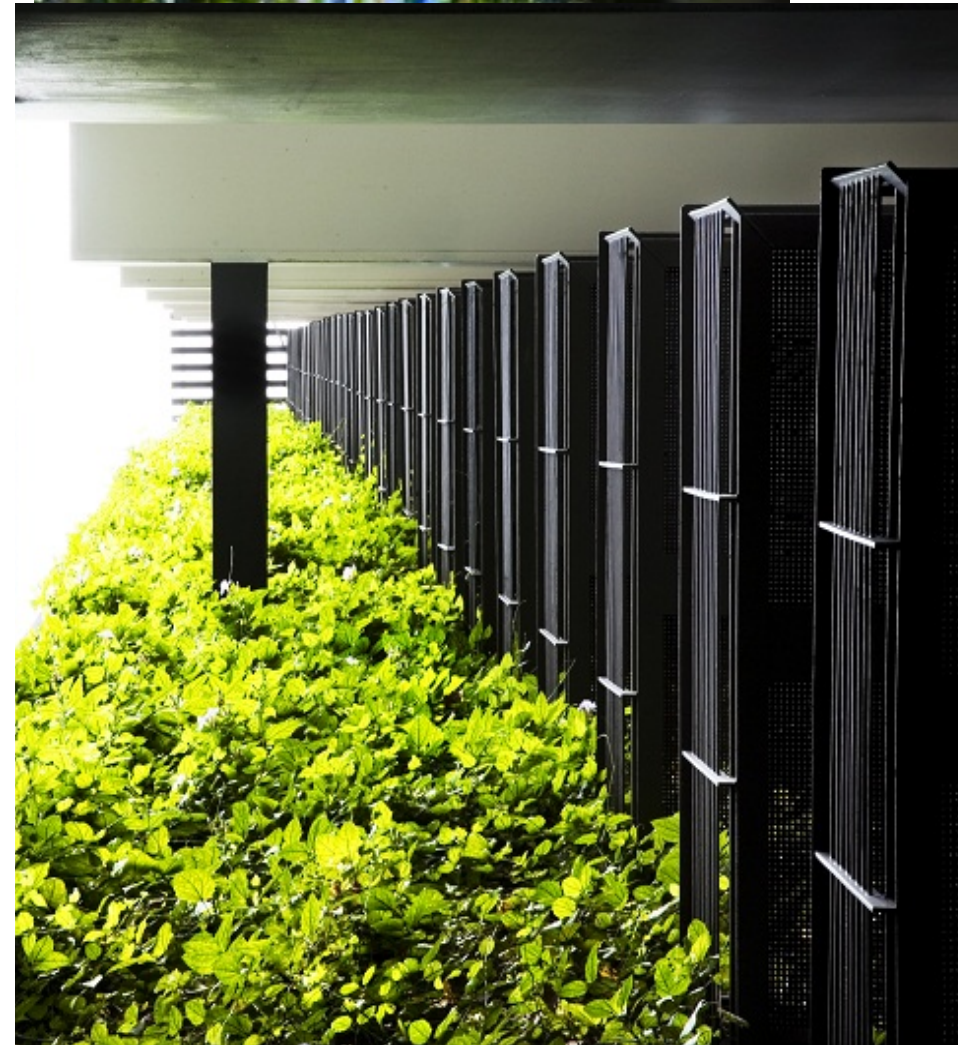
Integrating Nature & Technology – Khoo Teck Puat Hospital, Singapore



Integrating Nature & Technology – Newton Suites Condominium, Singapore



Integrating Nature & Technology – Newton Suites Condominium, Singapore

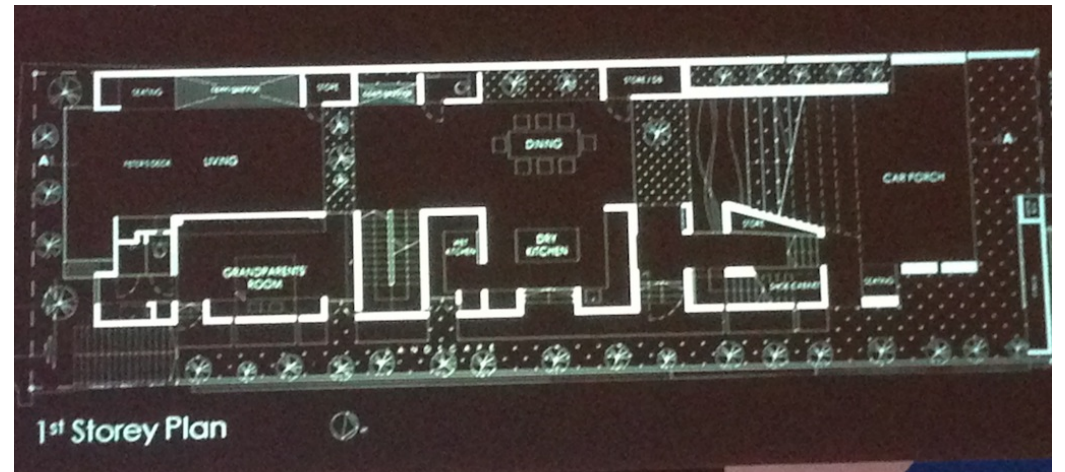
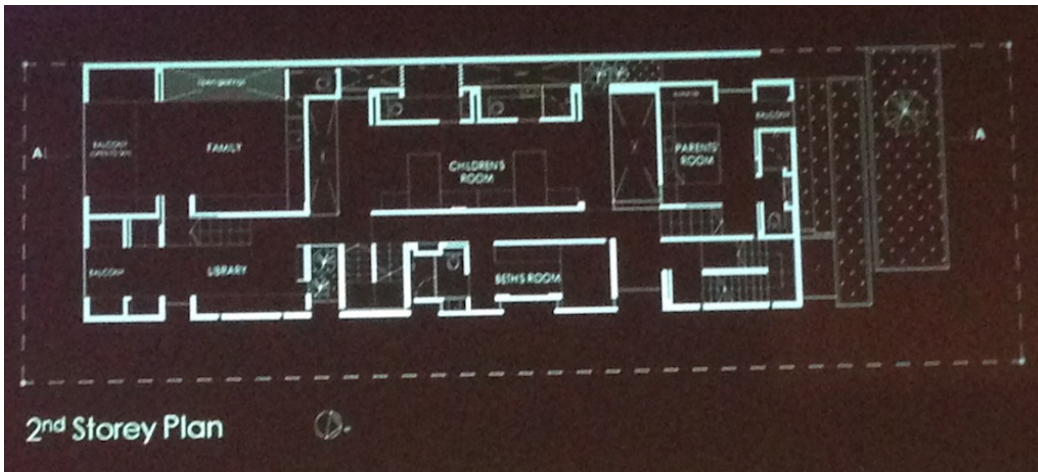


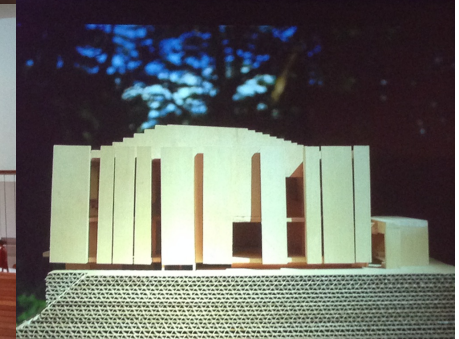
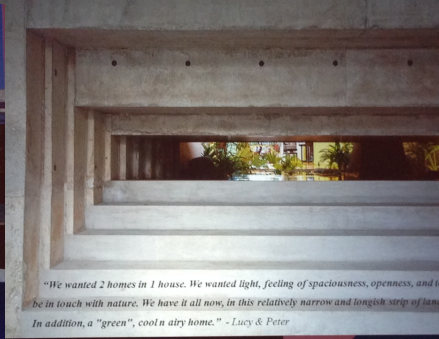
Integrating Nature & Technology – School Of The Arts, Singapore



Integrating Nature & Technology – School Of The Arts, Singapore



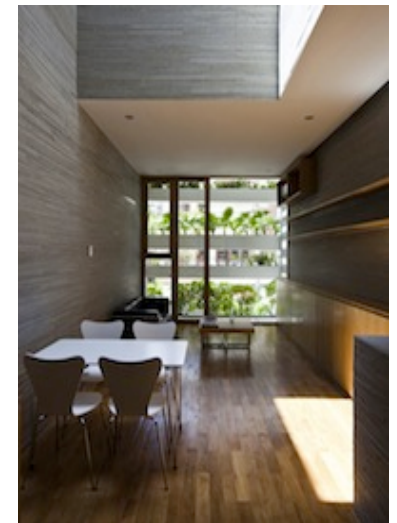
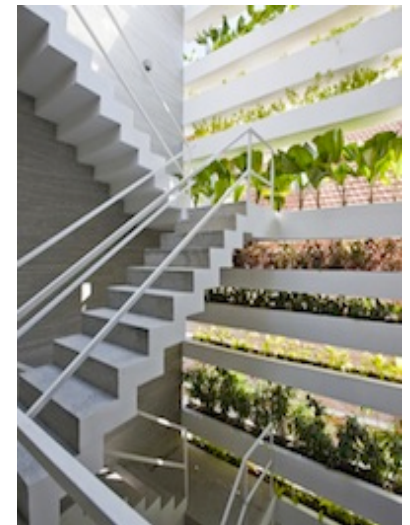






World Architecture Festival (WAF) 2013 Winner (Villa)

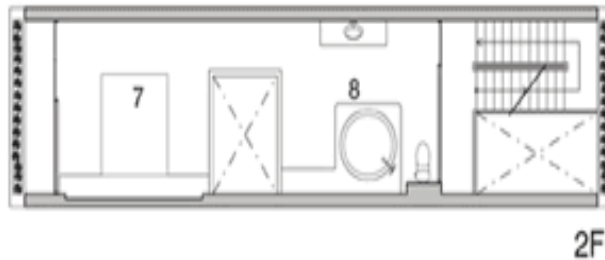




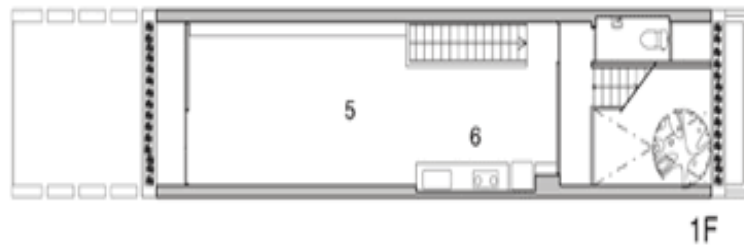
9 STUDY ROOM
10 WORSHIP ROOM
11 ROOF GARDEN



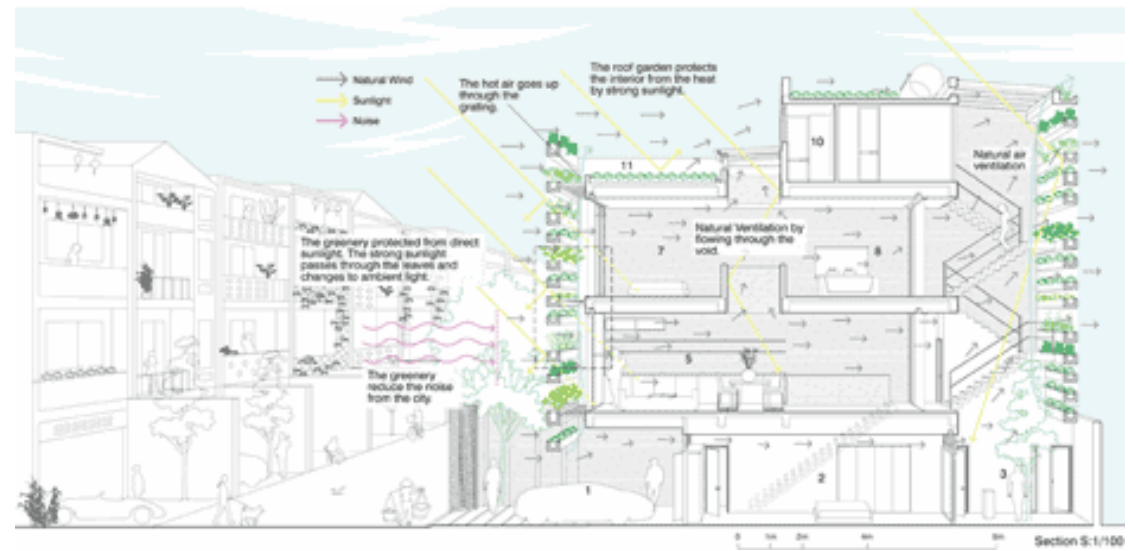
7 BEDROOM 2
8 BATH ROOM



5 LIVING SPACE
6 KITCHEN SPACE



1 PARKING
2 BEDROOM 1
3 COURTYARD
4 STORAGE



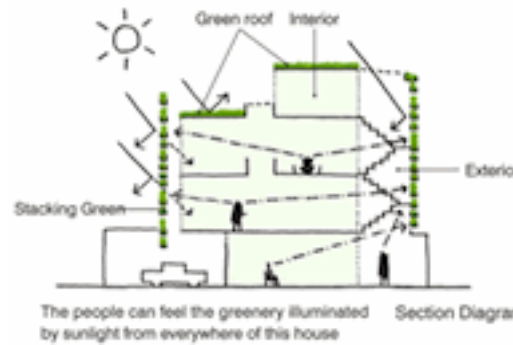
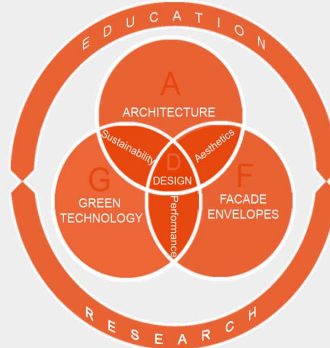




Photo: Amir Sultan

About Us



Practice:

1997-1999: Architecture Practice - UK & Singapore
 1999-2003: Glazing Technologies Design & Build
 2003-2009: Façade Systems Design Consultancy
 2009-Present: AgFacadesign
 - Integration of different disciplines.

Academia & Research:

2008-Present
 - NUS School of Architecture - Masters
 Tutor & Façade Studios
 - The Building Construction Authority
 (BCA) Academy - SCEM Course
 - Sustainable Energy Association
 Singapore (SEAS) - SCEM Course

Services:

- Architecture
- Glass Structures Design
- Façade Consultancy Design
- Building Diagnostics
- Green wall Façade Design
- Landscape & Hardscape Design
- Lighting Design
- Green Technologies & ESD
- Interior Design
- Urban Planning
- Project Management

Approach:

AgFacadesign (AgFd) is a unique architectural consultancy firm offering an integrated design approach by combining different disciplines in a holistically manner.

Always striving to produce innovative solutions that add value to the end product by evaluating the design process in detail at different stages.

With our creative approach, end products are functional and efficiently designed, resulting in refreshing and aesthetically pleasing solutions.

G FACADESIGN **AgFacadesign**
PHO LTD ARCHITECTS

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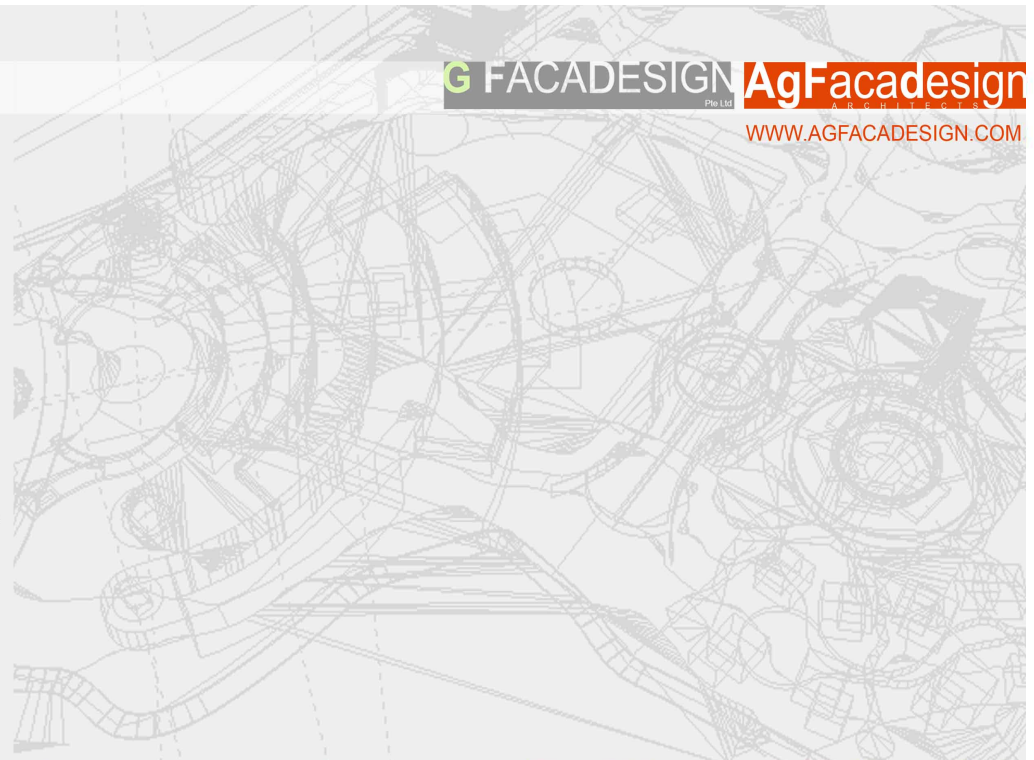
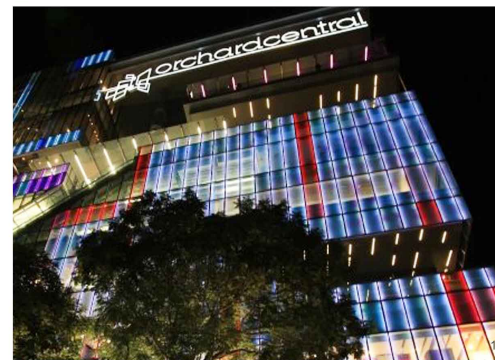
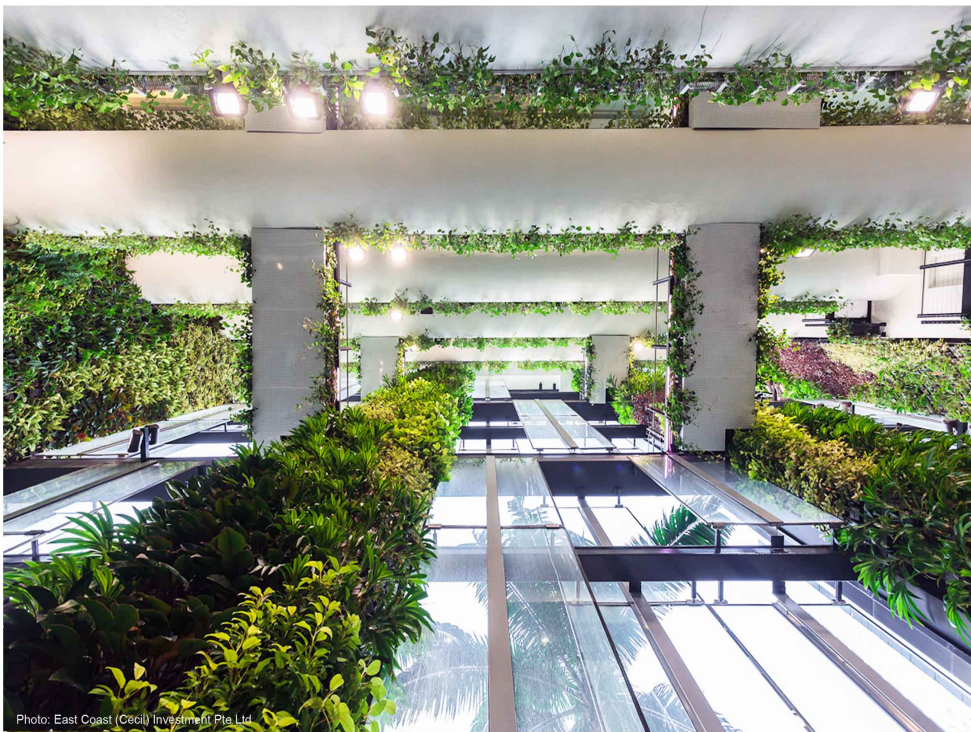


Photo: Kelvin Kan

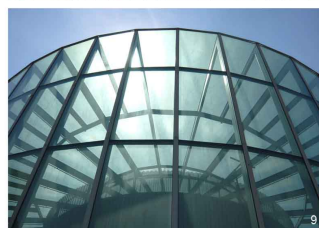
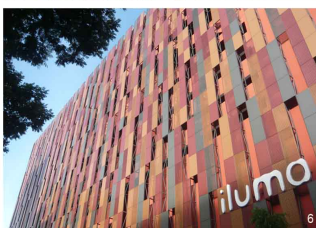
158 Cecil Street, Singapore - Layered Glass Façade



			10
1			11
2	3	4	
5	7	8	12
6		9	

Facade Types: Project

Layered-green Facades	1,2
Unitised Curtain Wall	5,11
Semi-unitised Curtain Wall	4,9
Structural Glass System	7,8
LED Integrated Facades	10,11
Pool Integrated Facades	3,12
Metal Cladding Facade	6
Pre-cast Panel Facade	5
Monocoque Facade	10



- 158 Cecil Street, Singapore, Completed 2011
- O-HQ, Singapore, Design Proposal 2011
- Resort in Bali, Planning Submission 2013
- Wisma Atria, Singapore, Completed 2012
- Singapore Management University, Completed 2005
- BUGIS + (ILUMA), Singapore, Completed 2007
- National Museum Connector, Singapore, Completed 2006
- MINT Toy Museum, Singapore, Completed 2006
- National Museum Rotunda, Singapore, Completed 2007
- ION Orchard, Singapore, Completed 2008
- Orchard Central, Singapore, Completed 2008
- ONE KL, Malaysia, Completed 2009

Front cover: RCRD Resort, Dhaka, Master Plan 2013
Back cover: 158 Cecil Street, Completed 2011

Project Nos 5-12 with Arup Façade Engineering, Singapore.



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4	5	6	10

Facade Types Project

Plaster Mesh Facade	1, 3
Metal Cladding	2, 3, 4, 10
Timber Facade	4
Curved Glass	5
Structure Glass System	7, 10
Feature Box Facades	8
SPV Envelope	9
Clamp-plate Facade	10

1 Philips Electronics, Completed 2010

2 11 WWP, Completed 2013

3 DFS @ Scotts Walk, Completed 2014

4 Serangoon Cove, Completed 2014

5 Lincoln Condominiums, Completed 2014

6 MD 11 NCS, Completed 2015

7 Hewlett-Packard, Completed 2010

8 Young Bahru Plaza, Completed 2010

9 24 WWP, Completed 2010

10 Crystal Pavilion, MBS, Completed 2010

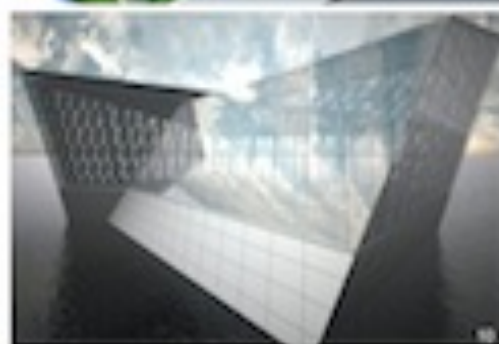
Front Cover

Top: Best Project - Masterplan, Architecture design and Facade

Bottom: Architect 2014 Pavilion (Winning Design in collaboration with NUS)

Back Cover

SEI Housing India - Multi-story Facade Consultancy



AgFacadesign – Architectural consultancy practice

G FACADESIGN Pte Ltd – Facade design consultancy firm

Both providing a hybrid of Architecture, Glass & Green* technologies, Façade and Design services.

*Passive Energy Design

Aim:

Seamless integration of envelope design with functional needs to maximize sustainability results.

Practice:

1987-1998: Architectural Practices in UK & Singapore

1998-2009: Glass Industry & Façade Consultancy

2009-Present: Set up AgFd

2013-Present: Set up G FACADESIGN Pte Ltd

NUS School of Arch. / BCA / SEAS – Tutor & Façade Technology Lectures

THANK YOU ! Q&A ?

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