

FLOOD RESEARCH CENTER

BY RICHARD WRIGHT

HOW CAN ARCHITECTS RESPOND TO A INLAND FLOOD RESEARCH CENTER
IN EXTREME FLOOD PLAINS THROUGH SOLUTIONS IN NATURE?

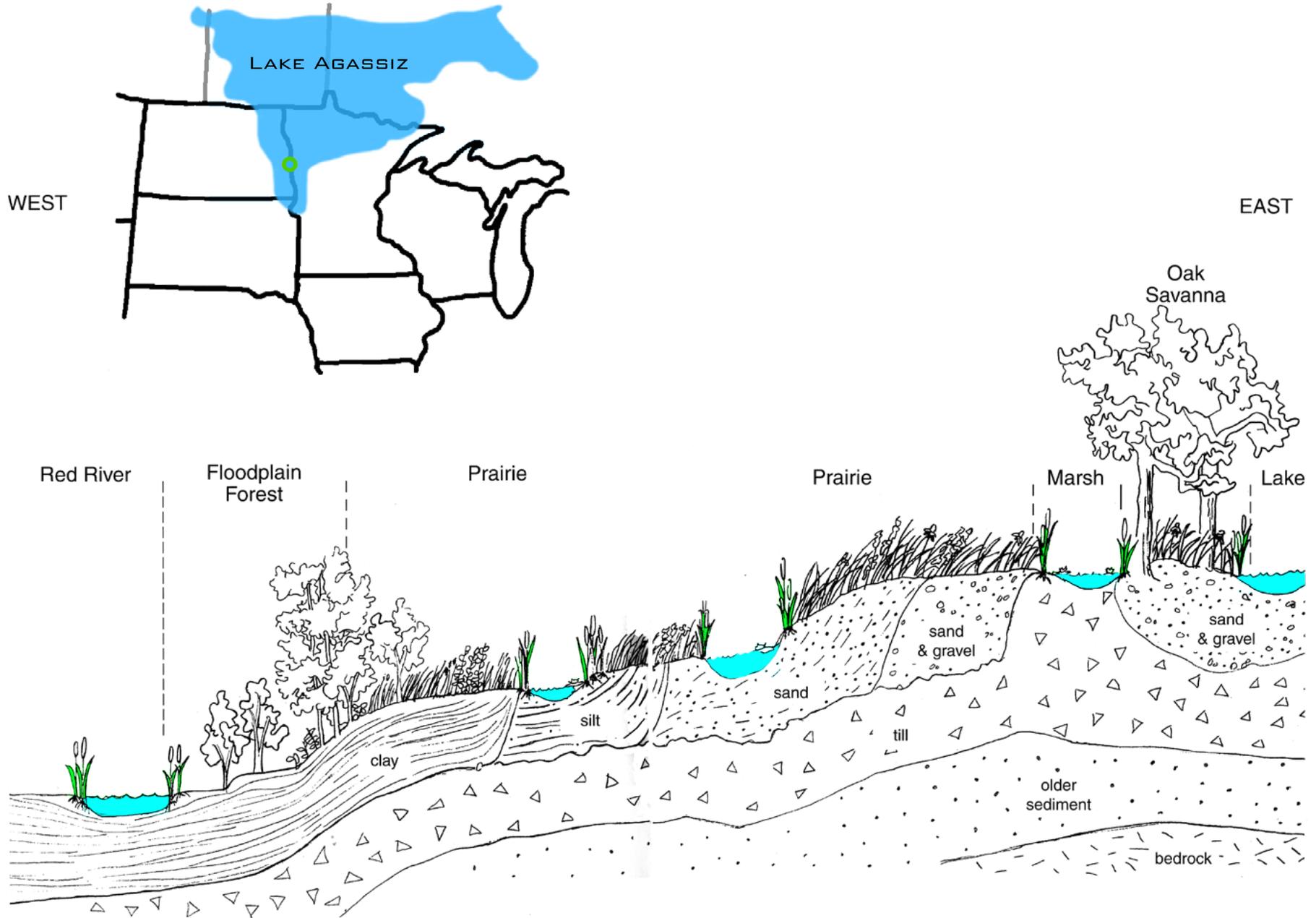
ABSTRACT

THIS PROJECT WILL OUTLINE RESEARCH INTO THE FLOOD PREVENTION METHODS IN NATURE AND IN THE MAN-MADE WORLD TO TRANSLATE INTO A NEW INNOVATIVE INLAND FLOOD RESEARCH CENTER DESIGN. THIS PROJECT WAS IN RESPONSE TO THE WIDESPREAD FLOODING EPIDEMIC IN THE VARIOUS REGIONS OF NORTH DAKOTA. I HOPE TO GIVE DWELLERS IN FLOOD PRONE AREAS A CHANCE TO DWELL IN HARMONY WITH NATURE'S NATURAL EVENTS. THE RESEARCH FACILITY'S MAIN FUNCTION IS TO RE-ESTABLISH THE WETLANDS TO ALLOW WATER TO HAVE SPACE TO EXPAND AND RETRACT. THE EXPANSION OF WETLANDS WILL REDUCE THE FAST PACE RUNOFF FROM FIELDS AND CONCRETE HARDSCAPES OF CITIES TO SAFE MANAGEABLE RATES.

KEY WORDS: FLOODING, RESEARCH CENTER

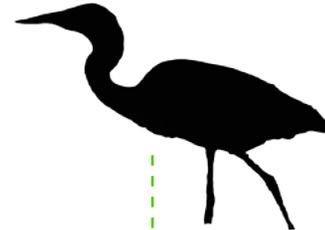
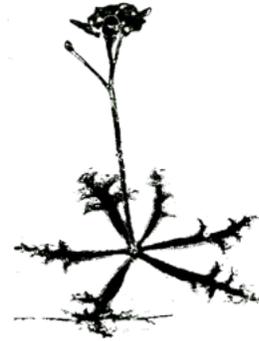
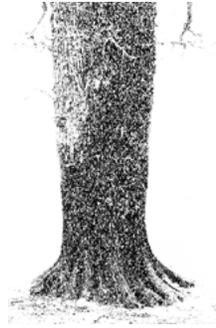
DESIGN PROCESS

RESEARCH: LAKE AGASSIZ



DESIGN PROCESS

RESEARCH: WATER SPECIFIC SPECIES



Column1	Bald Cypress Tree	Swamp White Oak	Cattails (Typha)	Swollen Bladderwort	Great Blue Heron	Bald Eagle	American Black Duck	Beaver	Raccoon	Painted Turtle
Swamps	X	X				X	X		X	
Marshes			X		X	X	X			
Lakes				X	X	X	X	X		X
Ponds				X	X	X	X	X		X
Rivers					X	X	X	X		X
Streams					X	X	X	X		X
Everglades	X					X	X		X	
Flood Migration					X		X		X	X
Flood Perminate Home	X	X	X	X		X	X	X		X
Flood Adaptation	X		X	X			X	X		
Floating Adaptation			X	X			X			
Elevated Adaptation	X	X			X	X	X		X	
Construction Adaptation								X		



WETLANDS

CAN STORE UP TO 360,000 GALLONS OF
WATER IN ONE ACRE.

CAN FILTER CONTAMINATED WATER

ARE A HABITAT TO A WIDE VARIETY OF
PLANTS AND ANIMALS

WILL RETAIN EXCESS WATER.

TYPES OF WETLANDS (Wildlife, 2011)

Wetland is a broad term to describe many specific types of ecosystems. To get a grasp of what wetlands are, here's a short summary of each. marshes, bogs, fens, and swamps.

MARSHES -Marshes are bodies of water that are relatively shallow water levels and full of grassland type plants and no trees. The animals include a wide variety of mammals and birds. The water can be freshwater or saltwater, in each the seasons or tides can change the water levels.

BOGS - Bogs are water bodies that have had plant material (peat) cyclically grow and die from the outer edges to move inward over the water to create a thin layer. The thin layer then slowly fills till the entire body of water is filled with peat that can be 5 to 10 feet deep depending the age of the bog. In some bogs it can take up to 50 years to produce just one inch of peat(Refuge). This creates a unique environment for many plant materials, but is generally dangerous for most mammals due to drowning(Refuge).

FENS – Fens form from water has percolated through alkaline soils to create unique plant and animal environment.

SWAMPS - Swamps are forested bodies of water that are generally shallow in depth.

VERNAL POOLS- Vernal Pools are seasonal bodies of water that eventually dry up and re-form year to year. This ecosystem gives amphibians in particular a uniquely safe environment to survive from season to season (Basic Wetland Facts, 2010)

DESIGN PROCESS

MAIN BUILDING ELEMENTS

AVERAGE ROOF SIZE
OF A HOME IS 40'X60'

THE POPULATION
OF FARGO/MOORHEAD IS
132,360

CAN STORE UP TO 360,000
GALLONS OF WATER IN ONE ACRE.

REDUCE THE
HEAT ISLAND EFFECT

317,664,000 SQUARE FEET
OF ROOF RUNNOFF

FILTERS CONTAMINATED WATER

RETAIN AND UTILIZATION WATER

198,000,000 GALLONS OF WATER
AFTER ONE INCH OF RAIN.

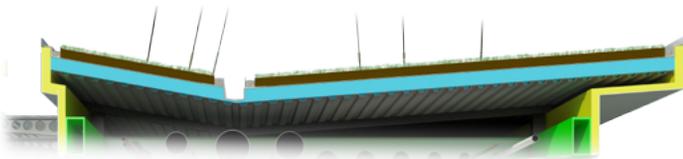
HABITAT TO A WIDE VARIETY OF
PLANTS AND ANIMALS

INTERIOR SUN PROTECTION

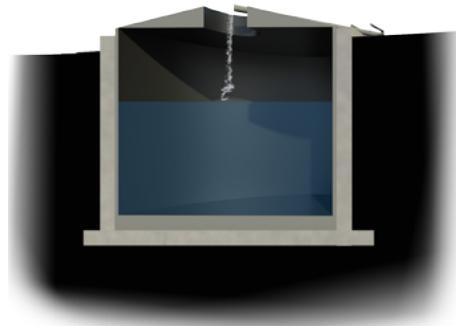
GREY WATER STORAGE CAN BE
USED FOR GARDENING, TOILETS,
AND POSSIBLY PURIFIED AS
DRINKING WATER

RETAINS EXCESS WATER.

GREEN ROOF



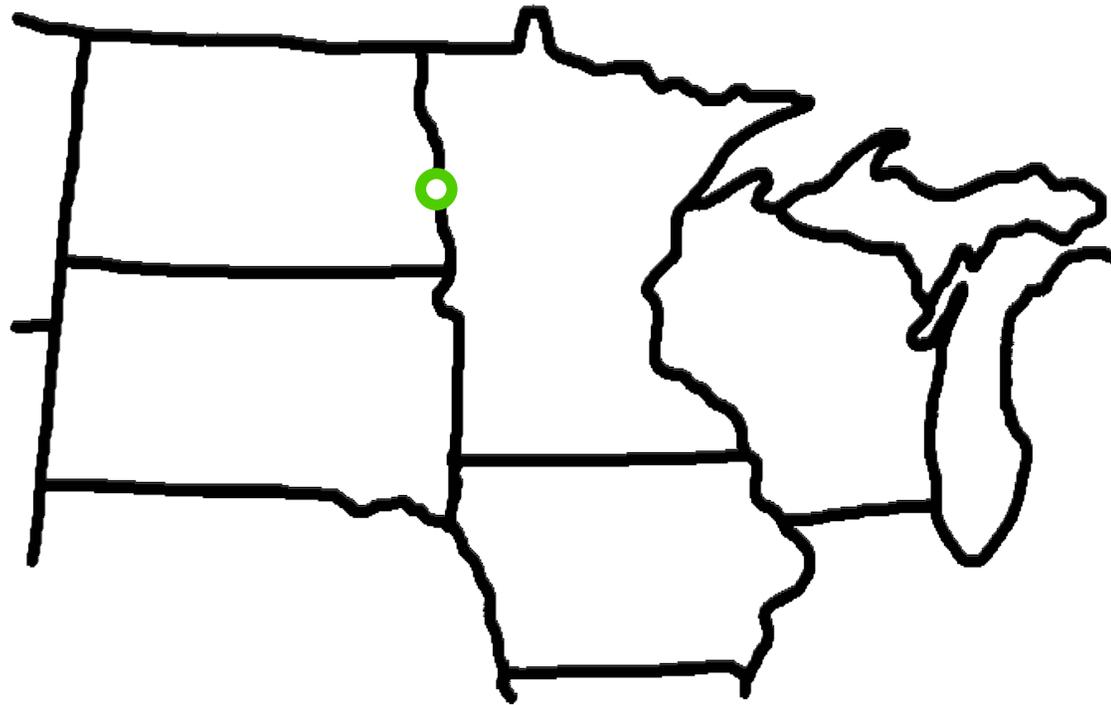
WATER COLLECTION



WETLANDS

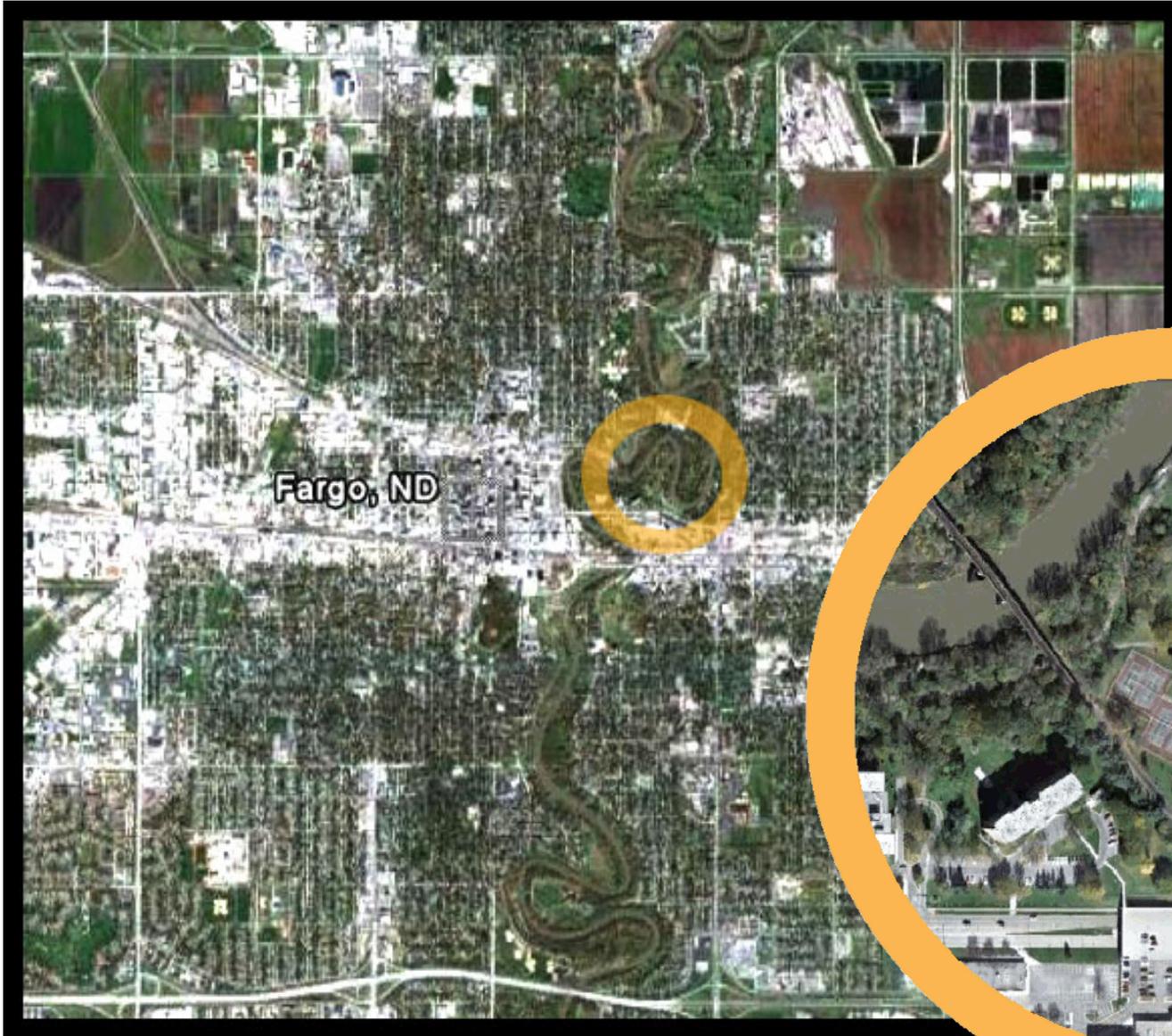


TYPEOLOGY: RESEARCH FACILITY
LOCATION: MOORHEAD, MINNESOTA



DESIGN PROCESS

SITE ANALYSIS



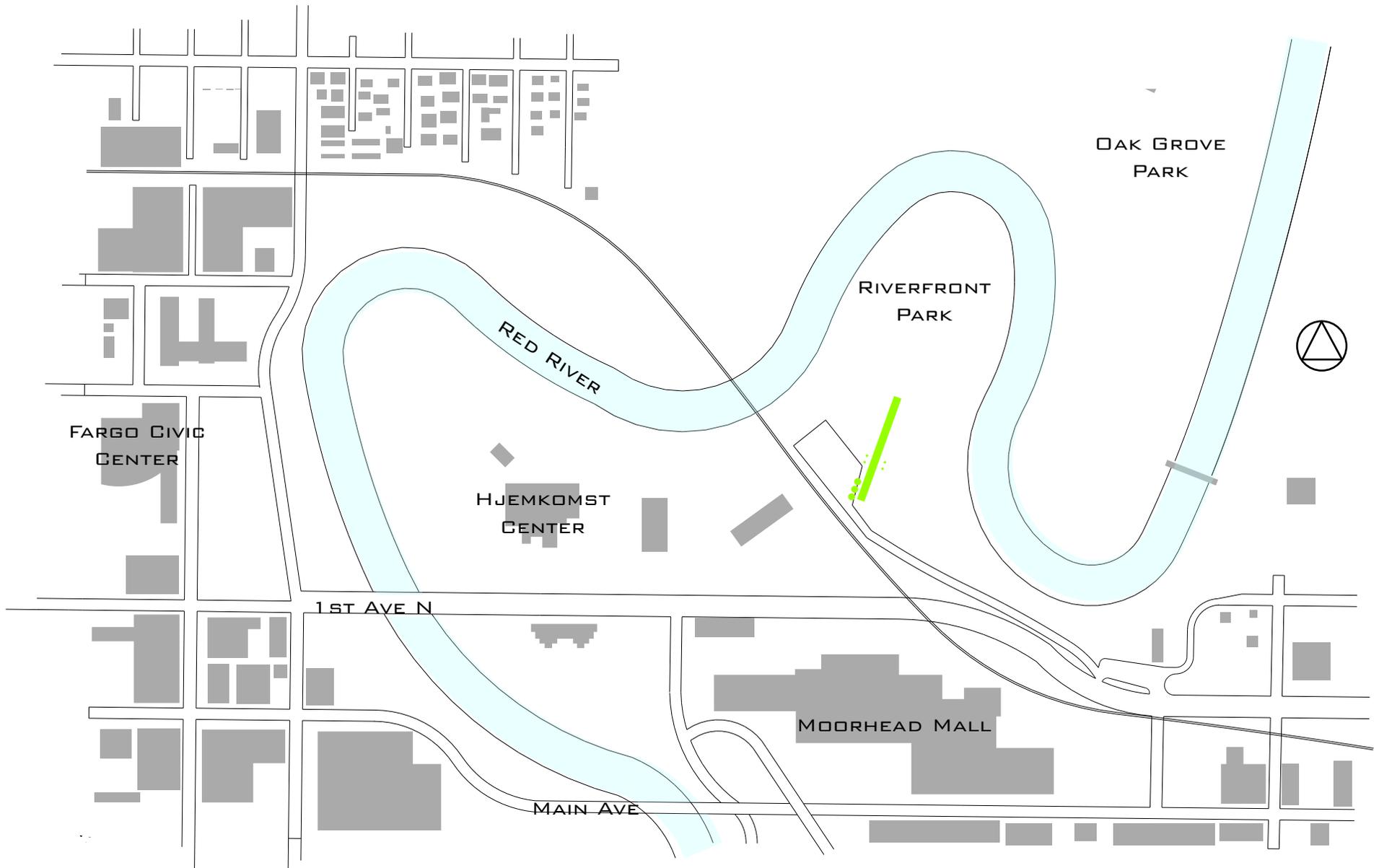
DESIGN PROCESS

SITE ANALYSIS



DESIGN PROCESS

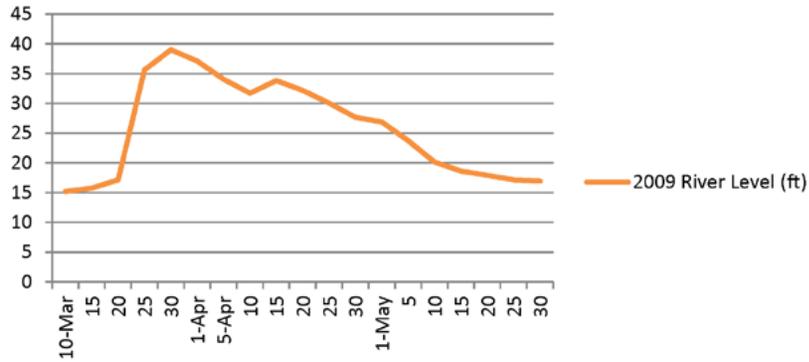
SITE LOCATION



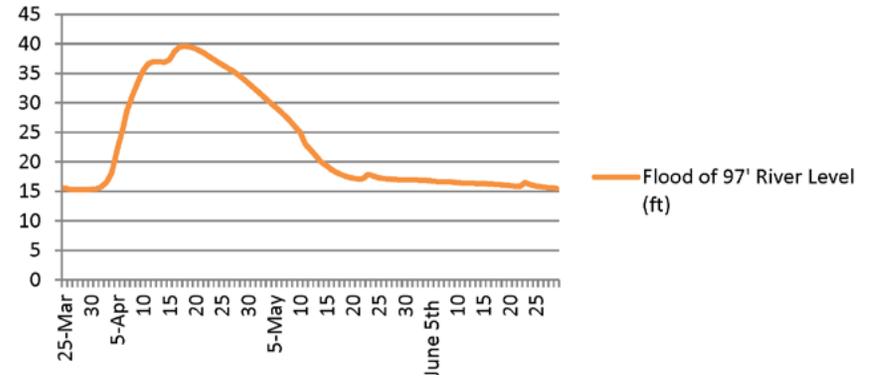
DESIGN PROCESS

SITE ANALYSIS

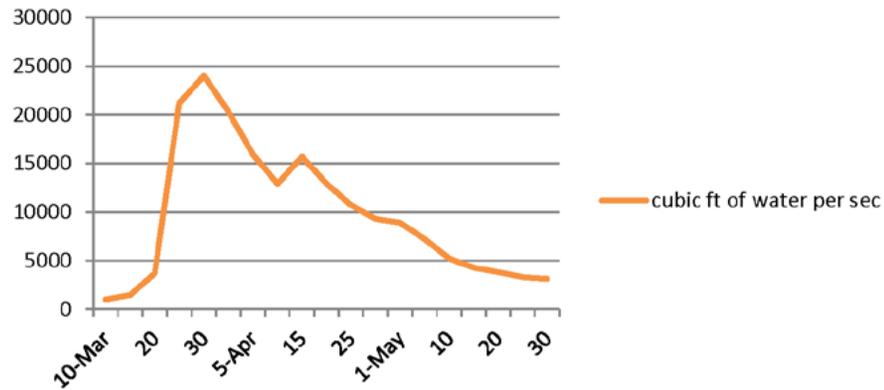
2009 River Level (ft)



Flood of 97' River Level (ft)

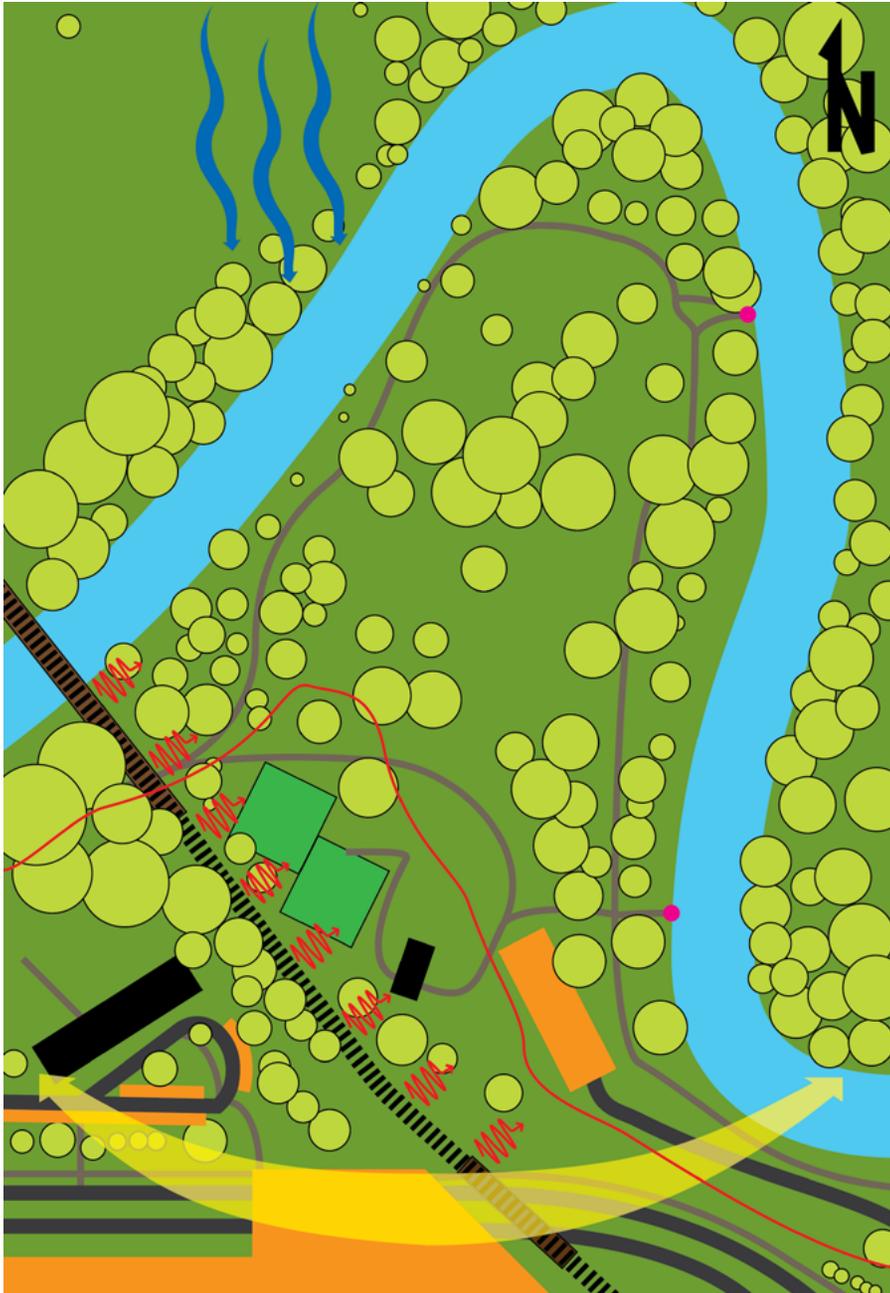


cubic ft of water per sec



DESIGN PROCESS

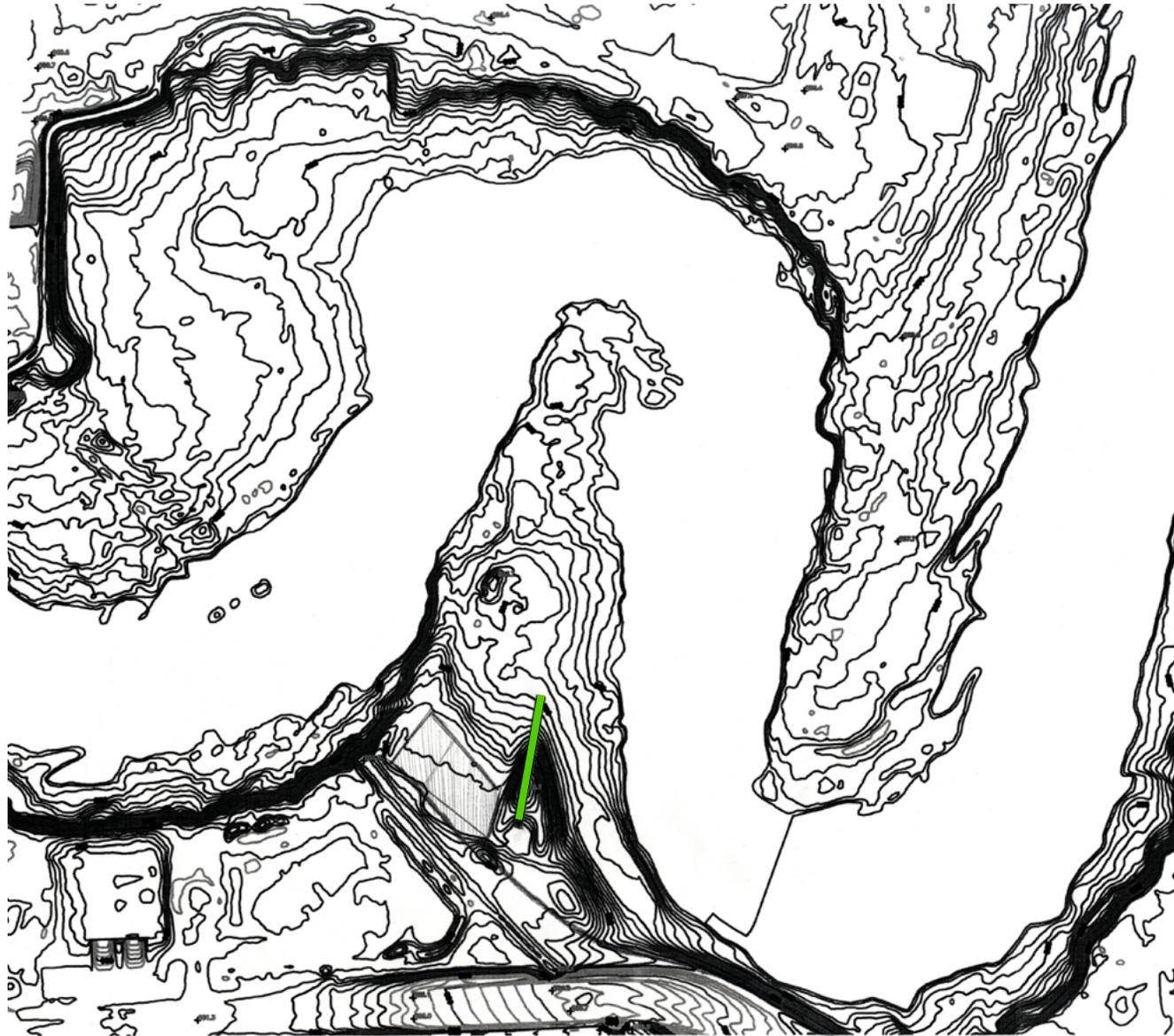
SITE ANALYSIS



- Sidewalk
- Roads
- Parking
- Bridges
- 09' Flood level
- Train Trax
- Trees
- River Balcony
- Tennis Courts
- Existing Structures
- Noise
- Wind
- Sun Pattern

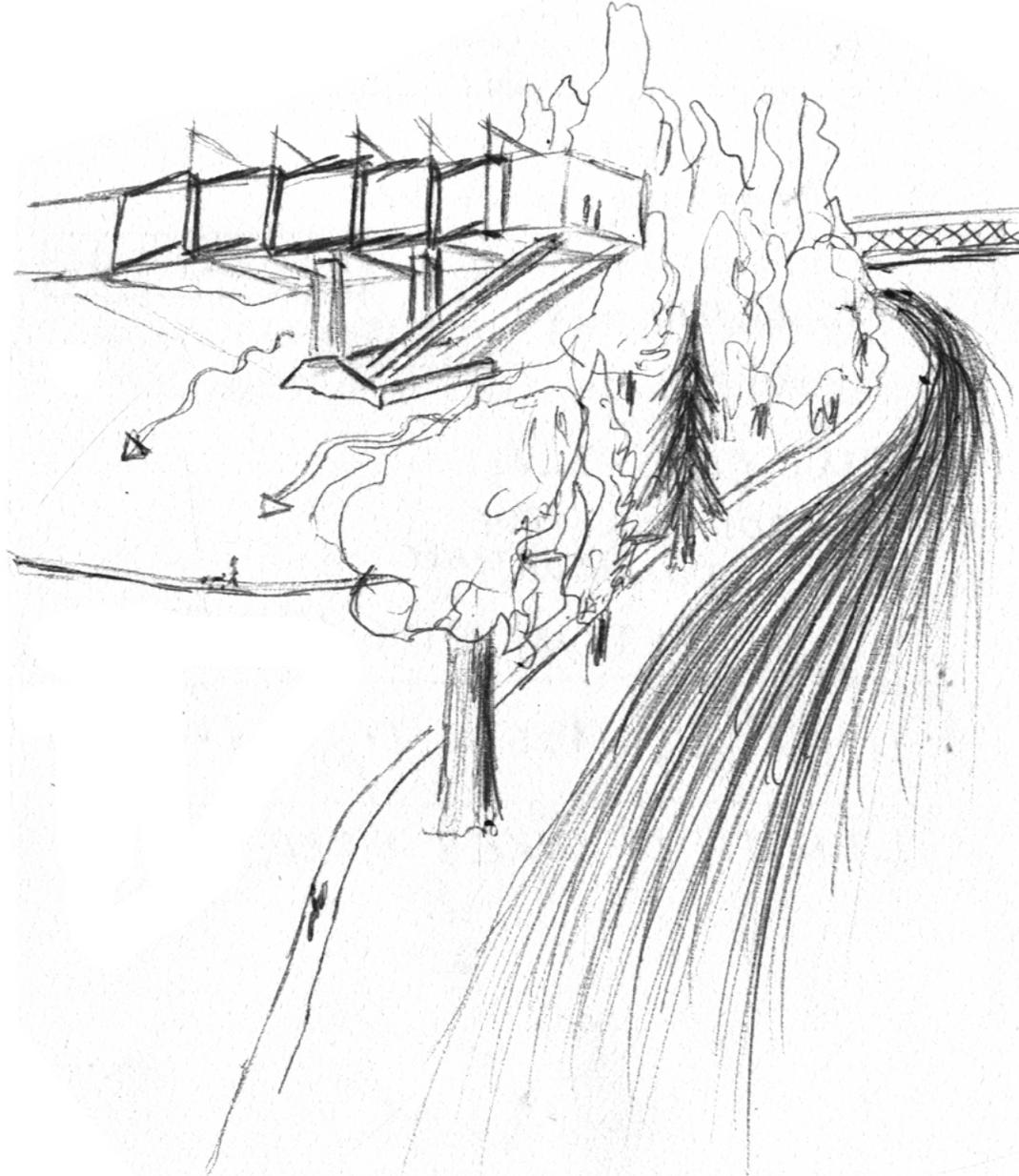
DESIGN PROCESS

PLAN DEVELOPMENT



DESIGN PROCESS

CONCEPT ONE



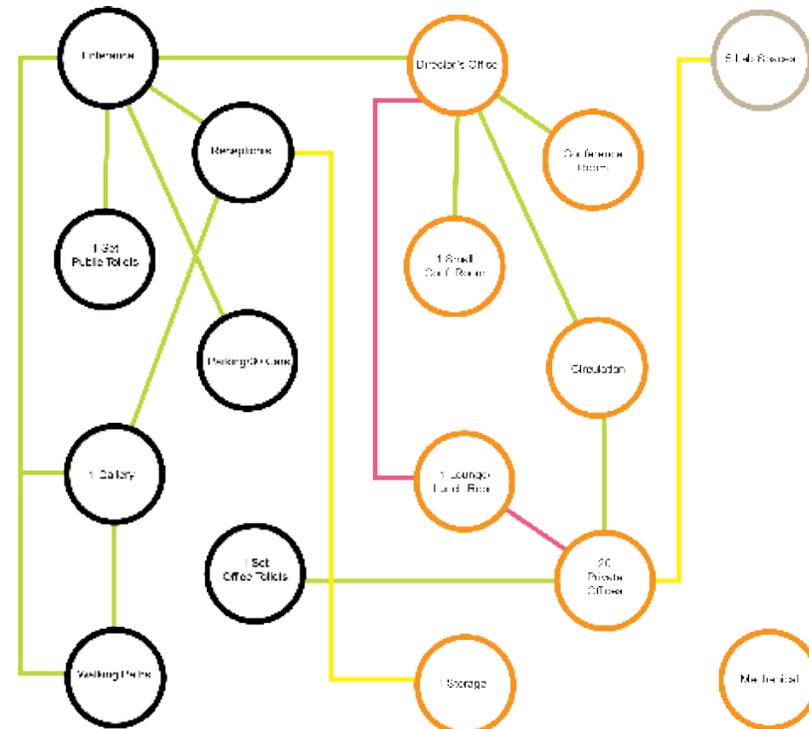
DESIGN PROCESS

PROGRAM

Interaction Matrix

	Entrance	Receptionist	Director's Office	1 set public toilets	1 set office toilets	Conference Room	1 Small Conf. Room	1 Storage	20 Private offices	5 Lab Spaces	1 Lounge/Lunch Room	Circulation	Parking/30 Cars	1 Gallery	Walking Paths	Mechanical
Entrance																
Receptionist																
1 Director's Office																
1 set public toilets																
1 set office toilets																
Conference Room																
1 Small Conf. Room																
1 Storage																
20 Private offices																
5 Lab Spaces																
1 Lounge/Lunch Room																
Circulation																
Parking/30 Cars																
1 Gallery																
Walking Paths																
Mechanical																

Column1	Square footage
Entrance	1200
Receptionist	300
1 Director's Office	400
1 set of Public Toilets	300
1 set of Office Toilets	300
Conference Room	800
1 Small Conference Room	500
1 Storage Room	1000
20 Private Offices	3000
5 Lab Spaces	750
1 Lounge/Lunch Room	600
Circulation	3000
Parking/30 Cars	4000
1 Gallery	1500
Walking Paths	3000
Mechanical	1000

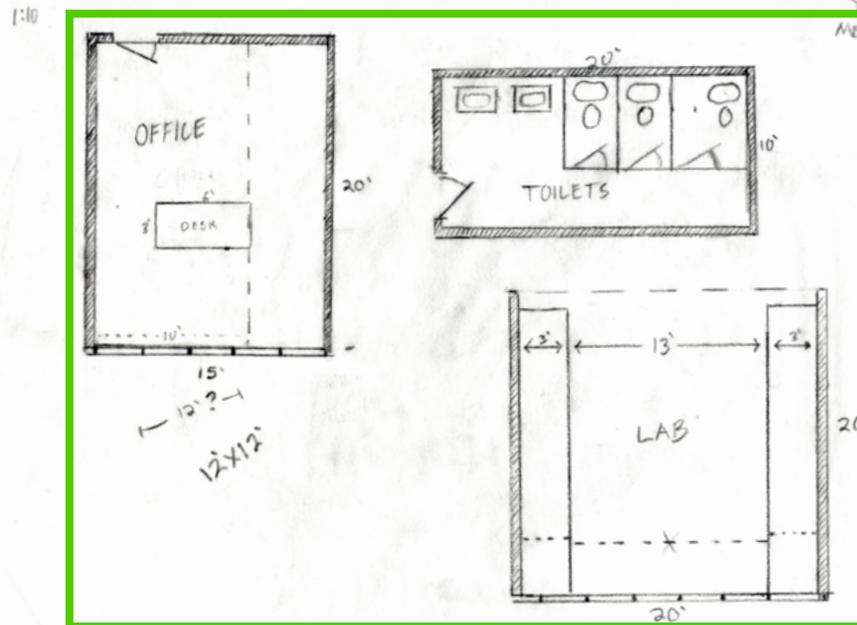
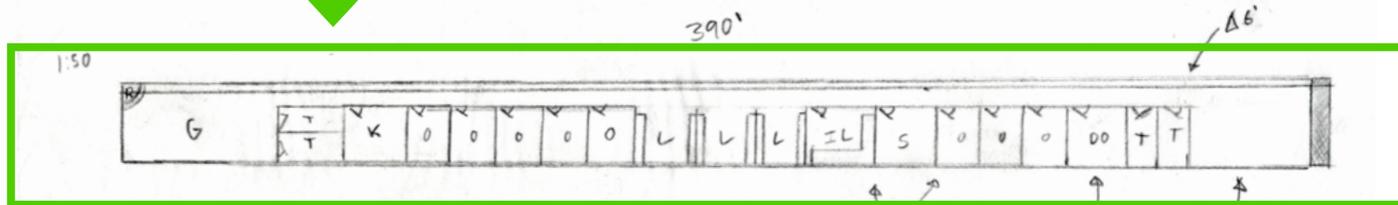


DESIGN PROCESS

PLAN DEVELOPMENT

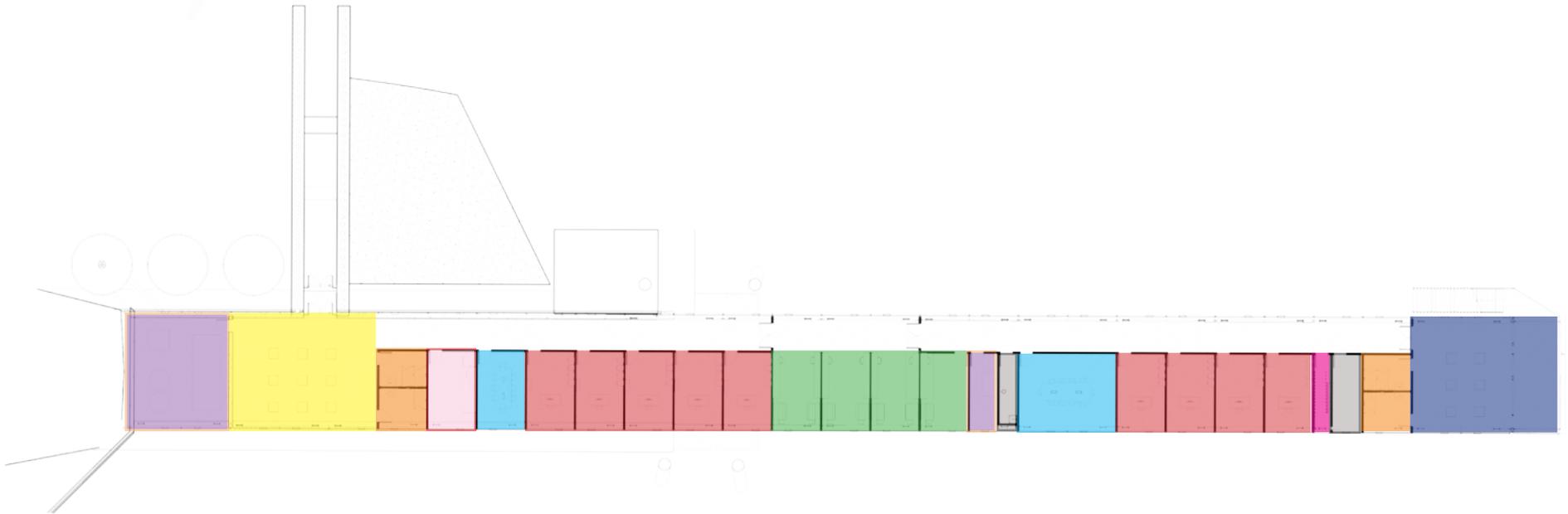
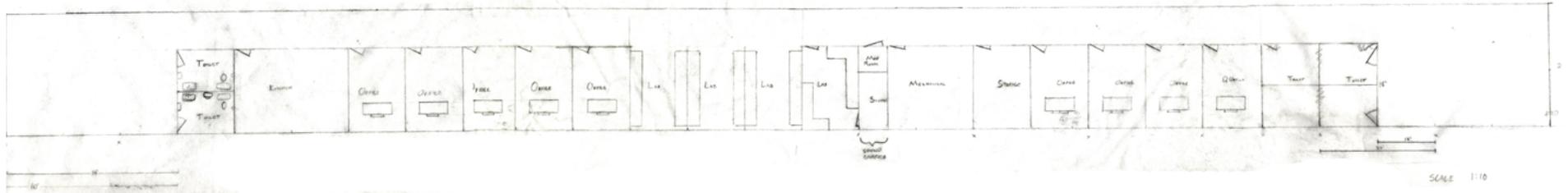


TOP DRIVEN VIEW



DESIGN PROCESS

PLAN DEVELOPMENT



 EXHIBITION SPACE

 TOILETS

 KITCHEN

 OFFICES

 MEETING ROOMS

 LABORATORIES

 STORAGE

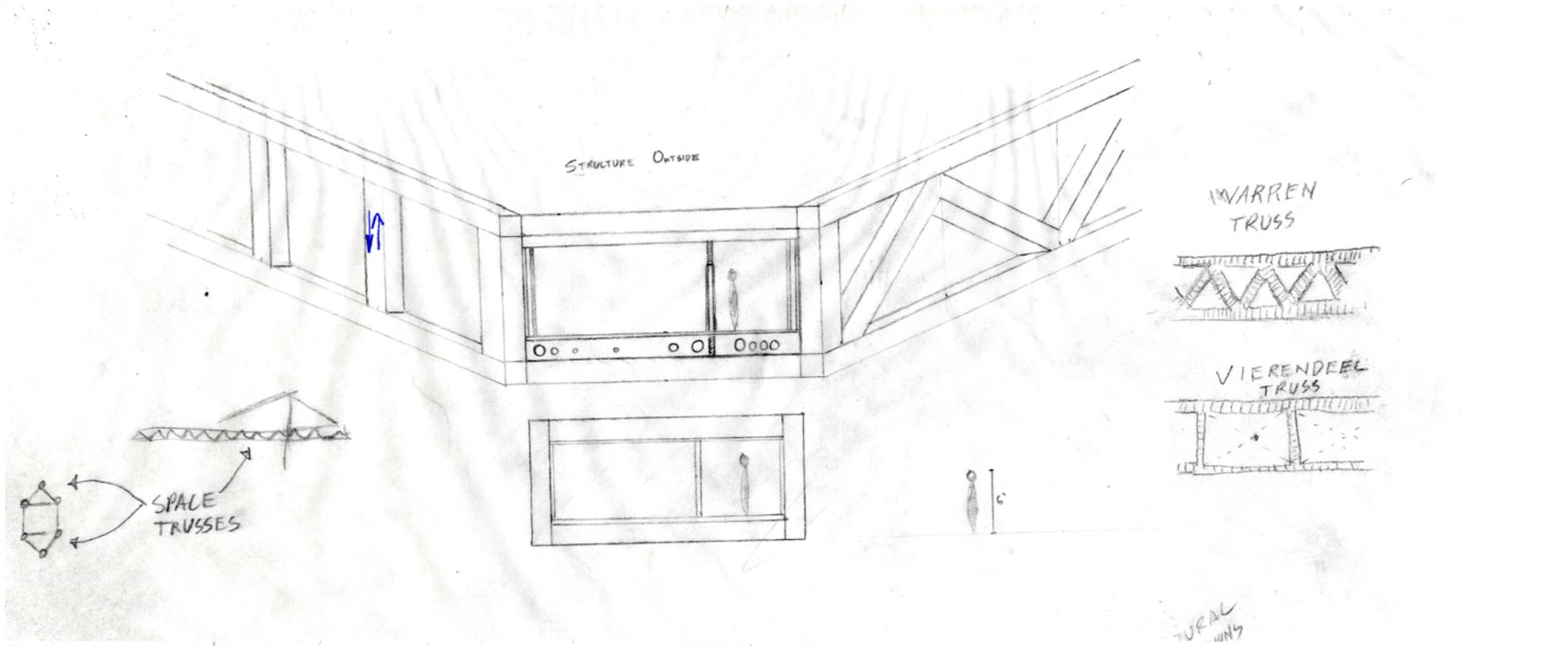
 MECHANICAL

 PUBLIC VIEWING SPACE

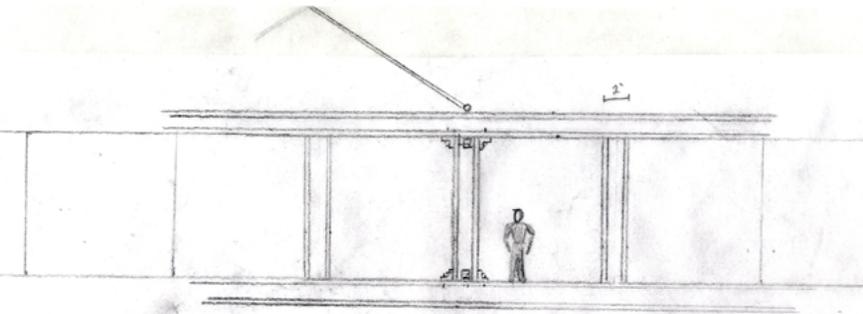
 STAIRWAY

DESIGN PROCESS

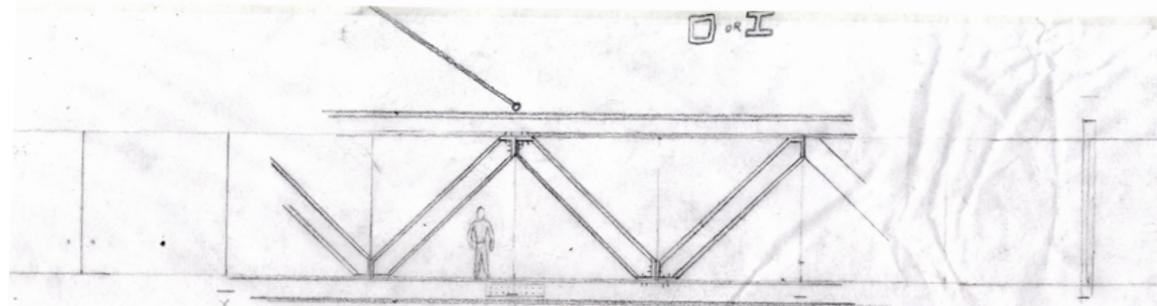
STRUCTURAL



VIERENDEEL TRUSS

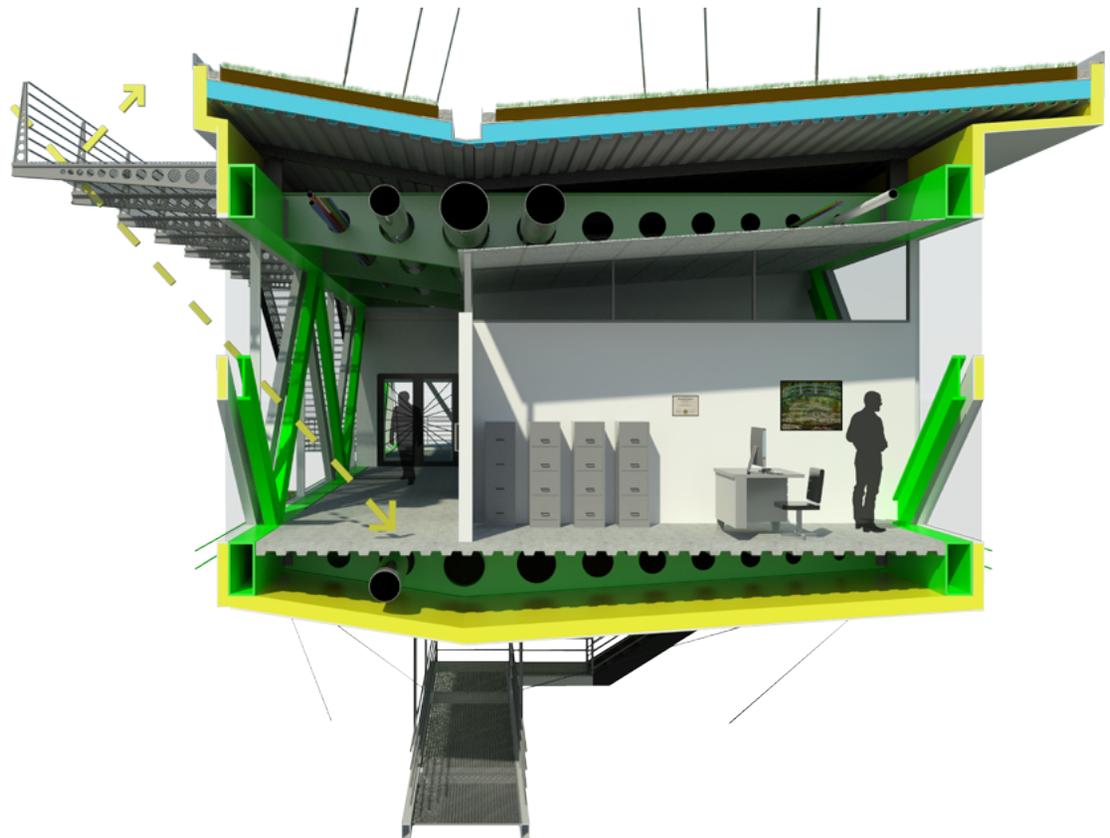
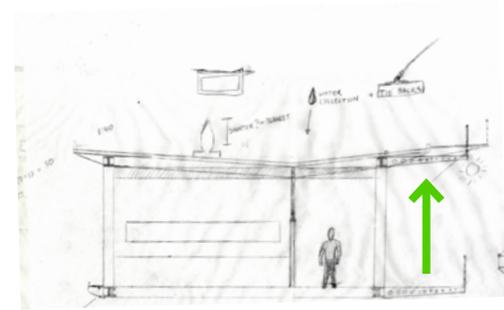
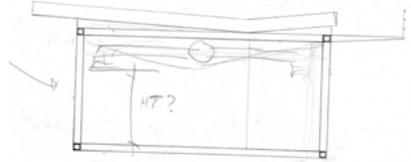
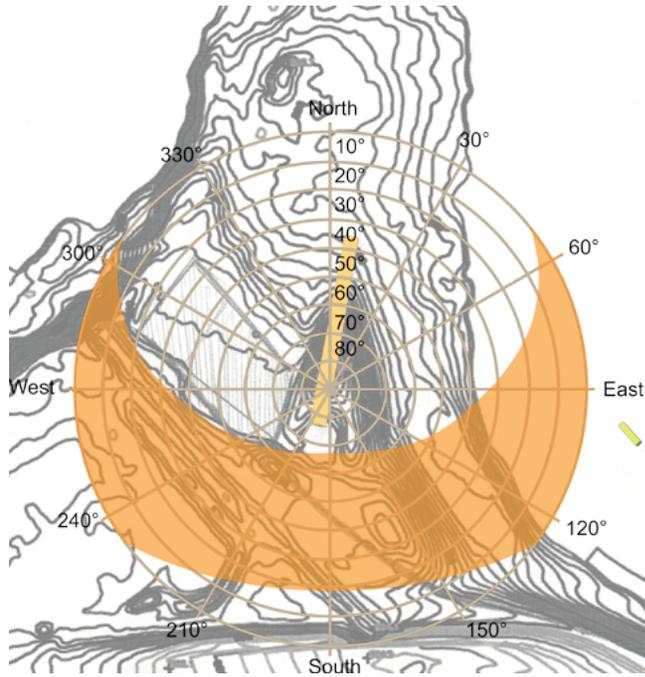


WARREN TRUSS



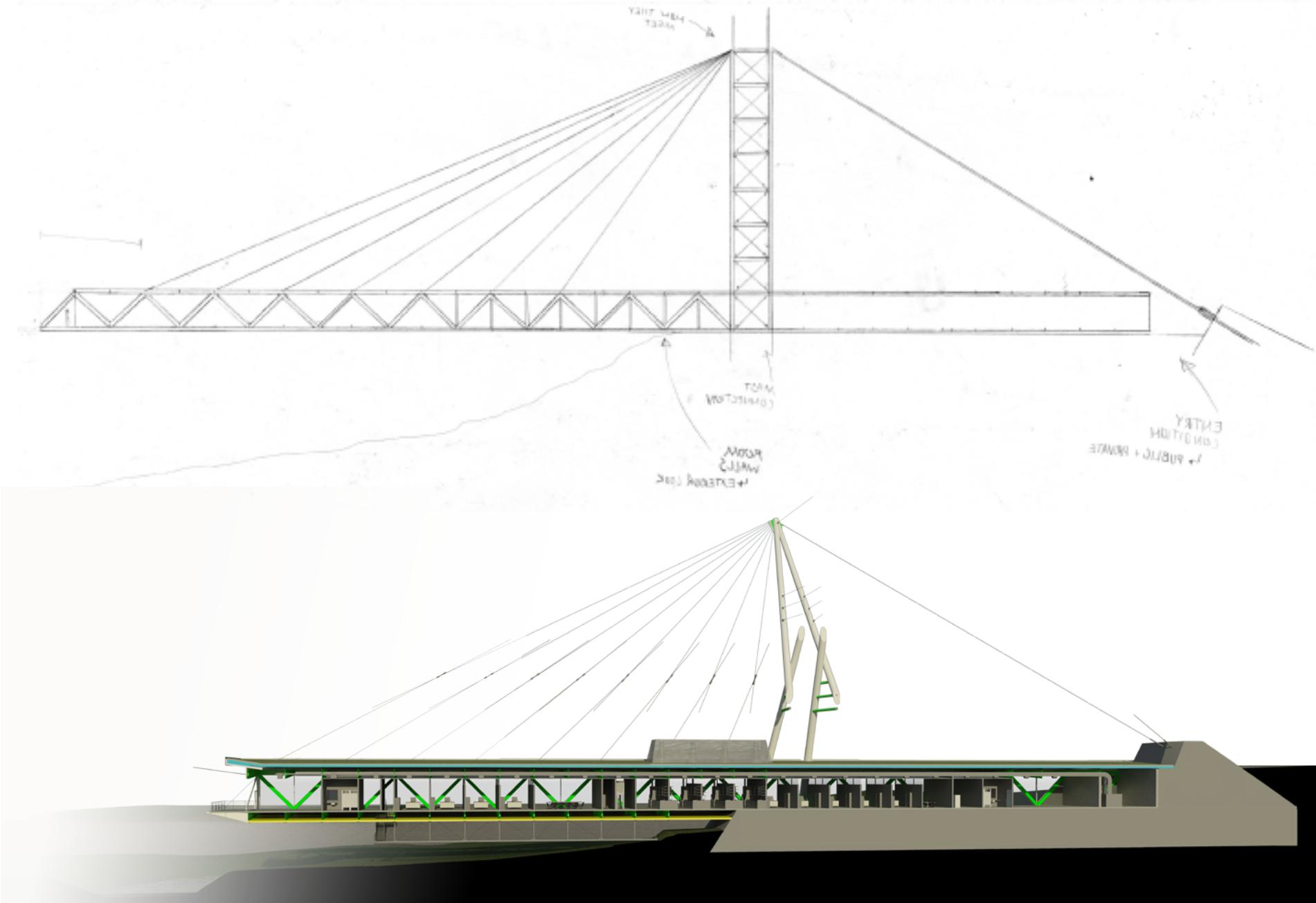
DESIGN PROCESS

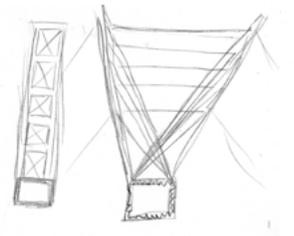
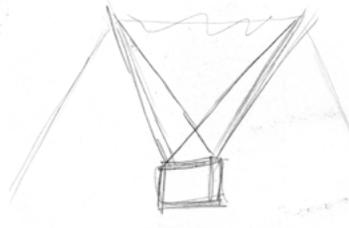
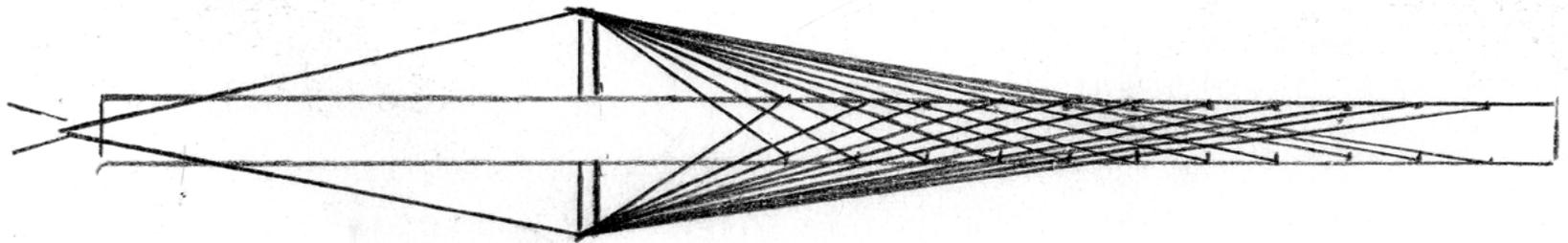
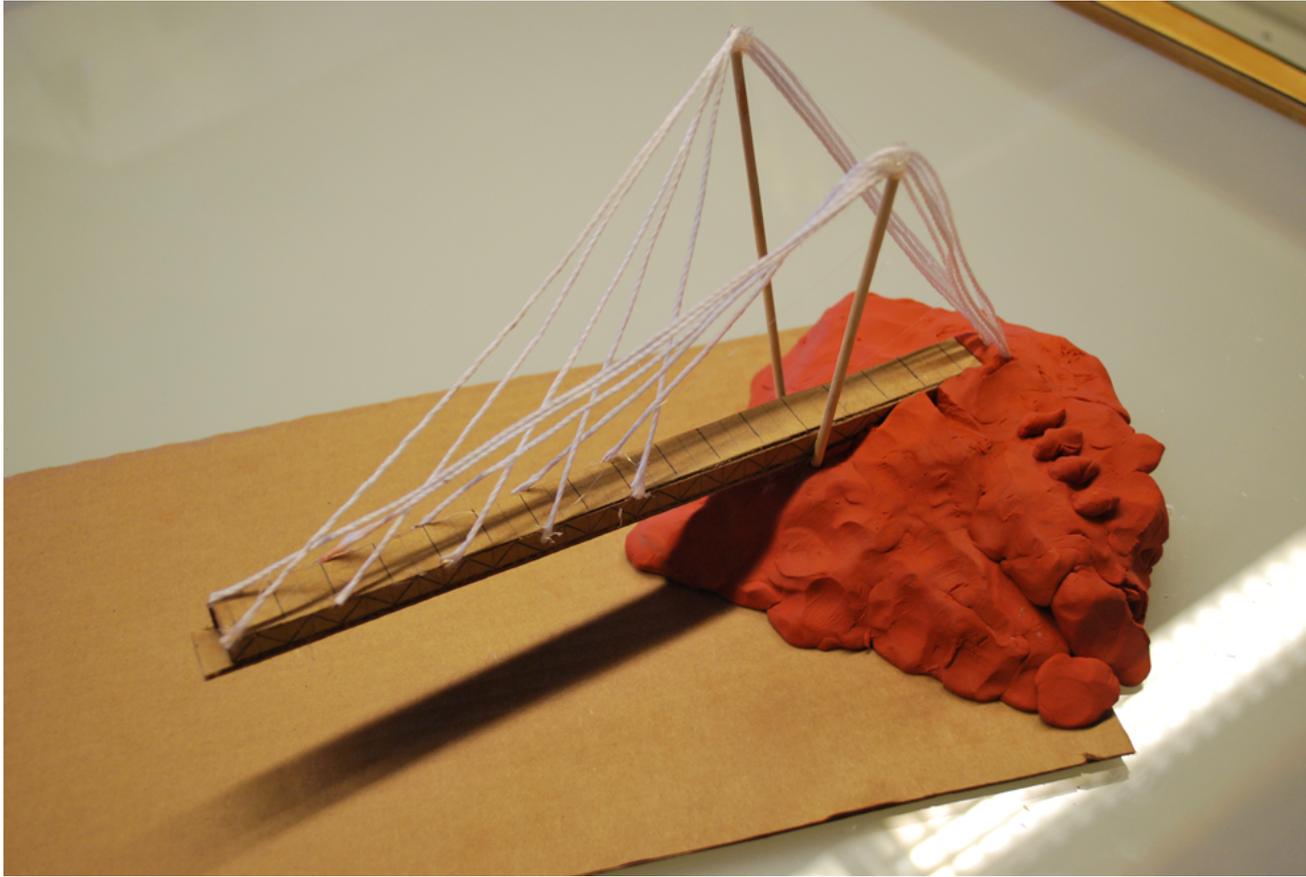
SUN STUDIES



DESIGN PROCESS

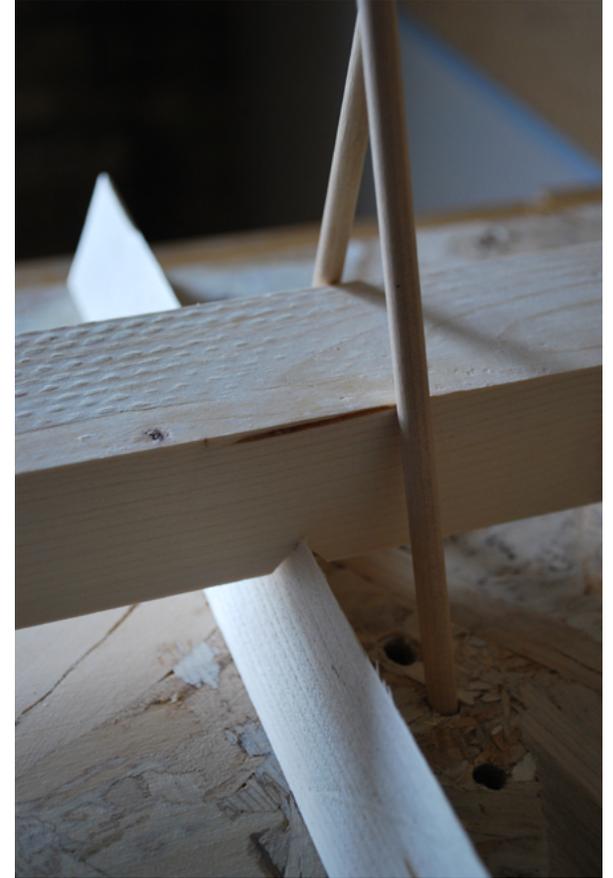
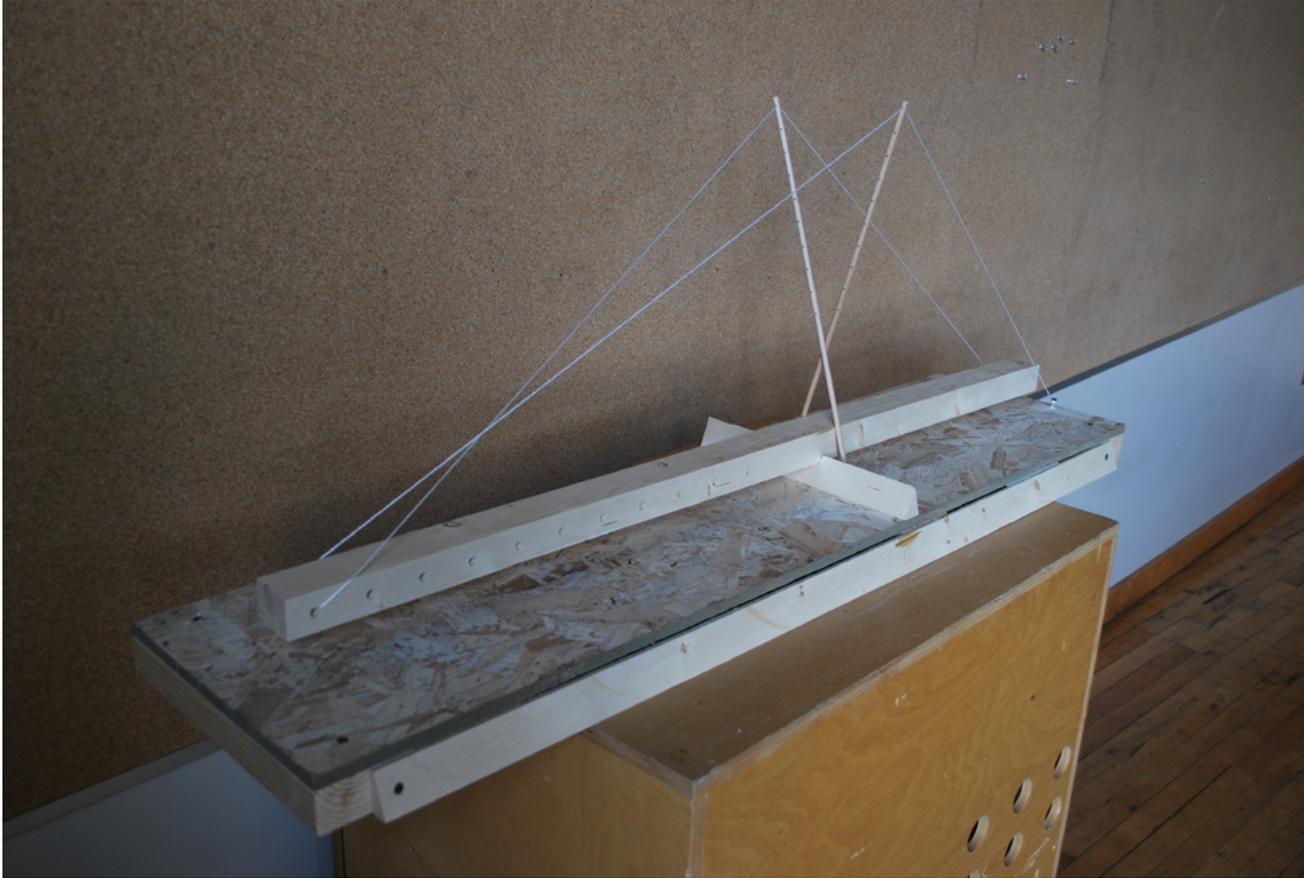
STRUCTURAL

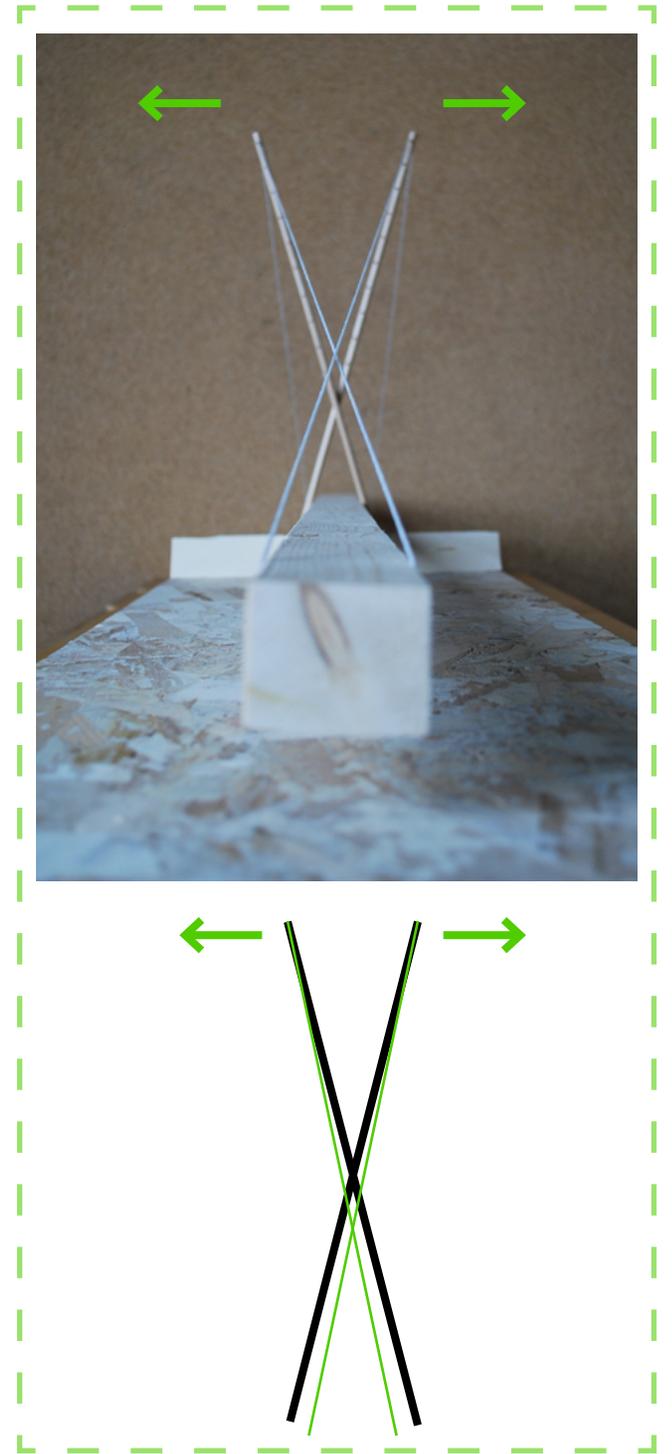
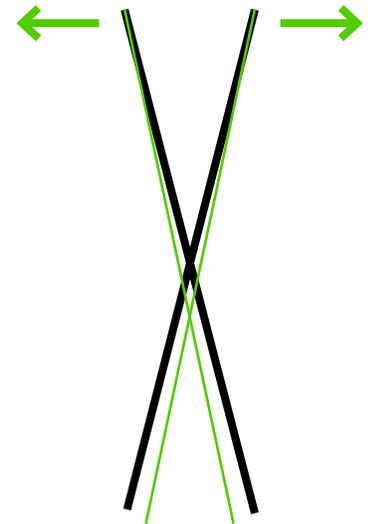
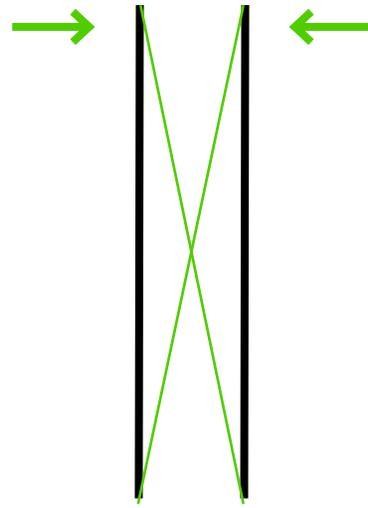
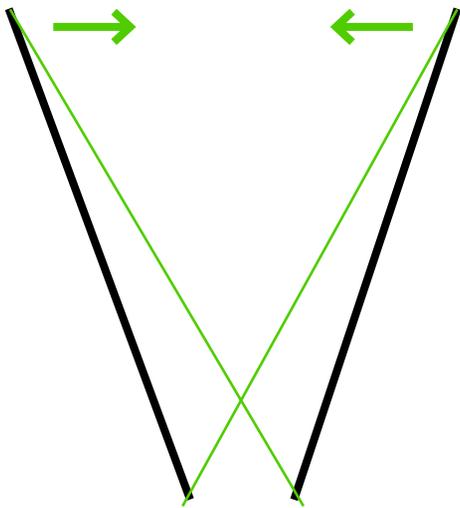
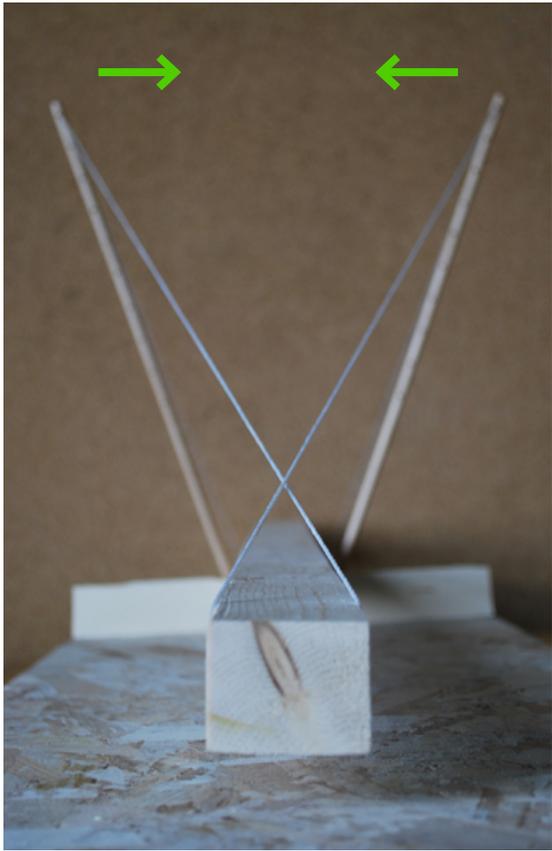


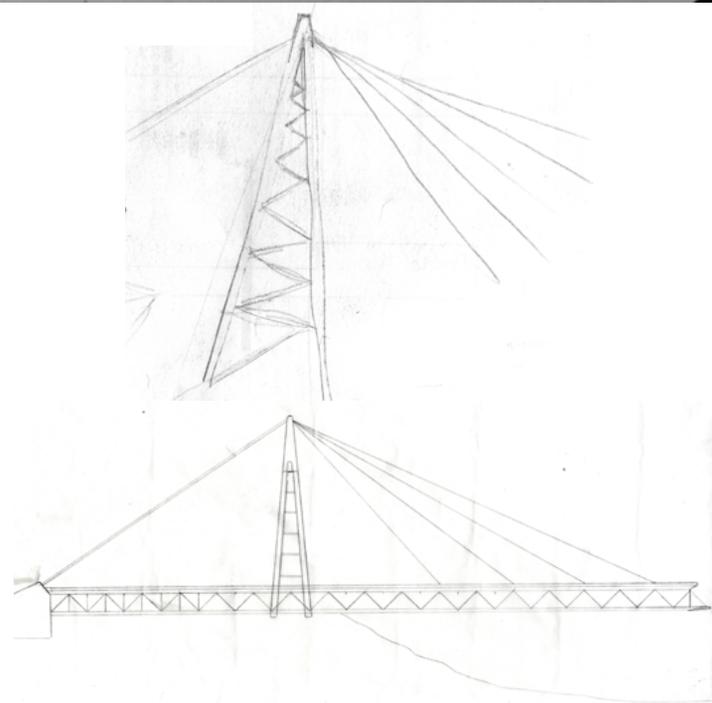
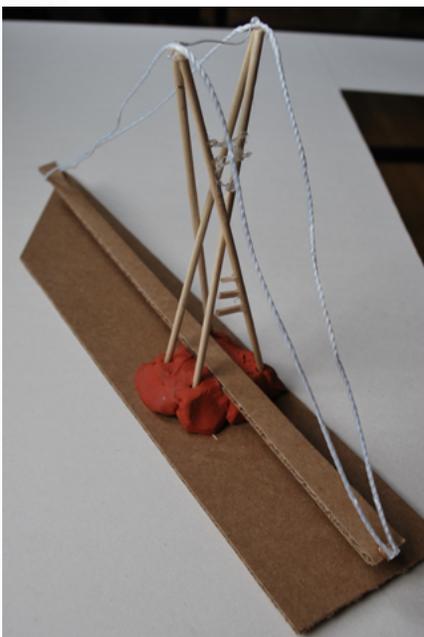
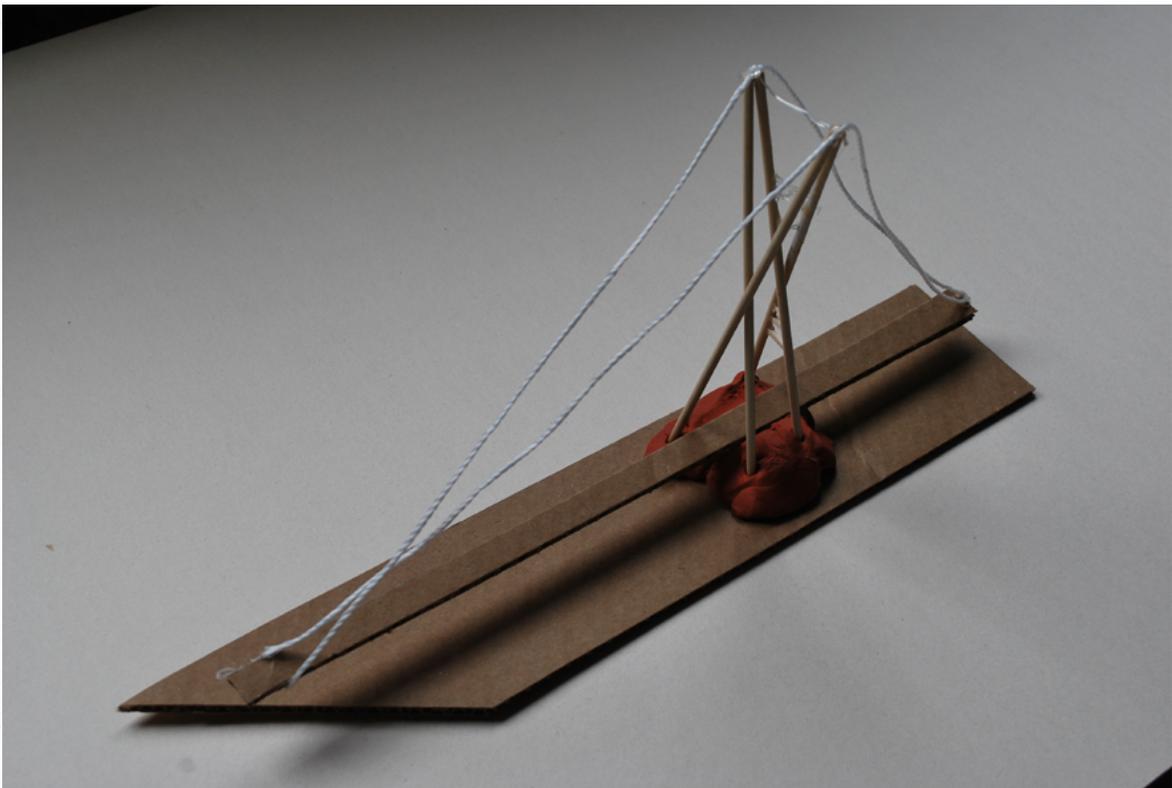
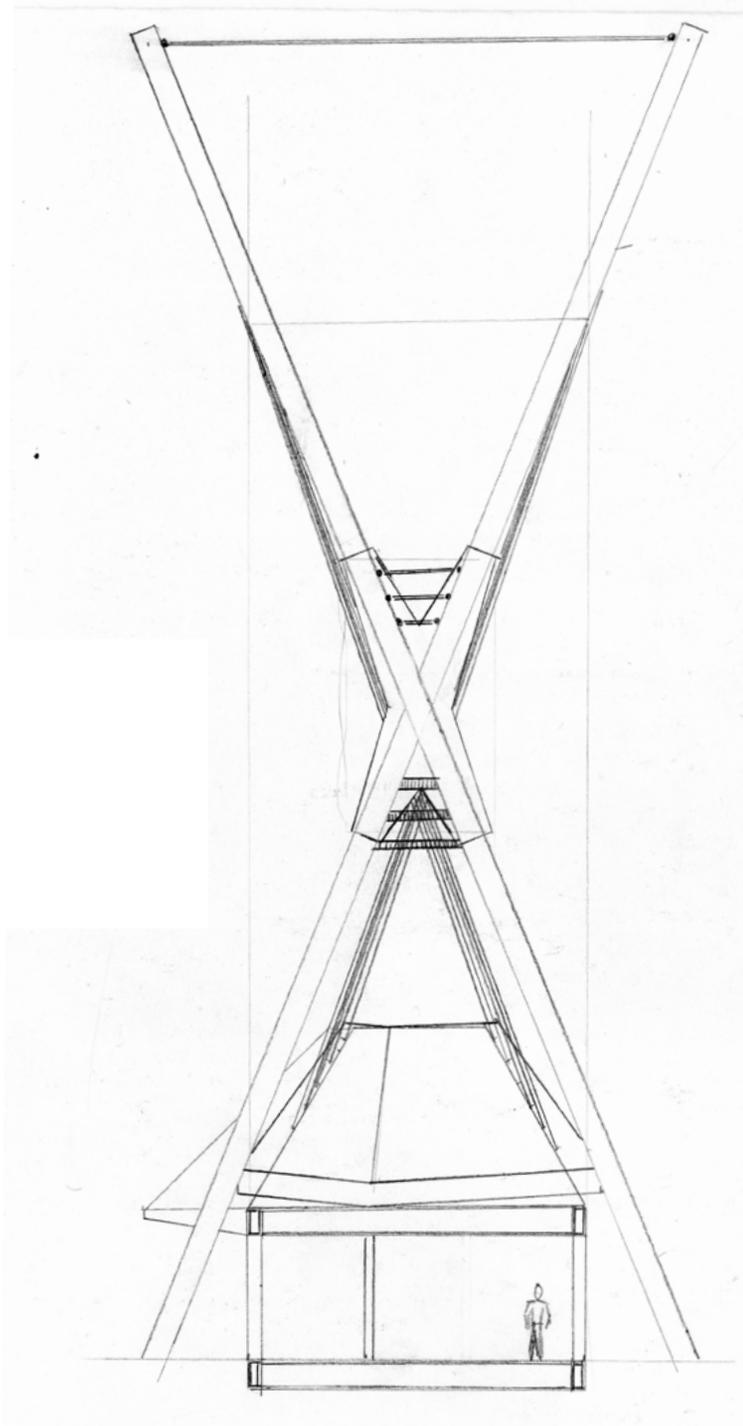


DESIGN PROCESS

STRUCTURAL MODEL

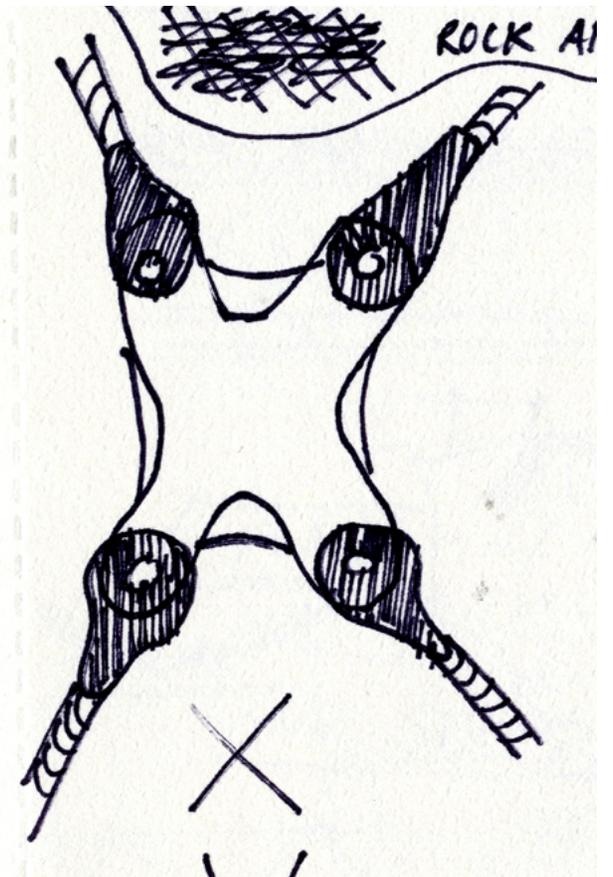
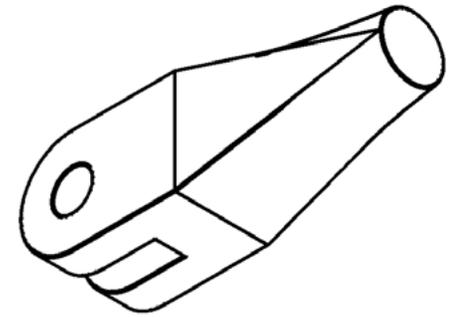
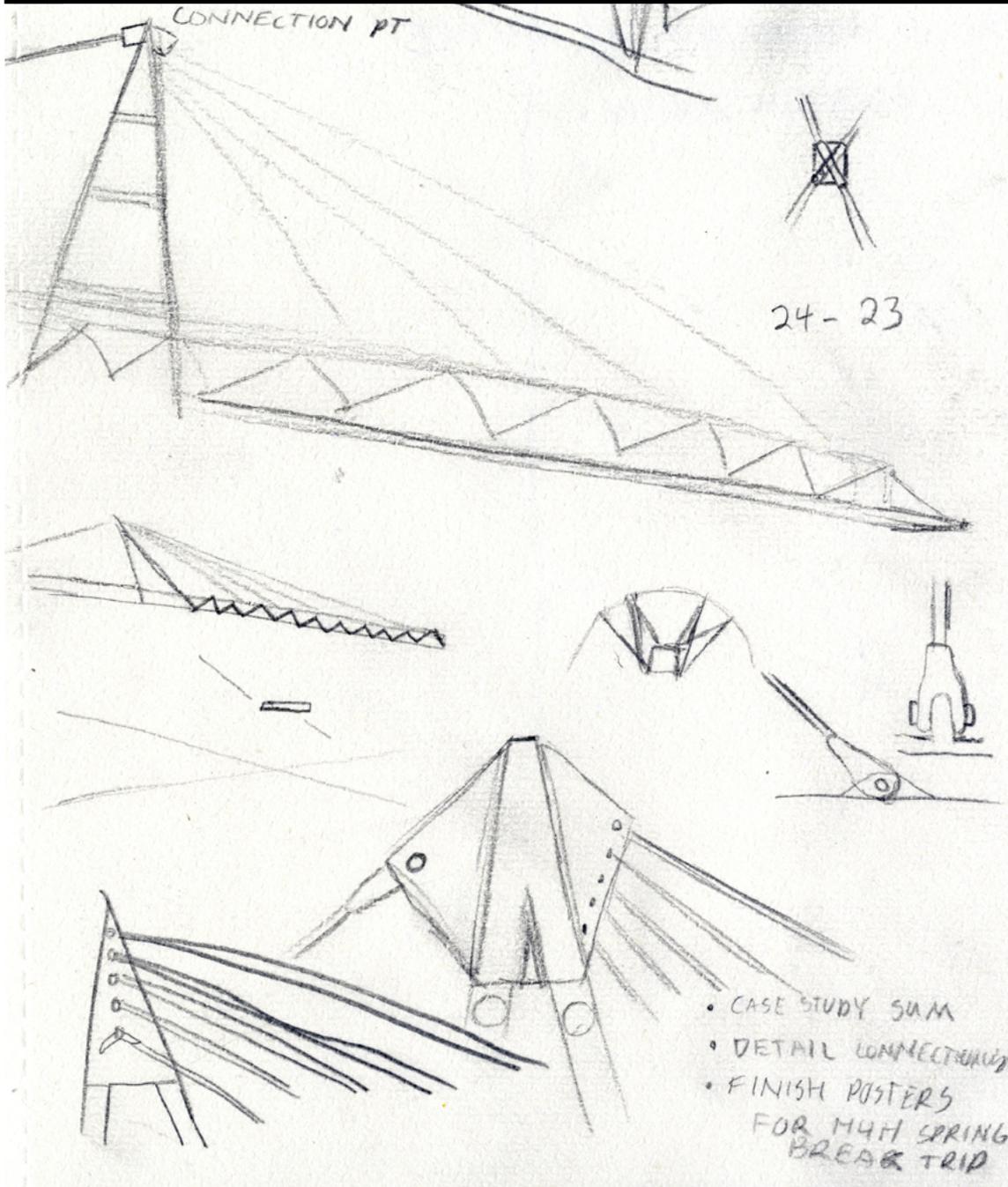


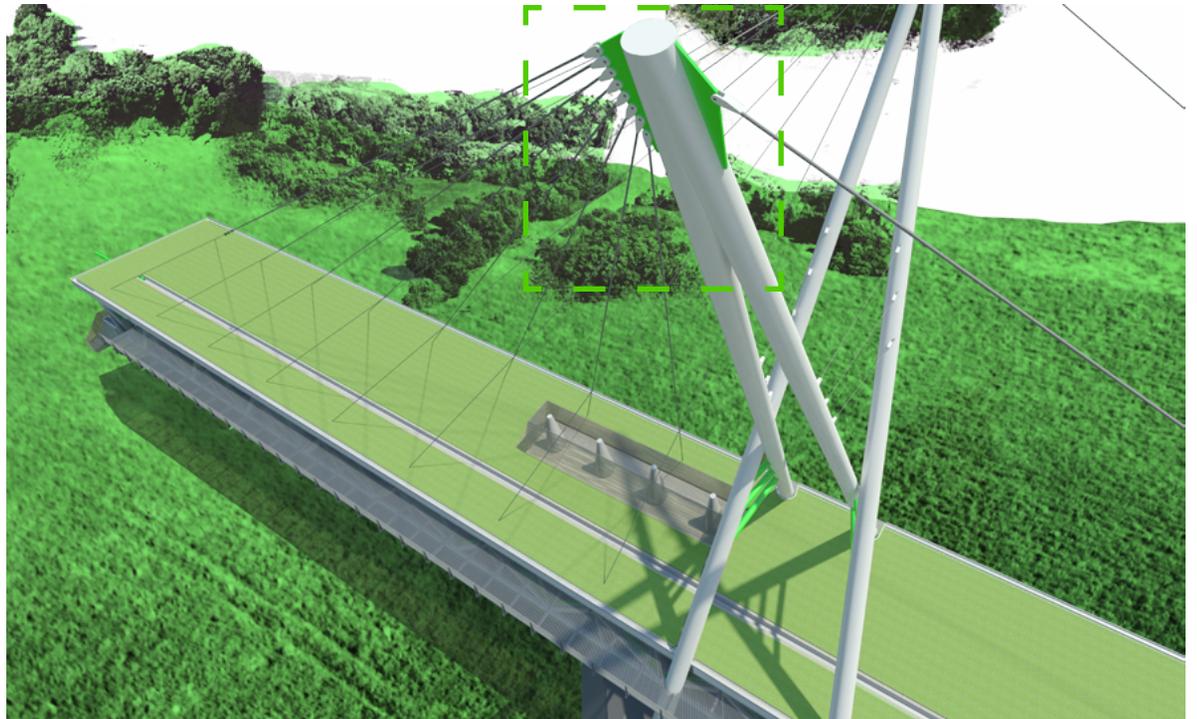
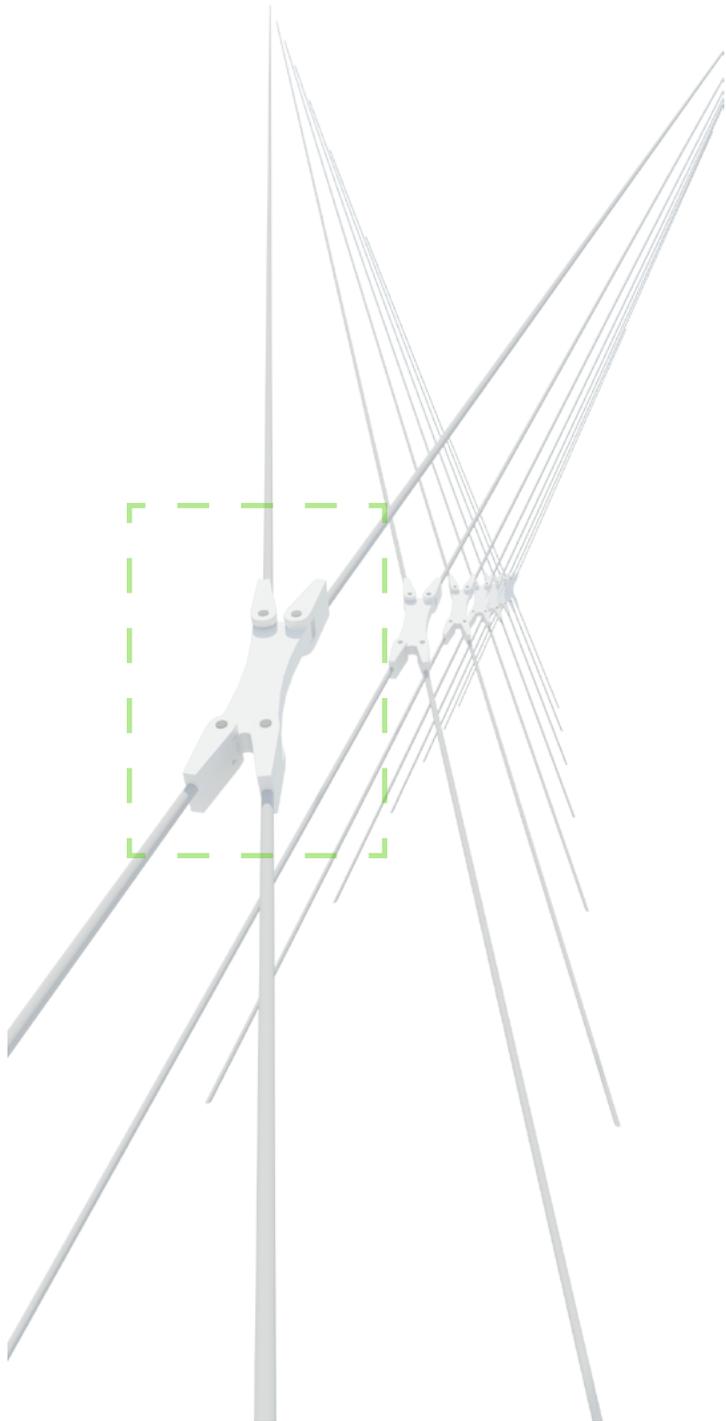




DESIGN PROCESS

STRUCTURAL CONNECTIONS





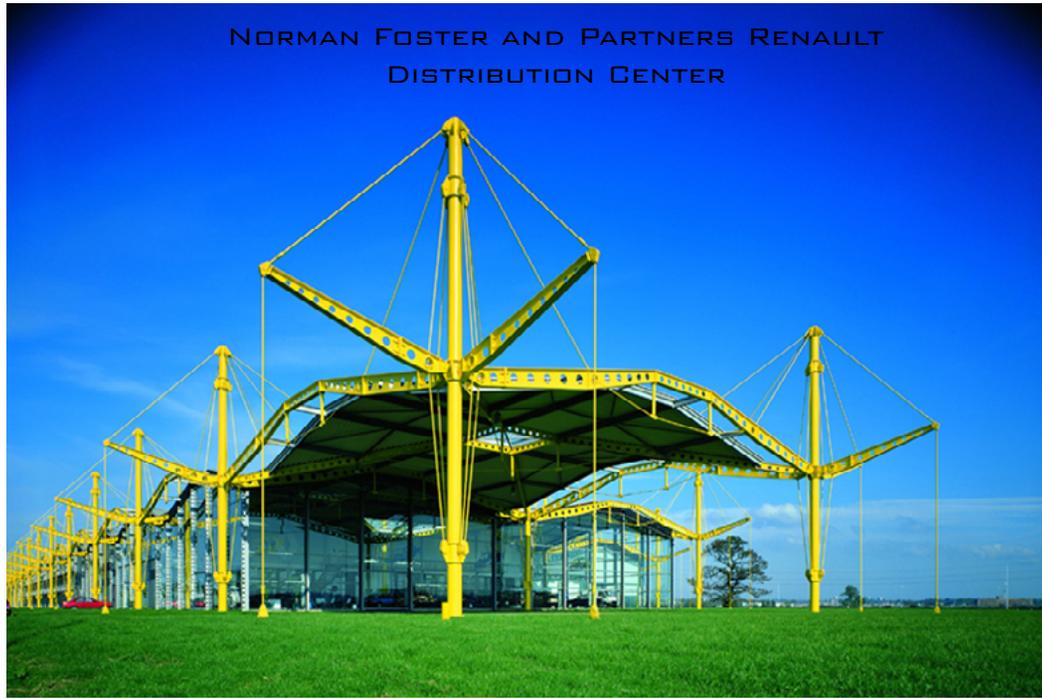
DESIGN PROCESS

CASE STUDIES

SANTIAGO CALATRAVA BRIDGE
TEL AVIV



NORMAN FOSTER AND PARTNERS RENAULT
DISTRIBUTION CENTER

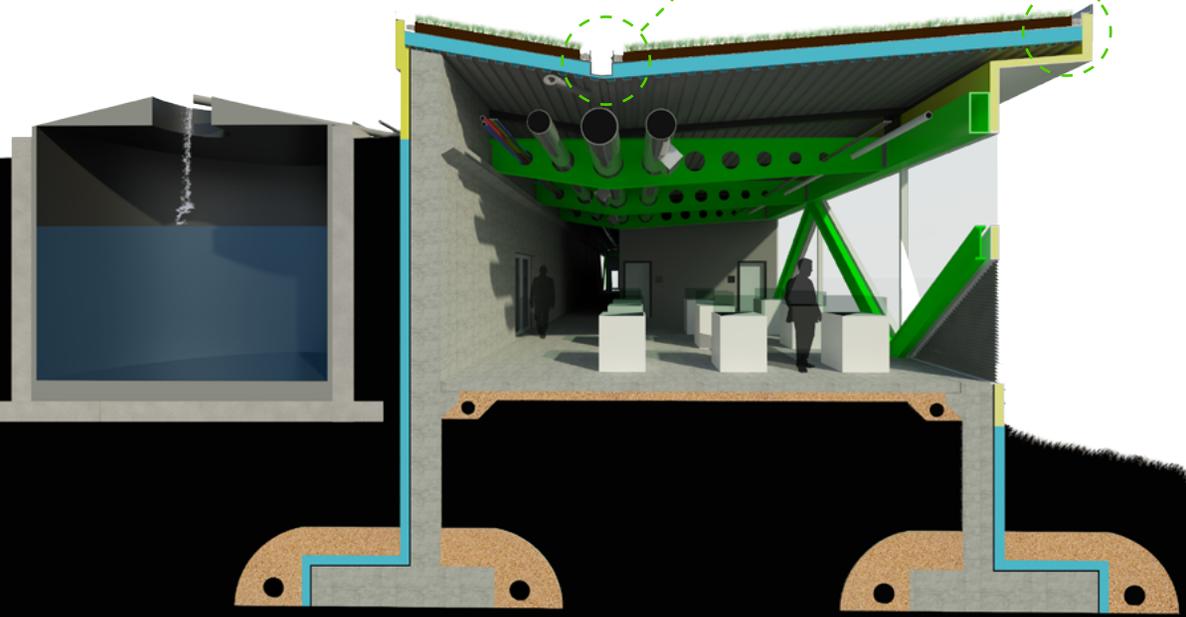
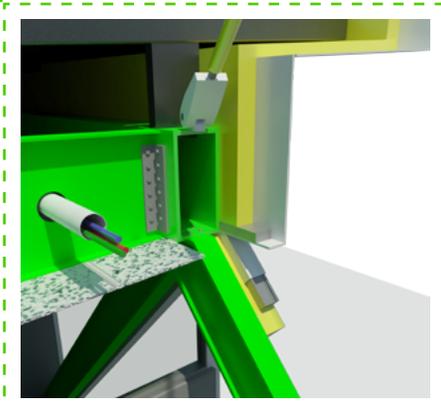
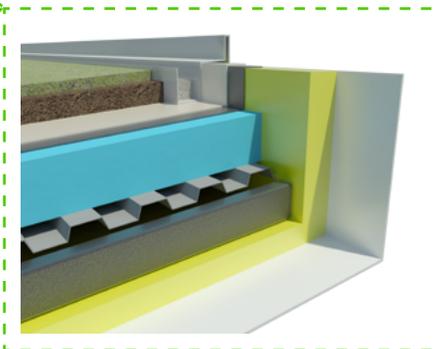
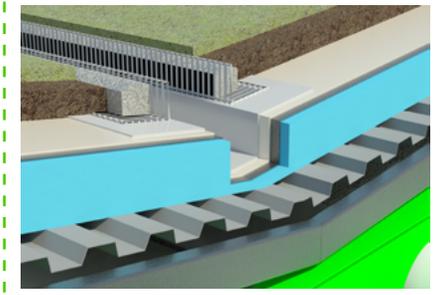
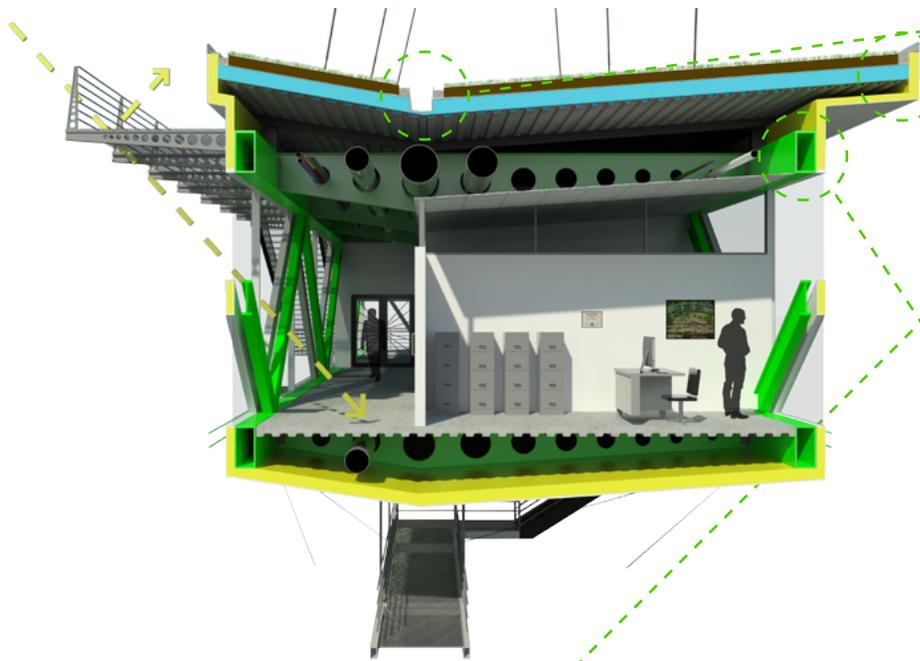


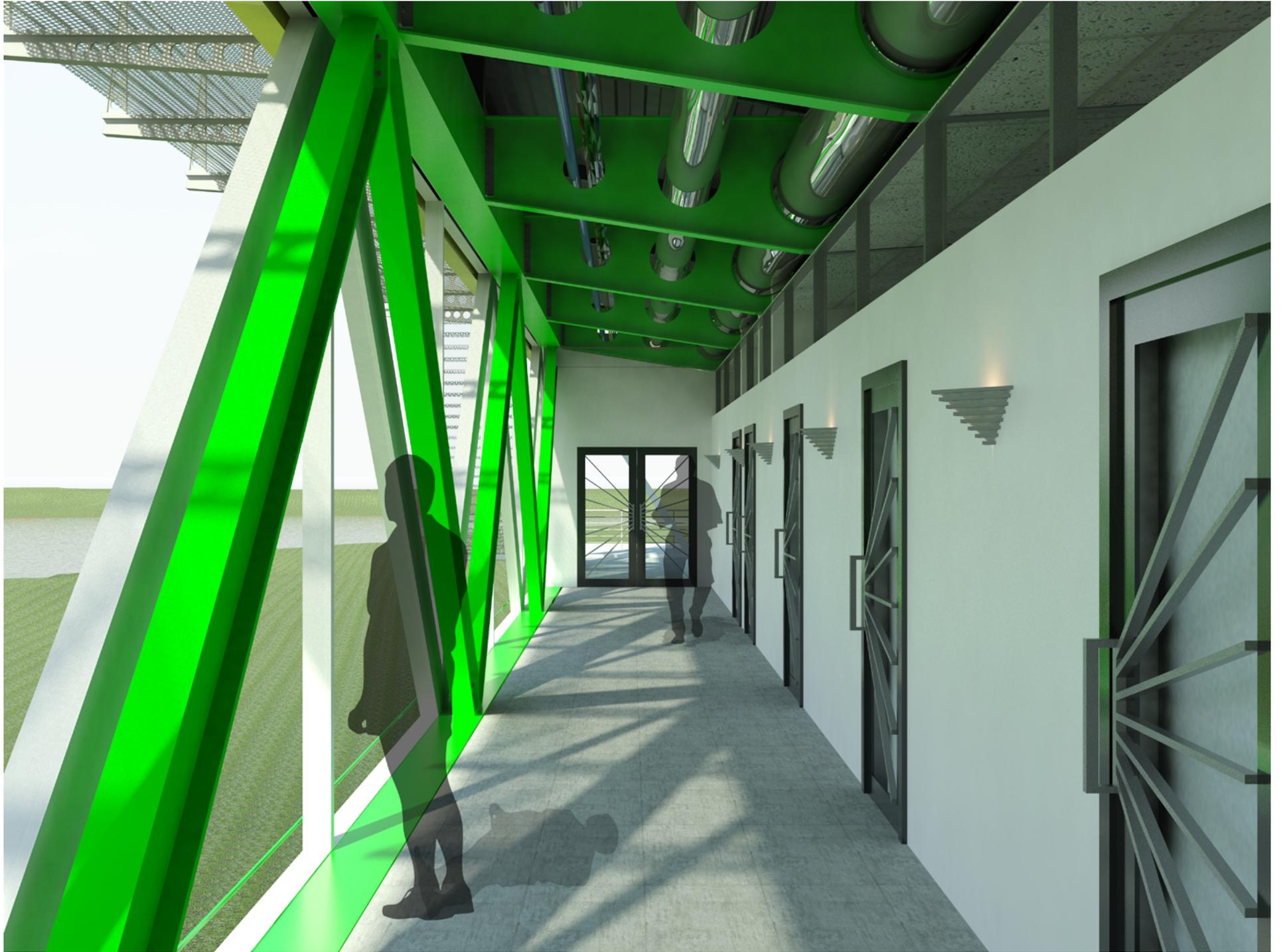
RICHARD ROGERS INMOS MICROPROCESSOR FACTORY



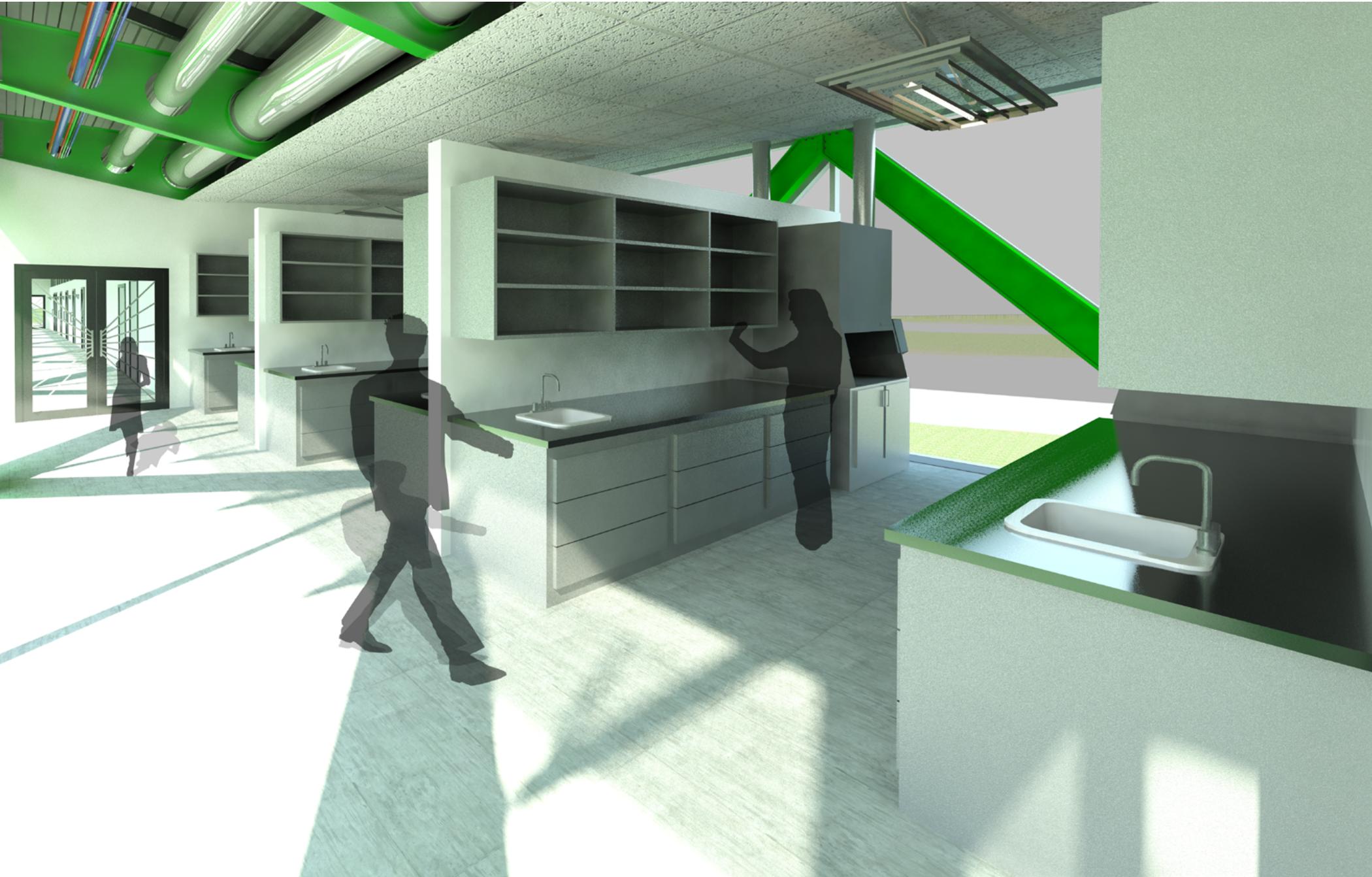
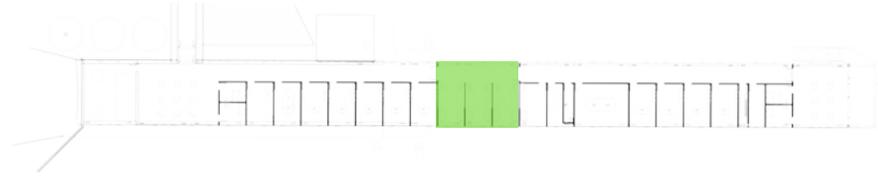
RICHARD ROGERS PATSCENTRE



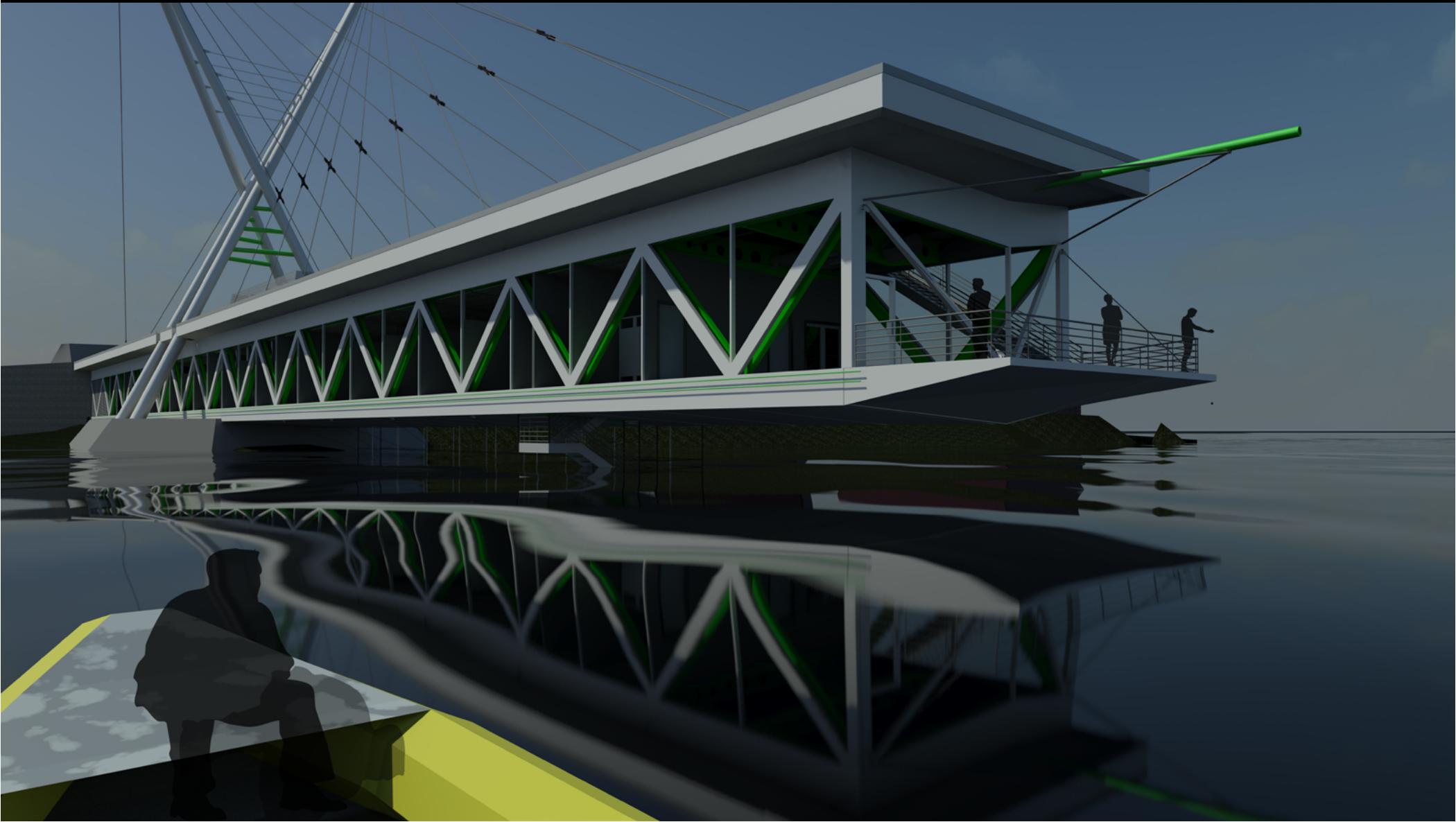




INTERIOR LABRATORY PERSPECTIVE



EXTERIOR 100 YEAR FLOOD PERSPECTIVE



ENTRY



NORTHWEST PERSPECTIVE FROM RIVERFRONT PARK

