Concept Design
QIC Building

ARCH-BIO®
Architecture with a Bioclimatic Approach

PROJECT TEAM

NAME OF STAFF	POSITION	TASK
Marco Santiago Morales Flores	Project Manager	**Entire team and project process manager including architectural and engineering plans.**
Mauro Rodolfo Cepeda Ortiz	Lead architect	**Principal architect and architectural design team leader.**
Jose Luis Yela Guevara	Architectural coordinator	**Architectural design, rendering and blueprints coordinator.**
Diego Augusto Lara Sosa	Structural Designer	**Structural designer and team leader.**
Fabricio Lenin Vasco Vera	Electrical engineer	**Electrical designer and team leader.**
Francisco Javier Vallejo Jaramillo	Mechanical engineer / plumbing engineer	**Mechanical and plumbing designer, team leader.**
Carolina Delgado del Hierro	**Landscape designer**	**Main landscape designer.**

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CLIMATE SITE ANALYSIS

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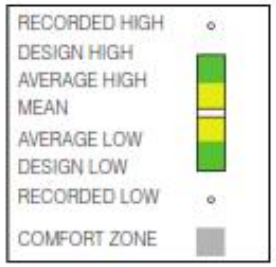
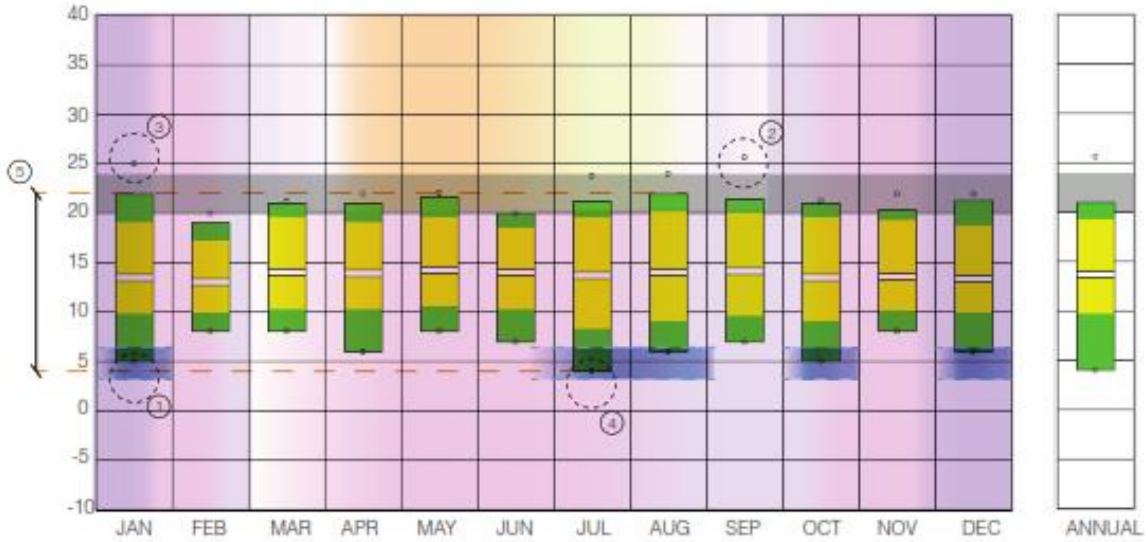
AVERAGE MONTHLY TEMPERATURE



MONTHS OF COLD DISCOMFORT

MONTHS OF HEAT DISCOMFORT

① MONTHS WITH MAXIMUM HEAT DISCOMFORT
② MONTHS WITH MAXIMUM COLD DISCOMFORT
③ MAXIMUM AVERAGE TEMPERATURE
④ MINIMUM AVERAGE TEMPEARTURE
⑤ WIDE THERMAL GRADIENT

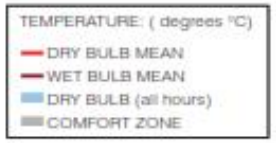


26°C
MAXIMUN TEMPERATURE

4°C
MINIMUN TEMPERATURE

18°C- 24°C
THERMAL COMFORT RANGE

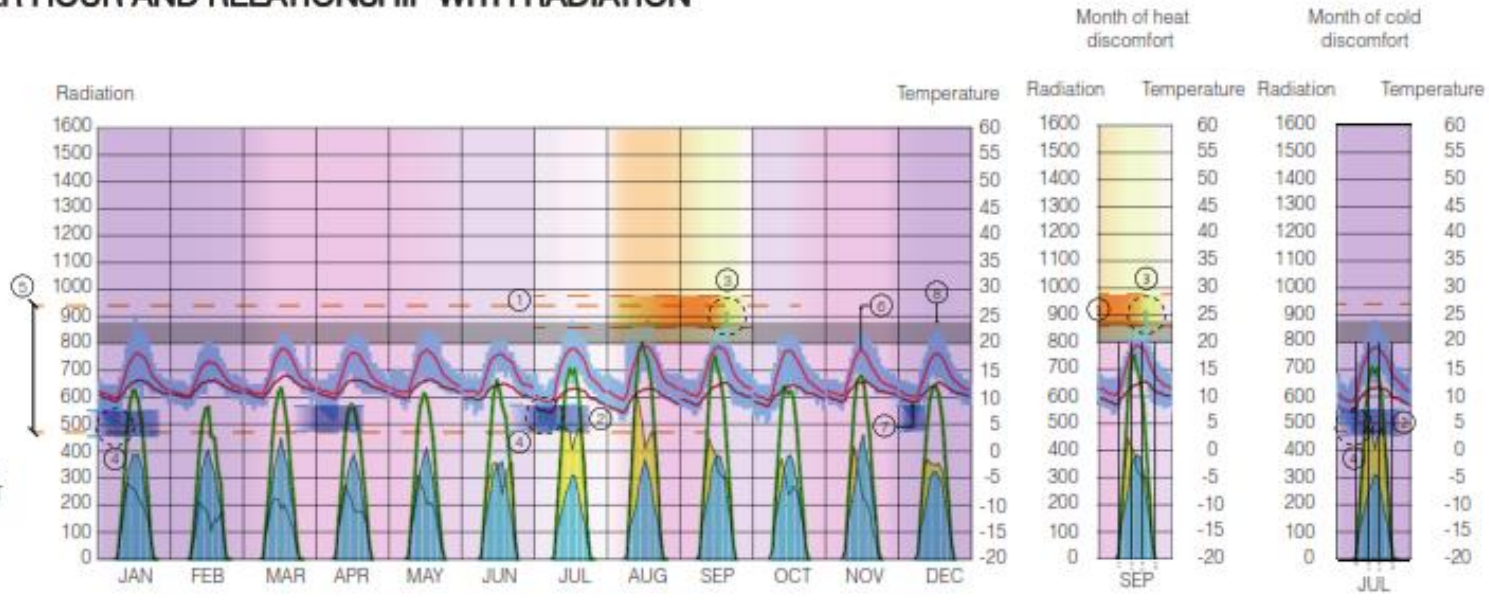
MONTHLY TEMPERATURE PER HOUR AND RELATIONSHIP WITH RADIATION



MONTHS OF COLD DISCOMFORT

MONTHS OF HEAT DISCOMFORT

① MONTHS WITH MAXIMUM HEAT DISCOMFORT
② MONTHS WITH MAXIMUM COLD DISCOMFORT
③ MAXIMUM AVERAGE TEMPERATURE
④ MINIMUM AVERAGE TEMPEARTURE
⑤ WIDE THERMAL GRADIENT
⑥ AVERAGE TEMPERATURE LINE - DRY BULB
⑦ AVERAGE TEMPERATURE LINE - WET BULB
⑧ COMFORT RANGE



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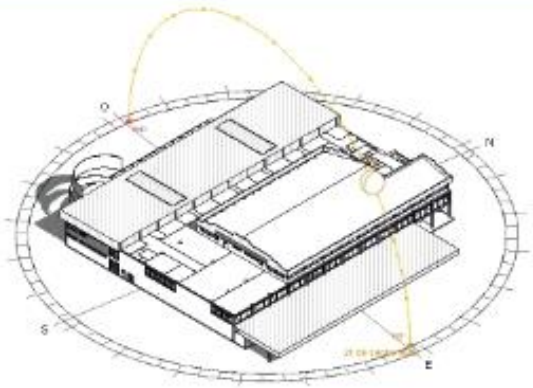
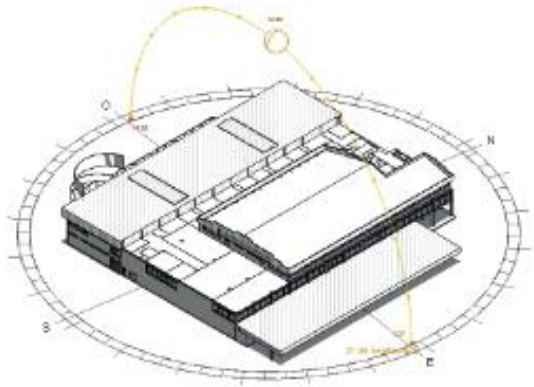
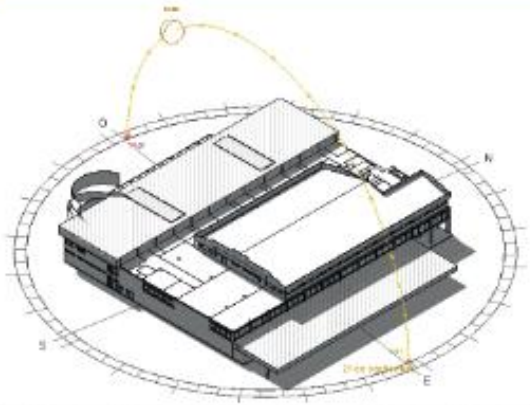
9:00 A.M. SEPTEMBER 21 – EQUINOX



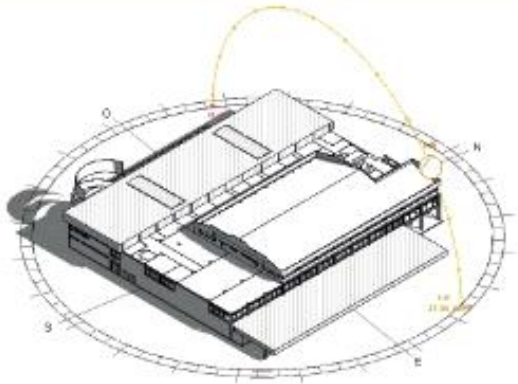
12:00 P.M. SEPTEMBER 21 – EQUINOX



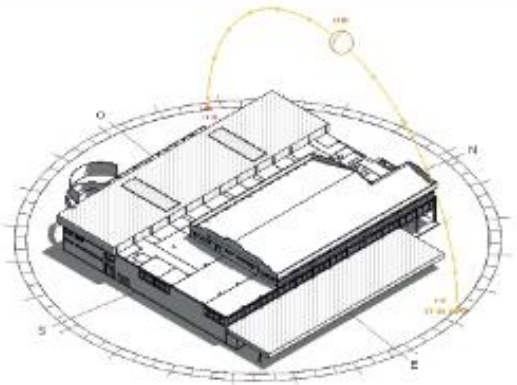
3:00 P.M. SEPTEMBER 21 – EQUINOX



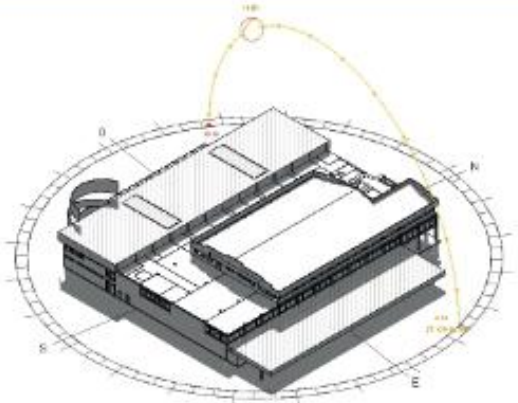
9:00 A.M. JUNE 21 – SOLSTICE

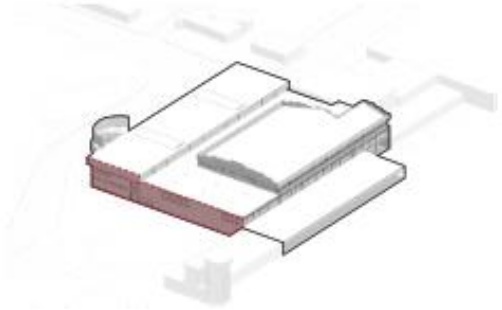


12:00 P.M. JUNE 21 – SOLSTICE

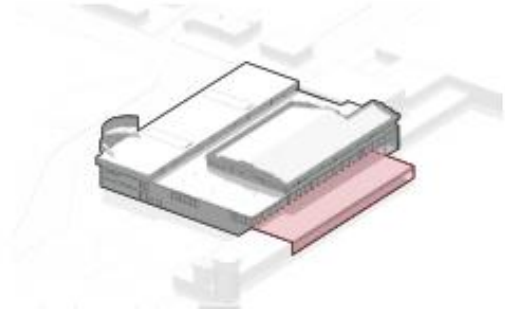


3:00 P.M. JUNE 21 – SOLSTICE

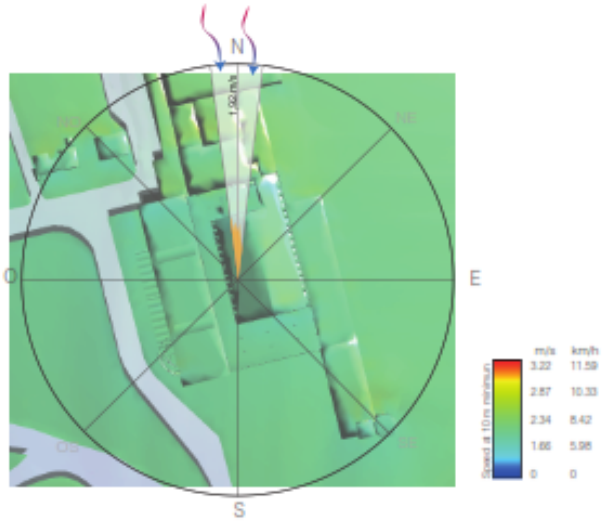




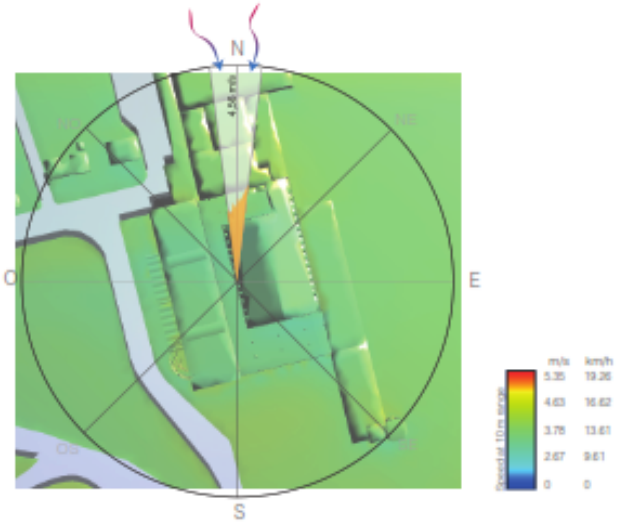
The "Revit Daylight Analysis" determined the daily intake of light with the current façade. The result showed that most of the spaces do not receive enough natural light, so artificial light is needed during major part of the day.



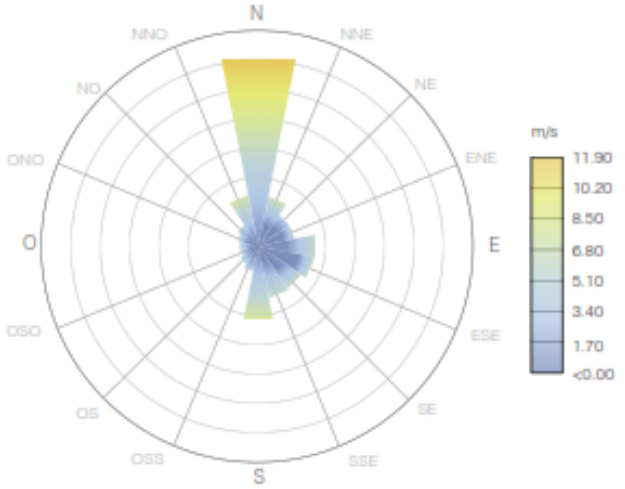
SPEED A T 10M MINIMUN (1,92 M/S)



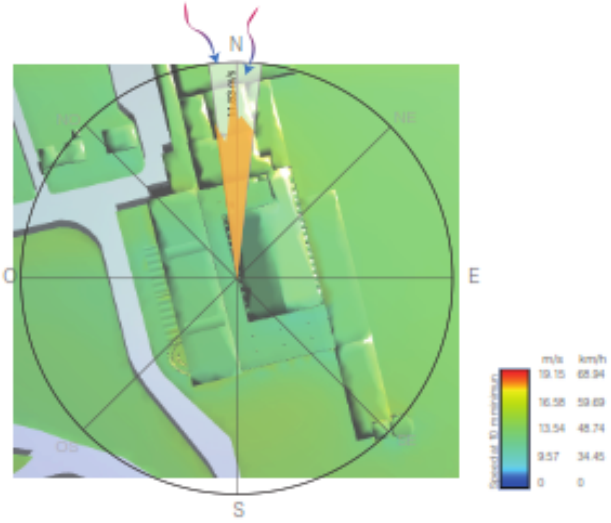
SPEED A T 10M RANGE (4,56 M/S)



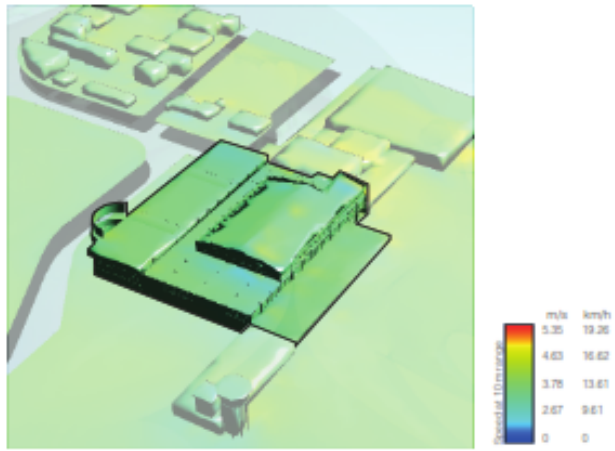
DIRECTION'S WINDROSE



SPEED A T 10M MAXIMUM (11,83 M/S)



SPEED A T 10M RANGE (4,56 M/S)



BEAUFORT WIND SCALE

The largest wind flow comes from the North at an average speed of 4.56 m/s. This speed, according to the Beaufort scale, is in the "comfortable wind" range, but is on the limit of becoming "too strong". Therefore, the North façade would be a good angle for the entry of wind.

It is important to consider that another building (not part of the intervention) blocks the North façade, consequently, the direction of the wind within the project causes very low air exchange, so air movement must be created mechanically to obtain a suitable work environment for the staff.

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BIOCLIMATIC PROJECT REQUIRMENTS

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ZONE	ROOM	NOTES	NET AREA	TEMPERATURE	ILUMINATION						VENTILATION								ACUSTIC COMFORT
					ILUMINATION LEVEL (LUX)			RECOMMENDED TONES OF LIGHT			NATURAL			MECHANICAL			PREVENTIVE		
					MIN	GOOD	VERY GOOD	DAY LIGHT	WHITE	WARM WHITE	LATERAL VENTILATION	CROOSED VENTILATION	INTERCONNECTION WITH ZONE VENTILATED	INDOOR AIR EXTRACTION	AIR CONDITIONING	AIR PURIFIER INTERIORS	PRE - VENTILATION	CHANGE OF SPEED OF AIR RENEWAL CONDITIONED	LAeq (dBA) (8 - 22 h)
Business incubation & acceleration	Tenant Office (S)	Office for 2-3 people	210 (30*7EA)	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	45
	Tenant Office (M)	Office for 3-5 people	250 (50*7EA)	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	45
	Tenant Office (L)	Office for 5-7 people	210 (70*7EA)	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	45
	Co - working	For 10-15 people	110	18 °C	500	700	1200	X	X		X	X	X	X	X	X	X	X	50
SME development	Tenant Office (XL)		400 (200*2EA)	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	50
Research	ICT Lab	For basic prototyping, IoT technologies and A.I.	200	18 °C	250	400	600	X	X		X	X		X	X		X	X	40
	Research Lab	Adaptive & flexible. Can be divided in to 2 rooms	120	18 °C	300	500	1000	X	X		X	X		X	X		X	X	40
Administration	Director´s		30	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	40
	Office	Open plan office	70	18 °C	300	500	1000		X	X	X	X	X	X	X		X	X	45
Public	Meeting room (S)	4-5 People	40 (20*EA)	18 °C	200	500	1000		X	X	X	X	X	X			X		45
	Meeting room (M)	5-8 People	30	18 °C	200	500	1000		X	X	X	X	X	X			X		45
	Meeting room (L)	10-12 People	50	18 °C	500	700	1000		X	X	X	X	X	X			X		45
	Seminar room	Lecture & training	130	18 °C	200	500	100		X	X				X	X	X	X	X	35
	Café	Including kitchen	160	18 °C	200	400	700		X	X				X	X	X	X	X	35
	Show room/Exhibit		150	18 °C	1000	2000	3000	X	X	X				X	X		X	X	50
Utilities	Mechanical & electrical	Generator, transformer	60	15 °C	100	200	400		X	X	X	X	X	X	X	X	X	X	15
	Server		30	15 °C	100	200	400		X	X	X	X	X	X	X	X	X	X	15
	Loading & waste		70	15 °C	200	300	500	X	X		X	X	X	X	X	X	X	X	15
	Storage		100	18 °C	200	300	500	X	X		X	X	X	X	X	X	X	X	15
NET AREA TOTAL							2420								2420				
Common	Lobby, vertical transportation, restroom, janitor´s		680	18 °C	300	500	700		X	X	X	X		X		X			15
GROSS FLOOR AREA							3100								3100				

Recommended bioclimatic parameters to be applied in the design

Inner Comfort : 18°C – 24 °C

Natural Ventilation: 1,8 m/s – 4 m/s (Beaufort Scale)

Natural Illumination: 230 lux – 400 lux

Acoustic Parameters: 30 - 40 dB

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CURRENT BUILDING

BIOCLIMATIC AND PERFORMANCE ANALYSIS

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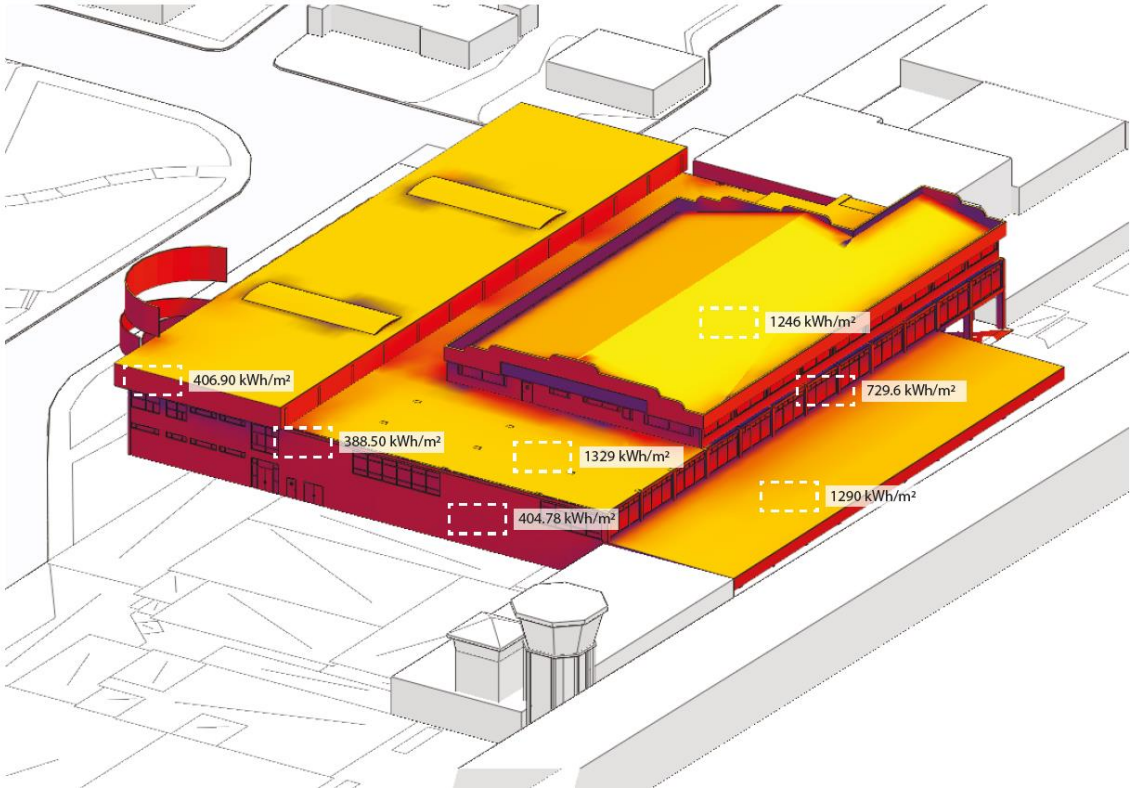
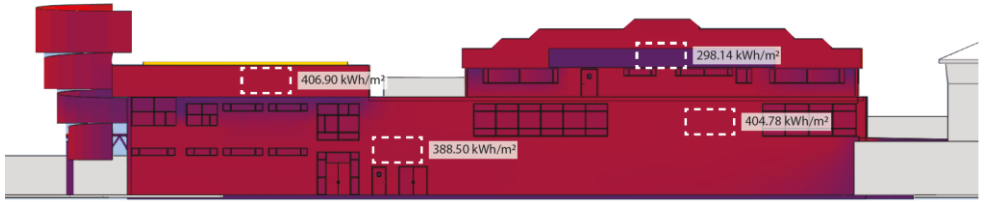
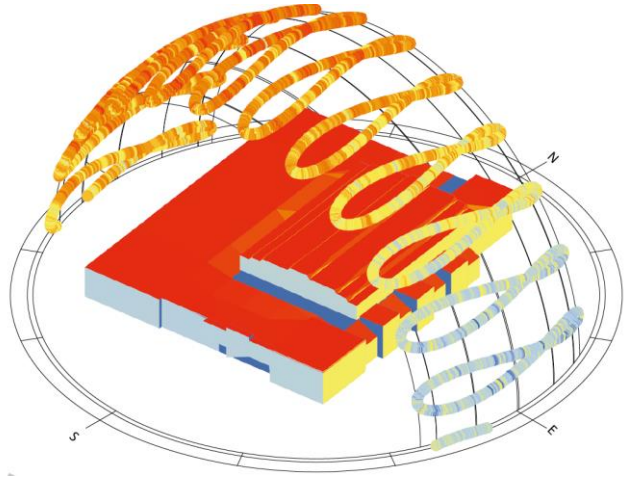
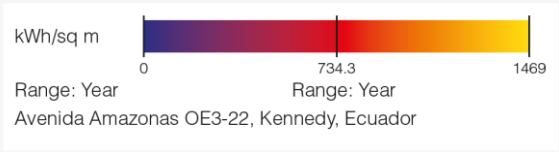
RADIATION









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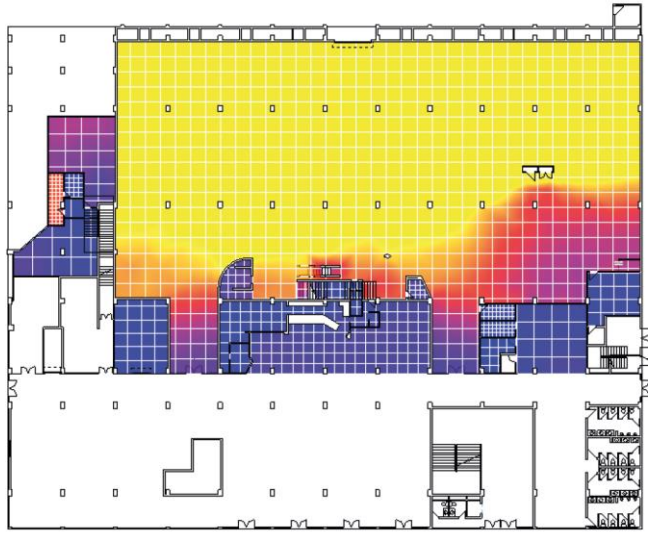
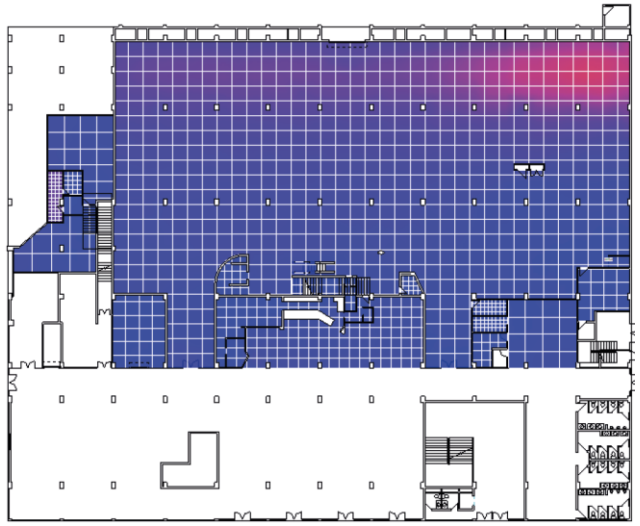
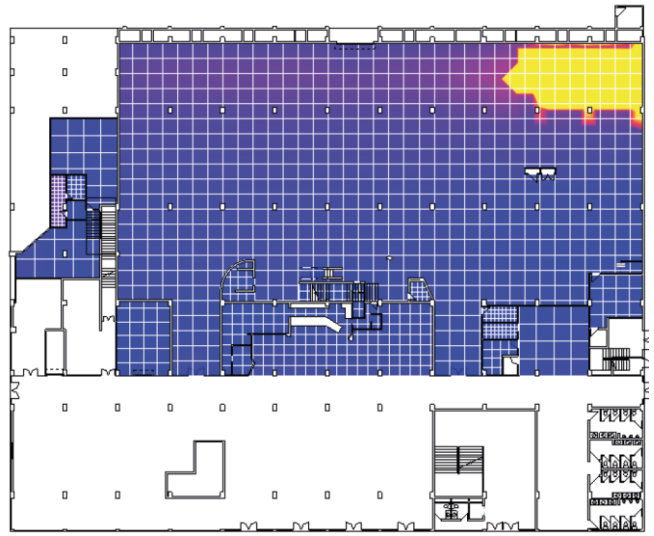
DAYLIGHTING ANALYSIS



9:00 A.M.



3:00 P.M.



BOTH

RESULTS SUMMARY FOR ALL ROOMS INCLUDED IN DAYLIGHTING EQUINOX

Total Both – 3% Passing
97% either time below threshold
0% either time above threshold

9:00 a.m. – 75% Passing
September 21
GHI:637, DNI:833, DHI:66
25% below threshold
0% above threshold w/o shades

3:00 p.m. – 3% Passing
September 21
GHI:172, DNI:212, DHI:17
97% below threshold
0% above threshold w/o shades

RESULTS SUMMARY FOR ALL ROOMS INCLUDED IN DAYLIGHTING EQUINOX

Total Both – 3% Passing
97% either time below threshold
0% either time above threshold

9:00 a.m. – 75% Passing
June 21
GHI:522, DNI:761, DHI:64
25% below threshold
0% above threshold w/o shades

3:00 p.m. – 3% Passing
June 21
GHI:156, DNI:202, DHI:16
97% below threshold
0% above threshold w/o shades

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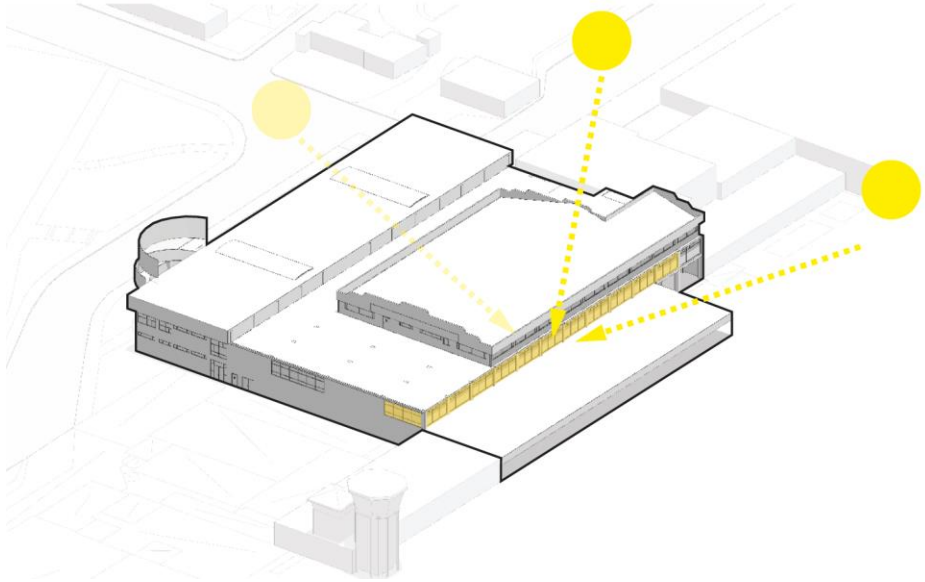
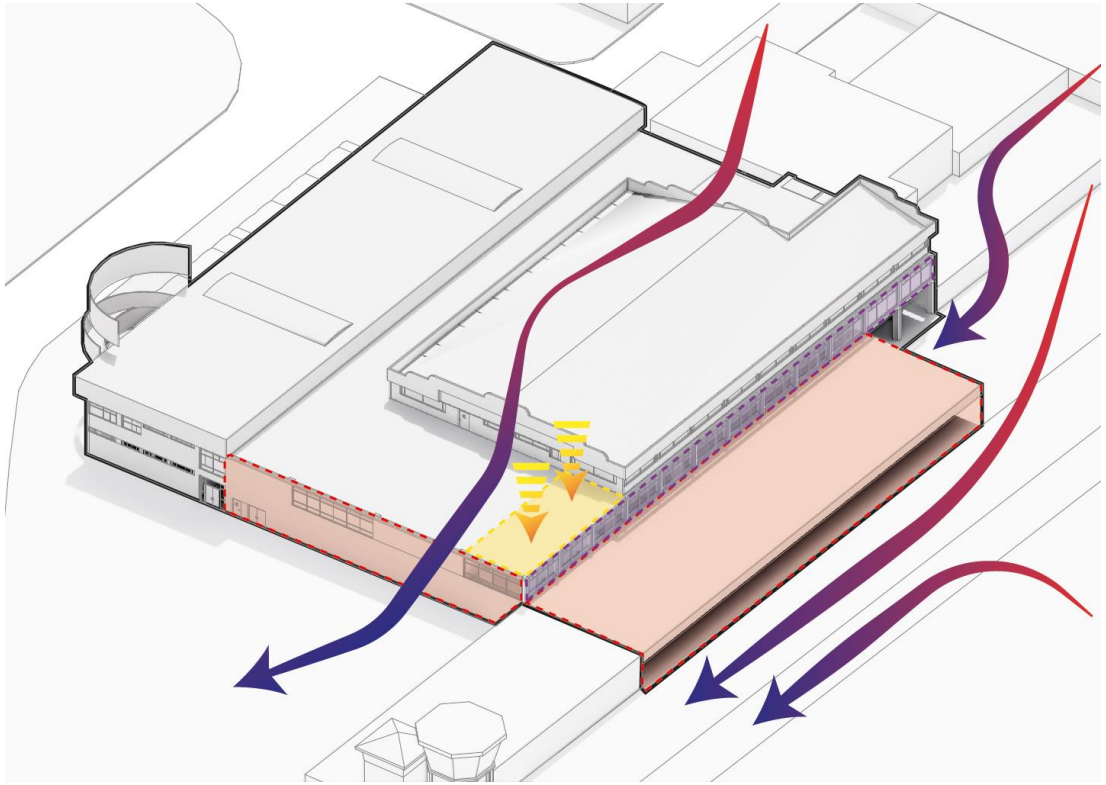
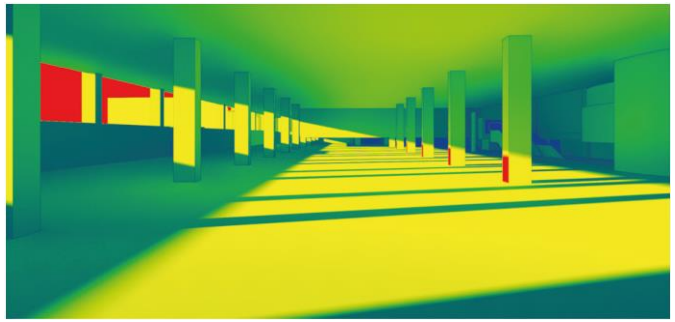
CLIMATE GENERAL DIAGNOSIS

SUNLIGHT INCOME







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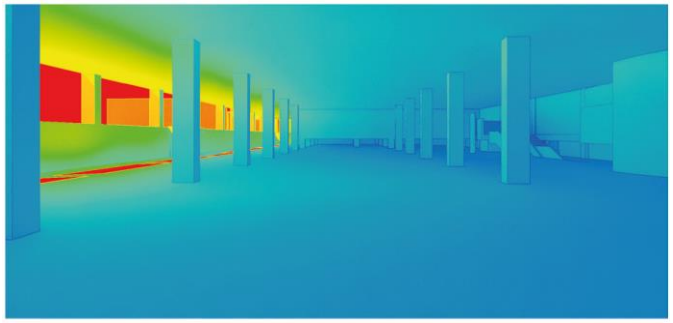

11:00 A.M.

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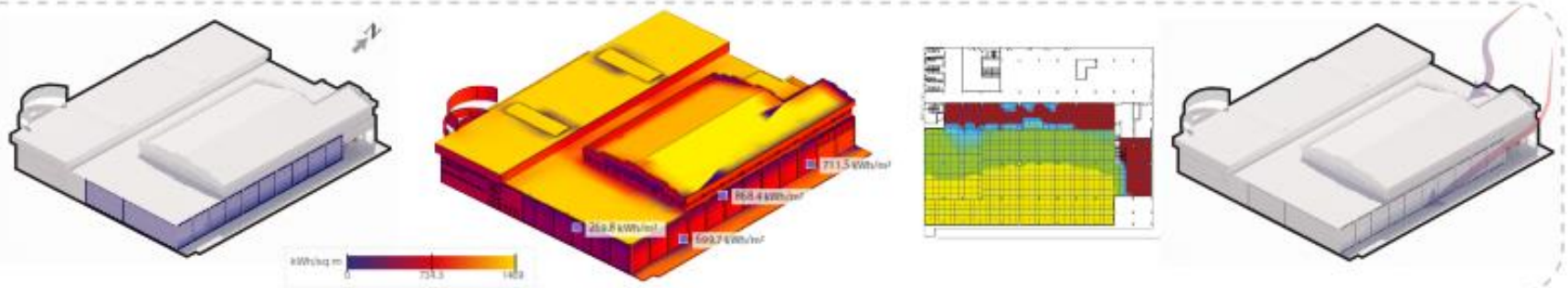
OPTION 1

(Glass Facade)

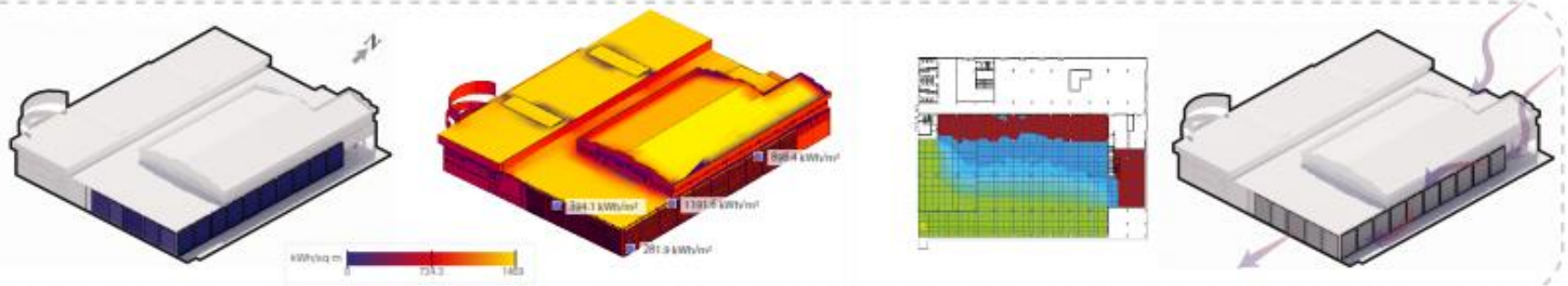
INTERIOR DAYLIGHT
O
LOW RADIATION RANGE
X
INTERIOR AIR EXCHANGE
X



OPTION 2

(Lattice Facade)

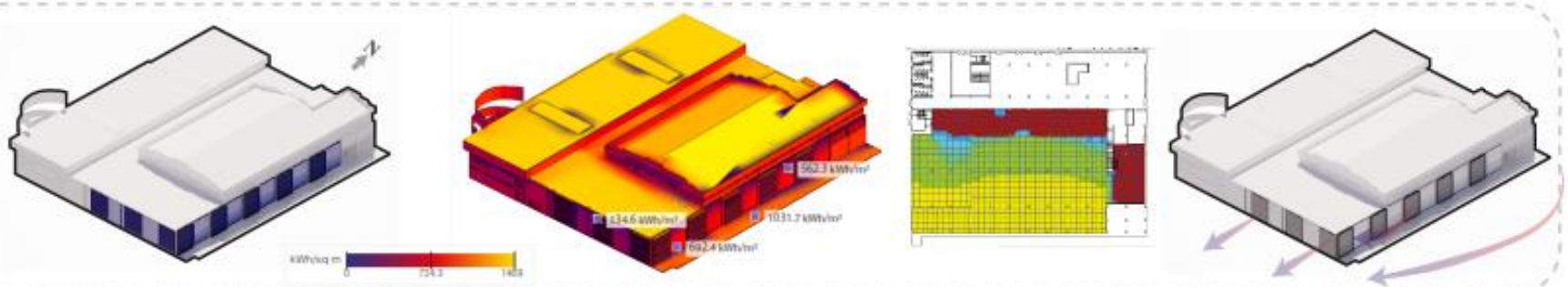
INTERIOR DAYLIGHT
X
LOW RADIATION RANGE
O
INTERIOR AIR EXCHANGE
X



OPTION 3

(Lattice and Glass Facade)

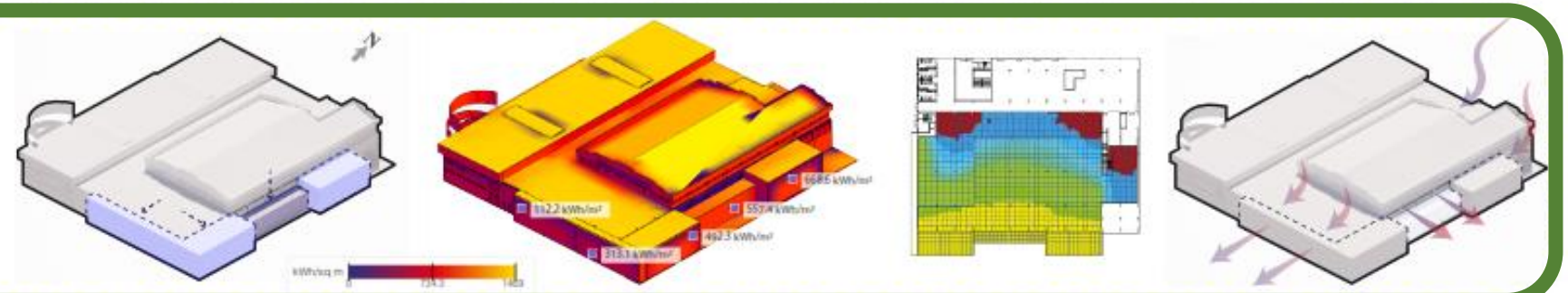
INTERIOR DAYLIGHT
O
LOW RADIATION RANGE
X
INTERIOR AIR EXCHANGE
O



OPTION 4

(Extruding elements)

INTERIOR DAYLIGHT
O
LOW RADIATION RANGE
O
INTERIOR AIR EXCHANGE
O



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BEST ARCHITECTURAL OPTION CONFIGURATION

BIOCLIMATIC AND PERFORMANCE OPTION 4

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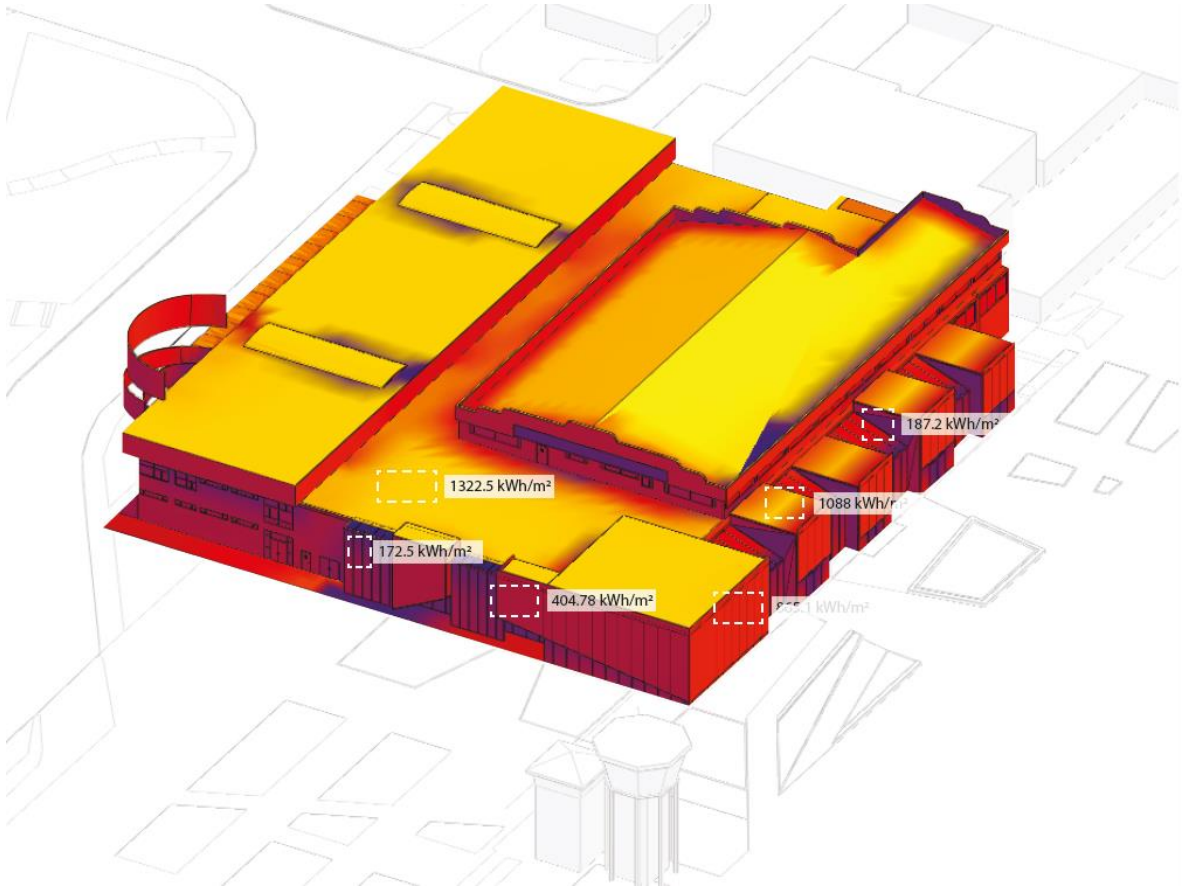
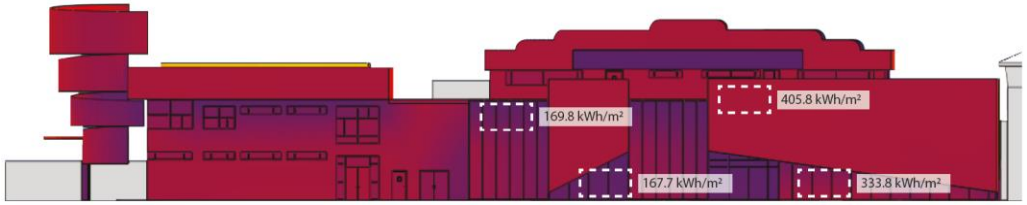
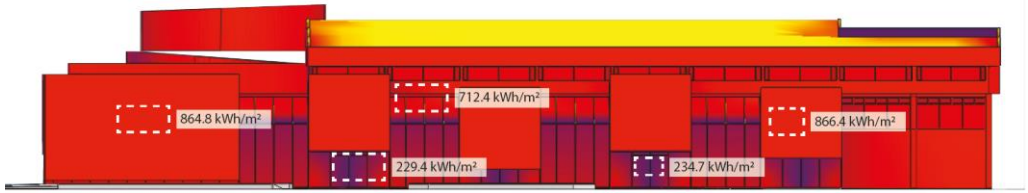
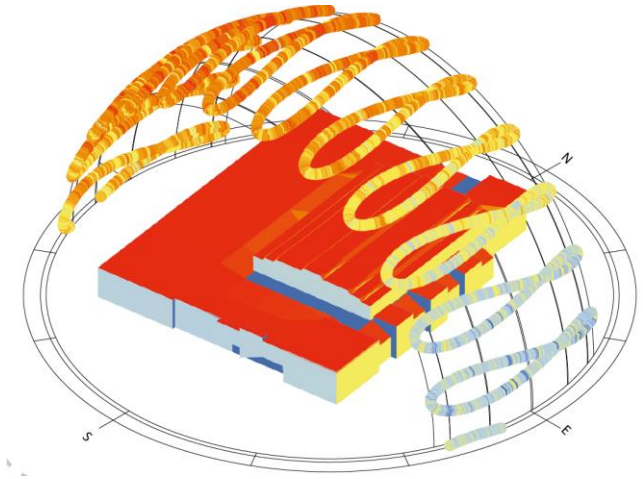
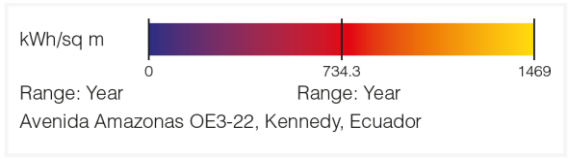
RADIATION











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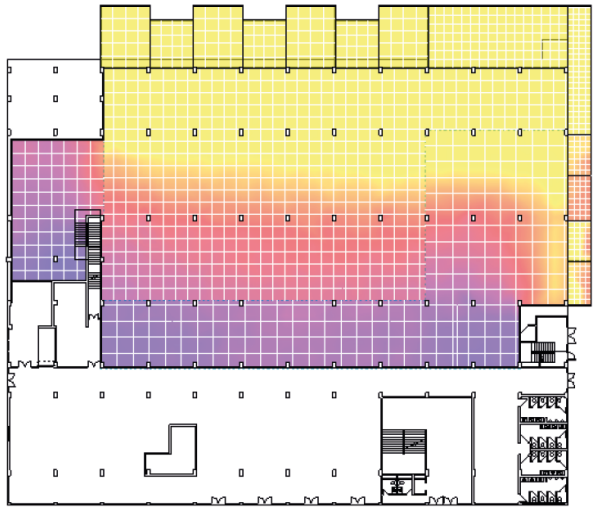
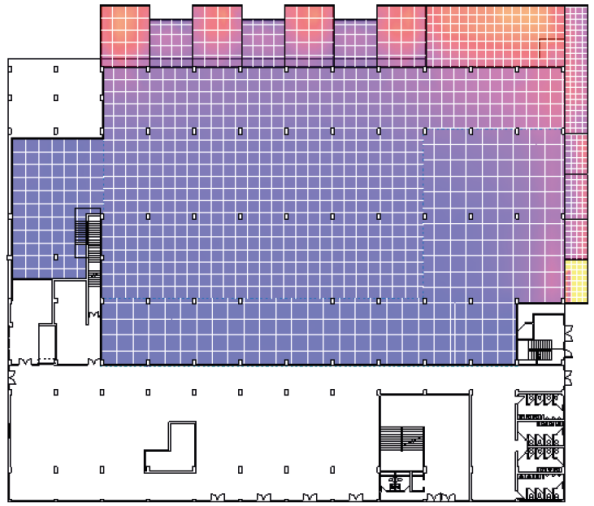
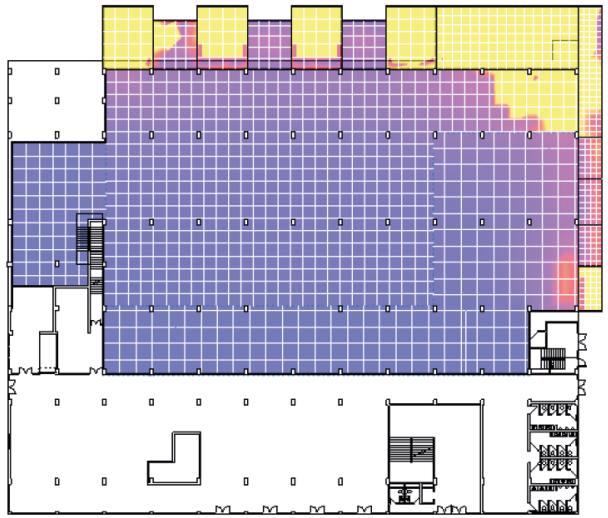
DAYLIGHTING ANALYSIS



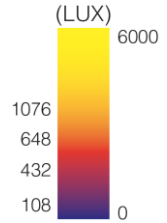
9:00 A.M.



3:00 P.M.



BOTH



RESULTS SUMMARY FOR ALL ROOMS INCLUDED IN DAYLIGHTING EQUINOX

Total Both – 14% Passing
97% either time below threshold
0% either time above threshold

9:00 a.m. – 81% Passing
September 21
GHI:637, DNI:833, DHI:66
25% below threshold
0% above threshold w/o shades

3:00 p.m. – 14% Passing
September 21
GHI:172, DNI:212, DHI:17
97% below threshold
0% above threshold w/o shades

RESULTS SUMMARY FOR ALL ROOMS INCLUDED IN DAYLIGHTING EQUINOX

Total Both – 12% Passing
97% either time below threshold
0% either time above threshold

9:00 a.m. – 81% Passing
June 21
GHI:522, DNI:761, DHI:64
25% below threshold
0% above threshold w/o shades

3:00 p.m. – 12% Passing
June 21
GHI:156, DNI:202, DHI:16
97% below threshold
0% above threshold w/o shades

MADE IN: AUTODESK REVIT, AUTODESK LIGHTING ANALYSIS

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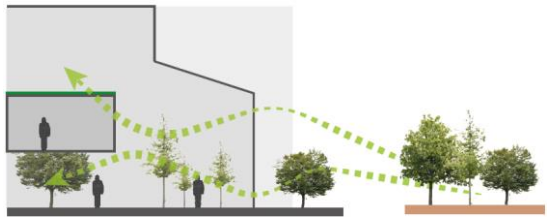
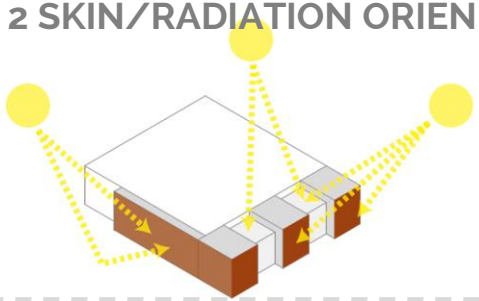
BIOCLIMATIC APPLIED STRATEGIES

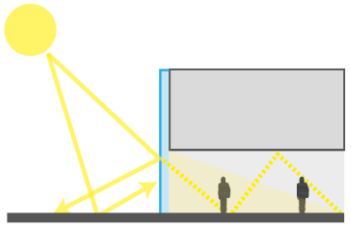
1 GREEN INPUT



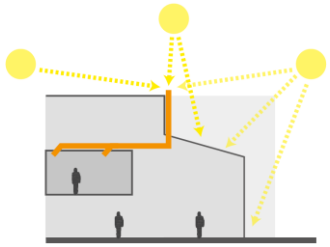
2 SKIN/RADIATION ORIEN



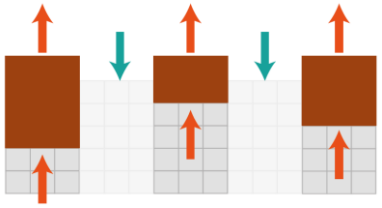
3 DIFFUSE SIDE LIGHTING



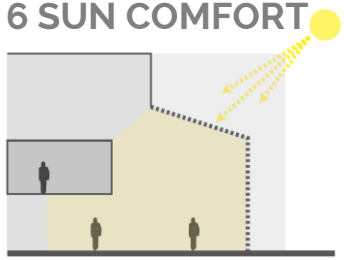
4 SOLAR TUBES



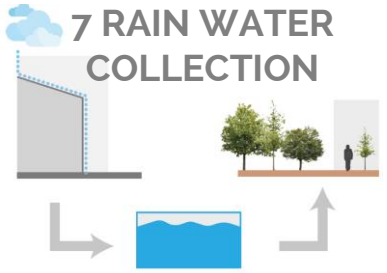
5 FACADE OPENINGS



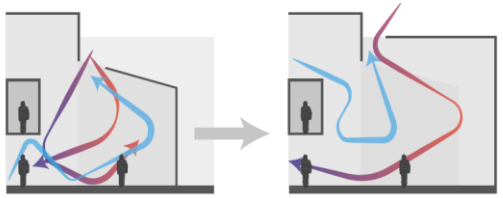
6 SUN COMFORT

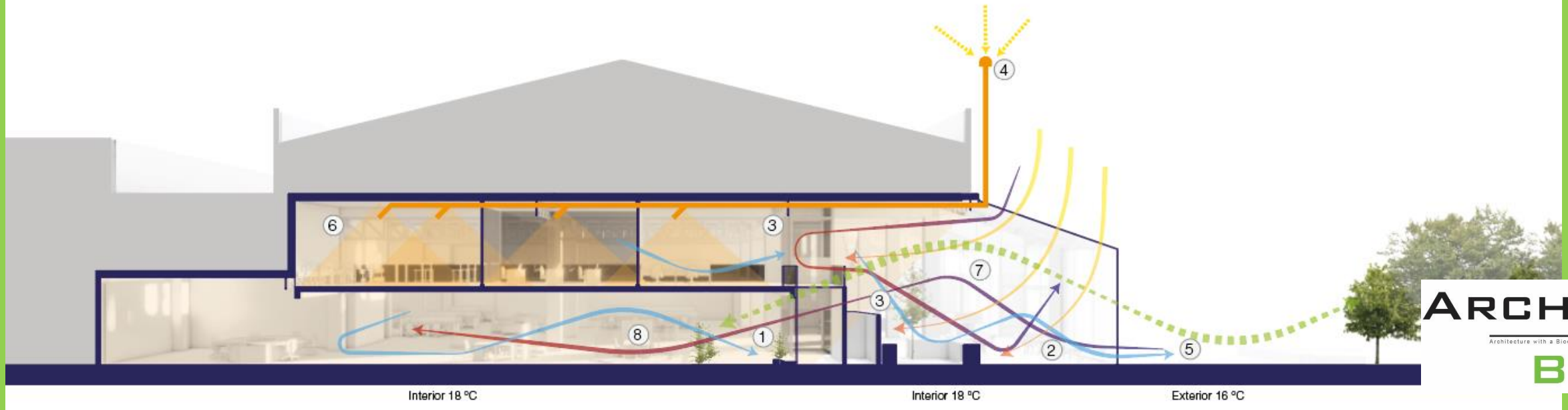


7 RAIN WATER COLLECTION



8 AIR EXCHANGE





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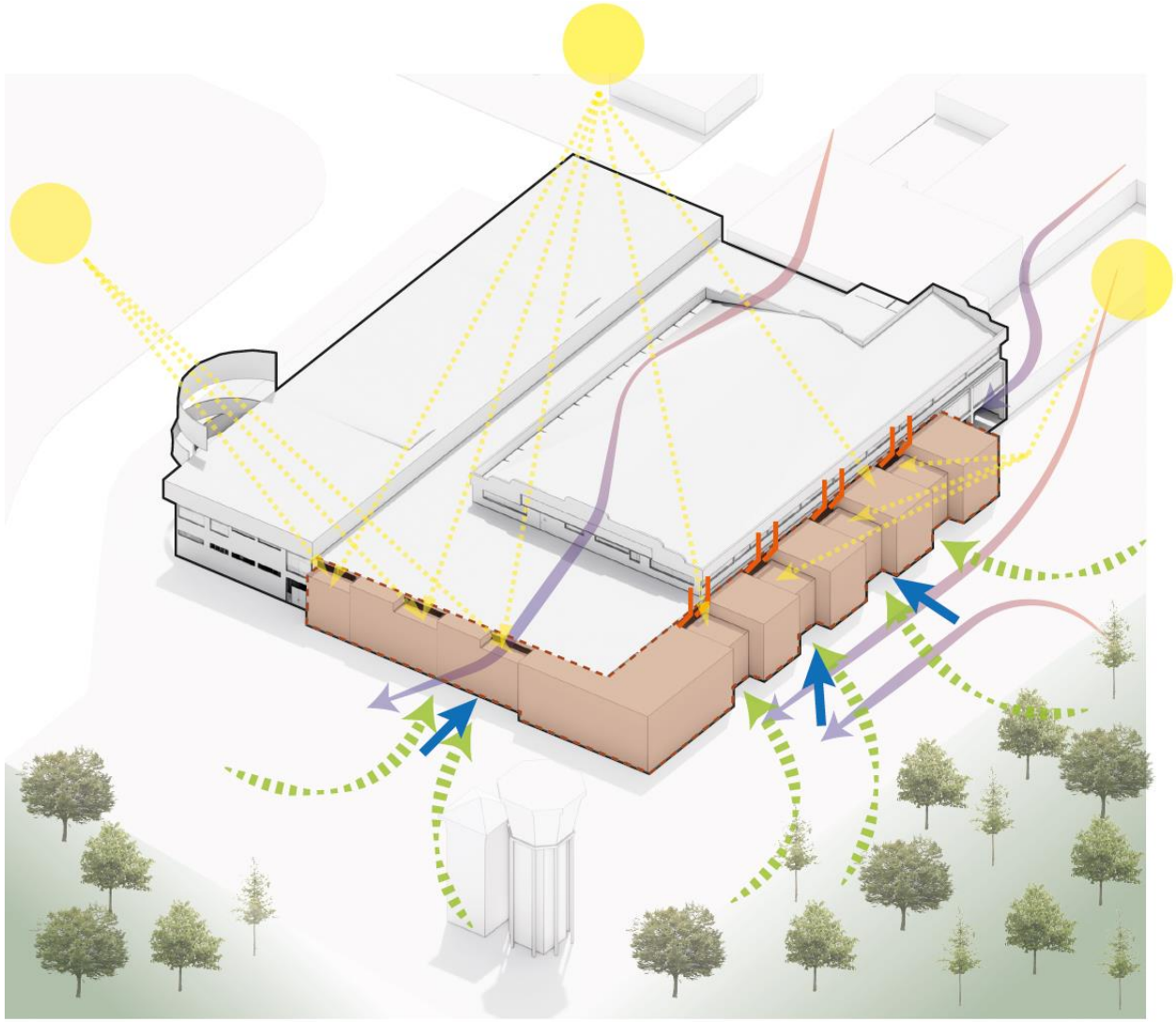
SUSTAINABLE APPLIED STRATEGIES



219.20
KWH / YEAR
REGULAR ENERGY CONSUMPTION

149.40
KWH / YEAR
OPTIMUM ENERGY CONSUMPTION

20.56
M3 X DAY
REGULAR WATER CONSUMPTION

10.28
M3 X DAY
OPTIMUM WATER CONSUMPTION

- TEMPERED GLASS
- VRF SYSTEM AIR-CONDITIONING
- LATTICE FACADE
- BIOPHILIA
- SOLAR TUBES

20%

CO^2

SUSTAINABLE STRATEGIES

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ARCHITECTURAL PROPOSAL

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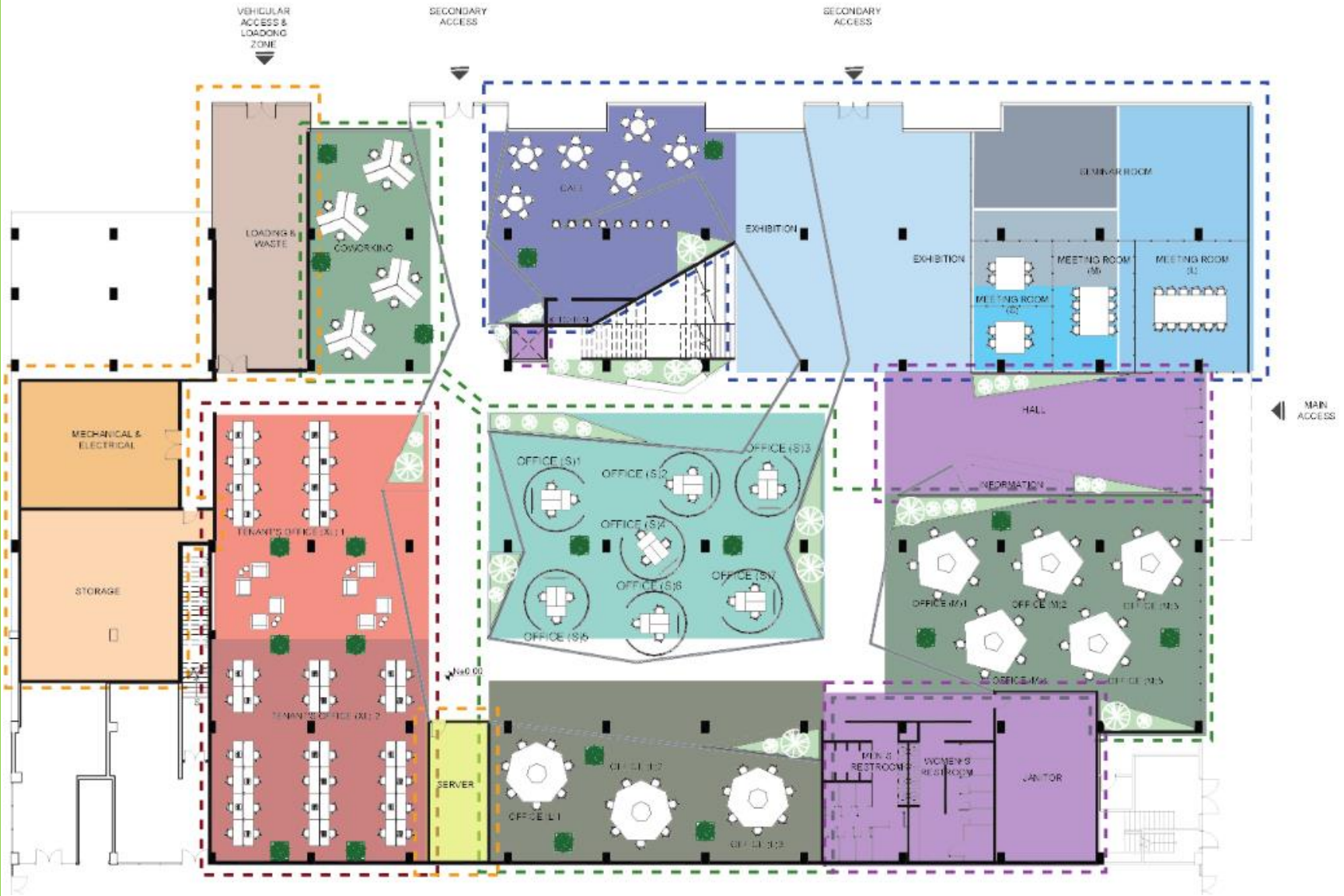
SITE UTILITY PLAN



SME DEVELOPMENT
- TENANT OFFICE XL (1)
- TENANT OFFICE XL (2)

BUSINESS INCUBATION & ACCELERATION
- TENANT OFFICE S
- TENANT OFFICE M
- TENANT OFFICE L
- COWORKING

PUBLIC
- MEETING ROOM (S)
- mEETING ROOM (M)
- MEETING ROOM (L)
- SEMINAR ROOM
- CAFE
- EXHIBITION

PUBLIC
- LOBBY
- VERTICAL TRANSPORTATION
- RESTROOMS
- JANITOR

UTILITIES
- MECHANICAL & ELECTRICAL
- SERVER
- IOADING & WASTE
- STORAGE

PROJECT

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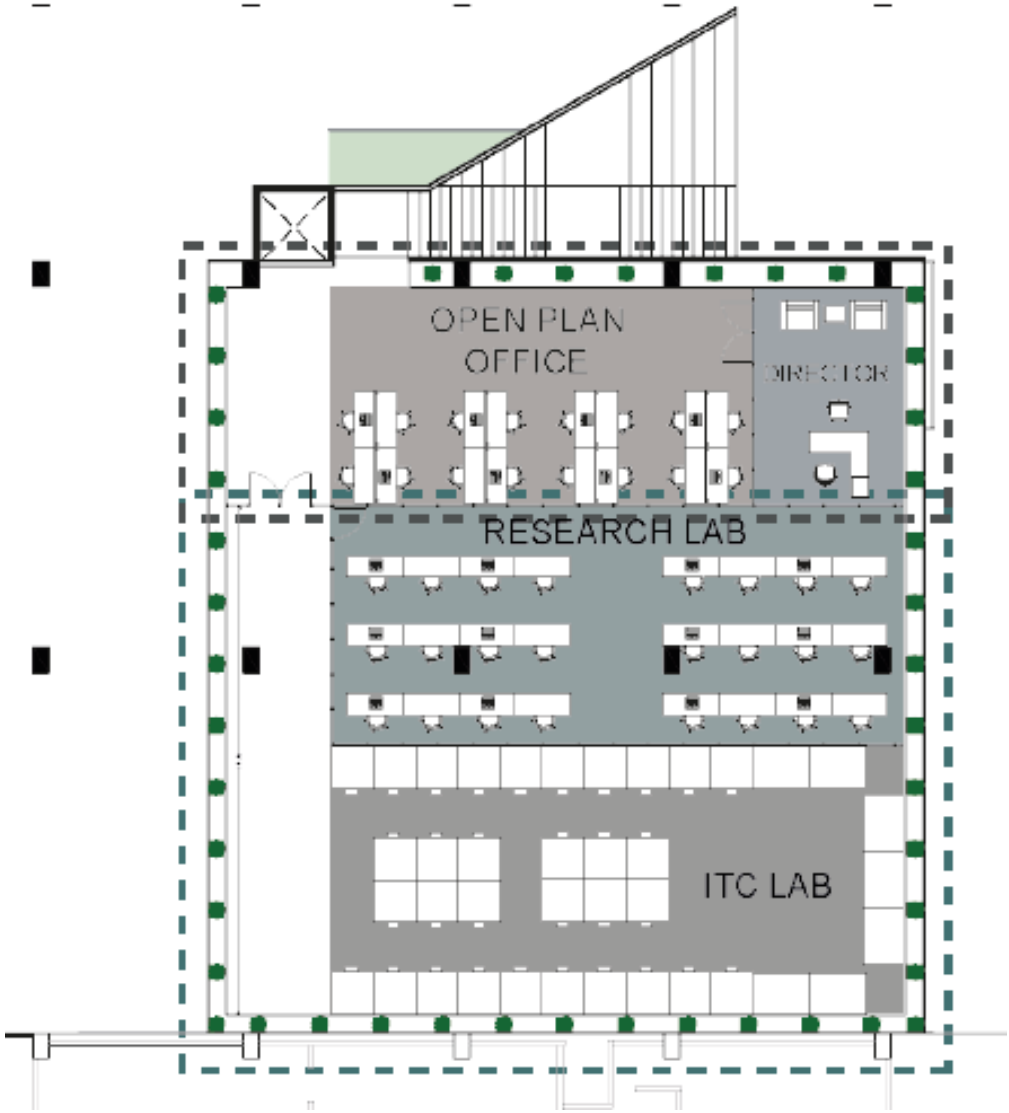
SITE UTILITY PLAN



ADMINISTRATION
- OPEN PLAN OFFICE
- DIRECTOR

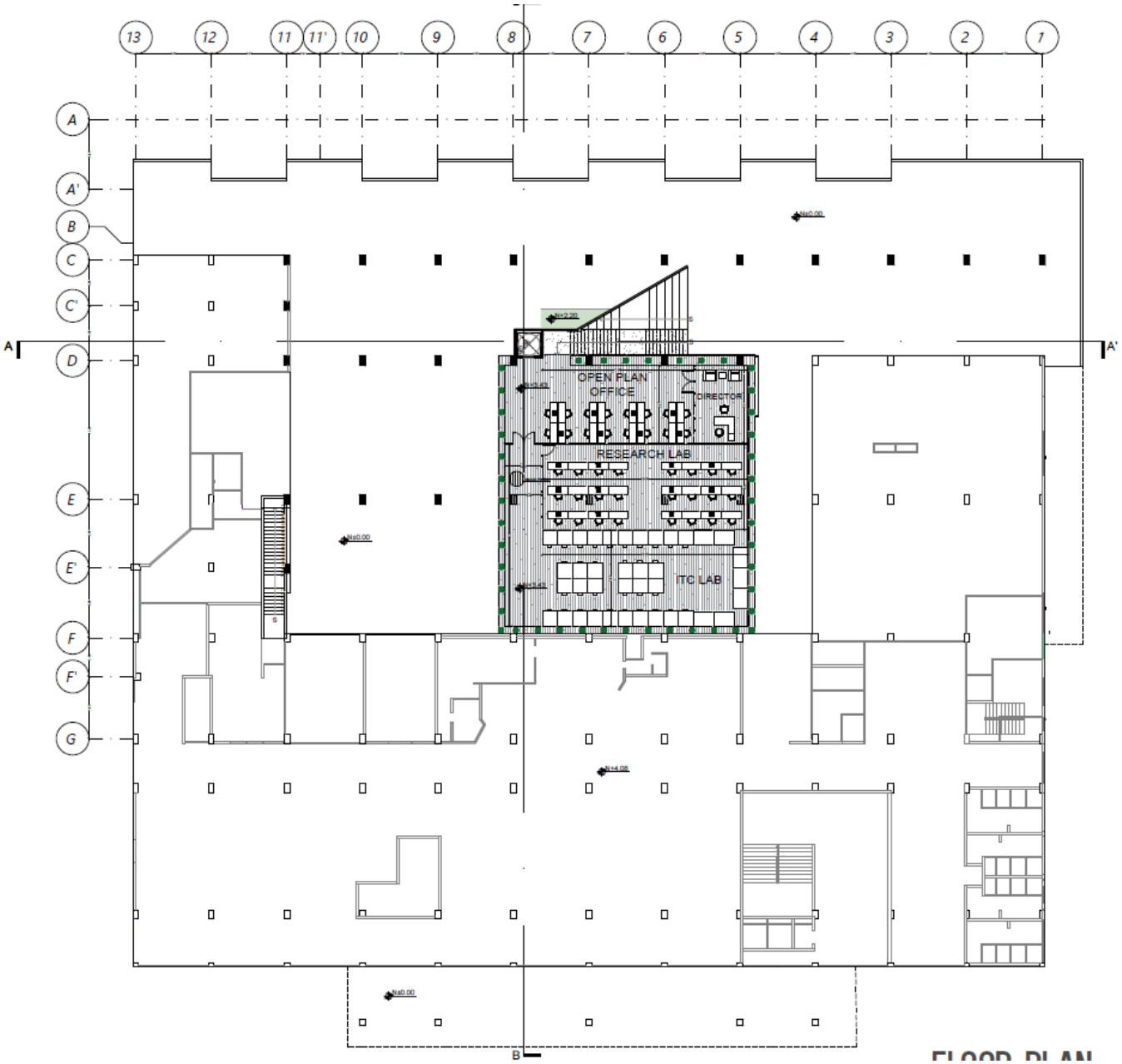
RESEARCH
- RESEARCH LAB
- ITC LAB

FLOOR PLAN – GROUND FLOOR

ZONE	ROOM	NOTES	NET AREA
Business incubation & acceleration	Tenant Office (S)	Office for 2-3 people	279,83
	Tenant Office (M)	Office for 3-5 people	248,16
	Tenant Office (L)	Office for 5-7 people	220,31
	Co - working	For 10-15 people	106,65
SME development	Tenant Office (XL)		361,78
Research	ICT Lab	For basic prototyping, IoT technologies and A.I.	183,7
	Research Lab	Adaptive & flexible. Can be divided in to 2 rooms	119,06
Administration	Director´s		29,68
	Office	Open plan office	106,5
Public	Meeting room (S)	4-5 People	38,56
	Meeting room (M)	5-8 People	40
	Meeting room (L)	10-12 People	53,68
	Seminar room	Lecture & training	134,11
	Café	Including kitchen	163,25
	Show room/Exhibit		199,1
Utilities	Mechanical & electrical	Generator, transformer	79,93
	Server		29,92
	Loading & waste		81,74
	Storage		103,68
NET AREA TOTAL			2579,64
Common	Lobby, vertical transportation, restroom, janitor´s		620,36
GROSS FLOOR AREA			3200

GROUND FLOOR: 2.641,06 m2

FLOOR PLAN – GROUND FLOOR



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NET AREA TOTAL			2579,64
Common	Lobby, vertical transportation, restroom, janitor´s		620,36
GROSS FLOOR AREA			3200

MEZZANINE : 558,94 m2

FLOOR PLAN – MEZZ

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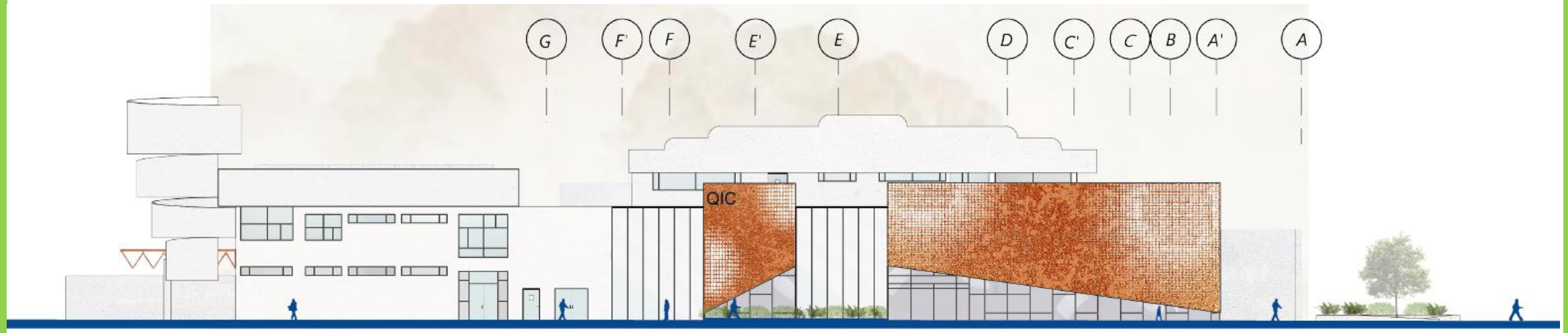
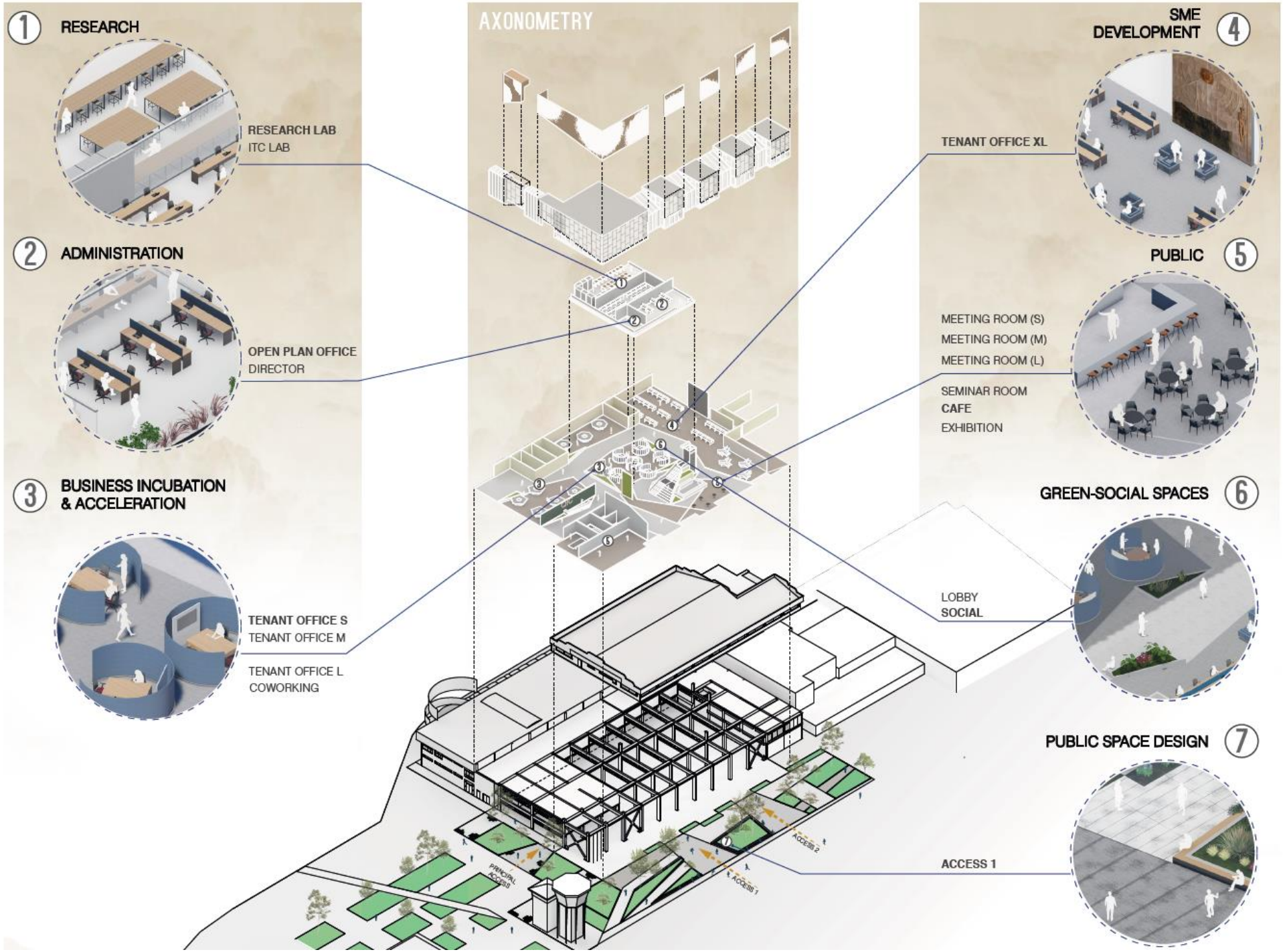
ELEVATIONS





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QIC
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INNOVATION
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XL
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PROPOSAL VIDEO

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Thanks for your attention !!

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