

NEURODIVERSE ARCHITECTURE

An Institution for Children with Special Needs

THE INSTITUTION IS HOME TO 300 CHILDREN WITH SPECIAL NEEDS. IT IS INTENDED TO CREATE A SPACE THAT WILL ACCOMMODATE THE NEEDS OF EACH STUDENT SPECIFIC TO THEIR ABILITIES, PREFERENCES, AND MOOD. IT SHOULD ALSO IMPROVE THE LEARNING AND LIVING SPACES OF MENTALLY CHALLENGED CHILDREN BY CREATING A HOLISTIC ENVIRONMENT THROUGH THE FOLLOWING STRATEGIES:

INVOLVE

INCORPORATING A SAFE, SOCIAL, AND INCLUSIVE SPACE WHILE PROVIDING COMMUNITY EXCHANGE ACTIVITIES THAT CAN HELP FOSTER RELATIONSHIPS

ADAPT

INCLUDING SENSORY AND BIOPHILIC DESIGN THAT ENABLES PEOPLE TO IMPROVE THEIR ENVIRONMENTAL INTERACTION

ACCESS

PROVIDING A WELCOMING AND ACCESSIBLE SPACE TO A DIVERSE GROUP OF PEOPLE AND BREAKING BARRIERS FOR PERSONS WITH DISABILITIES.

LIGHTING CONCEPT

EQUITABLE USE

SOME PEOPLE WITH SPECIAL NEEDS MAY PERCEIVE LIGHT VERY DIFFERENTLY AND MAY BE SENSITIVE TO CHANGES IN LIGHT. HENCE, IT IS IMPORTANT TO TAKE INTO CONSIDERATION THE DIFFERENCES OF EACH INDIVIDUAL AND ENSURE THAT THE LIGHTING IS COMFORTABLE TO ALL USERS. IT IS ALSO NECESSARY TO GUARANTEE THE SAFETY OF THE USERS THAT WILL UTILIZE THE SPACE

INVOLVE

LIGHTING DESIGN SHALL ATTRACT PEOPLE TO USE THE SPACE. IT SHALL HAVE DIFFERENT LEVEL OF ILLUMINATION TO HIGHLIGHT IMPORTANT SPACES

ADAPT

DIMMERS AND ALTERNATING SWITCH SHALL BE USED TO TAKE INTO CONSIDERATION THE DIFFERENCES OF EACH INDIVIDUAL AND ENSURE THAT THE LIGHTING IS COMFORTABLE TO ALL USERS. IT IS ALSO NECESSARY TO GUARANTEE THE SAFETY OF THE USERS THAT WILL UTILIZE THE SPACE

ACCESS

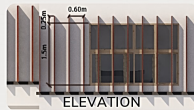
THE POSITIONING AND DESIGN OF LIGHTING SHALL BE UNIVERSAL. USING TRACK LIGHTING ALONG PATHWAYS SHALL GUIDE THE USER IN WAYFINDING AND NAVIGATION

SURFACE FINISHES

LIGHT-COLORED FINISHES ARE USED IN THE BUILDING TO ALLOW BETTER REFLECTION OF LIGHT. THESE FINISHES ALSO LESSEN INDOOR HEAT ACCUMULATION.



FLOOR FINISHES VARY PER ROOM TO DISTINGUISH ONE SPACE FROM ANOTHER. A MAPLE WOODEN PLANK IS UTILIZED AS THE MAIN FLOOR FINISH FOR THE HALLWAYS. IT HAS A REFLECTANCE VALUE OF ABOUT 20% AS IT IS A LIGHT WOOD.



- SOLUTION FOR THE DIMENSION OF VERTICAL FINIS**
- DEPTH = (0.50) / [TAN(40°)]
 - DEPTH = 0.595M
 - DEPTH = 0.60M FOR FULL SHADE
 - HEIGHT = [TAN(44.19°)] (0.50)
 - HEIGHT = 0.486M OR 0.50 FOR FULL SHADE
 - HEIGHT = 0.25M FOR 50% SHADE



- SOLUTION FOR THE DIMENSION OF OVERHANGS**
- DEPTH = (1.5) / [TAN(39.20°)]
 - DEPTH = 1.84M FOR FULL SHADE
 - DEPTH = 0.92M FOR 50% SHADE

MANILA, LATITUDE 14°N
DECEMBER 22, 3:00PM
AZIMUTH = 230° VSA = 40°
ALTITUDE = 32° HSA = 39.20°
ORIENTATION = 270° EPA = 44.19°

CARLA LOISE S. VICENCIO
IV - BS ARCHITECTURE

LIGHTING STRATEGIES

CONTRAST

HIGH CONTRAST ALLOWS USERS TO EASILY SEE THE SIGNAGE EVEN AT A DISTANCE. THIS IS HELPFUL FOR THE PEOPLE WITH DISABILITIES AS IT HAS A HIGH LEVEL OF VISIBILITY.

AMBIENT LIGHTING, DIFFUSION OF LIGHT, COOL WHITE

A COLOR TEMPERATURE OF COOL WHITE IS UTILIZED IN THE CLASSROOMS TO IMPROVE CONCENTRATION. A DIFFUSED LIGHT ALLOWS A MORE UNIFORM LIGHTING THROUGHOUT THE ROOM. DIFFUSED LIGHT ALSO CREATES A GOOD WORKING LIGHT AS IT REDUCES SHADOWS.

NATURAL LIGHTING, PLAY OF BRILLIANTS

NATURAL LIGHTING IS EMPHASIZED ON THE STAIRS AREA. A SERIES OF VERTICAL LOUVERS MADE OUT OF WOOD IS USED TO CREATE A PATTERN DURING THE DAY WHEN HIT BY THE SUNLIGHT. THIS BIOPHILIC DESIGN ALLOWS MORE NATURAL LIGHTING TO ENTER THE SPACE

FOCAL GLOW

THE WORKS OF THE STUDENTS ARE DISPLAYED ON THE CORRIDORS. THE DISPLAY SPACE IS HIGHLY LIT BY A SPOTLIGHT TO INCREASE VISUAL INTEREST OF THE PASSERSBY.

EXTERIOR LIGHTING: SENSORY GARDEN

PATHWAY LIGHTING

PATHWAY LIGHTING IDEAS, ASTERGARDEN.BLOGSPOT.COM

ACCENT LIGHTING

GARDENS FOR HOME, GARDENCLUB.LONDON.CO.UK

UNDERWATER LUMINAIRE

GARDEN LOVERS CLUB, BLOG.GARDENLOVERSCLUB.COM

THE GUIDE LIGHT IS STAGGERED, CREATING POOLS OF LIGHT THAT PROVIDES GENTLE GLOW ON THE PATH. THIS WILL BE USED AS A GUIDE FOR THE USERS IN THEIR WAYFINDING.

BACKLIGHTING IS USED AS ACCENT LIGHTING FOR THE PLANTS. THE LIGHT CREATE A SHADOW ON THE WALLS THAT IMPROVES THE CHARACTER OF THE SPACE.

THE POND HAS A WARM LIGHTING THAT IS WELCOMING TO THE USERS. UNDERWATER LIGHTING INCREASES THE AESTHETICS OF THE POND BY SHOWING THE DETAILS OF THE WATER AND ROCKS.

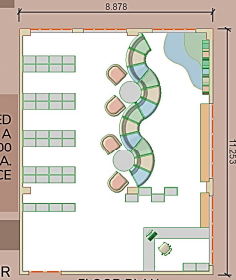


INTERIOR LIGHTING: LIBRARY

LIGHTING DESIGN APPROACH

LIBRARY IS AN ESSENTIAL SPACE IN A SCHOOL. LIGHTING SHOULD BE CAREFULLY DESIGNED AS THE FUNCTION OF THE LIBRARY RELIES HEAVILY ON IT. THUS, IT SHOULD BE ABLE TO ACHIEVE THE FOLLOWING:

- VISUAL COMFORT**: THE RECOMMENDED LIGHTING LEVEL OF A LIBRARY IS 300 TO 500 LUX BASED ON IESNA. THE MAINTENANCE FACTOR IS 0.80
- AESTHETIC LIGHTING**
- REDUCE ENERGY COST**



LIGHTING SPECIFICATIONS

FLICKERING OF LIGHTS MAY TRIGGER STUDENTS WITH SPECIAL NEEDS HENCE, FOR THE GENERAL LIGHTING, A CEILING MOUNTED LED TUBE LIGHTING WITH DIMENSIONS OF 60 X 1247 X 313 MM IS USED. THIS IS SPECIFICALLY CHOSEN AS LED TUBES LAST LONG AND MAY PREVENT THE FLICKERING OF LIGHTS. ADDITIONALLY, LED LAMP REDUCES ENERGY AND MAINTENANCE COSTS DUE TO ITS LOW WATTAGE BUT HIGH LUMEN OUTPUT. THE COLOR TEMPERATURE OF THE LAMP IS 4000K, IMITATING THE NATURAL DAYLIGHT AND IS BEST FOR FOCUSED WORK.

CALCULATION (ROOM INDEX/LUMEN METHOD)

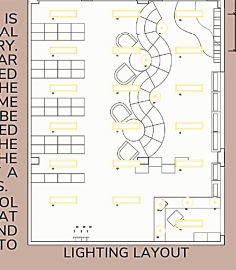
$$1) F = \frac{400 \text{ lx} \times L \times W}{P_e \times P_m \times P_f} = \frac{400 \text{ lx} \times 11.253 \text{ m} \times 8.878 \text{ m}}{80\% \times 50\% \times 20\%} = 11,253 \text{ m} \times 8.878 \text{ m} = 100,000 \text{ lm}$$

$$2) RI = \frac{l(w)}{h \sqrt{l + w}} = \frac{11.253 \times 8.878}{3.86 \sqrt{11.253 + 8.878}} = 1.29$$

$$3) N = \frac{l(A)}{(m)(LL)(MF)(UF)} = \frac{(400)(99.90)}{(1)(4200)(0.80)(0.66)} = 18 \text{ units}$$

RECOMMENDATIONS

A PARALLEL SCHEME IS FOLLOWED IN THE GENERAL LIGHTING OF THE LIBRARY. SIX ROWS OF LINEAR FIXTURES ARE CENTERED ABOVE EACH AISLE OF THE SHELVES. THIS SCHEME ALLOWS THE LIGHT TO BE UNIFORMLY DISTRIBUTED ACROSS THE ROOM. THE LIGHT IS DIFFUSED ON THE WHITE CEILING, GIVING IT A CLUTTER-FREE AESTHETICS. IT GIVES OFF A COOL TEMPERATURE THAT CREATE A SERIOUS AND CALM ATMOSPHERE TO AID IN CONCENTRATION



SUSPENDED LAMPS ARE USED AS SUPPLEMENTARY LIGHTING FOR THE ROOM. THIS FUNCTIONS AS TASK LIGHTING ON THE TABLES AND SEATING AREA. IT ALSO ACTS AS AN ACCENT LIGHTING ON THE COUNTER TO ATTRACT USERS.

ALTERNATING SWITCH IS ALSO INCORPORATED IN THE DESIGN TO ALLOW FLEXIBLE USE OF LIGHTING AND GIVE USERS A CHOICE. THIS MAY ALSO HELP IN ENERGY CONSERVATION AND REDUCE MAINTENANCE COSTS DURING THE DAY WHERE DAYLIGHT IS ABUNDANT.

CARLA LOISE S. VICENCIO
IV - BS ARCHITECTURE

BUILDING PROFILE

LOCATION:
DOÑA JULIA VARGAS AVENUE CORNER MERALCO AVENUE, BRGY. UGONG, PASIG CITY

BUILDING ORIENTATION:
THE ENTRANCE OF THE BUILDING IS FACING WEST WHILE THE LONGER SIDES IS ORIENTED TOWARDS THE NORTH-SOUTH AXIS TO MAXIMIZE DAYLIGHT

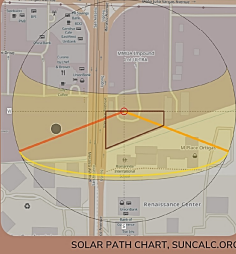
BUILDING TYPE:
AN EDUCATIONAL INSTITUTION FOR CHILDREN WITH SPECIAL NEEDS

SOLAR ANALYSIS

8 AM: THE MORNING SUN FROM THE EAST HITS DIRECTLY THE SENSORY GARDEN, ALLOWING MAXIMUM DAYLIGHT DURING THE MORNING

12 NN: THE SOUTH OF THE BUILDING HAS AN ATRIUM WITHIN THE RAMPS THAT ALLOWS THE HIGH NOON SUN TO FILL IN AND BRIGHTEN THE INTERIOR PARTS OF THE BUILDING.

4 PM: THE ENTRANCE OF THE BUILDING RECEIVES THE MOST SUNLIGHT DURING AFTERNOON. SUNSHADINGS ARE UTILIZED TO AVOID GLARE AND PREVENT HARSH DAYLIGHT TO PENETRATE THROUGH THE INTERIOR SPACES



DESIGN STRATEGIES

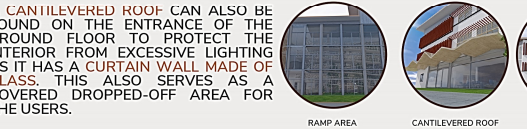
GIVEN THE IRREGULAR SHAPE AND LIMITED SPACE OF THE LOT, THE FORM OF THE BUILDING MUST BE OPTIMIZED SUCH THAT IT MAXIMIZES THE USABLE BUILDING SPACE. A VERTICAL APPROACH IS ALSO USED TO ACCOMMODATE THE SPACES NEEDED. AN ELONGATED STRUCTURE DIVIDED INTO TWO MASSES IS UTILIZED TO INCREASE THE EXTERIOR SURFACE AND AT THE SAME TIME, INCREASE THE NUMBER OF FENESTRATIONS. ALONG WITH THIS, THE LONGER SIDES ARE ORIENTED TOWARDS THE NORTH-SOUTH AXIS.

MAXIMIZING DAYLIGHT WHILE MINIMIZING SOLAR HEAT GAIN, AN ATRIUM IS ALSO INCORPORATED IN THE DESIGN AND IS LOCATED IN THE MIDDLE OF THE RAMP. THIS OPEN AREA ALLOWS THE TRANSMISSION OF LIGHT TO EVENLY SPREAD ACROSS THE BUILDING.

SUNSHADING AND FENESTRATIONS

WINDOWS ARE LOCATED ALONG THE PERIMETER, ALLOWING NATURAL LIGHT FROM MULTIPLE SIDES OF THE BUILDING. BECAUSE OF THE BUILDING'S FORM, MORE FENESTRATIONS ARE PROVIDED. TALL WINDOWS AND A LONG SPAN OF WINDOWS ARE ALSO UTILIZED IN THE BULK OF THE BUILDING TO INCREASE THE DAYLIGHT FACTOR OF THE INTERIOR. LARGE PANELS OF WINDOWS ARE ALSO USED ON THE RAMP AREA TO GIVE THE ATRIUM MORE NATURAL LIGHTING. CLERESTORY WINDOWS ARE ALSO PROVIDED TO HAVE ADEQUATE LIGHTING IN THE SPACES.

SUN SHADING DEVICES SUCH AS VERTICAL FINIS AND OVERHANGS ARE ALSO UTILIZED AND ARE LOCATED ON THE WEST TO AVOID EXCESSIVE DAYLIGHT THAT MAY CAUSE GLARE AND DISCOMFORT TO THE USERS.



REFERENCES:
ARCHITECTURE: INDI, VIRGILIO FERREIRA HIGH SCHOOL / ATELIER CENTRAL ARCHITECTS; RETRIEVED FROM <https://www.archdaily.com/107880/virgilio-ferreira-high-school-atelier-central>
BIOPHILIC LIGHTING: INDI, VIO VIRGILIO ARCHITECTURAL DESIGN; RETRIEVED FROM <https://www.hubbells.com/collections/biophilic-lighting>
LANDSCAPE INSPIRATION EXPRESS: INDI, MOOOL; WEEKLY INSPIRATION EXPRESS; MOOOL; RETRIEVED FROM <https://www.mooool.com/en/weekly-inspiration.html>
N.A. 2015. PATHWAY LIGHTING IDEAS. RETRIEVED FROM <https://www.aesthetics.com.au/inspiration/interior-lighting>
NASTIYA AK. INDI. RETRIEVED FROM <https://www.pinterest.com/pin/129238660072987/>