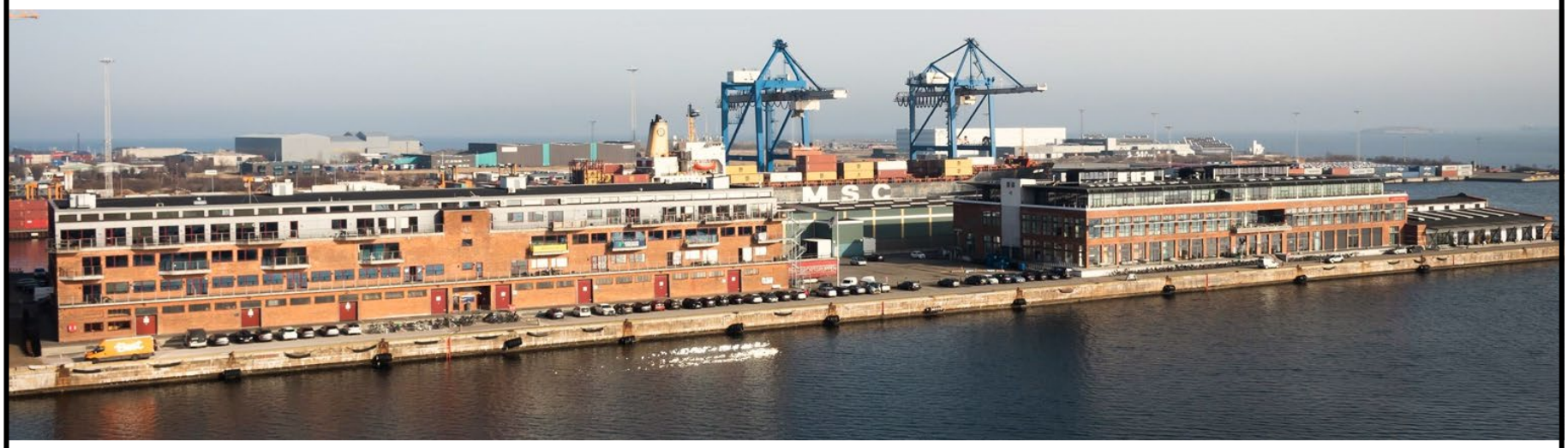
OSKAR GRAM NIELSEN

ARCHITECTURAL ENGINEER

PORTFOLIO

2023

RECONSTRUCTION OF WAREHOUSE 34, NORDHAVN



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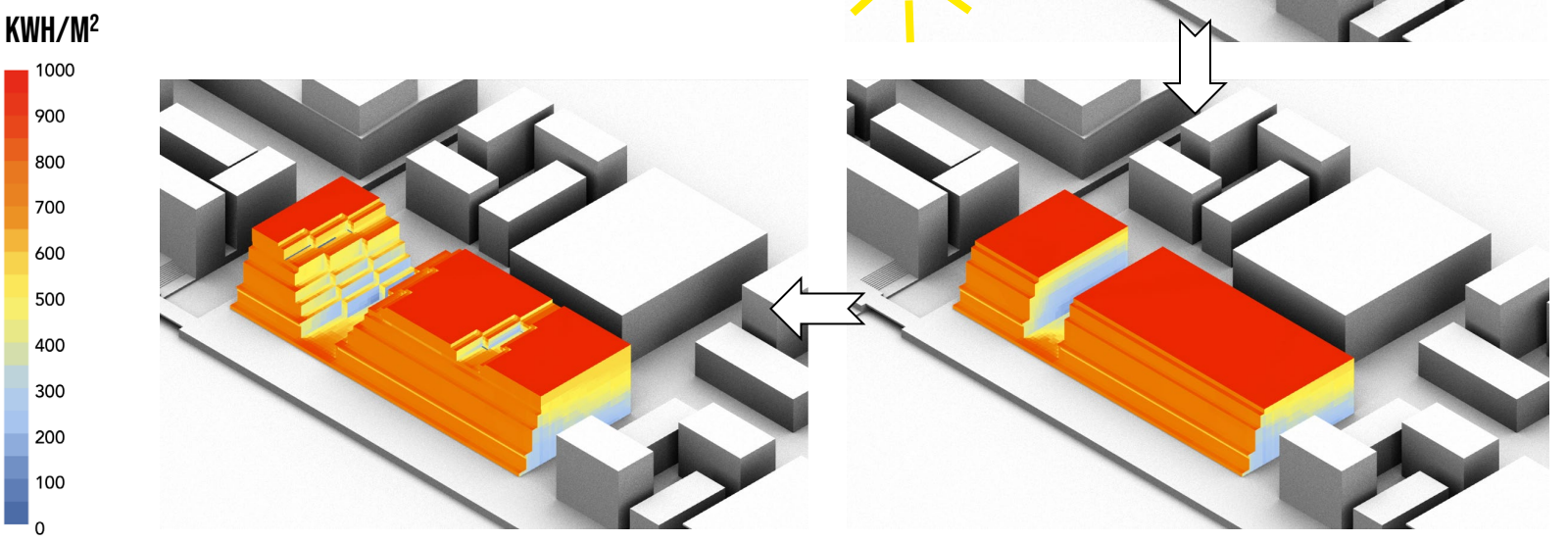
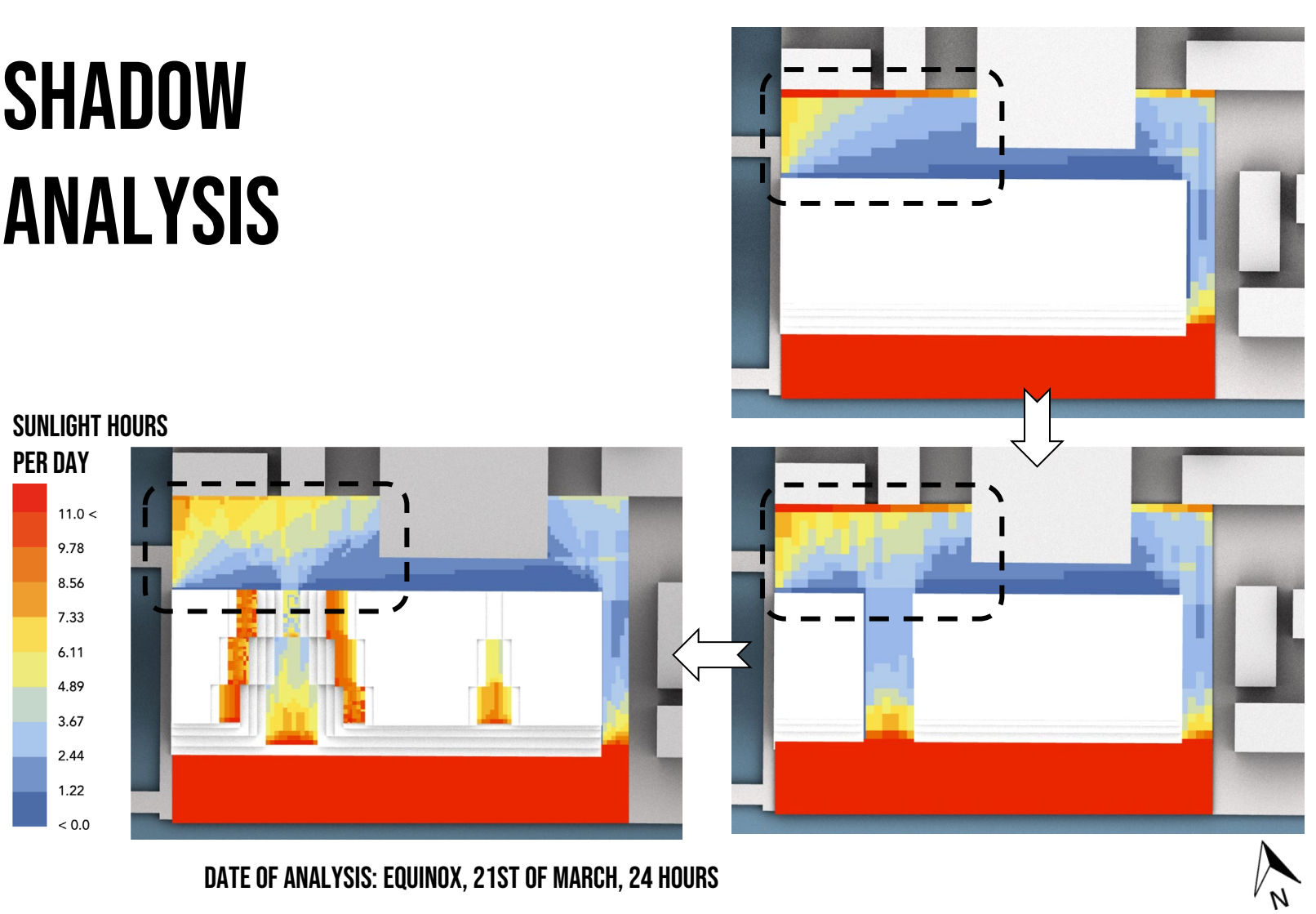
RADIATION ANALYSIS



OPENING THE FACADE CREATES PASSIVE HEATING AND INCREASED DAYLIGHT.

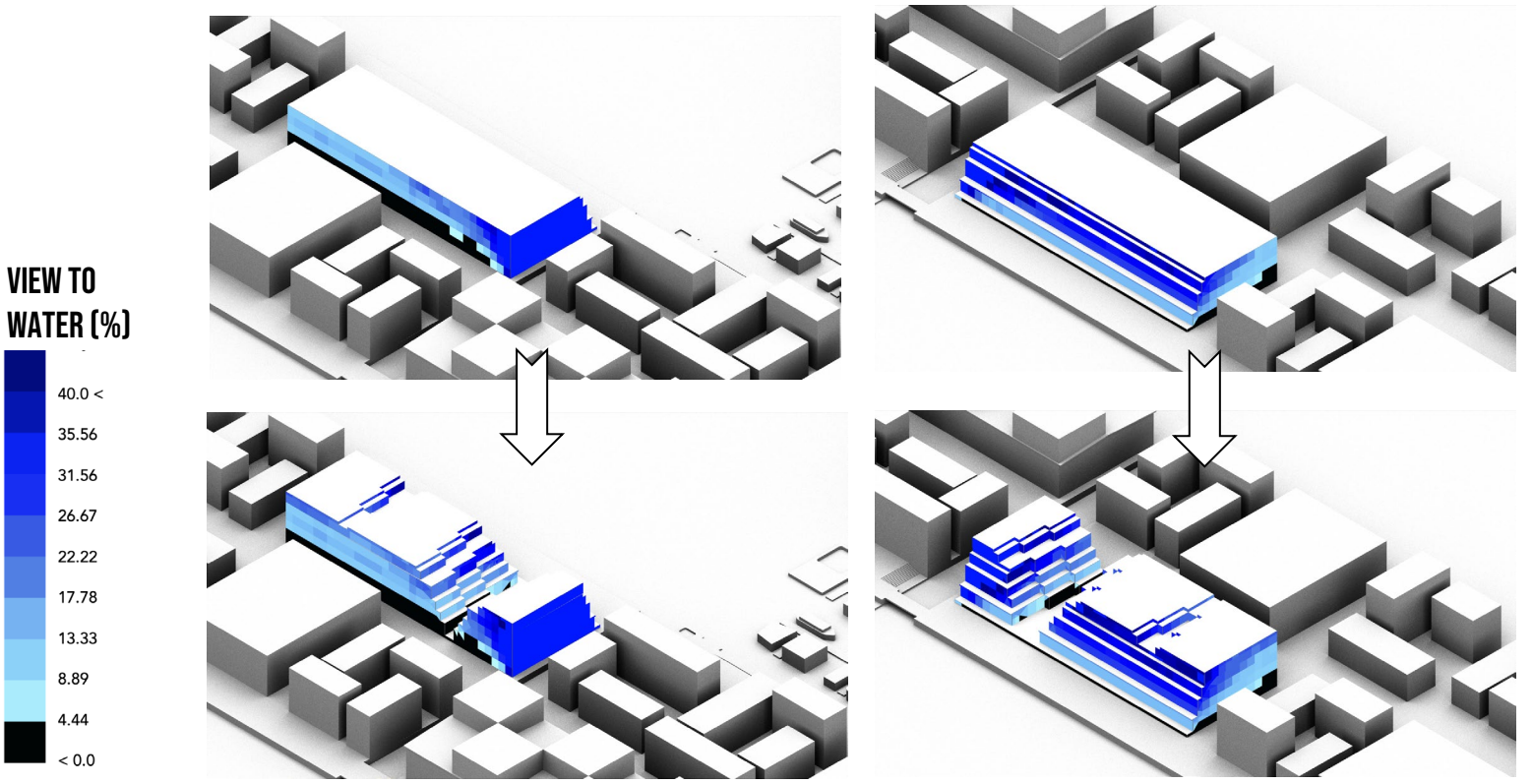
SHADOW ANALYSIS



DATE OF ANALYSIS: EQUINOX, 21ST OF MARCH, 24 HOURS

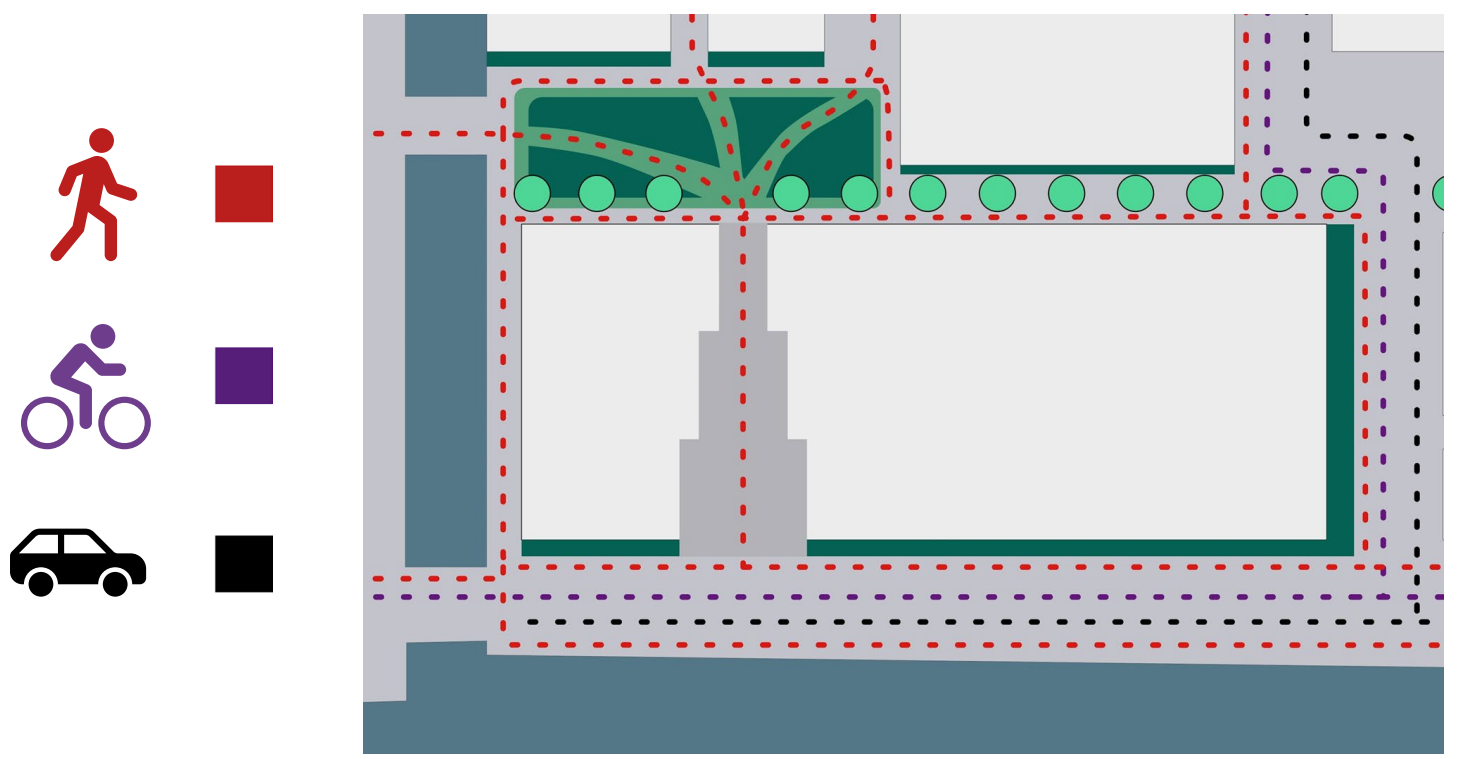
CREATING A PASSAGE THROUGH THE BUILDING LETS MORE LIGHT IN THE URBAN AREA BEHIND THE BUILDING, WHILE CREATING SUNNY TERRACES.

VIEW TO WATER ANALYSIS



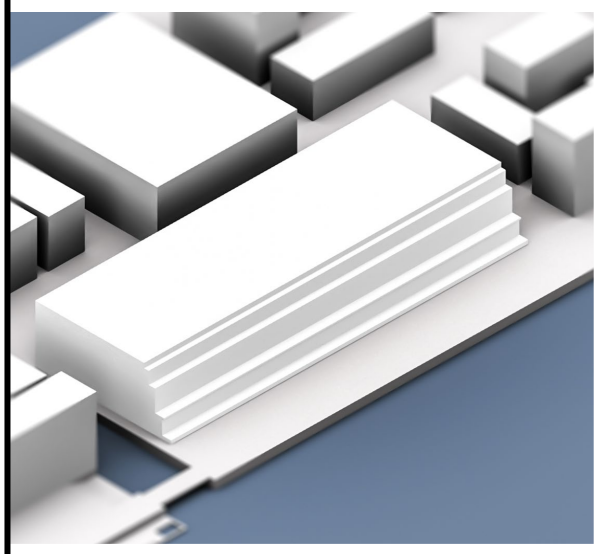
THE PASSAGE CREATES INCREASED FACADE AREA WHICH HAS VIEW TO WATER.

FLOW ANALYSIS

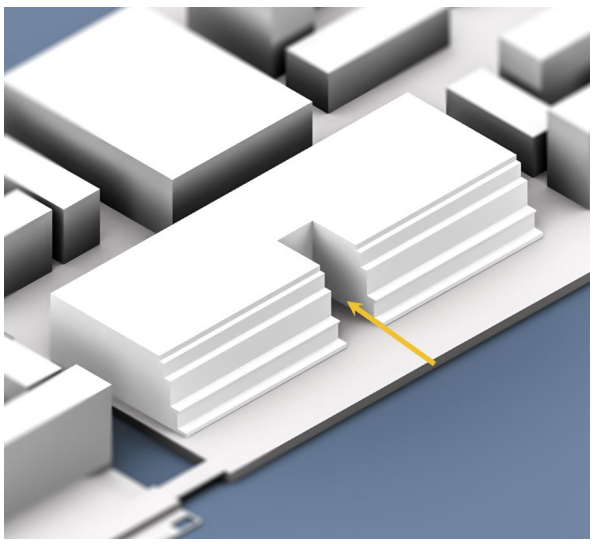


THE PASSAGE MAKES THE URBAN AREA MORE ACCESSIBLE FOR PEDESTRIANS AND CREATES MORE ACTIVITY AND SOCIAL AREAS.

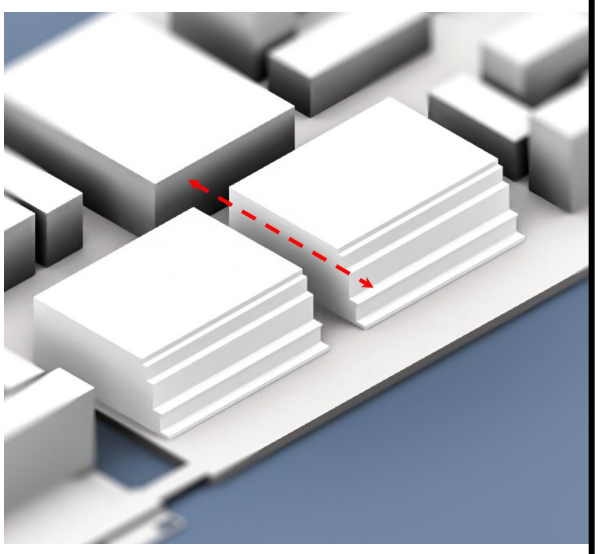
DESIGN PROCESS



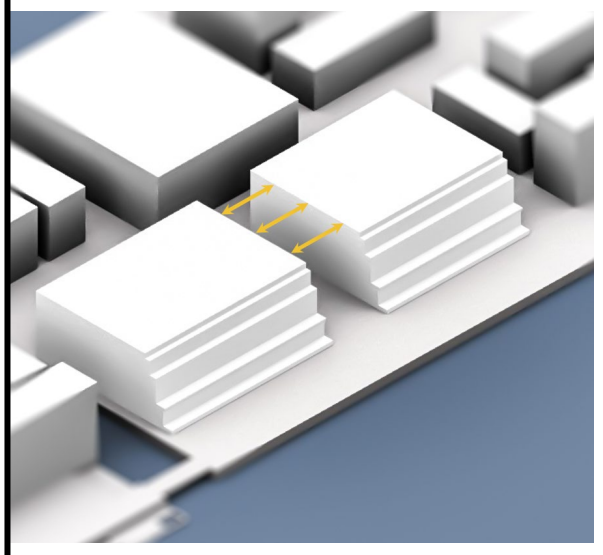
1. ORIGINAL WAREHOUSE



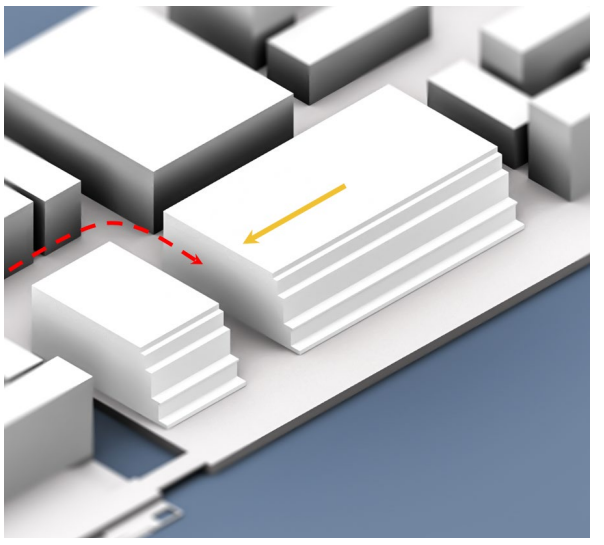
2. OPENING THE BUILDING TO LET LIGHT IN



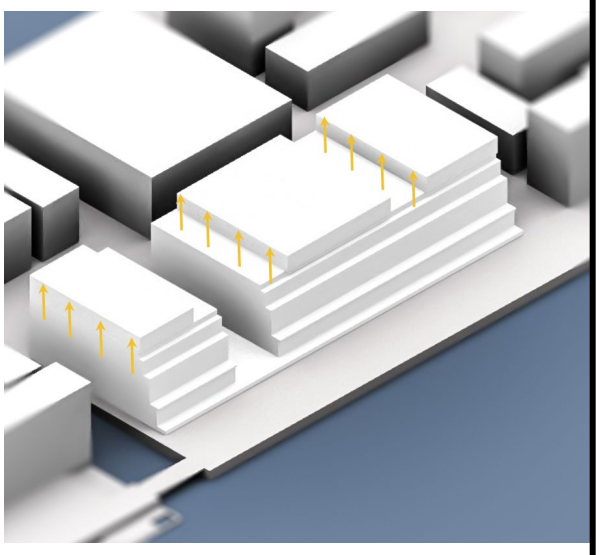
3. THE OPENING GOES THROUGH THE BUILDING TO IMPROVE FLOW



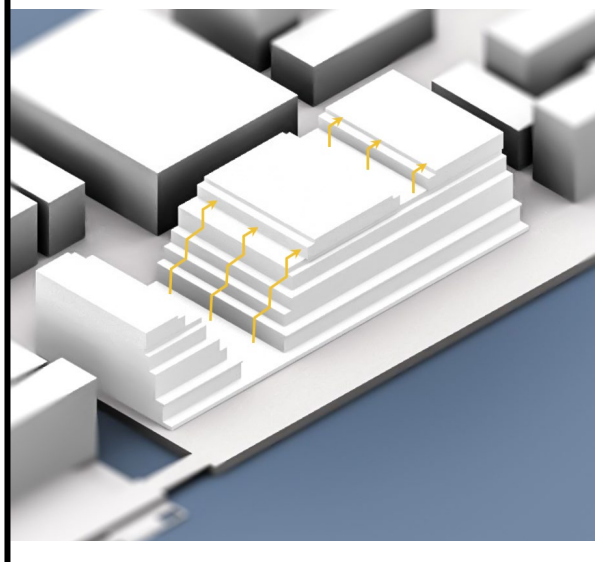
4. INCREASING THE WIDTH OF THE PASSAGE BY 50% TO ENHANCE SUNLIGHT



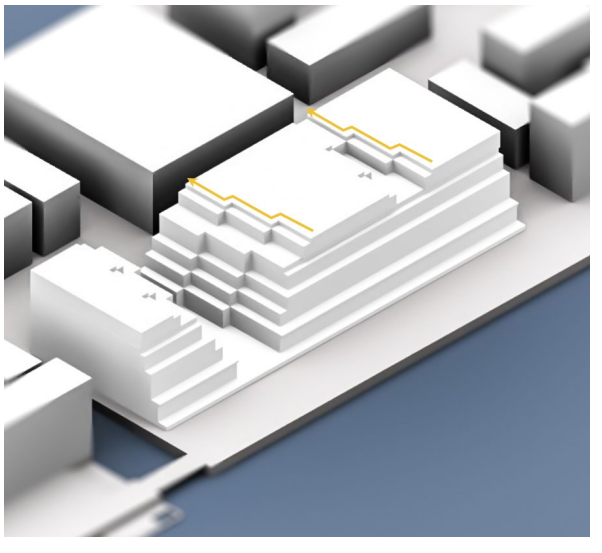
5. THE PASSAGE IS MOVED TO IMPROVE FLOW AGAIN



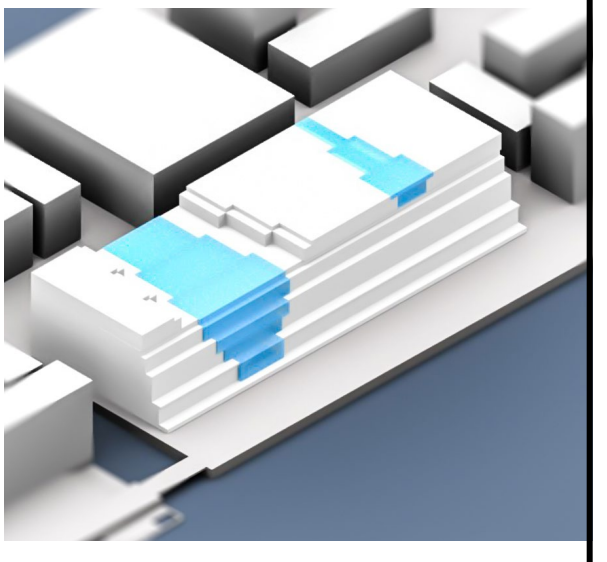
6. THE LOST AREA FROM THE PASSAGE IS GAINED THROUGH A NEW DECK



7. EVERY SECOND FLOOR IS MOVED 2 METERS IN TO INCREASE SUNNY TERRACE AREA



8. THE UPPER DECK IS DIVIDED INTO 3 SECTIONS ACROSS TO ENHANCE VIEW TO WATER



9. THE PASSAGE AND URBAN AREA ARE COVERED IN GLASS WHICH MAKES IT ACCESSIBLE ALL YEAR

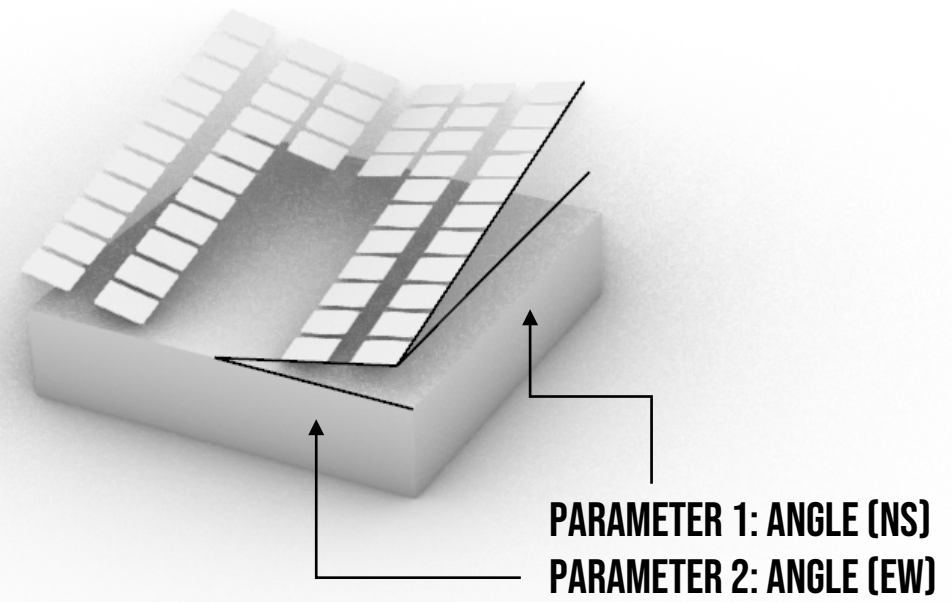
‘AURORA HOUSE’
SOLAR DECATHLON,
CHINA, ZHANGJIAKOU

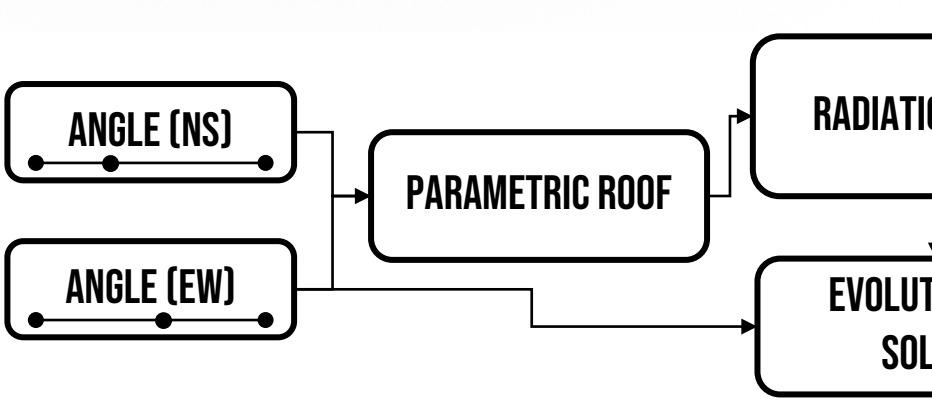
ARCHITECTURAL ENGINEER

OSKAR GRAM NIELSEN

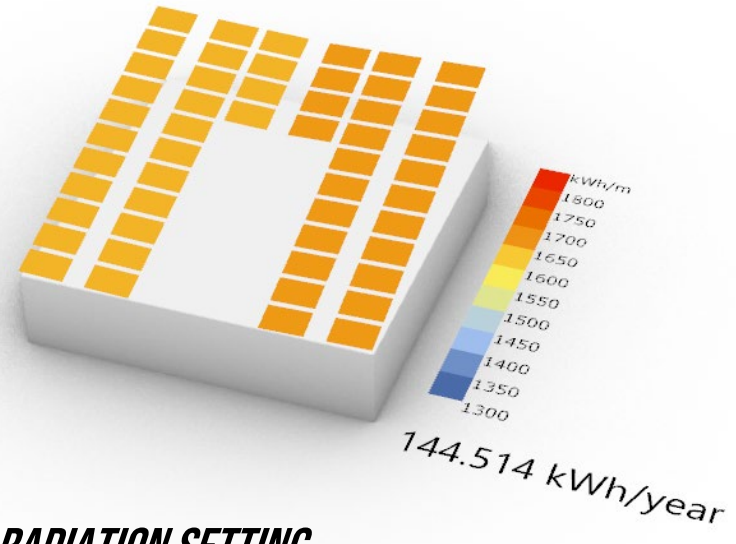
ROOF OPTIMIZATION

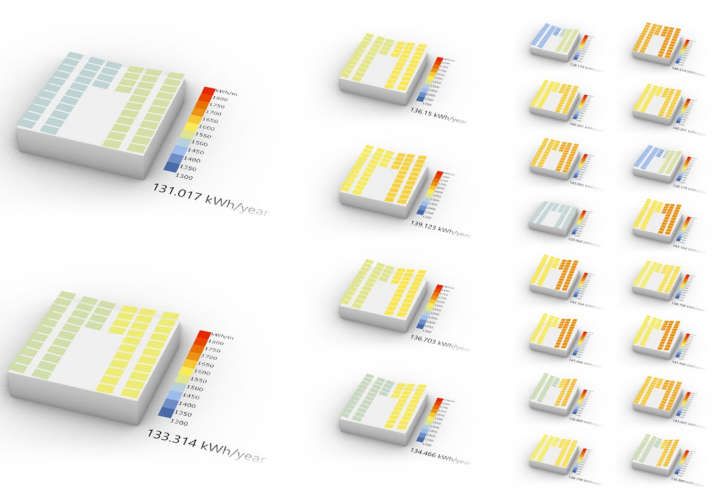
THE PV-PANELS ON THE ROOF HAVE TO BE OPTIMIZED FOR MAXIMUM RADIATION IN ORDER TO GENERATE THE MAXIMUM ENERGY OUTPUT. THE TWO MAIN PARAMETERS OF THE PARAMETRIC ROOF MODEL ARE THE ANGLES FACING NS AND EW, MARKED ON THE FIGURE. BY USING A SOLVER, ALL POSSIBLE ANGLES WERE ITERATED THROUGH, TO FIND THE MOST OPTIMAL ONE, SHOWN IN THE BUTTON.





LINK FOR FULL SIMULATION (30S): HTTPS://YOUTU.BE/0NNX2PS09ME

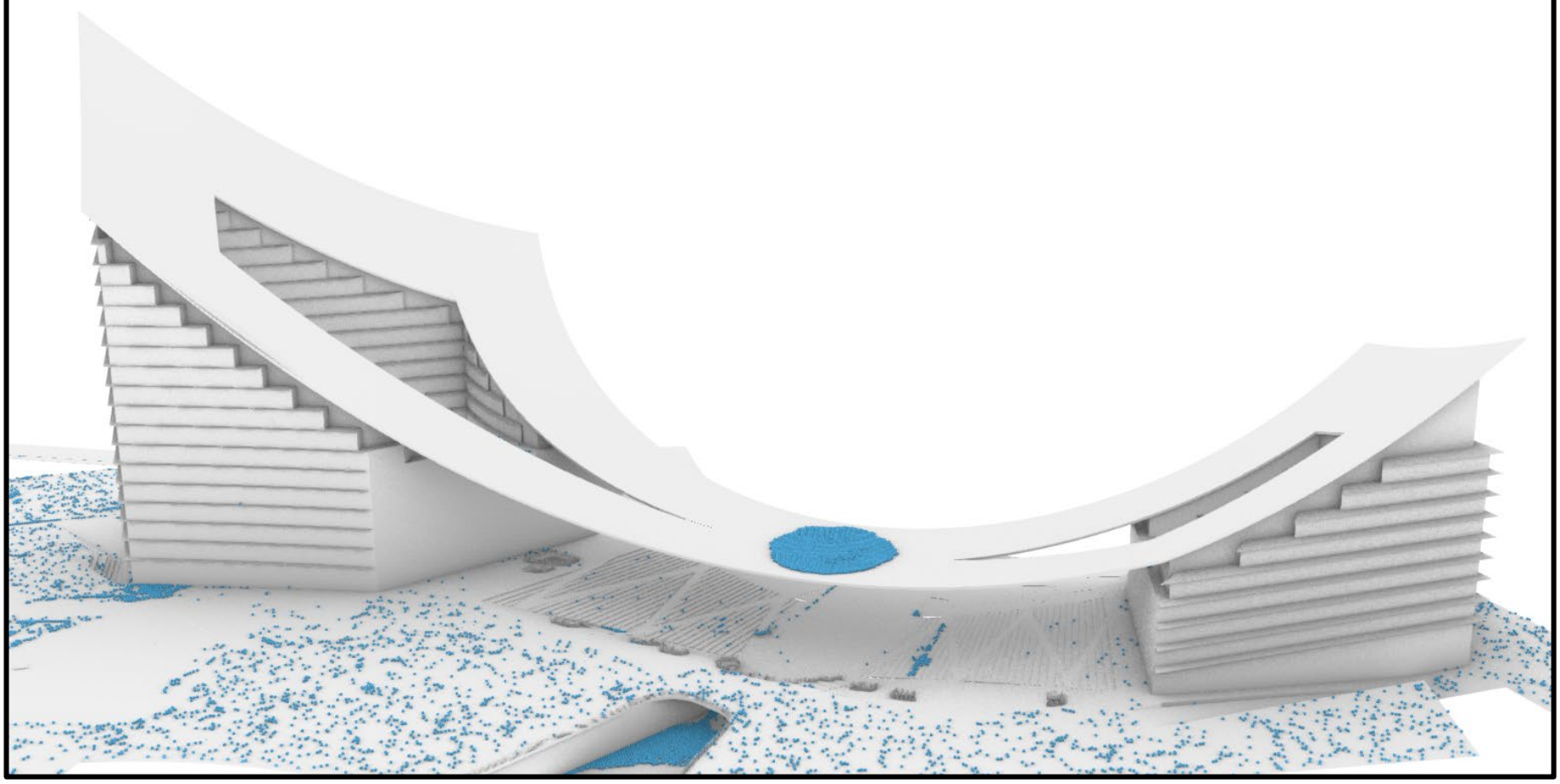




LARGEST RADIATION SETTING

PORTICO
ITALY, MILAN

CASE STUDY: BACHELOR THESIS



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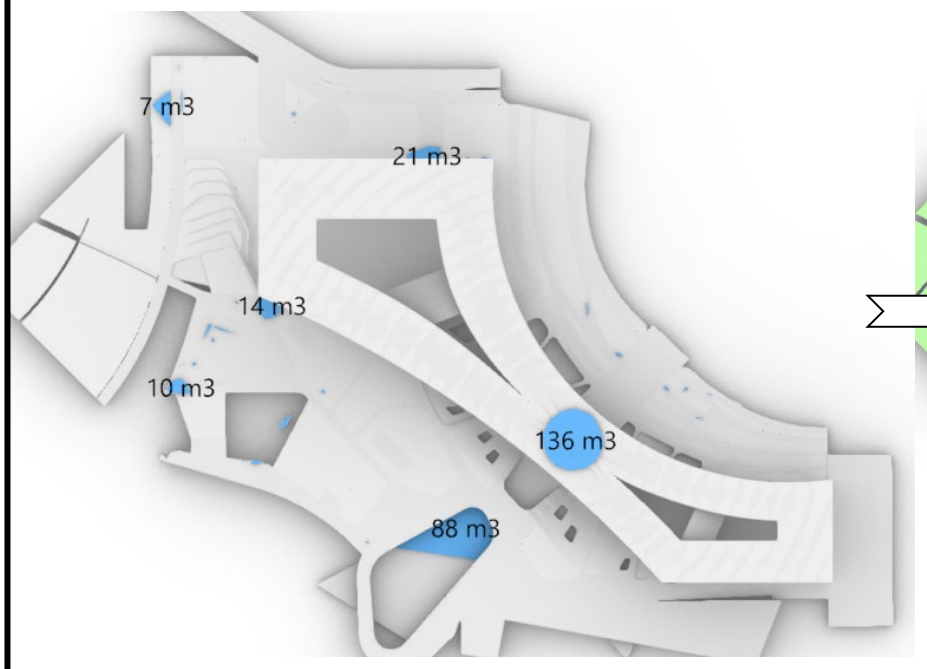
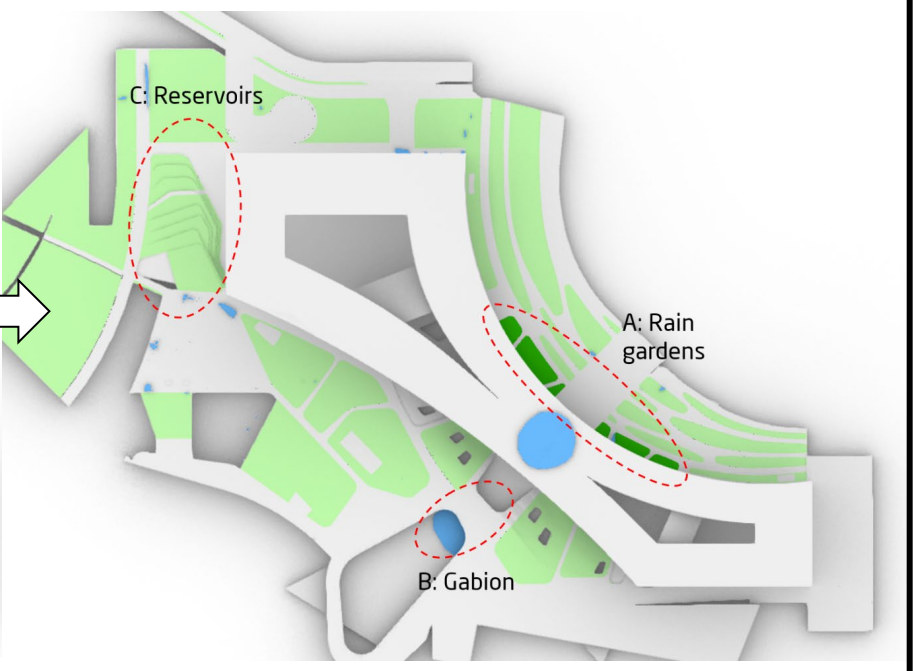
RAINWATER SIMULATION

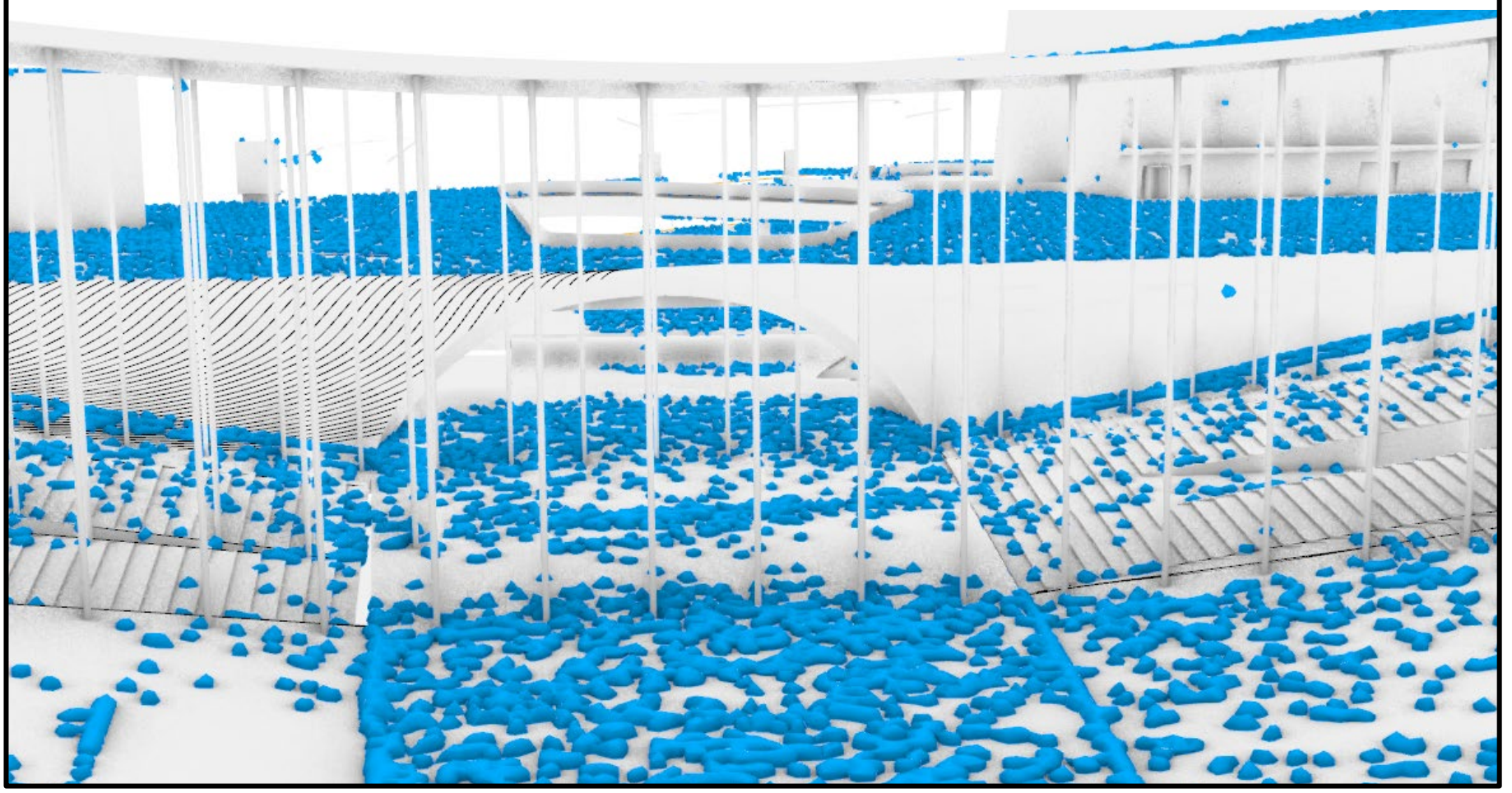
AFTER



BEFORE



THE OBJECTIVE OF THIS PROJECT WAS TO DEVELOP A SIMULATION MODEL CAPABLE OF ACCURATELY SIMULATING RAINFALL, WITH THE INTENTION OF UTILIZING IT DURING THE INITIAL STAGES OF THE DESIGN PROCESS. SPECIFICALLY, I SIMULATED 11 MM OF RAINFALL ON THE SITE USING BLENDER, EMPLOYING A TOTAL OF 200K PARTICLES, EACH OF WHICH REPRESENTS APPROXIMATELY 5 LITERS OF WATER.

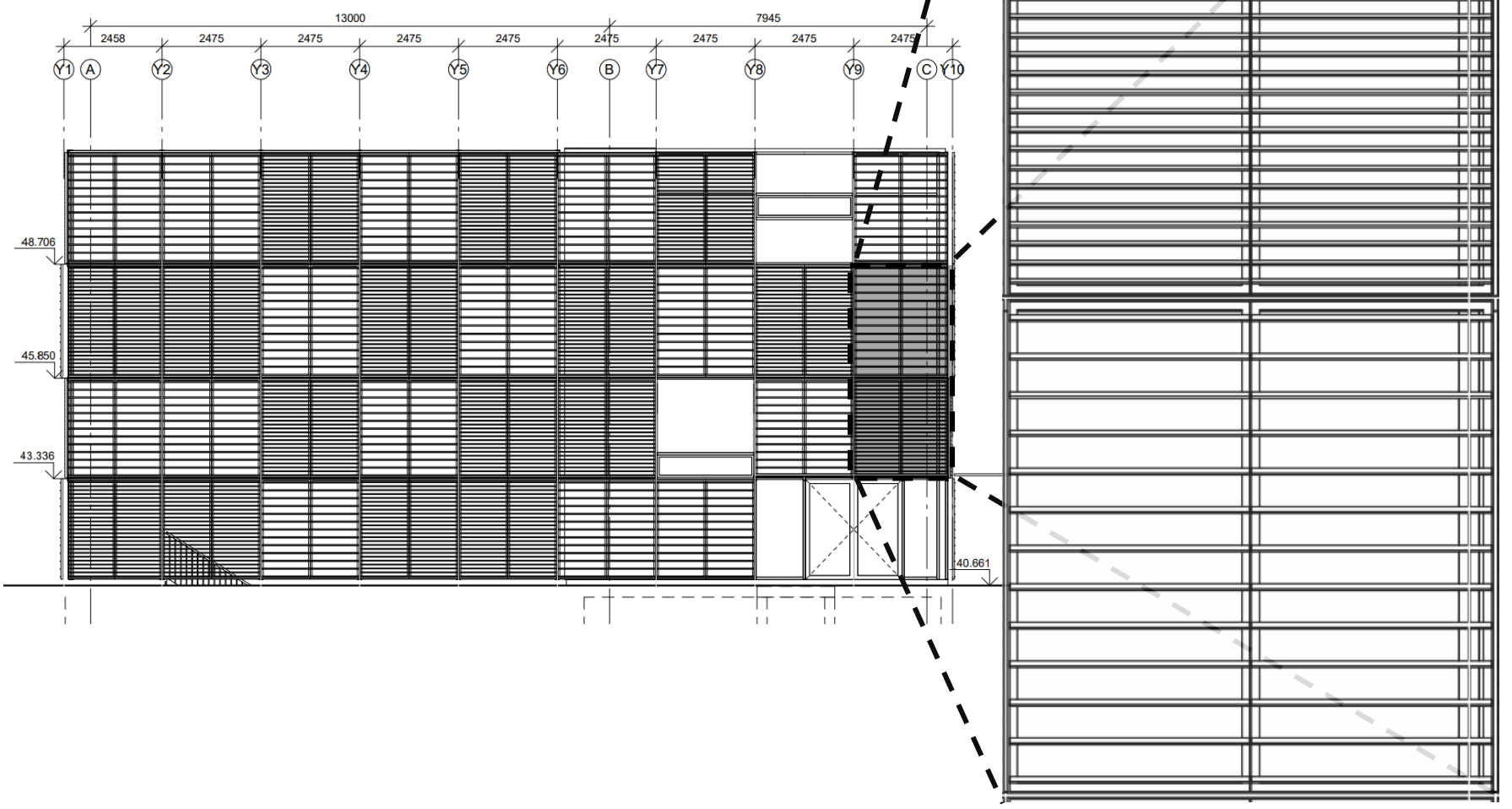


SUNSHADE DESIGN BUILDING 127, LYNGBY

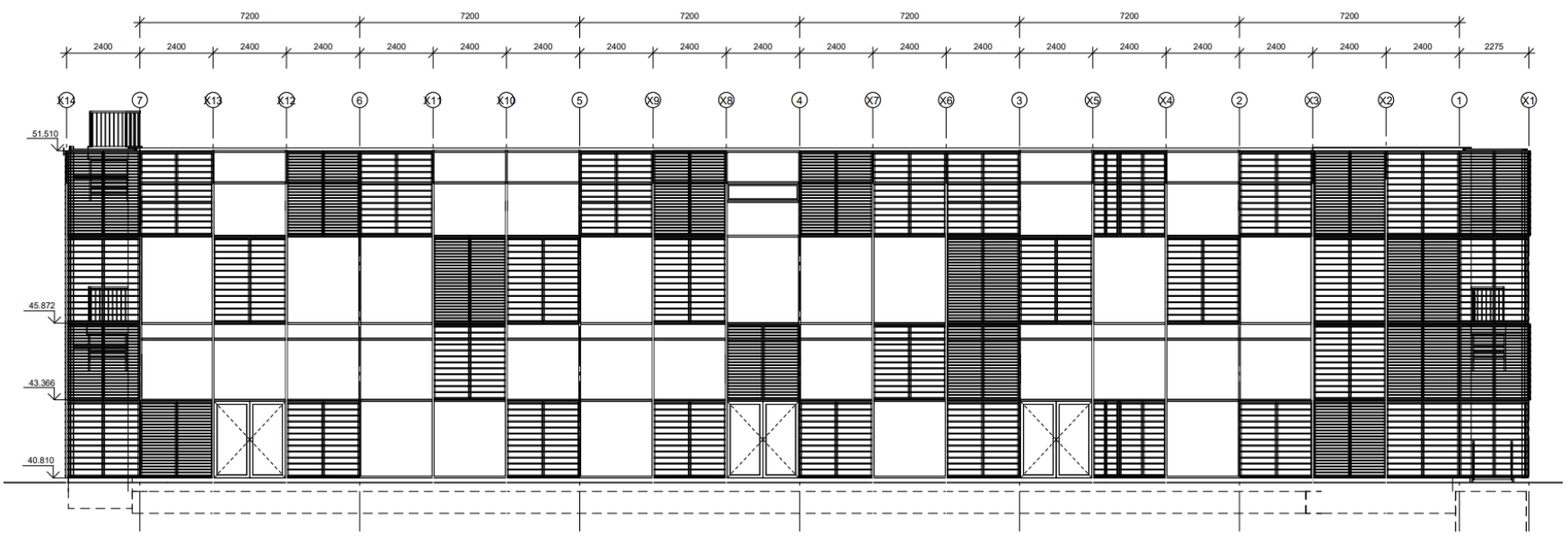
ELEVATIONS

VERTICAL WOOD LOUVRE

EAST ELEVATION

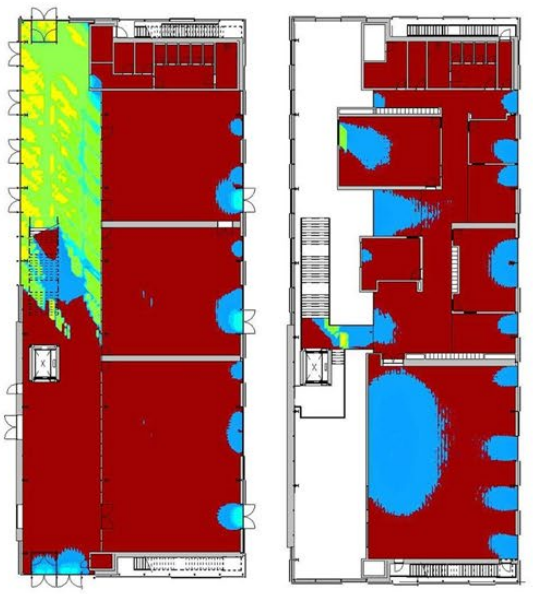


SOUTH ELEVATION

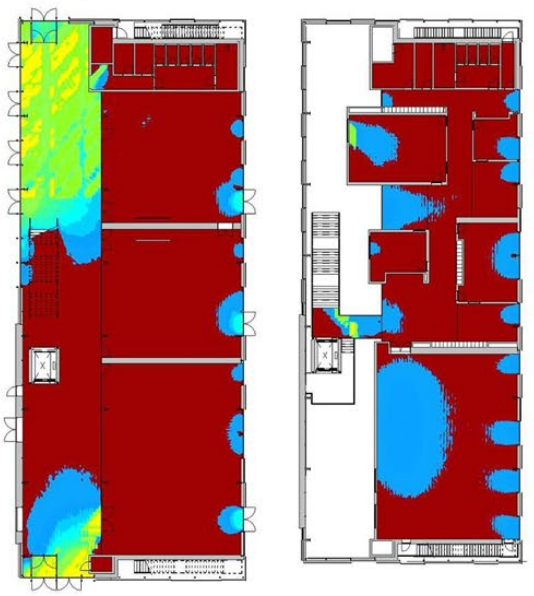


DAYLIGHT ANALYSIS

21/09
09 AM

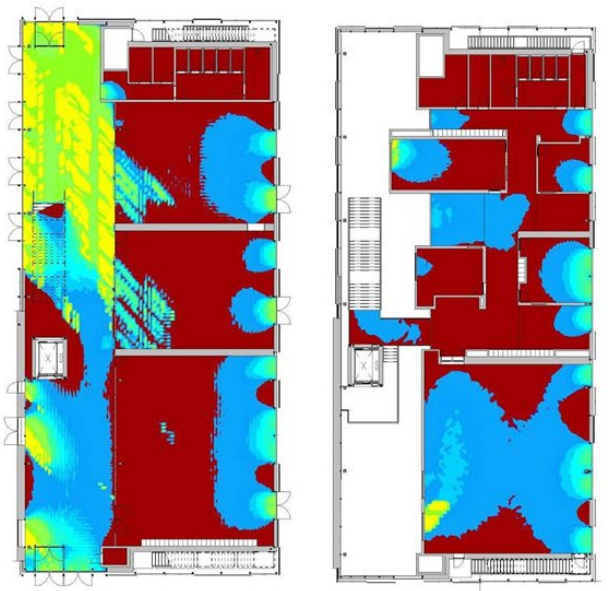


21/09
03 PM



BEFORE (STEEL GRID)

21/09
09 AM



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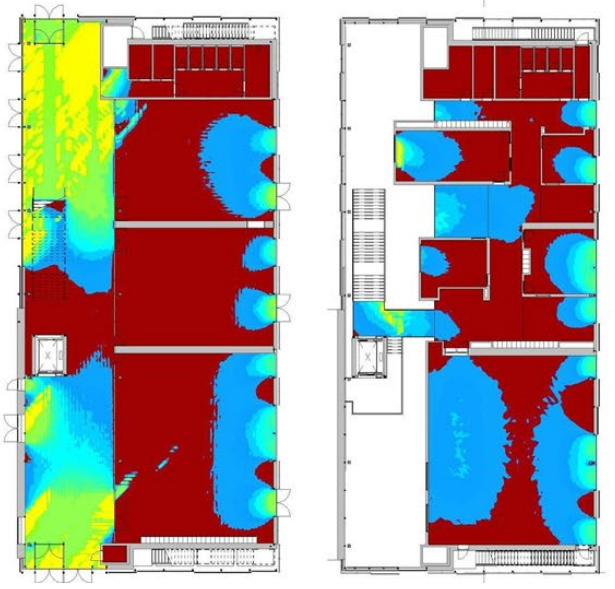
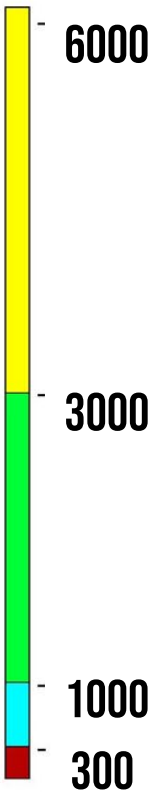
03 PM



AFTER (VERTICAL WOOD LOUVRE)

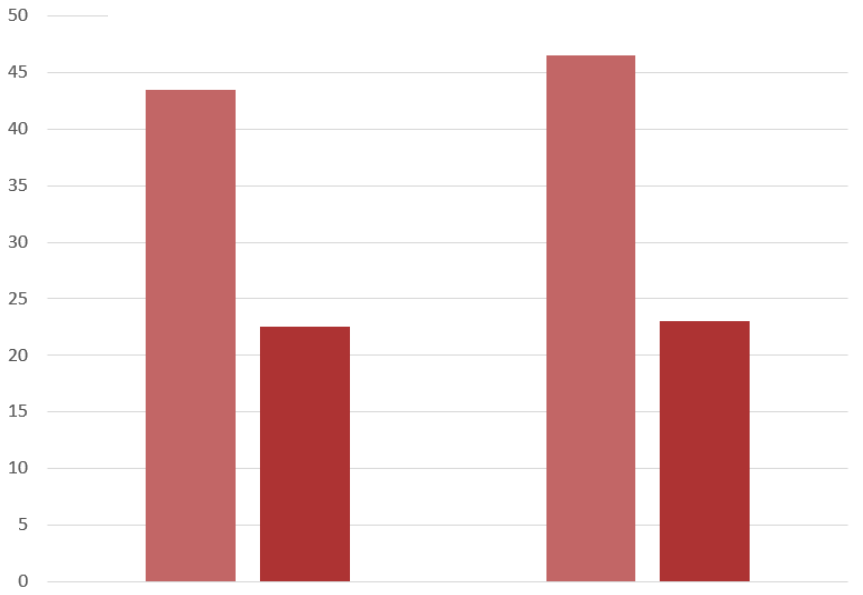
LUX



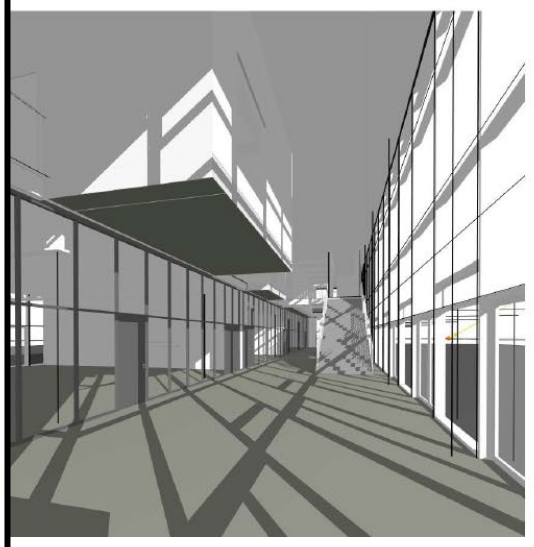
AREA (%) OVER 300 LUX

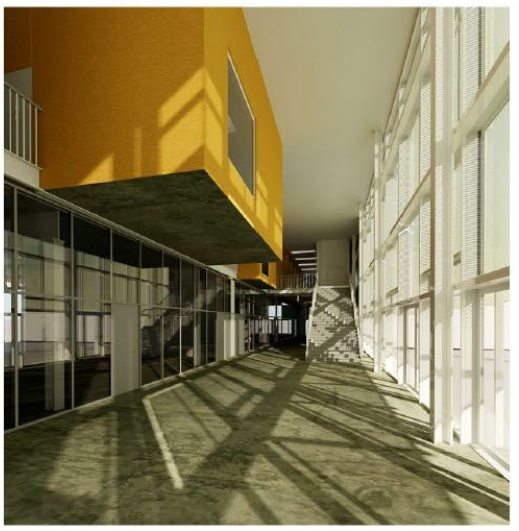
BEFORE

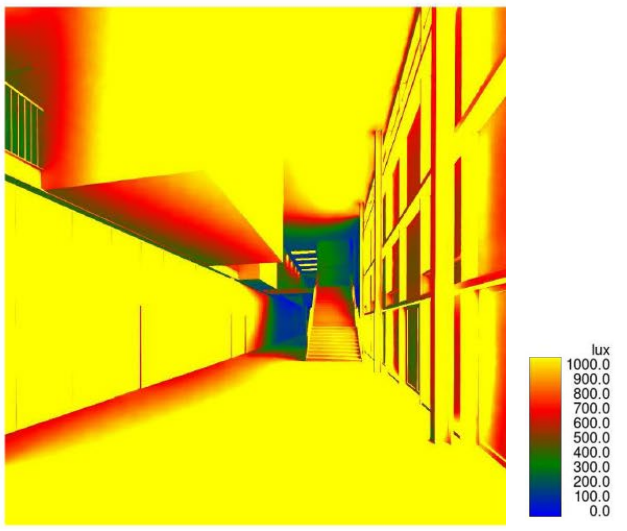
AFTER



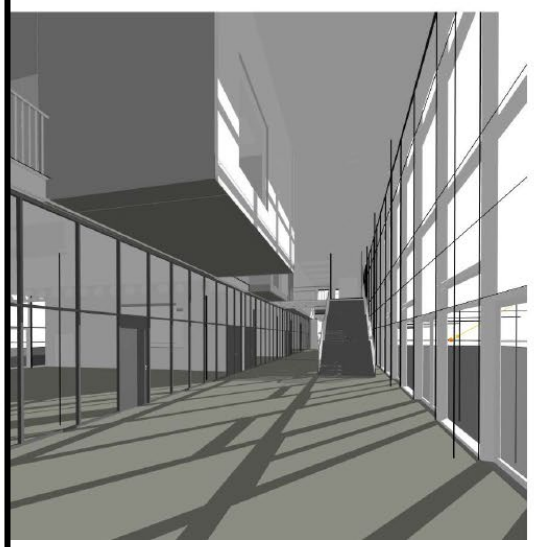
DAYLIGHT RENDERING

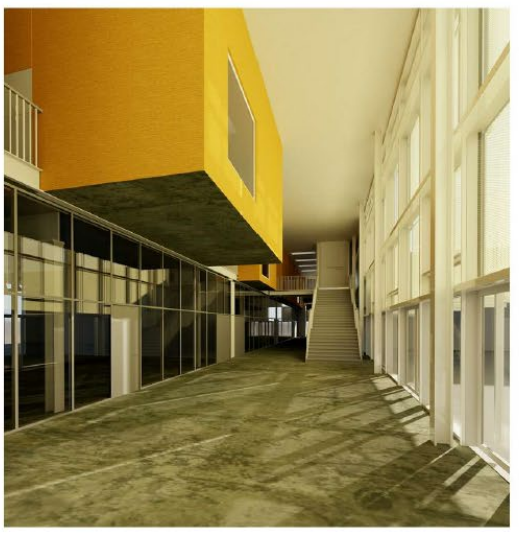


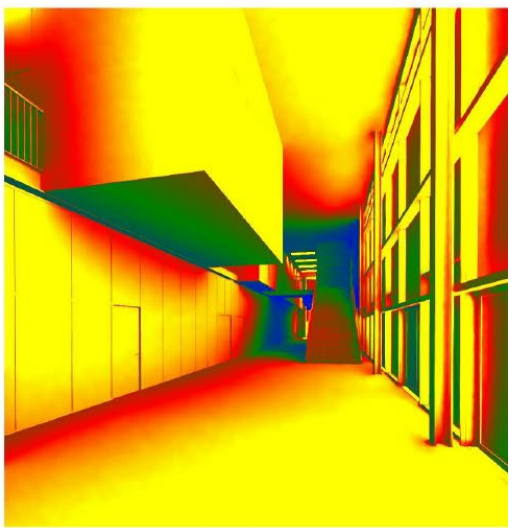




21/09, 3 PM







21/09, 9 PM

BY REPLACING THE STEEL GRID SUNSHADES WITH VERTICAL WOOD LOUVRES, I WAS ABLE TO SIGNIFICANTLY INCREASE THE AMOUNT OF DAYLIGHT THAT ENTERS THE BUILDING, REACHING OVER 300 LUX ON THE FLOOR AREA. AT THE SAME TIME, THE LOUVRES EFFECTIVELY MINIMIZE OVERHEATING, RESULTING IN A MORE COMFORTABLE INDOOR ENVIRONMENT.