



- SCIENTIFIC DISCOVERY -



+ DESIGNING THE SCIENCE MUSEUM OF THE FUTURE





- SIGNATURE PAGE -

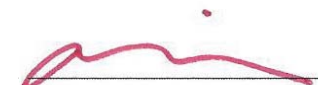
- SCIENTIFIC DISCOVERY -

A DESIGN THESIS SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE OF
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BY

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PRIMARY THESIS ADVISOR


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||||| - PROPOSAL - ||||||

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||||| - THESIS ABSTRACT - |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

THIS THESIS DEMONSTRATES THE CONNECTION BETWEEN HOW CHILDREN AND ADULTS LEARN ABOUT SCIENCE, AS WELL AS THE CONNECTION BETWEEN SCIENCE AND TECHNOLOGY IN MODERN BUILDING DESIGN. BY LOOKING AT THE SCIENTIFIC ADVANCEMENTS OF BUILDINGS, THE BUILDING ITSELF BECOMES A TOOL FOR TEACHING, GIVING VISITORS A HANDS ON EXPERIENCE OF THE CONNECTION BETWEEN SCIENCE AND EVERYDAY LIFE. THIS WILL HELP VISITORS LEARN ABOUT SCIENTIFIC STRATEGIES AND GIVE THEM A BETTER UNDERSTANDING OF THE ENVIRONMENT IN WHICH THEY LIVE. SCIENCE IS SOMETHING THAT HAS AN EFFECT ON EVERYONE IN THE WORLD; FROM GROWING FOOD, PRODUCING ELECTRICITY, TO LIVING A HEALTHY LIFESTYLE. EVERYTHING IS CONNECTED BY SOME TYPE OF SCIENTIFIC ADVANCEMENT OR DISCOVERY.





CAN A BUILDING BECOME A PART OF THE DISPLAYS IN A SCIENCE MUSEUM, AND INFLUENCE THE LEARNING THAT OCCURS THERE? WHAT CAN BE DONE TO EDUCATE PEOPLE ABOUT THE SCIENTIFIC ADVANCEMENTS OF BUILDINGS AND THE TECHNOLOGIES THAT SUPPORT THEM? THESE ARE THE TWO MAIN QUESTIONS THAT I AM GOING TO ANSWER THROUGH THE DESIGN PROCESS OF A SCIENCE MUSEUM AND LEARNING CENTER IN FARGO, ND. I HAVE ALWAYS ENJOYED SCIENCE AND THE NATURAL ENVIRONMENT, AND WANT TO TRY AND MERGE THESE TWO IDEAS INTO A BUILDING TO SHOW HOW BUILDINGS USE THE NATURAL ENVIRONMENT TO CREATE ENERGY FOR LIGHTING, HEAT AND COOL THE BUILDING, AND REUSE WATER BY USING IT EFFICIENTLY. IT IS FOR THESE REASONS THAT I DECIDED TO DESIGN A SCIENCE MUSEUM, GUIDED BY THE STANDARDS OF THE UNITED STATES GREEN BUILDING COUNCIL’S LEED RATING SYSTEM. BY IMPLEMENTING THESE STANDARDS THROUGH SCIENCE AND TECHNOLOGY DESIGN SOLUTIONS, THE BUILDING WILL WORK WITH THE ENVIRONMENT AND LESSEN IT’S IMPACT ON THE SURROUNDING NATURAL AREA.

I CHOSE A SITE IN THE FARGO-MOORHEAD AREA. I WAS THINKING ABOUT THE SIZE OF THE TWO CITIES AND REALIZED THAT THE CLOSEST SCIENCE MUSEUM IS IN THE ST. PAUL AREA(THE SCIENCE MUSEUM OF MINNESOTA). FARGO IS CONTINUING TO GROW AND THIS SCIENCE MUSEUM AND LEARNING CENTER WILL HELP EDUCATE CHILDREN AND MEMBERS OF THE COMMUNITY ABOUT SCIENCE AND TECHNOLOGY THAT IS USED IN THE EVERYDAY LIFE. EDUCATING EVERYONE IN THE COMMUNITY IS SOMETHING THAT WILL HELP THE COMMUNITY TO THRIVE AND CONTINUE THE GROWTH OF THE FARGO, WEST FARGO, AND MOORHEAD

COMMUNITIES. WHILE TRYING TO DECIDE ON A SPECIFIC SITE IN THE FARGO AREA, I WAS THINKING ABOUT A LOCATION THAT HAD SOMETHING FOR FAMILIES TO GO TO ALREADY. LOOKING AT THE AREA AROUND THE RED RIVER VALLEY ZOO, I FEEL THAT DESIGNING IN THE GENERAL VICINITY OF THE ZOO WOULD BE A GOOD OPPORTUNITY TO HELP ATTRACT MORE PEOPLE TO THE AREA. BY DESIGNING A NEW STATE OF THE ART LEARNING CENTER FOR THE SITE, I COULD CREATE A LEARNING SPACE THAT WILL BE IN CLOSE PROXIMITY TO THE ALREADY EXISTING ZOO.

MY DESIGN WILL TEACH ABOUT SCIENCE AND HOW IT CAN RELATE TO EVERYDAY LIFE. SCIENCE IS BEHIND EVERYTHING THAT WE HAVE DONE IN THE PAST AND ARE DOING FOR THE FUTURE. I WANT MY BUILDING TO SHOW THAT PROGRESSION AND EVOLUTION OF IDEAS AND TECHNOLOGIES. SCIENCE IS CONSTANTLY CHANGING AND IDEAS ARE EVOLVING. I WANT THE SPACES IN AND AROUND THE BUILDING TO CHANGE AND EVOLVE FOR THE DIFFERENT USES THAT THE BUILDING HAS AND CAN BE USED FOR MORE THAN JUST LEARNING. THE BUILDING WILL BE SOMEPLACE THAT THE COMMUNITY CAN USE FOR A VARIETY OF DIFFERENT OCCASIONS; PROM, BIRTHDAYS, OR ANY OTHER TYPE OF GATHERING AND MEETINGS.

ONE OF THE QUESTIONS I PROPOSED IS ABOUT HOW PEOPLE LEARN AND REACT TO SPACES IN A BUILDING. I AM GOING TO EXPLORE HOW BUILDINGS CAN CREATE SPACES THAT HELP PEOPLE LEARN ABOUT SCIENCE, AND CREATE GATHERING SPACES THAT ARE FLEXIBLE AND CAN CHANGE DEPENDING ON THE EVENT THAT IS TAKING PLACE IN THE SPACE. THE BUILDING WILL ALSO BE A TOOL FOR LEARNING ABOUT THE NATURAL SYSTEMS IN THE

ENVIRONMENT, AND HOW THEY ARE USED IN SUSTAINABLE DESIGN STRATEGIES. A COUPLE OF SUSTAINABLE DESIGN STRATEGIES THAT I WOULD LIKE TO INCORPORATE INTO MY DESIGN INCLUDE; A LIVING MACHINE, WHICH RECYCLES WATER FOR THE BUILDING; AND SOLAR GAIN, WHICH USES THE SUN TO HEAT, COOL, AND PRODUCE ENERGY FOR THE BUILDING. ANOTHER STRATEGY IS HOW THE BUILDING IS LOCATED ON THE SITE AND WHERE THE ENTRANCES AND MAIN AREAS ARE LOCATED. THESE ARE JUST A FEW STRATEGIES THAT WILL BE USED TO HELP IN THE DESIGN PROCESS.

THE OTHER QUESTION THAT I ASKED WAS, HOW CAN A BUILDING SHOW THE ADVANCEMENTS IN THE TECHNOLOGIES THAT BUILDINGS USE TODAY? TO SHOW THIS, THE BUILDING WILL BE DESIGNED IN A WAY THAT THE VISITORS CAN SEE HOW BUILDINGS WORK, AND WHAT TECHNOLOGIES ARE USED. I WANT TO EDUCATE THE COMMUNITY ABOUT STAINABILITY, AND WHAT IT ENTAILS, SO THEY CAN ALSO USE THESE STRATEGIES IN THEIR OWN HOMES.



||||| - THE PROJECT TYPOLOGY - ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

THE TYPOLOGY FOR THIS
THESIS, A SCIENCE MUSEUM AND
LEARNING CENTER, WILL FUNCTION
AS AN EDUCATIONAL BUILDING AND
COMMUNITY GATHERING SPACE.
THESE TWO TYPOLOGIES WILL WORK
TOGETHER TO CREATE A SPACE
WHERE THE TWO TYPOLOGIES FLOW
TOGETHER SEAMLESSLY.



||||| - TYPOLOGICAL RESEARCH - |||||||

- NATURAL HISTORY MUSEUM OF UTAH -
2011
SALT LAKE CITY, UT
ENNEAD ARCHITECTS

THIS 153,000 SQUARE FOOT NATURAL HISTORY MUESUM IS BUILT INTO THE FOOTHILLS OF THE WASSATCH MOUNTIAN RANGE AND IS SITUATED ON A 17 ACRE SITE ON THE EDGE OF THE UNIVERSITY OF UTAH CAMPUS. THE SHAPE AND FORM OF THE BUILDING WAS DESIGNED TO RESEMBLE THE SURROUNDING LANDSCAPE. THE BUILDING IS DESIGNED IN A WAY THAT THE FLOOR PLANS STEP BACK AND HUG THE HILL BEHIND IT. THE SPACES IN THE BUILDING INCLUDE CLASSROOMS, EXHIBITION DISPLAY AND STORAGE SPACE, RESEARCH FACILITIES, ADMINISTRATIVE AREAS, AND SUPPORT SPACES. (ENNEAD ARCHITECTS)

“UTAH IS VERY MUCH ABOUT THE LAND AND ITS UNUSUAL LANDSCAPES. BUT IT’S NOT *JUST* ABOUT THE LAND -- IT’S ABOUT HOW THE PEOPLE HAVE ENGAGED THE LAND OVER THE MILLENNIUM. WE BEGAN TO THE SHAPE AND MODIFY THE BUILDING ACCORDINGLY.” (THE DESIGN TEAM)

- TODD SCHLIEMANN,
ENNEAD ARCHITECTS



- IMAGE 1 | EXTERIOR -

A VARIETY OF DESIGN ASPECTS ATTRACTED ME TO THIS BUILDING AS A CASE STUDY FOR MY THESIS. THE FIRST THING THAT I FOUND INTERESTING IS THE WAY THE BUILDING RESEMBLES THE MOUNTAINS AND AREA AROUND IT. IT CREATES A MODERN, ABSTRACT FEEL OF WHAT A MOUNTAIN SHOULD, AND COULD LOOK LIKE FROM THE INSIDE AND OUTSIDE. THE WAY THAT THIS IS ACHIEVED IS BY THE ABSTRACT WALLS IN THE SPACES.

ANOTHER ASPECT THAT I FOUND EXCITING WAS THE SITE LOCATION AND HOW THE BUILDING IS INTEGRATED INTO THE SITE. THE BUILDING SITE ITSELF IS LOCATED RIGHT ON THE EDGE OF THE CITY AND THE NATURAL ENVIRONMENT. THE LEVELS OF THE BUILDING ARE DESIGNED IN A WAY THAT THEY STEP UP THE MOUNTAIN GIVING THE BUILDING THIS LAYERED LOOK AND FEEL. (NATURAL HISTORY MUSEUM OF UTAH)

I ALSO THINK THAT THEY HANDLED THE SPATIAL ORGANIZATION IN A WELL THOUGHT OUT MANNER THE



- IMAGE 2 | THE CANYON -

DESIGNER, ENNEAD ARCHITECTS, CREATED TWO WINGS AND DIVIDED THEM WITH A HUGE CENTRAL PUBLIC SPACE, CALLED THE CANYON. THE NORTH WING IS HOME TO THE RESEARCH AND EDUCATIONAL SPACES, WHILE THE SOUTH WING IS WHERE THE EXHIBITS ARE ON DISPLAY FOR THE PUBLIC. (NATURAL HISTORY MUSEUM OF UTAH)

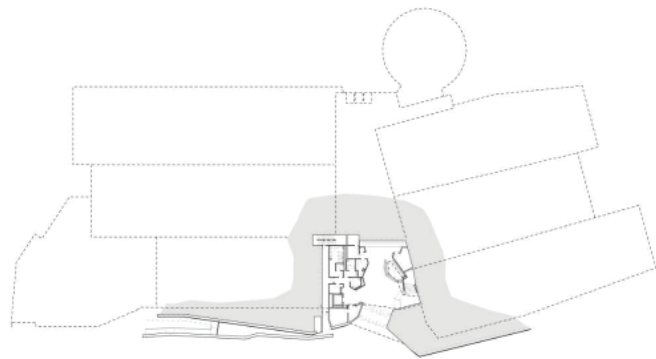
THE EXHIBIT SPACES CREATE THIS LAYERING FEEL AND HAVE A CLEAR CIRCULATION PATH THROUGHOUT THE SPACES. SINCE THIS IS MORE OF A NATURAL SCIENCE CENTER THERE ARE DINOSAUR BONES AND SKELETONS, ALONG WITH ANIMALS AND THE ENVIRONMENTS IN WHICH THEY LIVE.



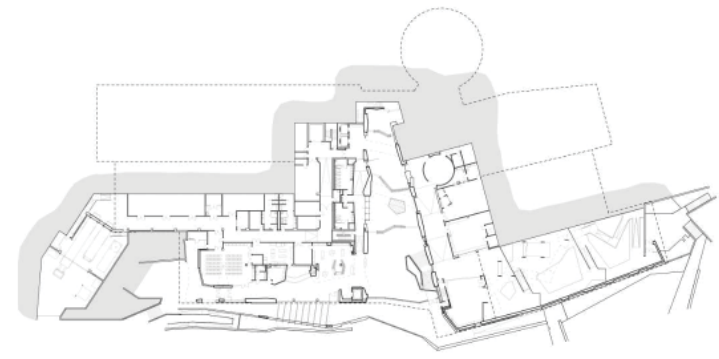
- IMAGE 3 | EXHIBIT AREA -



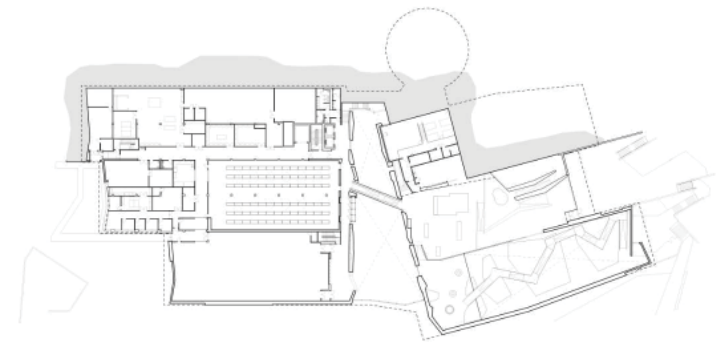
- FIGURE 1 | SITE PLAN -



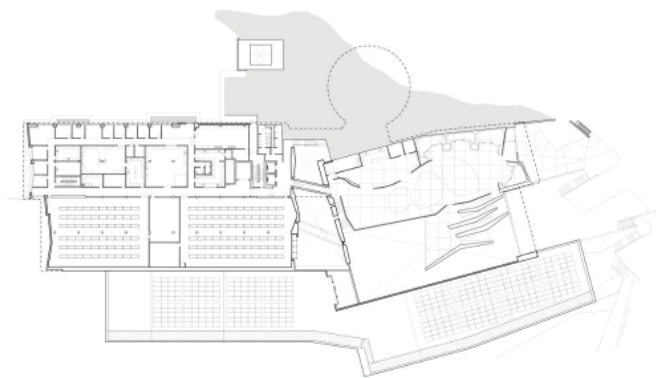
- FIGURE 2 | FIRST FLOOR PLAN -



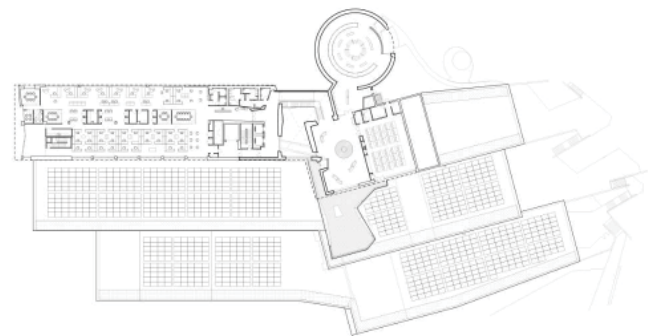
- FIGURE 3 | SECOND FLOOR PLAN -



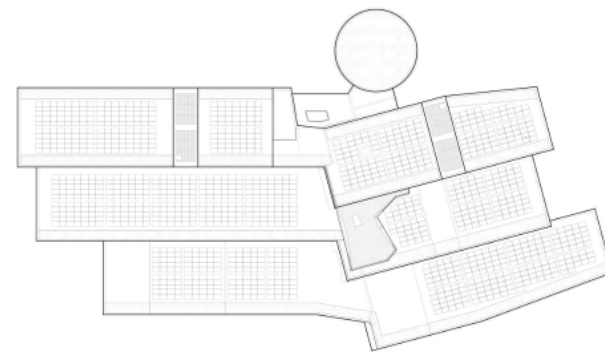
- FIGURE 4 | THIRD FLOOR PLAN -



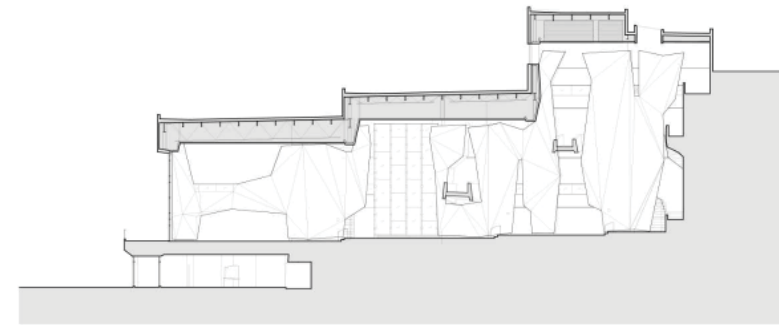
- FIGURE 5 | FOURTH FLOOR PLAN -



- FIGURE 6 | FIFTH FLOOR PLAN -



- FIGURE 7 | ROOF PLAN -

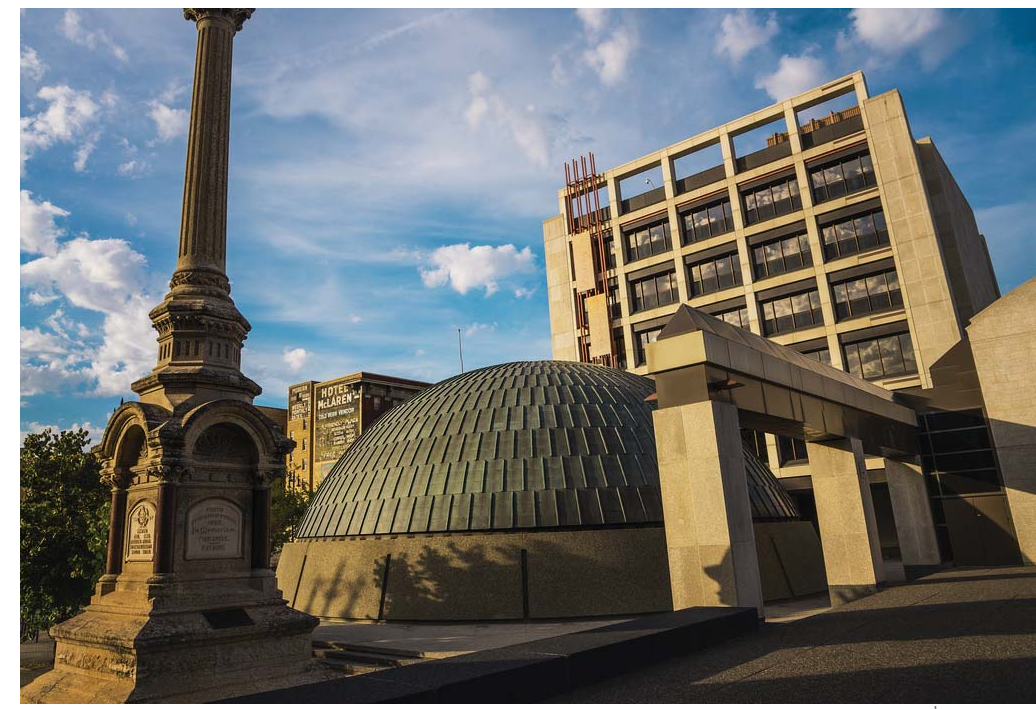


- FIGURE 8 | SECTION -

- THE MANITOBA MUSEUM -

1979
WINNIPEG, MB
MOODY, MOORE & PARTNERS
(ORIGINAL BUILDING)

THE BUILDING WAS ORIGINALLY BUILT IN 1979, AND HAS GONE THROUGH A LOT OF RENOVATIONS AND REPAIRS SINCE THEN. THE MUSEUM STARTED OUT WITH 111,626 SQ.FT. AND CONTINUES TO ADD SPACE AS ITS COMMUNITY GROWS. THE BUILDING STARTED WITH TWO EXHIBIT GALLERIES AND HAS GROWN TO ALMOST 10 GALLERY SPACES. (THE MANITOBA MUSEUM REDEFINES) THE MOST RECENT DESIGN WAS THE MASTER PLAN FOR THE MUSEUM, WHICH WILL ALLOW THE BUILDING TO HAVE 327,000 SQ. FT. OF SPACE. (WINNIPEG ARCHITECTURE FOUNDATION) THE SITE FOR THE MANITOBA MUSEUM IS NESTLED IN THE HEART OF WINNIPEG AND IS A COUPLE OF BLOCKS AWAY FROM THE RED RIVER OF THE NORTH. THE OWNERS OF THE BUILDING WANTED TO INCORPORATE OFFICES AND WORKSHOP AREAS IN THE BUILDING, ALONG WITH THE MUSEUM GALLERIES AND THEIR SUPPORT SPACES. (THE MANITOBA MUSEUM REDEFINES)



- IMAGE 4 | EXTERIOR -

THE MUSEUM IS INTERESTING TO ME BECAUSE OF ALL THE RENOVATIONS AND CHANGES THAT IT HAS GONE THROUGH OVER THE YEARS. THE BUILDING IS EVER CHANGING AND EVOLVING TO THE NEEDS OF THE GROWING COMMUNITY.

ONE OF THE MAIN ATTRACTIONS OF THE MUSEUM IS THE PLANETARIUM. THE PLANETARIUM WAS ONE OF THE FIRST IN CANADA TO HAVE THE DIGISTAR PROJECTION SYSTEM, WHICH WAS STATE-OF-THE-ART AT THE TIME. (EXPERIENCE) THE PLANETARIUM IS ABLE TO SEAT 278 PEOPLE ALLOWING A LARGE NUMBER OF VISITORS TO SEE THE SHOWS AT THE SAME TIME. I CAN REMEMBER AS A CHILD SEEING A SHOW IN THE PLANETARIUM AND I FOUND IT VERY INTERESTING. IT WAS A WHILE AGO THAT I VISITED THE MUSEUM AND IT HAS GONE THROUGH A COUPLE OF RENOVATIONS SINCE, BUT I REALLY ENJOYED THE MUSEUM. THAT IS WHAT SPARKED MY INTEREST IN SCIENCE AND THE ADVANCEMENTS OF THE TECHNOLOGY THAT IS USED IN OUR



- IMAGE 5 | PLANETARIUM -

EVERYDAY LIVES.

THE BUILDING IS NOT ONLY A MUSEUM BUT ALSO A RESEARCH FACILITY, WHICH IS USED TO ENHANCE THE MUSEUM'S EXHIBITS AND CREATES A SPACE FOR SCIENTIFIC ADVANCEMENTS. THE BUILDING WAS DESIGNED IN A WAY TO ALLOW FOR EXPANSIONS. AN EXAMPLE OF THIS IS THAT THE RESEARCH TOWER WAS BUILT TO WITHSTAND SIX ADDITIONAL FLOORS FOR EXTRA SPACE TO GROW. THE ARCHITECT WAS VERY SMART IN DESIGNING A SPACE THAT COULD BE ADDED TO IN THE FUTURE. THIS IS AN IMPORTANT ISSUE THAT NEEDS TO BE TAKEN INTO ACCOUNT WHEN DESIGNING A BUILDING. WITH THAT IN MIND THE BUILDING CAN CHANGE AND EVOLVE WITH THE NEEDS OF THE COMMUNITY. (WINNIPEG ARCHITECTURE FOUNDATION)



- IMAGE 6 | FUTURE DESIGN -



I HAVE BEEN IN CONTACT WITH THE MANITOBA MUSEUM,
AND THEY ARE GOING TO GET BACK TO ME ABOUT FLOOR
PLANS AND ELEVATIONS OF THE BUILDING, FOR MY FURTHER
EXPLORATION OF THE SPACES AND THEIR CONNECTIONS.

||||| - TYPOLOGICAL RESEARCH CONT. - |||||||

- SCIENCE MUSEUM OF MINNESOTA -

1999
SAINT PAUL, MN
ELLERBE BECKET

THE SCIENCE MUSEUM OF MINNESOTA IS EXACTLY THAT, A SCIENCE MUSEUM AND LEARNING CENTER. THE MUSEUM HAS OUTGROWN SEVERAL BUILDINGS IN ITS LIFETIME, AND THE RIVERFRONT LOCATION IS THE MOST RECENT BUILDING THAT THEY OCCUPY. THE BUILDING IS 370,000 SQ. FT. AND HAS THE ONLY CONVERTIBLE-DOME OMNITHEATER IN THE UNITED STATES. THE BUILDING IS APART OF A LARGER REDEVELOPMENT OF THE LAND AROUND THE MISSISSIPPI RIVER IN THE CITY. THE BUILDING IS SITUATED ON A SITE THAT IS ADJACENT TO A MAIN ROAD IN THE AREA, W KELLOGG BLVD. (MACK, L. 1999)

“A GOOD MUSEUM NEEDS TO OFFER SURPRISES, AS YOU MOVE THROUGH THE MUSEUM, THE INTERIOR SPACES, EXHIBITS AND RIVER VIEWS UNFOLD IN UNEXPECTED WAYS, MAKING YOU VISIT MORE EXCITING AND MEMORABLE. ”

(HOEKSTRA, J. 2000)

- ANDY CERS,
ELLERBE BECKET



- IMAGE 7 | RIVERFRONT -

THE MAIN THING THAT IS ASTONISHING TO ME IS THE SHEAR SIZE OF THIS MUSEUM, AND THE PROCESS THAT THE ARCHITECTS TOOK TO ACCOMPLISH THIS DESIGN. I FOUND IT VERY INTERESTING THAT THE OWNERS WANTED A BUILDING THAT WOULD SERVE THEIR NEEDS FOR THE FUTURE. THEY BASED THE DESIGN ON THAT NEED, RATHER THAN ABOUT THE DESIGN AND LOOK OF THE BUILDING ITSELF. (HOEKSTRA, J. 2000)

THIS MUSEUM IS LIKE A SMALL COMMUNITY, BECAUSE THERE ARE SO MANY DIFFERENT DISCIPLINES AND INTERESTS ALL LOCATED UNDER ONE ROOF. THE DESIGNERS STRATEGICALLY PLACED THE PARKING RAMP UNDER THE PUBLIC PLAZA, WHICH CREATES A PUBLIC MEETING SPACE, AND GREEN AREA NEXT TO THE MUSEUM. THIS HIDES THE PARKING RAMP FROM THE STREET LEVEL VIEW. ANOTHER THING THAT THEY DID WAS TO MAXIMIZE THE VIEWS TO THE RIVER. THE MISSISSIPPI RIVER WAS ONE OF THE MAIN ROUTES FOR TRANSPORTATION IN THE BEGINNING WHEN THE CITY WAS STILL GROWING. (HOEKSTRA, J. 2000)



- IMAGE 8 | MAIN STAIRWAY -

I ALSO THINK THAT INCORPORATING THE OUTDOOR ENVIRONMENT IN THE DESIGN OF THE MUSEUM IS IMPORTANT. THIS IS SOMETHING THAT CAN GET THE ATTENTION OF THE PEOPLE THAT ARE PASSING BY THE MUSEUM ON A DAILY BASIS. THE STATE-OF-THE-ART OMNITHEATER IS A THEATER THAT CAN CHANGE FROM AN IMAX THEATER, WHICH IS A 70 FT. BY 90 FT. FLAT SCREEN, TO A SPHERE FOR THE OMNI SHOWS, WHICH IS A 92 FT. DIAMETER SHELL THAT LOWERS LIKE A VISOR TO CREATE A ROUNDED SCREEN. (HOEKSTRA, J. 2000)

THIS BUILDING IS DESIGNED FOR THE HEAVY USE BY THE PUBLIC AND FOR THE PUBLIC. THAT IS THE MAIN THING THAT THE OWNERS AND ARCHITECTS WANTED TO ACCOMPLISH WHEN THEY DESIGNED THE BUILDING, AND I FEEL THAT THEY HAVE DONE A GREAT JOB OF CREATING SPACES THAT ARE INVITING AND PUBLIC ORIENTED FOR THE USE OF THE VISITORS.



- IMAGE 9 | EXHIBIT AREA -

I HAVE BEEN IN CONTACT WITH THE SCIENCE MUSEUM OF MINNESOTA, AND THEY ARE GOING TO GET BACK TO ME ABOUT FLOOR PLANS AND ELEVATIONS OF THE BUILDING, FOR MY FURTHER EXPLORATION OF THE SPACES AND THEIR CONNECTIONS.



- TYPOLOGICAL RESEARCH CONT. -

- TYPOLOGICAL SUMMARY -

THE STUDIES THAT I HAVE DONE ON THESE THREE BUILDINGS, HAVE MADE ME THINK ABOUT THE SPACES THAT I NEED TO INCORPORATE IN MY THESIS DESIGN. ONE OF THE MAIN SPACES IN EVERY SCIENCE MUSEUM IS A THEATER OR MOVIE SPACE. THE SCIENCE MUSEUM OF MINNESOTA HAS THE OMNITHEATER AND THE MANITOBA MUSEUM HAS THE PLANETARIUM. IN MY THESIS DESIGN ONE OF THE MAIN THINGS THAT WILL BE INCLUDED IN THE DESIGN WILL BE SOME TYPE OF THEATER OR PLANETARIUM; I PLAN TO INCLUDE A SIMILAR TYPE OF SPACE AS A FOCAL POINT OF MY DESIGN.

I CHOSE THE NATURAL HISTORY MUSEUM OF UTAH, BECAUSE THE BUILDING IS INTEGRATED INTO THE SITE REALLY WELL. THE WAY THE DIFFERENT LEVELS STEP BACK TO FOLLOW THE HILLS AND MOUNTAINS INTRIGUED ME. I ALSO LIKE THE ABSTRACT LOOK AND FEEL THAT THE

MAIN HALLWAY PORTRAYS, WHICH RESEMBLES A MOUNTAIN. MY SITE IS NOT LOCATED IN A REGION THAT HAS HILLS OR MOUNTAINS, BUT I WOULD LIKE TO DESIGN A BUILDING THAT IS IMBEDDED INTO THE ENVIRONMENT SIMILAR TO THAT OF THE UTAH MUSEUM.

I ALSO HAVE NOTICED THAT ALL OF THE MUSEUMS HAVE HAD SOME TYPE OF RESEARCH AREA FOR STUDENTS OR TEACHERS. THESE TYPES OF SPACES ALLOW VISITORS TO GET INVOLVED IN SCIENTIFIC EXPERIMENTS AND BECOME INSPIRED. THE PUBLIC CIRCULATION IN THE MUSEUMS IS A SPACE THAT IS REALLY IMPORTANT TO THE SUCCESS OF THE MUSEUM. I THINK THAT IF THE CIRCULATION SPACES ARE NOT COHESIVE AND FLOW WELL WITH IN THE BUILDING, THEN THE VISITORS WILL HAVE PROBLEMS FINDING THEIR WAY THROUGH THE BUILDING TO ALL OF THE EXHIBITS.

IN MANY COMMUNITY SPACES NATURAL LIGHT IS IMPORTANT TO MAKE PEOPLE FEEL COMFORTABLE, AND CREATE A WELCOMING ENVIRONMENT. USING NATURAL

LIGHT IS A GOOD WAY TO HELP LOWER THE ENERGY CONSUMPTION OF THE BUILDING. THE SUNLIGHT CAN NOT ONLY BE USED FOR LIGHTING BUT CAN ALSO BE USED TO HELP HEAT THE BUILDING IN THE WINTER TIME, AND COOL THE BUILDING IN THE SUMMER TIME. THE SCIENCE MUSEUM OF MINNESOTA USES NATURAL LIGHT IN THE PUBLIC SPACES, WHICH HELPS TO CREATE A WARM, WELCOMING SPACE THAT PEOPLE WANT TO INHABIT.

LOOKING AT THESE CASE STUDIES HAS HELPED ME TO BETTER UNDERSTAND THE COMMON SPACES THAT ARE FOUND WITHIN SCIENCE MUSEUMS. BY LOOKING AT THE FLOOR PLANS OF THESE BUILDINGS I WAS ABLE TO ANALYZE HOW THE SPACES ARE LAID OUT AND HOW THEY RELATE TO ONE ANOTHER. THIS REINFORCED THE IMPORTANCE OF SPATIAL ORGANIZATION, ESPECIALLY IN A BUILDING TARGETED TOWARDS THE PUBLIC.

||||| - MAJOR PROJECT ELEMENTS - |||||||

- EDUCATIONAL SPACES -

- EXHIBIT AREAS
- CLASSROOMS
- BREAKOUT AREAS
- OFFICES

- SHARED SPACES -

- FOOD / EATING AREA / CAFE
- THEATER SPACE
- GREEN SPACES
- OUTDOOR SPACES

- COMMUNITY SPACES -

- MEETING ROOMS
- OFFICES
- CLASSROOMS
- RESEARCH AREAS

- SUPPORT SPACES -

- PARKING
- LOADING DOCK
- EXHIBIT STORAGE
- CUSTODIAL / CLEANING AREA
- CIRCULATION SPACES
- MECHANICAL SPACES
- UTILITY SPACES



- OWNER -

THE MUSEUM WILL BE COMMUNITY OWNED, ALONG WITH THE CITY OF FARGO, AND THE PUBLIC SCHOOL DISTRICT.

- USERS -

THE PRIMARY USERS OF THE BUILDING CONSIST OF STUDENTS, TEACHERS, AND COMMUNITY, AS WELL AS SUPPORT STAFF THAT ALLOW THE FACILITY TO FUNCTION ON A DAILY BASIS. THE BULK OF THE SPACES ARE GOING TO BE USED BY THE GENERAL PUBLIC. ALL SPACES IN THE BUILDING ARE GOING TO BE USED BY AT LEAST ONE OF THE USER GROUPS, IF NOT ALL OF THE USER GROUPS.

- STUDENTS -

STUDENTS ARE A GROUP OF CHILDREN THAT CAN RANGE FROM AGES 2 TO 18. THESE STUDENTS WANT TO LEARN ABOUT HOW THE WORLD WORKS AND WANT TO DISCOVER

THE SCIENCE IN A VARIETY OF DIFFERENT THINGS AND WAYS. I WANT THEM TO HAVE ACCESS TO THE SPACES DURING THE DAYTIME OR ANY TIME FOR THAT MATTER. I WANT THEM TO BE ABLE TO COME AS A CLASS AND EXPLORE DURING THE SCHOOL HOURS. FOR THIS USER GROUP I ASSUME THAT THEY WILL BE ARRIVING BY BUS OR OTHER GROUP TRANSPORTATION, INCLUDING VANS. I WANT TO CREATE A SPACE THAT IS ACCOMMODATING TO THOSE WHO HAVE PROBLEMS MOVING AND GETTING AROUND IN PUBLIC SPACES. I WOULD LIKE TO HAVE ANYONE AND EVERYONE BE ABLE TO MOVE AND OCCUPY THE SPACES THAT I AM GOING TO DESIGN FOR THE SCIENCE MUESEUM.

- TEACHERS -

TEACHERS ARE A GROUP OF PEOPLE WHO EDUCATE A WIDE RANGE OF STUDENTS, AND WOULD VISIT THE MUSEUM FOR EDUCATIONAL PURPOSES. THESE TEACHERS WILL EXPLORE AND SHOW STUDENTS THE SCIENCE EXHIBITS WHICH ALLOW THEM TO LEARN ABOUT SCIENCE. THERE WILL BE DEDICATED SPACES FOR LEARNING, LIKE CLASSROOM SPACES AND

BREAKOUT AREAS FOR TEACHERS TO EDUCATE STUDENTS. I WOULD INVITE TEACHERS AND STUDENTS FROM AROUND THE AREA TO COME TO VISIT THE MUSEUM, NOT JUST ONE TIME BUT MULTIPLE TIMES AND INVITE THEIR FAMILIES AND FRIENDS ALSO. I THINK THAT THE MAIN TIME THE BUILDING WILL BE IN USE BY STUDENTS AND TEACHERS WILL BE DURING WEEKDAYS, BETWEEN 8AM - 5PM, AND THE WEEKENDS BETWEEN 8AM - 8PM.

- COMMUNITY -

COMMUNITY MEMBERS ARE A GROUP OF PEOPLE WHO LOVE TO LEARN AND LIKE TO CONTINUE LEARNING AFTER SCHOOL OR JUST FOR FUN. THERE WILL BE GATHERING SPACES FOR COMMUNITY EVENTS, MEETINGS, AND ALSO GENERAL SPACES FOR PEOPLE TO MEET AND RELAX WITH FAMILY AND FRIENDS. THE MAJORITY OF THIS USER GROUP WILL BE USING THIS SPACE MOSTLY ON THE WEEKENDS, AND DURING THE EVENINGS. DURING THE WEEKEND I WOULD EXPECT TO SEE THE MOST VISITORS TO THE MUSEUM.

- STAFF -

THE STAFF MEMBERS WILL USE THE BUILDING TO CREATE AN ENVIRONMENT FOR LEARNING. THEY WILL USE THE SPACES TO EDUCATE A WIDE VARIETY OF VISITORS AND GUESTS. THE STAFF WILL HAVE TO BE THERE DAILY AND WILL HAVE SECURED ACCESS TO THE ENTIRE BUILDING AND STORAGE SPACES. THE STAFF WILL BE SETTING UP THE EXHIBITS AND THE SPACES FOR GATHERING AND LEARNING.

- THE SITE -

- THE REGION -



- FIGURE 9 | REGION -

- THE CITY -



- FIGURE 10 | CITY -

- THE SITE



- FIGURE 11 | SITE -

THE SITE FOR MY PROJECT IS LOCATED IN FARGO, ND, ACROSS FROM THE RED RIVER VALLEY ZOO. I CHOSE THE CITY OF FARGO BECAUSE OF THE SIZE OF THE CITY AND THE FACT THAT THERE IS NOT A SCIENCE MUSEUM IN THE IMMEDIATE AREA. THE SITE THAT I DECIDED ON WAS IN A LOCATION WITH ACCESS TO 42ND AVE S, WHICH IS A MAIN ROADS IN FARGO. I ALSO CHOSE THE SITE BECAUSE OF THE LOCATION TO THE INTERSTATE INTERSECTIONS. THIS LOCATION CAN BE SEEN FROM BOTH INTERSTATES AND HAS THE OPPORTUNITY TO DRAW IN VISITORS FROM THE INTERSTATE. I WANTED TO DESIGN A MUSEUM BY THE ZOO IN FARGO, BECAUSE I THOUGHT THAT HAVING TWO MAIN ATTRACTIONS IN THE SAME AREA WOULD BRING GUESTS TO BOTH, AND REINVIGORATE THE AREA.



THE EMPHASIS FOR MY
 THESIS IS CREATING A SPACE THAT
 ENHANCES LEARNING AND CAN BE
 USED FOR EDUCATIONAL PURPOSES.
 THE SPACES THAT WILL BE DESIGNED
 WILL ALSO BE USED FOR COMMUNITY
 EVENTS AND GATHERINGS. THE
 BUILDING WILL BE USED FOR MORE
 THAN JUST A SCIENCE MUSEUM, BUT
 ALSO A GATHERING SPACE FOR THE
 COMMUNITY.



- THE ACADEMIC -

MY THESIS IS BASED ON SOMETHING THAT I FIND INTERESTING AND CHALLENGING. BEING THAT THIS IS MY FINAL PROJECT BEFORE GRADUATING WITH MY MASTERS OF ARCHITECTURE, I WANT TO SHOW WHAT I HAVE LEARNED THROUGHOUT MY YEARS AT SCHOOL. THIS IS THE FINAL DESIGN I WILL BE DOING IN SCHOOL AND WANT TO MAKE SURE IT IS A DESIGN THAT WILL MAKE ME PROUD. I WANT TO SHOW THE TEACHERS THAT HAVE TAKEN THEIR TIME TO HELP ME AND TEACH ME THE IMPORTANT LESSONS, THAT I WAS ACTUALLY LISTENING AND LEARNING.

- THE PROFESSIONAL -

ONE OF MY MAIN PROFESSIONAL GOALS IS TO GRADUATE WITH MY MASTERS AND BECOME A LICENSED ARCHITECT SHORTLY AFTERWARD. I WANT TO WORK AT A FIRM THAT

HAS A GREAT CONNECTION TO THE COMMUNITY THAT IT SERVES. IN COMPLETING MY THESIS I FEEL THAT I WILL BE BETTER EQUIPPED TO HELP DESIGN SPACES THAT WILL EDUCATE AND CREATE AN ENVIRONMENT FOR THE COMMUNITY. I WANT TO BE ABLE TO DESIGN A SPACE THAT WILL HELP STUDENTS OR, COMMUNITY MEMBERS FOR THAT MATTER, LEARN AND CONTINUE TO GROW AS A COMMUNITY.

- THE PERSONAL -

MY DRIVE FOR BUILDING AND DESIGN HAS BEEN INSTILLED IN ME EARLY ON IN LIFE. I WANT TO DESIGN SPACES THAT EFFECT THE COMMUNITY THAT THEY ARE DESIGNED FOR, BY CREATING A GATHERING SPACE FOR THAT COMMUNITY. I WANT TO BE ABLE TO DESIGN FOR FAMILIES AND CREATE SPACES THAT OTHERS WOULD LIKE TO INHABIT. MOST OF ALL I WOULD LIKE TO BECOME A LICENSED PROFESSIONAL AND DESIGN SPACES FOR THE REMAINDER OF MY CAREER IN THE DESIGN PROFESSION.



- A PLAN FOR PROCEEDING -

- RESEARCH DIRECTION -

I WILL BE CONDUCTING RESEARCH THROUGHOUT THE ENTIRETY OF THE DESIGN PROCESS THROUGH DIFFERENT RESEARCH TECHNIQUES. THE FIRST THING THAT I WILL BE RESEARCHING WILL BE HOW A SCIENCE MUSEUM IS ORGANIZED AND THE SPACES THAT ARE REQUIRED FOR AN EFFECTIVE SPATIAL LAYOUT. THE SPACES THAT ARE REQUIRED FOR A SCIENCE MUSEUM HAVE A LARGE IMPACT ON THE WAY THE BUILDING WILL LOOK AND HOW PEOPLE MOVE THROUGHOUT IT. I WILL ALSO BE LOOKING AT THE SITE AND THE CLIMATE OF THE REGION TO CREATE A DESIGN THAT RESPONDS TO THE CHANGE OF SEASONS AND THE NATURAL ENVIRONMENT.

- DESIGN METHODOLOGY -

THE MAIN METHOD THAT I WILL BE USING WILL BE A MIXED METHOD APPROACH. THIS APPROACH WILL USE THE ANALYSIS OF QUANTITATIVE AND QUALITATIVE RESEARCH. THIS WILL INCLUDE THE STANDARD RESEARCH AND GRAPHIC ANALYSIS OF OTHER SUCCESSFUL SCIENCE MUSEUMS. I WILL ALSO BE IN CONTACT WITH THE SCIENCE MUSEUM OF MINNESOTA AND THE THE MANITOBA MUSEUM TO GET THEIR OPINIONS ON THE BUILDINGS THEY WORK IN AND THE THINGS THAT WORK WELL AND THE THINGS THAT NEED TO BE RECONFIGURED TO WORK BETTER. WITH THIS INFORMATION I WILL BE ABLE TO DESIGN A LEARNING FACILITY THAT CAN INFLUENCE THE LEARNING, AND TEACHING OF VISITORS.

- DESIGN PROCESS DOCUMENTATION -

THE DOCUMENTATION OF MY DESIGN PROCESS WILL BE DONE THROUGHOUT THE ENTIRE YEAR. IT WILL BE DISPLAYED IN MY THESIS BOOK TO SHOW THE STEPS THAT WERE TAKEN THROUGH THE DESIGN OF MY THESIS PROJECT. IN MY FINAL DISPLAY I WILL SHOW THE STEPS THAT WERE TAKEN TO CREATE MY FINAL DESIGN PROPOSAL. MY FINAL DISPLAY WILL CONSIST OF A SITE MODEL SHOWING THE SURROUNDING ROADS AND BUILDINGS. THERE WILL ALSO BE A LARGER SCALE SECTION MODEL TO SHOW SOME OF THE MAIN AREAS IN THE BUILDING. MY BOARDS WILL SHOW A VARIETY OF DIFFERENT VIEWS AND IDEAS THAT WILL BE INCLUDED IN THE DESIGN. THESE VIEWS WILL CONSIST OF EXTERIOR AND INTERIOR PERSPECTIVES, SECTIONS, ELEVATIONS, FLOOR PLANS, AND DETAILS. ONE OF THE MAIN PERSPECTIVES IS GOING TO BE A WINTER SCENE BECAUSE OF THE NORTHERN ENVIRONMENT AND THE FACT THAT IT IS COLD AND COVERED IN SNOW FOR ATLEAST HALF OF THE YEAR.

- PROJECT SCHEDULE -

	- TASK -	- WORK DAYS -
PROJECT DOCUMENTATION		88 DAYS
CONTEXT ANALYSIS		10 DAYS
CONCEPTUAL ANALYSIS		15 DAYS
ECS PASSIVE ANALYSIS		10 DAYS
ECS ACTIVE ANALYSIS		10 DAYS
STRUCTURAL DEVELOPMENT		10 DAYS
FLOOR PLAN DEVELOPMENT		20 DAYS
ENVELOPE DEVELOPMENT		15 DAYS
MATERIALS SELECTION		15 DAYS
SECTION EXPLORATION		20 DAYS
	MIDTERM REVIEWS	4 DAYS - MAR 9-13
	PROJECT REVISIONS	10 DAYS
	GRAPHIC RENDERING	20 DAYS
	PRESENTATION LAYOUT	5 DAYS
	MODEL CONSTRUCTION	10 DAYS
	PRESENTATION PREPARATION	7 DAYS
	CD OF BOARDS TO ADVISOR	1 DAY - APR 23
	PRINTING OF BOARDS	2 DAYS
	INSTALLATION OF EXHIBIT	1 DAY - APR 27
	REVIEW OF THESIS	7 DAYS - APR 30 TO MAY 7
	FINAL DOCUMENTATION	5 DAYS - MAY 11
	COMMENCEMENT	1 DAY - MAY 16

||||| - PROGRAMMING - |||||

|||||

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THE GOAL OF MY THESIS PROJECT IS TO EXPLORE AND EXAMINE THE INFLUENCES OF LEARNING AND TEACHING IN THE SPACES WHERE THEY TAKE PLACE. THE MAIN IDEA IS TO FIND WHAT THE MOST EFFECTIVE BUILDING TO LEARN AND TEACH IN IS, OR WHAT TYPE OF SPACES CAN CREATE AN EFFECTIVE LEARNING ENVIRONMENT. I FEEL THAT SPACES HAVE A GREAT INFLUENCE ON HOW PEOPLE LEARN. A SECONDARY GOAL OF MY PROJECT IS TO DESIGN A GREEN SPACE FOR THE COMMUNITY TO VISIT AND STAY; SOMEPLACE THAT DRAWS IN THE PUBLIC AND CREATES A FUN SPACE FOR FAMILIES TO BRING THEIR CHILDREN.

- LEARNING SPACE -

THE END PRODUCT OF MY THESIS IS GOING TO BE A SPACE THAT CAN ENHANCE LEARNING IN THE SCIENTIFIC FIELD. STUDENTS SEEM TO NOT BE EXCITED ABOUT SCIENCE, BECAUSE OF THE WAY THAT THE TEACHERS TEACH THE

SUBJECT. (HOLMES, J. 2011) THIS INFORMATION RAISES QUESTIONS ABOUT HOW TEACHERS CAN EFFECTIVELY TEACH SCIENCE, AND THE ENVIRONMENT NEEDED TO HELP MOTIVATE KIDS TO WANT TO LEARN. (HOLMES, J. 2011) TO GET CHILDREN MOTIVATED ABOUT LEARNING ABOUT SCIENCE THERE HAS TO BE A CONNECTION WITH EVERYDAY LIFE AND REAL WORLD EXPERIENCES. IN THE ARTICLE “INFORMAL LEARNING: STUDENT ACHIEVEMENT AND MOTIVATION IN SCIENCE THROUGH MUSEUM-BASED LEARNING,” THEY EXPLORED AND TESTED SEVEN HYPOTHESES ABOUT THE VARIOUS MOTIVATIONAL AND ACHIEVEMENT ASPECTS THAT ARE INFLUENCED BY MUSEUM-BASED LEARNING. (HOLMES, J. 2011)

- HYPOTHESIS 1 -

THE FIRST HYPOTHESIS STATED THAT THERE WOULD BE A SIGNIFICANT DIFFERENCE IN THE MOTIVATION LEVELS BETWEEN STUDENTS WHO EXPERIENCED MUSEUM-BASED LEARNING AND THOSE THAT DID NOT. THEY FOUND THAT THE STUDY WAS NOT COLLABORATING CLAIMS IN THE

LITERATURE. THE QUIZ THE STUDENTS WERE TAKING WAS ASKING THE WRONG QUESTIONS. THE QUESTIONS WERE ASKING ABOUT SCHOOL-BASED ASPECTS OF SCIENCE; ABOUT HOMEWORK AND HOW THEY FELT ABOUT DOING CHALLENGING PROBLEMS IN SCIENCE. THERE WAS NO QUESTIONS ABOUT THE STUDENTS MOTIVATION TOWARDS SCIENCE OR THE EXHIBITS IN THE MUSEUM. THE DATA DID SHOW THAT A LOT OF THE STUDENTS WERE ALREADY HIGHLY MOTIVATED TOWARDS SCIENCE AT THE BEGINNING OF THIS STUDY. (HOLMES, J. 2011) THIS HYPOTHESIS IS NOT GOING TO INFLUENCE MY DESIGN GREATLY BUT I FELT THAT IT IS IMPORTANT TO INCORPORATE ALL OF THE FINDINGS IN THIS STUDY BECAUSE THEY ALL INFLUENCE THE OTHERS AND AFTER ONE STUDY IS COMPLETED THE FOLLOWING ONE HAS A DIFFERENT ASPECT OR QUESTION AS IT EVOLVES THROUGHOUT THE STUDY.

- HYPOTHESIS 2 -

THE SECOND HYPOTHESIS IS LOOKING AT THE SCIENTIFIC ACHIEVEMENT BETWEEN THE STUDENTS

WHO EXPERIENCED THE MUSEUM-BASED LEARNING AND THOSE THAT DID NOT. THE THOUGHT BEHIND THIS HYPOTHESIS IS TO SEE WHETHER A CHANGE IN THE LEARNING ENVIRONMENT WOULD HELP IMPROVE THEIR ACHIEVEMENTS IN SCIENCE. AGAIN THE RESEARCHERS FOUND THAT THERE COULD BE A PROBLEM IN THE WAY THIS WAS TESTED. THEY FORGOT TO TAKE INTO ACCOUNT THAT SOME OF THE STUDENTS MAY HAVE VISITED THE MUSEUM BEFORE AND MAY HAVE PRECONCEIVED NOTIONS ABOUT THE EXHIBITS IN THE SCIENCE MUSEUM. (HOLMES, J. 2011) THIS SHOWS THAT TO INFLUENCE THE STUDENTS ACHIEVEMENT IN SCIENCE, THEY HAVE TO VISIT THE MUSEUM MORE THAN ONCE. THIS MEANS THAT TO CREATE AN EFFECTIVE SPACE YOU HAVE TO DRAW PEOPLE IN MORE THAN ONCE FOR AN EFFECTIVE LEARNING EXPERIENCE.

- HYPOTHESIS 3 -

THIS HYPOTHESIS IS STATING THAT THERE IS A CONNECTION BETWEEN THE RELATIONSHIP OF THE STUDENT'S INTRINSIC MOTIVATION AND THE QUALITY OF

LEARNING TO THE TYPE OF LEARNING THEY TOOK PART IN. THE STUDY FOUND THE DIFFERENT LEARNING GROUPS DID NOT HAVE THE SAME EFFECT. IN THIS TEST THE MUSEUM DID PLAY A ROLE IN THE MOTIVATIONAL AND ACHIEVEMENT IN SCIENCE. THIS HAS SHOWN THAT A SCIENCE MUSEUM CAN EFFECT THE WAY CHILDREN LEARN IN CERTAIN ENVIRONMENTS. WITH THIS INFORMATION I KNOW THAT A SCIENCE MUSEUM CAN ENHANCE THE LEARNING CAPABILITIES OF STUDENTS.

- HYPOTHESIS 4 -

FOR THIS HYPOTHESIS THE RESEARCHERS TESTED THE LEVEL OF INTRINSIC MOTIVATION TOWARDS SCIENCE BASED ON THE TYPE OF LEARNING ENVIRONMENT THE STUDENTS WERE TAUGHT IN. DURING THIS ANALYSIS THE RESEARCHERS FOUND THAT THE STUDENTS ENJOYED THE MUSEUM MORE AND WAS PREFERRED OVER THE CLASSROOM LESSON. THE ENTHUSIASM OF THE MUSEUM WORKER ALSO WAS THOUGHT TO HAVE AN IMPACT ON THE STUDENTS MOTIVATION TOWARDS SCIENCE. (HOLMES, J. 2011) THIS

GETS ME TO THINKING ABOUT THE WORKERS THAT ARE NEEDED FOR THE MUSEUM AND THE INTERACTIONS THAT THEY HAVE TO HAVE WITH EVERYONE WHO ENTERS THE MUSEUM SPACES. THE INTERACTIONS WITH THE WORKERS ARE VERY IMPORTANT AND NEED TO BE THOUGHT OF AS PART OF THE MUSEUM EXPERIENCE. THE BUILDING ALSO HAS TO CREATE AN ENVIRONMENT THAT GIVES THE WORKERS THE BEST CHANCE TO TEACH AND EDUCATE ANYONE WHO ENTERS THE BUILDING. THIS CREATES THE ONE OF THE ITEMS THAT NEEDS TO BE INCLUDED IN THE DESIGN OF THE SCIENCE MUSEUM.

- HYPOTHESIS 5 -

THIS HYPOTHESIS IS RELATED TO THE FOURTH ONE BY STATING THAT THE LEVELS THE STUDENTS REACHED WITH THEIR SCIENTIFIC THINKING WAS GREATLY INFLUENCED BY THE TYPE OF TREATMENT OR WHERE THEY WERE TAUGHT. THIS MEANS THAT THE QUESTION-BASED LEARNING OR MUSEUM-BASED LEARNING CAN BE AN EFFECTIVE LEARNING METHOD AND CAN ALSO LEAD

TO IMPROVE THE STUDENTS ACHIEVEMENT. THIS MAY BE BECAUSE OF THE HANDS ON LEARNING THAT THE STUDENTS HAD TAKEN PART OF, IN THE SCIENCE MUSEUM. THE OTHER GROUPS TESTED DID NOT SHOW ANY SIGNIFICANCE SCIENCE ACHIEVEMENTS. (HOLMES, J. 2011) WITH THIS KNOWLEDGE I KNOW THAT TO CREATE AN ENVIRONMENT THAT IS EFFECTIVE IN TEACHING ABOUT SCIENCE THERE HAS TO BE SOME TYPE OF HANDS ON EXPERIENCE. WITH DOING THIS THE POSSIBILITY OF SCIENCE ACHIEVEMENTS IS GREATER AND WILL CREATE AN ENVIRONMENT THAT HELPS STUDENTS TO LEARN.

- HYPOTHESIS 6 & 7 -

THESE LAST TWO HYPOTHESES INCLUDE THE THOUGHT THAT LONG-TERM EFFECTS ARE GREATER IN MUSEUM-BASED LEARNING AND ACHIEVEMENTS IN SCIENCE. THE RESEARCHERS FOUND THAT TAKING PART OF INQUIRY-BASED LEARNING LEADS TO MORE POSITIVE ATTITUDES TOWARDS SCIENCE AND CAREERS FOR LONG TERM AFTER THE PARTICIPATION IN THE LEARNING

EXPERIENCE. THE DATA SHOWS THAT THERE WAS AN INCREASE PARTICIPATION IN SCIENCE BECAUSE OF THE HANDS ON ASPECT THE PROGRAM AND SHOWN. (HOLMES, J. 2011) THIS RESEARCH HAS SHOWN THAT TEACHING SCIENCE THROUGH HANDS ON EXHIBITS INCREASES THE ACHIEVEMENTS IN SCIENCE FOR STUDENTS LONG TERM. A MUSEUM CAN BE A SPACE THAT IS USED FOR ADDITIONAL LEARNING SPACES AND CAN BE CONSIDERED AS INFORMAL CLASSROOMS. AS I STATED BEFORE ONE VISIT DID NOT HAVE A GREAT IMPACT ON THE ACHIEVEMENT OF MUSEUM-BASED LEARNING, THERE HAS TO BE MULTIPLE VISITS IN ORDER TO HAVE AN EFFECTIVE LEARNING EXPERIENCE.

- SPACIAL LEARNING -

IN THIS SECTION I WILL BE EXPLORING HOW GALLERY SPACES CAN ENHANCE THE LEARNING EXPERIENCE, AND THE DIFFERENT WAYS GALLERIES WORK TO CREATE A LEARNING ENVIRONMENT.

FIRST, TO UNDERSTAND HOW TO DESIGN A SCIENCE MUSEUM, WE HAVE TO FIRST KNOW WHAT IS A SCIENCE

MUSEUM? THE MAIN PART OF A MUSEUM IS THE GALLERY SPACES. THESE SPACES ARE NOT ONLY SUPPOSED TO ATTRACT A LARGE NUMBER OF VISITORS, BUT ALSO CREATE AN EXCITING LEARNING SPACE THAT EDUCATES VISITORS ABOUT THE ROLES OF SCIENCE IN THEIR EVERYDAY LIVES. THERE ARE A VARIETY OF DIFFERENT ISSUES THAT CAN BE USED TO INFORM VISITORS ABOUT SCIENCE; THEY INCLUDE GLOBAL WARMING, DEFORESTATION, DEVELOPMENT OF NUCLEAR POWER, AND ENDANGERED SPECIES RESCUING, BUT THERE ARE MANY MORE TOPICS THAT CAN BE COVERED AS WELL. (SCHAUBLE, L., BARTLETT, K. 1997) WITH AN IDEA OF WHAT A SCIENCE GALLERY DOES, NOW WE CAN LOOK AT HOW THE SPACES ARE DESIGNED.

THERE ARE ALSO A VARIETY OF DIFFERENT APPROACHES TO DESIGNING A GALLERY SPACE. ONE IS A “FUNNEL APPROACH” WHICH HAS A WIDE VARIETY OF EXHIBITS NEAR THE ENTRANCE OF THE MUSEUM TO TRY AND FUNNEL GUESTS INTO A CERTAIN AREA. THIS ALLOWS THE VISITORS TO DECIDE WHETHER THEY WANT TO GO DEEPER INTO THAT TOPIC AND SPEND MORE TIME

IN THAT CERTAIN PART OF THE GALLERY, OR TO MOVE ON TO ANOTHER TOPIC. THESE IDEAS ARE CONSIDERED TO BE THE BIG IDEAS IN THE SCIENCE MUSEUM. THESE IDEAS OR THEMES IN SCIENCE ARE DESCRIBED IN A WAY THAT A CHILD COULD RELATE TO THEM. THE MAIN ORGANIZING THEMES ARE CHANGE AND MOTION, STRUCTURE AND FUNCTION, AND INTERACTIONS.

ANOTHER THING TO KEEP IN MIND IS TO CONNECT A VARIETY OF DIFFERENT EXHIBITS TO EACH OTHER. THIS CAN RELATE THE TOPICS AND CREATE A BETTER UNDERSTANDING OF THE TOPIC IN QUESTION. WHEN THE EXHIBIT TOPICS ARE CHOSEN ONE THING TO KEEP IN MIND IS TO RELATE THEM TO A REAL LIFE SITUATION. SOME EXAMPLES OF THIS WOULD BE THE CONSTRUCTION SITE, THE CREEK, THE WATERSHED TABLE, AND THE FOSSIL DIG. THESE NAMES ARE EASY FOR CHILDREN TO UNDERSTAND BY RELATING THEM TO EVERYDAY LIFE. IF YOU SAW A SIGN THAT SAID PHYSICAL SCIENCES VERSUS THE CREEK OR THE FOSSIL DIG ODDS ARE YOU WILL GO SEE THE CREEK OR THE FOSSIL DIG INSTEAD OF THE PHYSICAL SCIENCE SECTION.

THESE NAMES ARE MORE RELATABLE TO REAL LIFE RATHER THAN PHYSICS OR BIOLOGY OR A TERM OF SIMILAR IDEAS. THESE TERMS MAKE KIDS THINK THAT THERE IS GOING TO BE TERMS THAT ARE CONFUSING AND ARE NOT GOING TO RELATE TO THEIR EVERYDAY LIFE. THIS MAY CREATE SOME CONFUSION ABOUT WHAT WILL BE SHOWN IN THE SPACES, ESPECIALLY FOR CHILDREN.

SPACES THAT CREATE AN ENVIRONMENT FOR PLAYING CAN HELP EDUCATE CHILDREN AND CREATE BETTER CONNECTIONS FOR LEARNING ABOUT SCIENCE. ONE SPACE THAT SHOULD BE INCORPORATED INTO A SCIENCE MUSEUM IS SPACE FOR MEDITATION. THIS SPACE CAN CREATE A SPACE THAT THE MUSEUM STAFF CAN EXPLAIN THE EXHIBITS AND ALLOW MEETING AREAS FOR THE STUDENTS AND VISITORS. THESE MEDITATION SPACES CAN BE INTEGRATED INTO THE GALLERY SPACES AND CIRCULATION AREAS TO ALLOW A SPACE FOR THE VISITORS TO STOP AND RELAX IN THE MUSEUM.

THE BUILDING CAN SHOW VISITORS A VARIETY OF DIFFERENT THINGS. ONE OF THESE EDUCATIONAL POINTS

IS HOW BUILDINGS USE ENERGY AND THE DIFFERENT ADVANCEMENTS AND TECHNOLOGIES THAT ARE BEING INTEGRATED INTO BUILDINGS TO HELP LOWER THE ENERGY CONSUMPTION. THIS POINT HAS A VARIETY OF DIFFERENT SUB-TOPICS THAT ALL HAVE AN IMPACT ON THE ENERGY CONSUMPTION OF A BUILDING. THE MAIN ITEMS THAT CAN BE SHOWN IN A BUILDING ARE LIGHTING OR ENERGY USE/ CREATION, HEATING AND COOLING, WATER USE AND RE-USE, RECYCLABLE MATERIAL USAGE, ECT.

ENERGY USE IN BUILDINGS CAN ACCOUNT FOR THE MAJORITY COST OF A BUILDING, SO IN TERMS OF DESIGNING A BUILDING THAT REDUCES THAT COST, WILL ULTIMATELY LOWER THE OPERATING COST OF THE BUILDING. THERE ARE WAYS TO SHOW THIS OFF TO POTENTIAL VISITORS, SOME IDEAS ARE GAGES THAT SHOW THEM THE USAGE OF THE BUILDING AND THE POWER THAT THE BUILDING IS PRODUCING. THERE CAN ALSO BE AN EXHIBIT ABOUT SOLAR PANELS AND HOW THEY WORK BY CONVERTING SOLAR ENERGY TO ELECTRICAL ENERGY. A WAY TO LIGHT THE BUILDING IS REALLY EASY DURING THE DAYTIME BY

USING THE SUNLIGHT TO LIGHT THE BUILDING. DURING THE EVENINGS THOUGH THAT CAN BE MORE CHALLENGING. LIGHTS THAT ARE MADE OF LED'S USE SIGNIFICANTLY LESS ENERGY TO RUN AND LAST LONGER THAN A TYPICAL LIGHT BULB.

THERE ARE WAYS TO HEAT AND COOL A BUILDING THAT USE LITTLE TO NO ENERGY. THE MAIN SOURCE OF HEAT FOR A BUILDING IN THE NORTH IS SOLAR ENERGY. THERE IS A VARIETY OF DIFFERENT WAYS TO CAPTURE THE ENERGY FROM THE SUN INCLUDING HEAT SINKS THAT STORE THE HEAT IN A MASSIVE ITEM LIKE A CONCRETE FLOOR OR IN A LIQUID LIKE MATERIAL. NATURAL COOLING USES THE SOLAR POWER TO CREATE A UPLIFT OF THE WARM AIR AND ALLOWING THE COOL AIR AT THE BASE OF THE WALL TO ENTER THE BUILDING.

USING WATER IN THE BUILDING IS SOMETHING THAT WILL NEED TO BE THOUGHT ABOUT ALSO. THE FIRST QUESTION IS HOW MUCH WATER DO WE WANT TO REUSE, AND THE WAY WE WANT TO CLEAN THAT WATER. THE WATER CAN BE CLEANSED BY USING PLANTS AND A SERIES

OF CHAMBERS, THIS PROCESS IS KNOWN AS THE LIVING MACHINE. THIS PROCESS IS GOING TO BE ABLE TO BE SHOWN TO THE PUBLIC AND ALLOW VISITORS TO SEE AND FEEL THE PLANTS THAT ARE USED FOR THE PROCESS. THIS COULD BE AN INTERACTIVE SPACE THAT SHOW EACH STEP AND THE REASONS FOR THEM.

THIS PROJECT IS IMPORTANT TO ME BECAUSE I FEEL THAT SCIENCE HAS A GREAT IMPACT ON THE FUTURE OF THE WORLD. SCIENCE IS CONTINUING TO EVOLVE AND CHANGE WITH NEW THEORIES AND TECHNOLOGIES BEING DEVELOPED. SCIENCE AND TECHNOLOGY WORK HAND IN HAND AND ARE THE TWO MAIN FACTORS IN THE EVOLUTION OF THIS FIELD. I THINK THAT TEACHING SCIENCE TO THE YOUNGER GENERATION WILL CREATE A STRONG FOUNDATION FOR THEM TO BUILD ON AND ALLOW THE SCIENTIFIC FIELD TO CONTINUE EVOLVING AND CHANGING FOR THE GOOD.

AS SCIENCE EVOLVES SO ARE THE TECHNOLOGIES THAT ARE USED IN THE ADVANCEMENTS OF THE FIELD. THESE SAME ADVANCEMENTS CAN BE USED IN BUILDING DESIGN, CONSTRUCTION, USE, AND MAINTENANCE. SCIENCE AND TECHNOLOGY IS BECOMING MORE APART OF THE EVERYDAY LIFE FOR THE AVERAGE PERSON. JUST TAKE A LOOK AT THE ADVANCEMENTS OF THE CELL PHONE AND

HOW AVAILABLE THEY ARE NOW, ALMOST EVERYONE HAS A CELL PHONE. THIS NEW MOVE TOWARD THE “SMART BUILDING” IS GOING TO BE ONE THAT ALLOWS THE BUILDING TO EVOLVE AND CHANGE DEPENDING ON THE SURROUNDING ENVIRONMENT, AND THE USERS COMFORT LEVEL.

BUILDINGS ARE GOING TO CONTINUE TO EVOLVE AND CHANGE WITH THE TECHNOLOGIES THAT SUPPORT AND RUN THEM. THIS GIVES US, AS DESIGNERS, THE OPPORTUNITY TO CREATE SPACES THAT ENHANCE THE LIFE OF THE OCCUPANTS AND THE USERS.

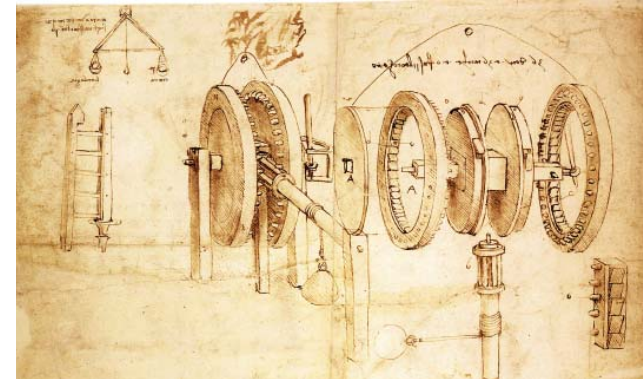
THIS PROJECT WILL ALLOW ME TO EXPLORE AND DESIGN A BUILDING THAT WILL SET A STANDARD FOR THE NEW ERA OF BUILDING DESIGN, “SMART BUILDINGS.” THEY ARE THE BUILDINGS OF THE FUTURE, WHICH WILL ALLOW ME TO DESIGN A BUILDING THAT HAS NEW FEATURES AND TECHNOLOGIES THAT WILL BECOME A STANDARD FOR DESIGN.

- HISTORICAL, SOCIAL, AND CULTURAL CONTEXT -

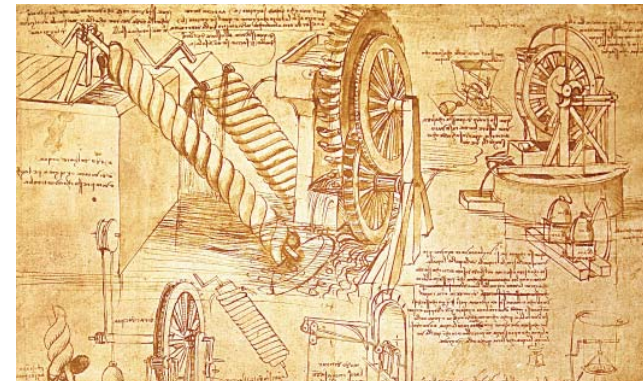
THE HISTORY OF SCIENCE IS ROOTED DEEPLY IN THE CURIOSITY OF THE SCIENTISTS THAT FOUNDED IT, AND THE SCIENTISTS THAT ARE TODAY PUSHING THE LIMITS OF THE FIELD. THESE TYPES OF PEOPLE ARE THE ONES THAT ARE CREATING, EXPLORING, NOT JUST EARTH BUT IN THE SOLAR SYSTEM AND OTHER GALAXIES. THESE DISCOVERIES ARE CHANGING EVERYDAY LIFE FOR PEOPLE ON THE PLANET.

SCIENCE IS EVOLVING AT AN EXPONENTIAL RATE AND WILL CONTINUE TO CHANGE AND EVOLVE. THIS CREATES AN EXCITING TIME WHERE ANYTHING CAN AND WILL BE POSSIBLE IN THE NEAR FUTURE. IN THIS CONTEXT THE WORLD WILL BE CHANGED BY THE ADVANCEMENT OF TECHNOLOGY AND KNOWLEDGE. IN MY OPINION KNOWLEDGE IS POWER.

IN SOCIETY TODAY TECHNOLOGY RULES. EVERYTHING WE DO IN OUR EVERYDAY LIVES HAS A PART OF TECHNOLOGY IN IT, OR RELIES ON IT IN SOME WAY. JUST THINK ABOUT YOUR AVERAGE DAY. WHAT IS THE FIRST THING YOU DO IN THE MORNINGS? ONE OF THE FIRST THINGS THAT I DO IS TURN ON THE LIGHTS. JUST DOING

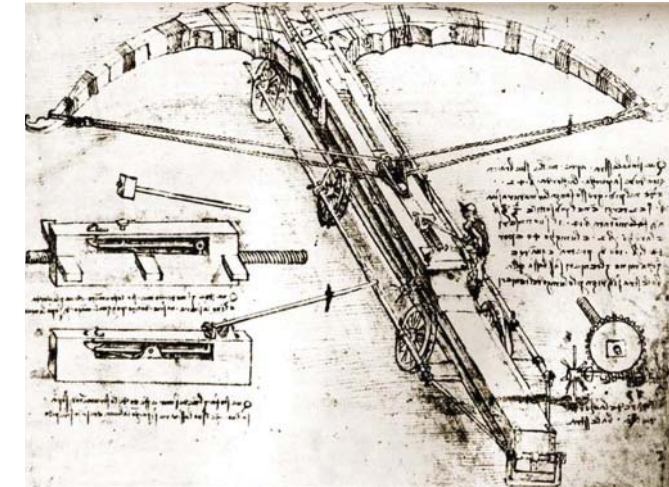


- IMAGE 10 | DA VINCI'S MACHINE 1 -



- IMAGE 11 | DA VINCI'S MACHINE 2 -

THAT YOU HAVE ALREADY BEEN IMPACTED BY SCIENCE AND TECHNOLOGY. LOOKING INTO THE FUTURE OF THE WORLD AND THE TECHNOLOGY THAT WILL BE, I FEEL THAT TECHNOLOGY WILL HAVE AN EVEN MORE GREATER HOLD ON US AS A SOCIETY. RIGHT NOW AS I SIT HERE I HAVE MORE TECHNOLOGY AT MY FINGERTIPS THAN A PERSON DID 10 OR EVEN 5 YEARS AGO. THIS ADVANCEMENT IN TECHNOLOGY IS NOT GOING TO SLOW DOWN AND WILL CONTINUE TO CREATE AND MAKE EVERYDAY LIFE "EASIER."



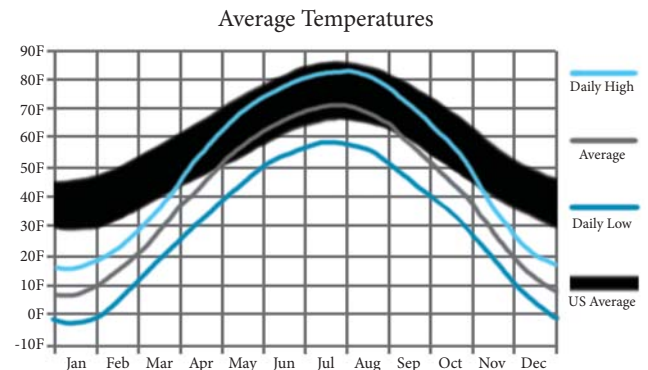
- IMAGE 12 | DA VINCI'S MACHINE 3 -

- SITE ANALYSIS -

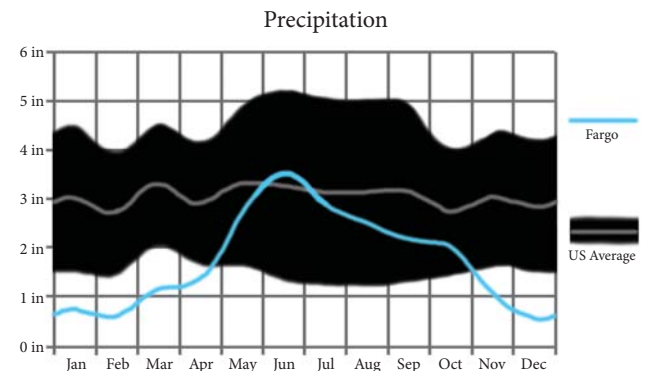
- THE SOLID OBJECTS -

THE SITE THAT MY THESIS PROJECT IS LOCATED ON IS LOCATED ON THE CORNER OF 42ND ST S AND 23RD AVE S IN FARGO, ND. THE SITE IS CURRENTLY AN EMPTY FIELD AND IS LOCATED TO THE EAST OF THE RED RIVER VALLEY ZOO. THE SITE IS LOCATED NEXT TO A CROSSROADS IN THE CITY. THIS CROSSROAD IS WHERE TWO MAIN INTERSTATES CROSS; INTERSTATE 94 AND INTERSTATE 29.

ONE OF THE MOST IMPORTANT THINGS TO KNOW ABOUT THE REGION IS THE CLIMATE. THE CLIMATE HAS A GREAT INFLUENCE ON THE DESIGN OF THE BUILDINGS IN THE AREA. IN THE SUMMER THE AVERAGE TEMPERATURE IS 83 DEGREES F, AND THE AVERAGE TEMP IN THE WINTER IS 0 DEGREES F. THE RECORDED HIGH TEMPERATURE WAS 106 DEGREES F AND THE LOW TEMPERATURE WAS -48 DEGREES F. WITH THIS WIDE OF A TEMPERATURE RANGE THE BUILDING HAS TO BE ABLE TO KEEP THE HEAT OUT AND THE COOL IN DURING THE SUMMER AND THE COLD OUT AND HEAT IN DURING THE WINTER. NOT ONLY DOES



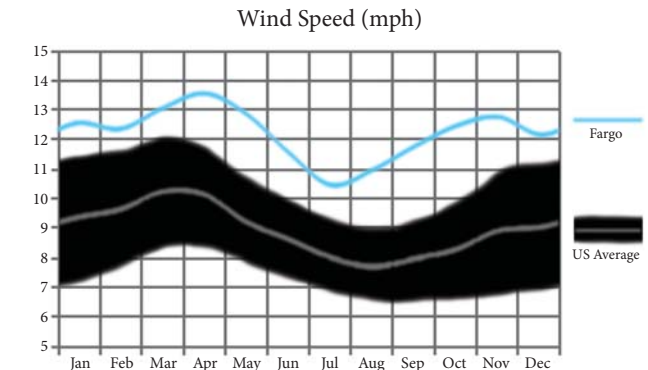
- FIGURE 12 | AVERAGE TEMPERATURES -



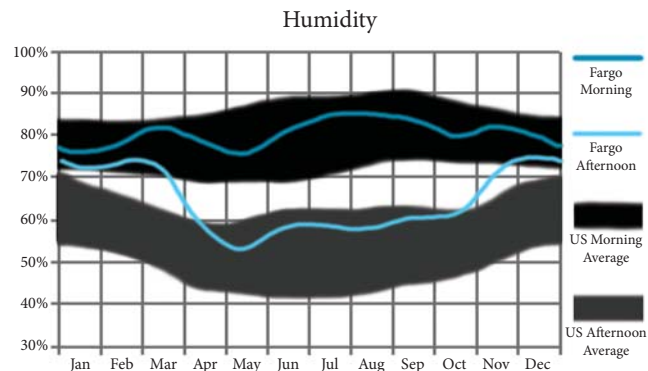
- FIGURE 13 | PRECIPITATION -

THE TEMPERATURE IMPACT THE DESIGN THE WIND, PRECIPITATION, AND SUN HAVE AN IMPORTANT ROLE ALSO.

THE SOIL ON THE SITE IS CALLED VERTISOLS, WHICH MEANS THAT THE SOIL IS COMPOSED OF CLAY. VERTISOLS ARE SOILS THAT SHRINK AND SWELL WITH THE CHANGES IN THE SOIL MOISTURE. THIS CAN CAUSE PROBLEMS WHEN CONSTRUCTING A BUILDING, BECAUSE THE SOIL WILL SHRINK AND CRACK IN DRY ENVIRONMENTS AND SWELL IN MOIST ENVIRONMENTS. THIS CREATES PROBLEMS WHEN TRYING TO ENGINEER THE FOOTINGS FOR A BUILDING. WHEN DESIGNING MY THESIS I AM GOING TO TAKE THAT INFORMATION INTO CONSIDERATION FOR THE FOOTING AND FOUNDATION DESIGN.



- FIGURE 14 | WIND SPEED -

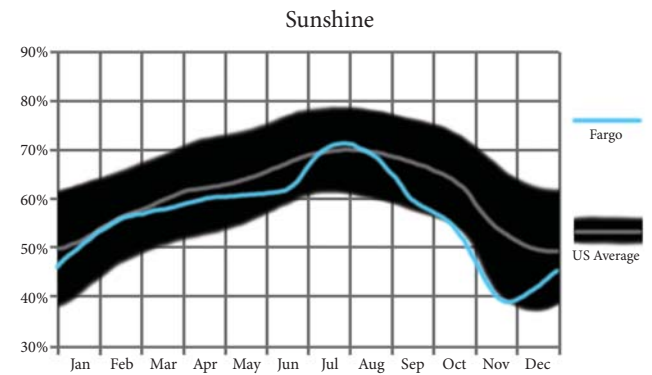


- FIGURE 15 | HUMIDITY -

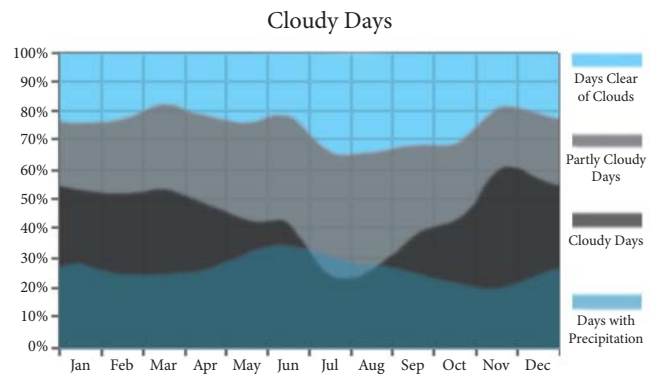
- CONSTANTLY CHANGING -

SOME THINGS THAT ARE CONSTANTLY CHANGING CAN ALSO HAVE AN IMPACT ON THE DESIGN. THE MAIN TOPICS THAT I AM GOING TO LOOK AT ARE THE TRAFFIC PATTERNS ON THE SURROUNDING ROADS, BOTH PEDESTRIAN AND VEHICLE PATTERNS, AND ALSO THE DIFFERENT PLANTS AND ANIMALS THAT ARE FOUND IN THE AREA.

THE TRAFFIC IN THE AREA CAN BE RATHER BUSY AT TIMES AND IS MOSTLY STEADY THROUGHOUT THE DAY. THE MAIN ROADS ARE THE INTERSTATES THAT ARE ON THE NORTH AND EAST SIDES OF THE SITE. SINCE THERE IS NO RAMPS COMING OFF OF THE INTERSTATE NEARBY, THE INTERSTATE TRAFFIC IS ONLY PASSING BY ON THE TWO SIDES OF THE SITE. THE SITE IS ALSO NEXT TO A MAIN ROAD THAT RUNS NORTH AND SOUTH, 42ND ST S. THIS ROAD IS REALLY BUSY DURING THE MORNING AND EVENING RUSH HOUR TRAFFIC. DURING THE DAYTIME THE TRAFFIC IS FAIRLY STEADY AND CONTINUOUS ON 42ND. THE ROAD TO THE SOUTH OF THE SITE IS NOT BUILT YET. MY DESIGN



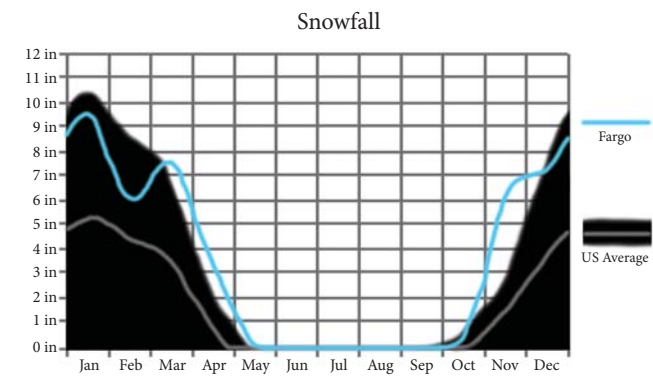
- FIGURE 16 | SUNSHINE -



- FIGURE 17 | CLOUDY DAYS -

WOULD CALL FOR THE ROAD TO THE SOUTH OF THE SITE TO BE COMPLETED. THE AVENUE NUMBER WOULD BE 23RD AVE S, WHICH IS THE AVENUE THAT RUNS TO THE SOUTH OF THE RED RIVER VALLEY ZOO, AND IS THE MAIN ACCESS POINT TO THE ZOO.

THE PEDESTRIAN TRAFFIC IS NONE EXISTENT AND DOES NOT SEEM TO EXIST AROUND THE SITE. THE SITE IS OUT OF THE WAY FOR PEDESTRIAN TRAFFIC, AND IS CUT OFF BY INTERSTATE 94. THE WALK TO THE MUSEUM WOULD BE LONG AND OUT OF THE WAY, HAVING TO WALK OVER THE INTERSTATE FROM THE NORTH SEEMS TO BE DIFFICULT. IF THERE WAS A BETTER PEDESTRIAN PATH THEN THERE MIGHT BE A POSSIBILITY FOR AN EASIER WALKABILITY TO AND AROUND THE SITE. FOR THAT TO HAPPEN THOUGH THERE NEEDS TO BE ENOUGH FOOT TRAFFIC. I FEEL THAT CONNECTING THE RED RIVER VALLEY ZOO AND THE MUSEUM WOULD ALLOW AND CREATE MORE FOOT TRAFFIC IN THE AREA. THIS COULD BRING LIFE TO THE AREA AND CREATE A SPACE THAT FAMILIES WOULD WANT TO SPEND A DAY OR AFTERNOON.



- FIGURE 18 | SNOWFALL -

- SITE ANALYSIS CONT. -

THE PLANT AND ANIMAL LIFE ON THE SITE SEEMS TO BE RATHER BARE ALSO. THE SITE RIGHT NOW IS FARM LAND AND IS USED FOR GROWING CROPS. THERE IS A GROUP OF TREES TO THE EAST OF THE SITE THAT COULD BE HOME FOR A VARIETY OF DIFFERENT ANIMALS, INCLUDING FOX, RABBIT, MAYBE SOME DEER, BUT BEING IN THE MIDDLE OF THE CITY THERE WOULD PROBABLY ONLY BE SMALL ANIMALS. THE IDEA FOR MY THESIS IS TO USE THIS SITE AND CREATE AN ENVIRONMENT THAT SHOWS THE VISITORS THE NATURAL LANDSCAPE OF NORTH DAKOTA. THE DESIGN WOULD USE NATURAL GRASSES TO CREATE A GRASSLANDS THAT WERE COMMON IN THE AREA BEFORE THE CITY STARTED AND GREW TO THE SIZE IT IS NOW. THIS CAN CREATE A PLACE FOR LEARNING ABOUT THE ENVIRONMENT AND THE NATURAL SYSTEMS THAT ARE IN NATURE, THIS IS THE OUTDOOR EXHIBIT SPACE THAT IS A PERMANENT INSTALLMENT.



- IMAGE 13 | SOUTH VIEW -



- IMAGE 14 | 42ND OVERPASS -

- THE CHARACTER -

THE CHARACTER OF THE SITE IS DIFFERENT THAN THAT OF A SITE DOWNTOWN, THERE IS AN OPENNESS THAT MAKES YOU FEEL LIKE YOU ARE NOT DIRECTLY IN THE MIDDLE OF A CITY. IN THE DESIGN OF THE BUILDING AND SURROUNDING SPACES THE ONE MAIN THING I WOULD LIKE TO DO IS TRY KEEP THAT OPEN FEELING AND NOT OVER-CROWD THE SPACE WITH TOO MUCH BUILDING.

THE SITE HAS A GROUP OF TREES ON THE EAST SIDE THAT CREATE A SHELTERED FEELING FROM INTERSTATE 29. THESE TREES HELP TO REDUCE THE NOISE FROM THE ROAD. THERE IS NO BUILDINGS THAT ARE CLOSE TO OR NEXT TO THE SITE, BUT THE OVERPASS CREATES A SHELTERING FEELING ON THE NORTHWEST OF THE SITE. THE SITE IS FLAT AND LOOKS TO BE WELL DRAINED, SO THERE SHOULDN'T BE A PROBLEM WITH THE DRAINAGE OF THE SITE. ON THE SITE THERE WILL ALSO BE A NEW POND WATER CONTAINMENT SYSTEM THAT WILL HOLD THE RUNOFF FROM THE BUILDING AND SITE.



- IMAGE 15 | EAST VIEW OF SITE -



- IMAGE 16 | SOUTHEAST VIEW OF SITE -

- THE ESSENCE -

THE THING THAT CAPTURED MY ATTENTION WAS THE FACT THAT IT WAS SO CLOSE TO THE ZOO. THE THING THAT I REALIZED WAS THE ZOO SEEMS TO NOT HAVE AS MANY VISITORS AS IT COULD. DESIGNING A MUSEUM NEXT TO THE ZOO, WOULD BRING MORE PEOPLE TO THE AREA AND ATTRACT MORE VISITORS TO THE ZOO AND THE MUSEUM. I ALSO FEEL THAT THE SITE SHOULD BE ALLOWED TO STAY MORE NATURAL AND RETURN IT BACK TO A GRASSLAND TYPE OF PLACE SOMETHING THAT WILL BRING A BIT OF NATURE BACK INTO THE CITY.



- IMAGE 17 | ZOO VIEW -



- IMAGE 18 | PANORAMIC OF SITE -



- IMAGE 19 | PANORAMIC ACROSS I94 -



- BUILDING PROGRAM -

- TYPES OF SPACES -

GALLERIES	RESEARCH LAB	EXHIBIT STORAGE
INTERIOR	LAB SPACE	CREATION
EXTERIOR	STORAGE	RESTORATION
SEATING	MEETING ROOMS	SHIPPING/RECEIVING
CLASSROOMS	OFFICES	RESTROOMS
STORAGE	AUDITORIUM	1/50 OCCUPANTS
OFFICES	SEATING	PARKING
STAFF LOUNGE	STAGE	MECHANICAL/ELECTRICAL
CURATORS OFFICES	LIGHT CONTROL	COMMUNITY GARDENS
SHARED OFFICES	AUDIO CONTROL	CUSTODIAL
STAFF OFFICES	STORAGE	GREEN SPACES
STORAGE	DRESSING ROOM	
ADMINISTRATION	CAFE	
RECEPTION	SEATING	
BUILDING MANAGER	RESTAURANTS	
BOARD ROOM	GIFT SHOP	
WORK ROOM	SALES FLOOR	
STORAGE	STORAGE	
SECURITY CENTER	CASHIER DESK	

- EDUCATIONAL -

ADMINISTRATION	2,000 SF
INDOOR GALLERY SPACE	20,000 SF
OUTDOOR GALLERY SPACE	30,000 SF
CLASSROOMS	2,500 SF
OFFICES	1,000 SF
RESEARCH LAB	10,000 SF

- PUBLIC -

AUDITORIUM	2,500 SF
CAFE	1,000 SF
GIFT SHOP	3,000 SF
RESTROOM	3,000 SF
PARKING	80,000 SF
MEETING ROOMS	2,500 SF
COMMUNITY GARDENS/GREEN SPACES	30,000 SF

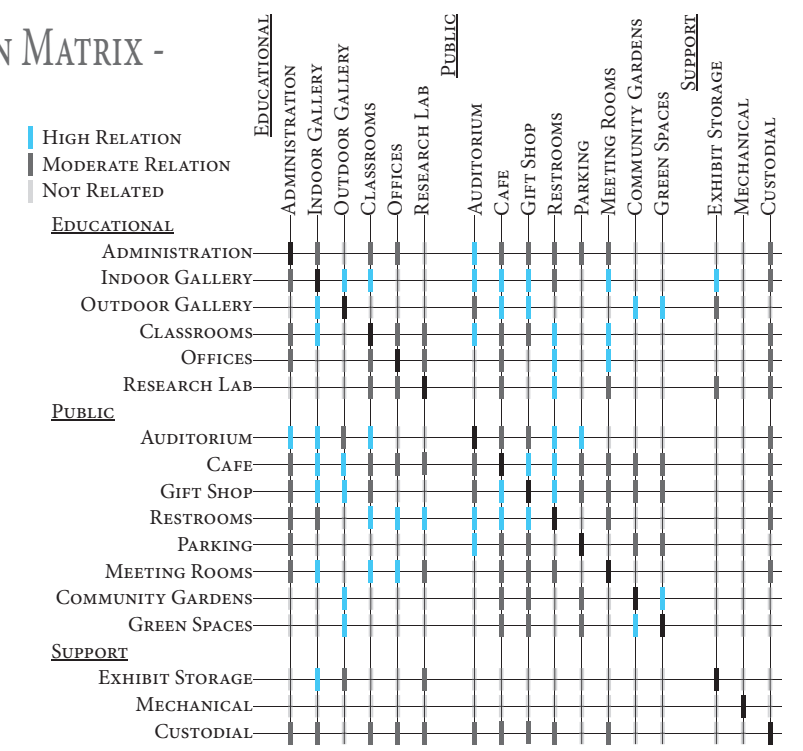
- SUPPORT -

EXHIBIT STORAGE	10,000 SF
MECHANICAL/ELECTRICAL	2,000 SF
CUSTODIAL	1,000 SF

- TOTAL SQ FT -

ABOUT 90,000 SF

- INTERACTION MATRIX -



||||| - DESIGN SOLUTION - |||||

|||||

|||||



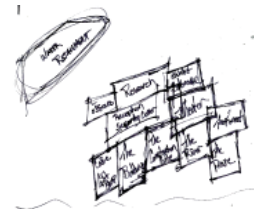
- IMAGE 20 | ENTRY PERSPECTIVE -



- PROCESS -

- DRAWINGS -

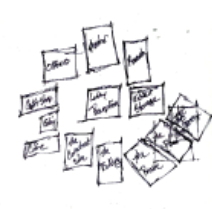
THESE ARE ALL PROCESS SKETCHES THAT EXPLORED FORM, CIRCULATION AND LAYOUTS.



- IMAGE 21 | PROCESS 1 -



- IMAGE 22 | PROCESS 2 -



- IMAGE 23 | PROCESS 3 -



- IMAGE 24 | PROCESS 4 -



- IMAGE 25 | PROCESS 5 -



- IMAGE 26 | PROCESS 6 -



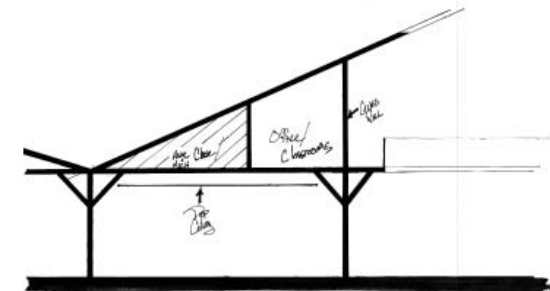
- IMAGE 27 | PROCESS 7 -



- IMAGE 28 | PROCESS 8 -



- IMAGE 29 | PROCESS 9 -



- IMAGE 36 | PROCESS 16 -



- IMAGE 37 | PROCESS 17 -



- IMAGE 38 | PROCESS 18 -



- IMAGE 39 | PROCESS 19 -



- IMAGE 40 | PROCESS 20 -



- IMAGE 30 | PROCESS 10 -



- IMAGE 31 | PROCESS 11 -



- IMAGE 32 | PROCESS 12 -



- IMAGE 33 | PROCESS 13 -



- IMAGE 34 | PROCESS 14 -



- IMAGE 35 | PROCESS 15 -



- IMAGE 41 | PROCESS 21 -

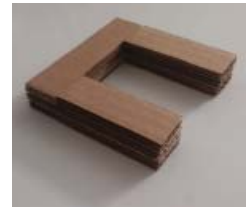


- IMAGE 42 | PROCESS 22 -

- PROCESS CONT. -

- MODELS -

THESE ARE ALL PROCESS MODELS THAT EXPLORED
FORM, CIRCULATION AND LAYOUTS.



- IMAGE 43 | MODEL 1 -



- IMAGE 44 | MODEL 2 -



- IMAGE 45 | MODEL 3 -



- IMAGE 46 | MODEL 4 -



- IMAGE 47 | MODEL 5 -



- IMAGE 48 | MODEL 6 -



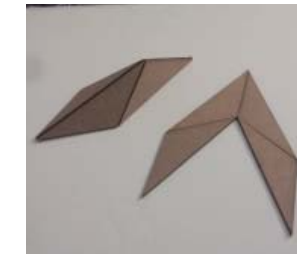
- IMAGE 49 | MODEL 7 -



- IMAGE 50 | MODEL 8 -



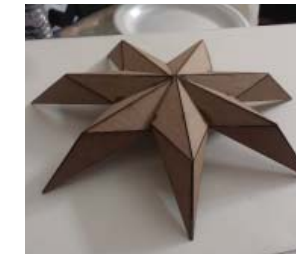
- IMAGE 51 | MODEL 9 -



- IMAGE 52 | MODEL 10 -



- IMAGE 53 | MODEL 11 -

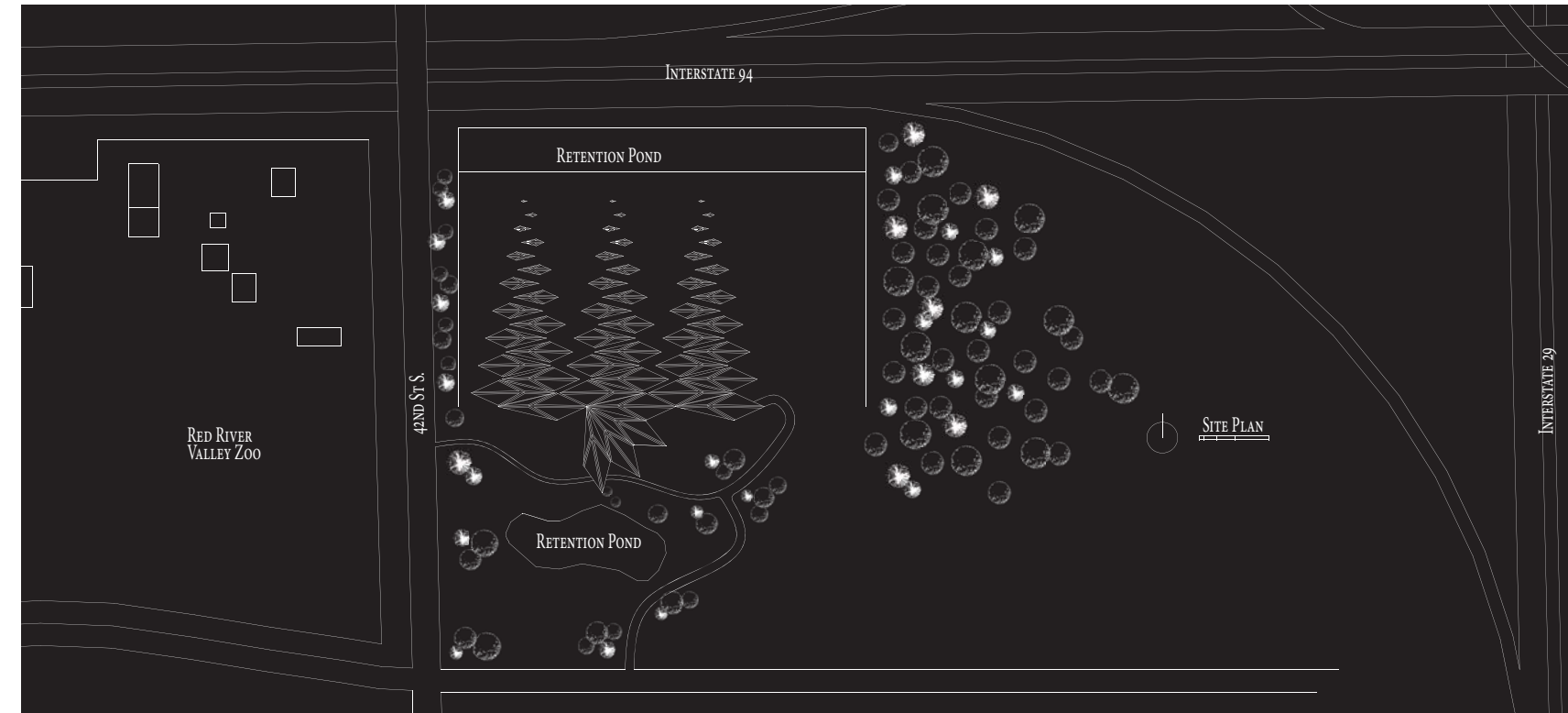


- IMAGE 54 | MODEL 12 -

- SITE -

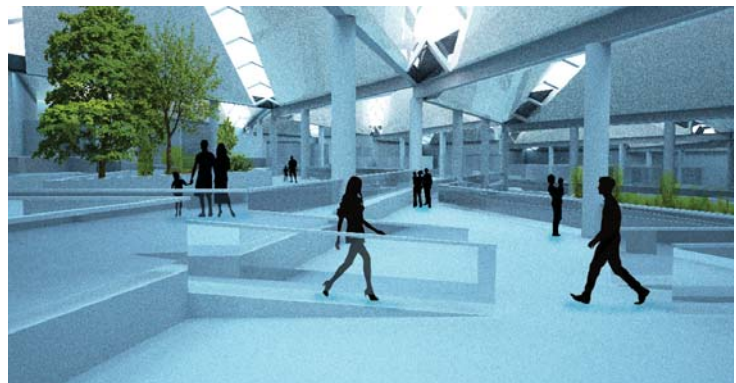
THE SCIENCE AND LEARNING CENTER IS LOCATED BY THE RED RIVER VALLEY ZOO. THE BUILDING IS GOING TO BE BUILT ON THE EAST SIDE OF 42ND ST S AND JUST SOUTH OF INTERSTATE 94.

THE BUILDING SITE IS OPEN FOR A VARIETY OF DIFFERENT ACTIVITIES, AND PARK SPACES. ALL OF THE PARKING IS LOCATED INSIDE THE BUILDING AND IS NOT CLUTTERING THE SITE AND BUILDING. THERE IS ALSO TWO WATER RETENTION PONDS ON IS LOCATED ON THE NORTH SIDE OF THE BUILDING WHILE THE OTHER IS JSUT SOUTH OF THE MAIN ENTRANCE. THE SITE WAS DESIGNED IN A WAY TO PROVIDE AN OPEN AREA THAT IS NOT CRAMPED WITH PARKING AND ALLOWS THE VISITORS AN OPEN AREA FOR A VARIETY OF DIFFERENT ACTIVITIES.



||| - INTERIOR PERSPECTIVES - |||

THE GALLERY IS THE MAIN PART OF THE MUSEUM AND IS THE MAIN SPACE THAT ALL THE EXHIBITS ARE DISPLAYED. THE GALLERIES ARE LOCATED ON THE EAST SIDE OF THE BUILDING NEXT TO THE UNDERGROUND PARKING AREA.



- IMAGE 56 | GALLERY PERSPECTIVE -

THE LOBBY IS LOCATED ON THE SOUTH SIDE OF THE BUILDING. EVERYONE WHO ENTERS THE SCIENCE MUSEUM HAS TO PASS THROUGH THIS SPACE BEFORE THEY CAN ENTER THE MUSEUM, LABS, CLASSROOMS, AND THEATER.

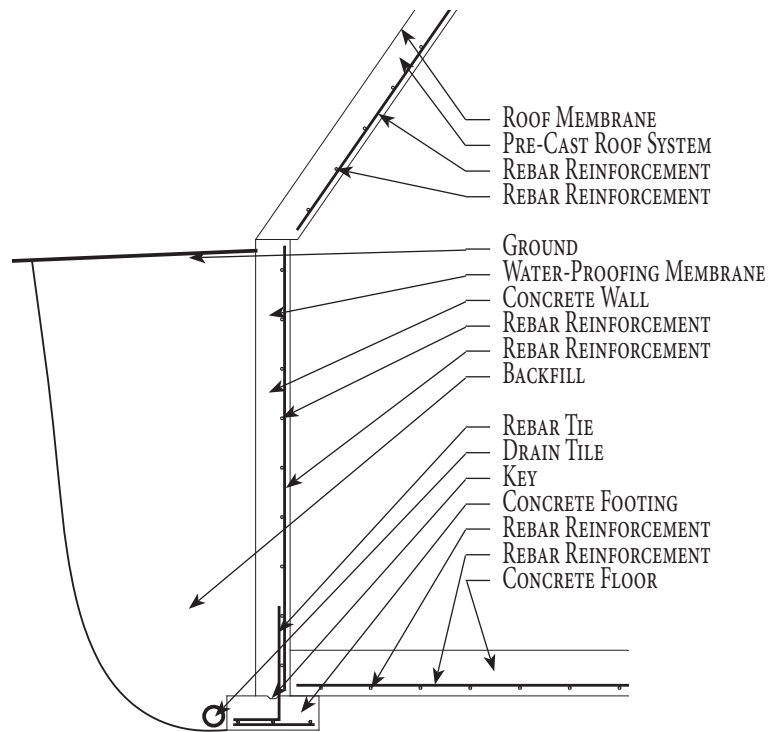


- IMAGE 57 | LOBBY PERSPECTIVE -



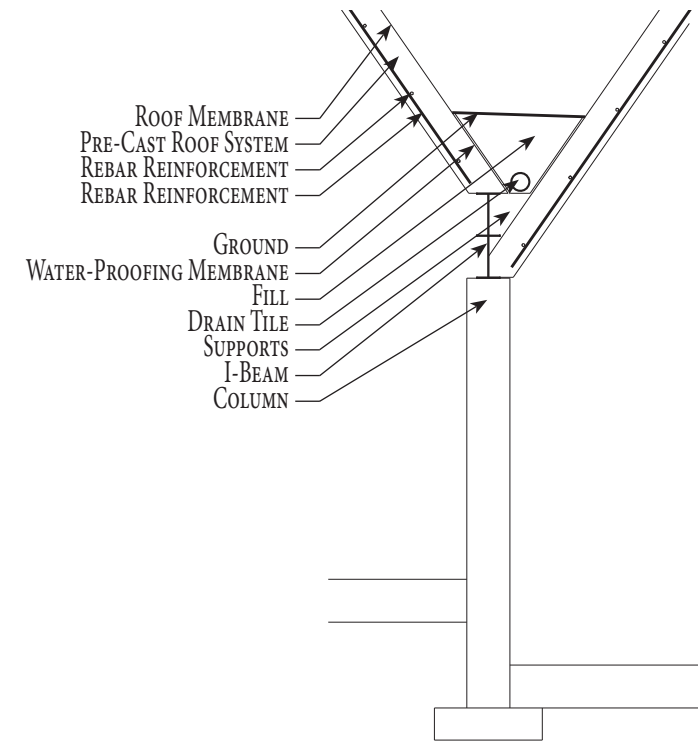
- SECTIONS -

- WALL SECTION -



- IMAGE 58 | WALL SECTION -

- ROOF & BEAM SECTION -



- IMAGE 59 | ROOF & BEAM SECTION -



||||| - PERFORMANCE ANALYSIS - ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

- RESPONSE TO THE SITE -

THE SCIENCE MUSEUM IS DESIGNED IN A WAY THAT
ALLOWS THE BUILDING TO BE ORIENTED WITH THE MAIN
ENTRANCE ON THE SOUTH SIDE OF THE BUILDING. THE
FACT THAT THE BUILDING IS IN THE GROUND ALSO ALLOWS
THE EARTH TO SHELTER THE BUILDING FROM THE WINTER
WINDS. ALSO, WITH HAVING TWO RETAINING PONDS ON THE
SITE ALLOWS FOR LESS RUN OFF INTO THE STORM SEWWR
SYSTEM. HAVING THESE WILL ALSO ALLOW THE BUILDING TO
USE THIS WATER FOR WATERING THE GROUNDS AROUND THE
BUILDING AND FOR USE IN THE BUILDING FOR THE TOILETS
AND FOR THE LIVE GALLERIES INSIDE.



- RESPONSE TO THE TYPOLOGICAL RESEARCH AND PROGRAM -

WHEN I WAS RESEARCHING WHAT A SCIENCE MUSEUM IS, I FOUND THAT A MUSEUM TEACHES STUDENTS BY HAVING HANDS ON EXHIBITS THAT WILL BE MORE THAN JUST LECTURES ABOUT SCIENCE. I FOUND THAT HANDS ON EXPLORATION IS EASIER TO REMEMBER THAN LISTENING OR READING. THIS INFLUENCES THE DESIGN OF THE EXHIBITS AND HOW THE VISITORS INTERACT WITH THEM. NOT ONLY CAN THE EXHIBITS TEACH THE VISITORS BUT ALSO THE BUILDING. THE WAY THAT THE BUILDING FORM IS MADE OF PYRAMIDS REMINDS THE USERS OF THE ANCHIENT PYRAMIDS AND HOW THEY WERE SCIENTIFIC ADVANCEMENTS AND ACHIEVEMENTS OF THEIR TIME.



||||| - PERFORMANCE ANALYSIS CONT.- |||||

- RESPONSE TO THE GOALS AND PROJECT EMPHASIS -

THE DESIGN OF THE SCIENCE MUSEUM REFLECTS THE SCIENTIFIC FIELD WITH THE OVERALL FORM. HOW THE PYRAMIDS GET SMALLER AND DISAPPEAR INTO THE GROUND. THIS IS LIKE HOW GALAXIES INTERACT WITH EACH OTHER WHEN THEY COLLIDE. OR IT CAN RELATE TO THE VERY START OF THE GALAXY; THE BIG BANG AND HOW EVERYTHING STARTED OUT COMPACT AND ORGANIZED AND IS EXPANDING AND CREATING MORE SPACE BETWEEN THEM.



- THE BOARDS -



||||| - 112 - ||||| - IMAGE 61 | THESIS BOARDS -





- IMAGE 62 | THESIS SITE MODEL -



- IMAGE 63 | PROCESS MODELS -

||||| - APPENDIX - ||||||

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|||| - PREVIOUS DESIGN STUDIO EXPERIENCE- |||||

- 2ND YEAR -

- FALL 2011 -

INSTRUCTOR - RHET FISKNESS
TEA HOUSE & BOAT HOUSE

- SPRING 2012 -

INSTRUCTOR - JOAN VORDERBRUGGEN
FOR THE BIRDS, DANCE STUDIO, & DWELLING

- 3RD YEAR -

- FALL 2012 -

INSTRUCTOR - MIKE CHRISTENSON
USITT IDEAL THEATER COMPETITION

- SPRING 2013 -

INSTRUCTOR - STEVE MARTENS
BREWERY & FOSSIL MUSEUM

- 4TH YEAR -

- FALL 2013 -

INSTRUCTOR - DAVID CRUTCHFIELD
HIGH RISE

- SPRING 2014 -

INSTRUCTOR - STEVE MARTENS
HISTORIC PRESERVATION / ADAPTIVE USE

- 5TH YEAR -

- FALL 2014 -

INSTRUCTOR - REGIN SCHWAEN
HELLO NATURE COMPETITION

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MIDDLE RIVER, MINNESOTA

- QUOTE -

“HARD WORK DOES NOT NECESSARILY GUARANTEE SUCCESS,
BUT NO SUCCESS IS POSSIBLE WITHOUT HARD WORK.”

DR T.P. CHIA

