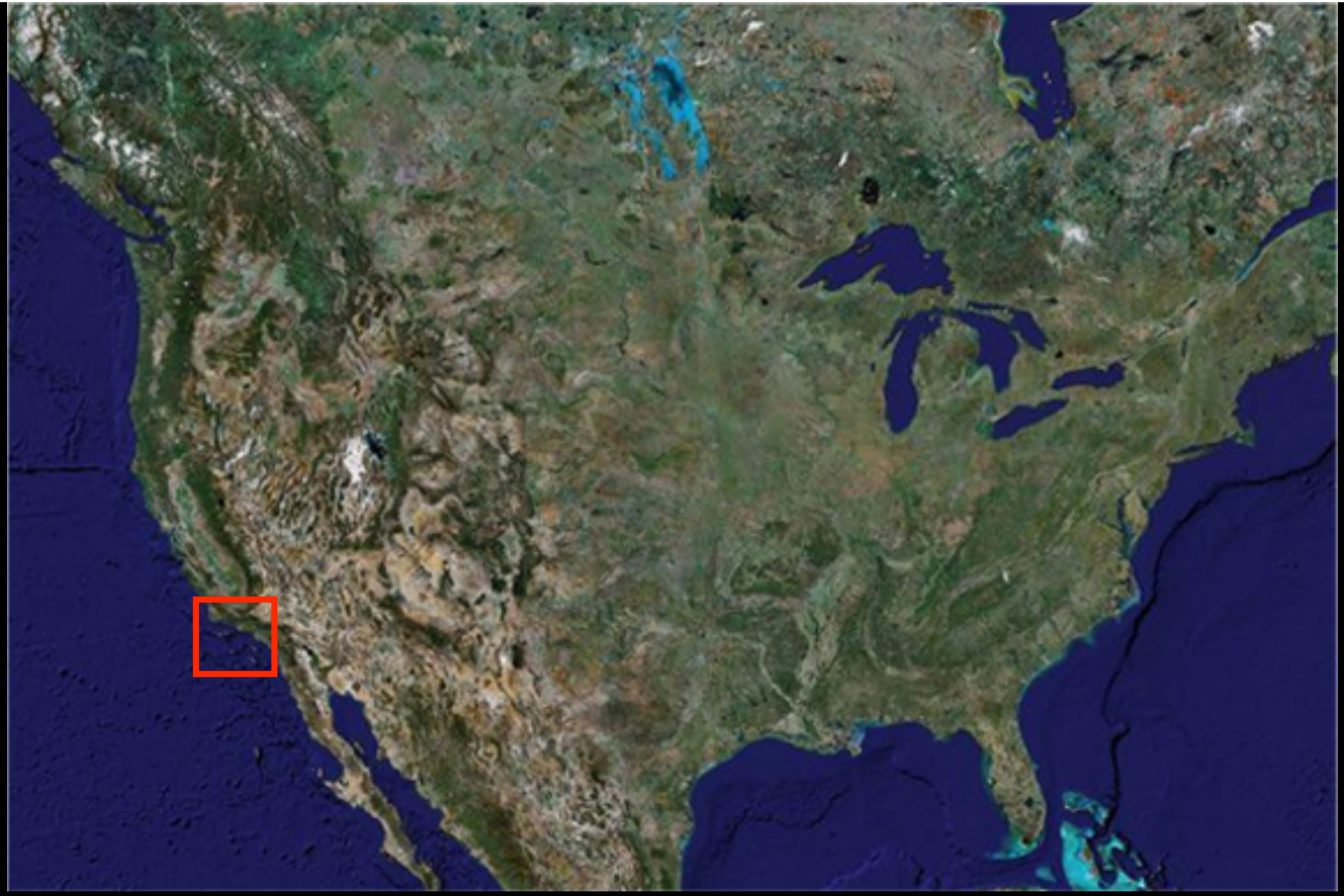
Ventura, California / Fall, 2009

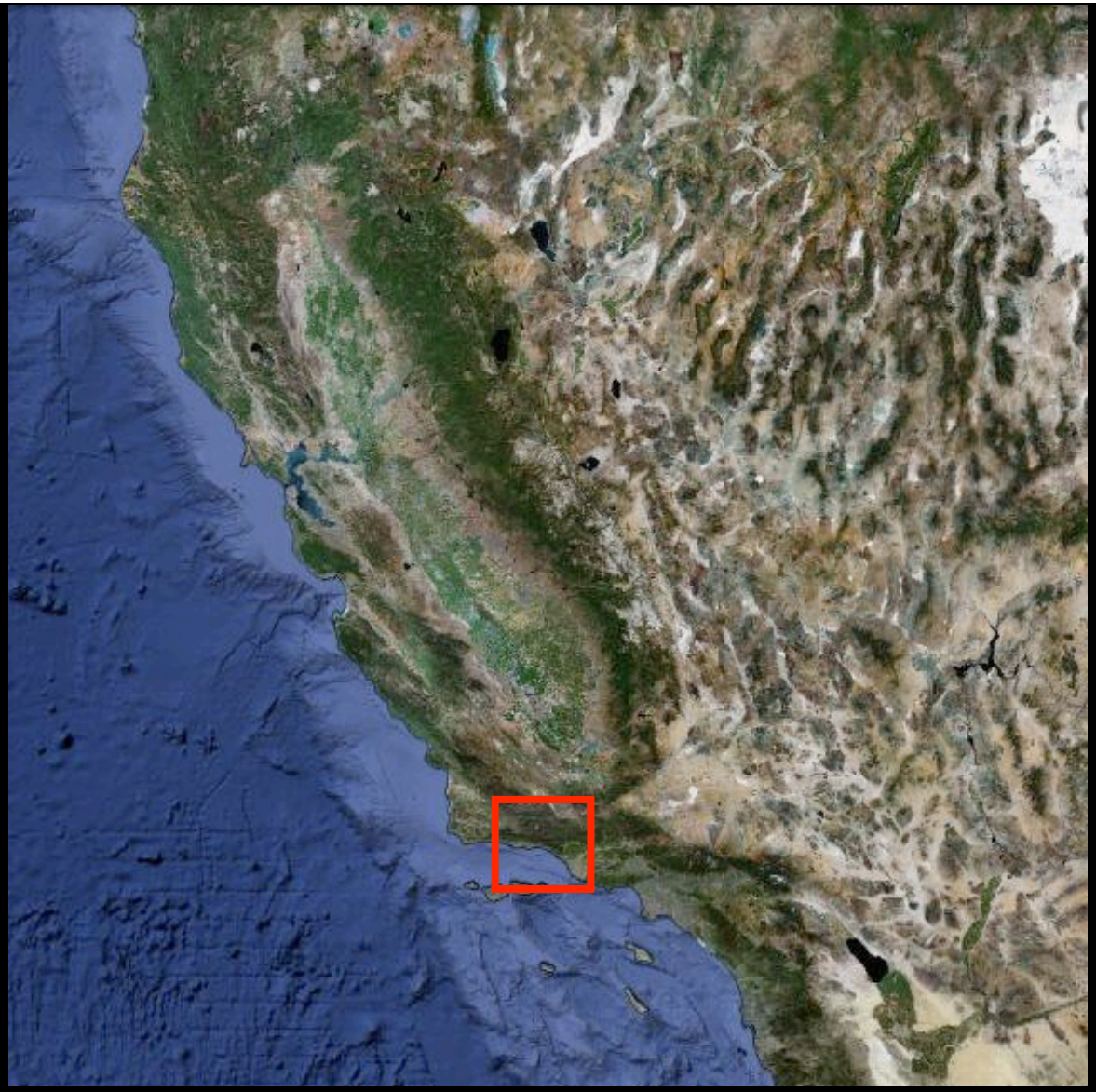
The University of Notre Dame School of Architecture Graduate Urban Design Studio



Ventura in Continental Context

Ventura, California / Fall, 2009

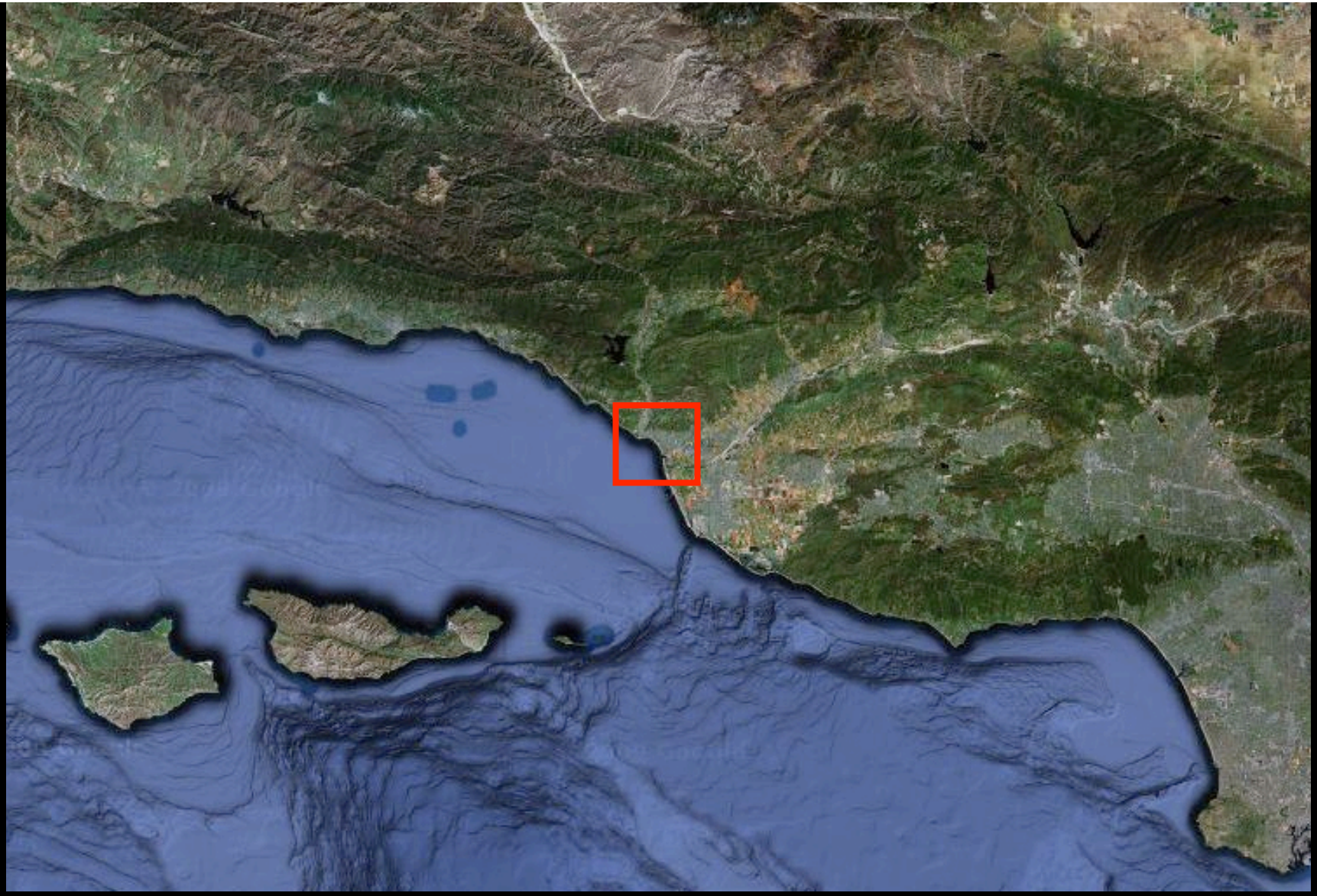
The University of Notre Dame School of Architecture Graduate Urban Design Studio



Ventura in Regional Context

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio



Ventura in Local Context

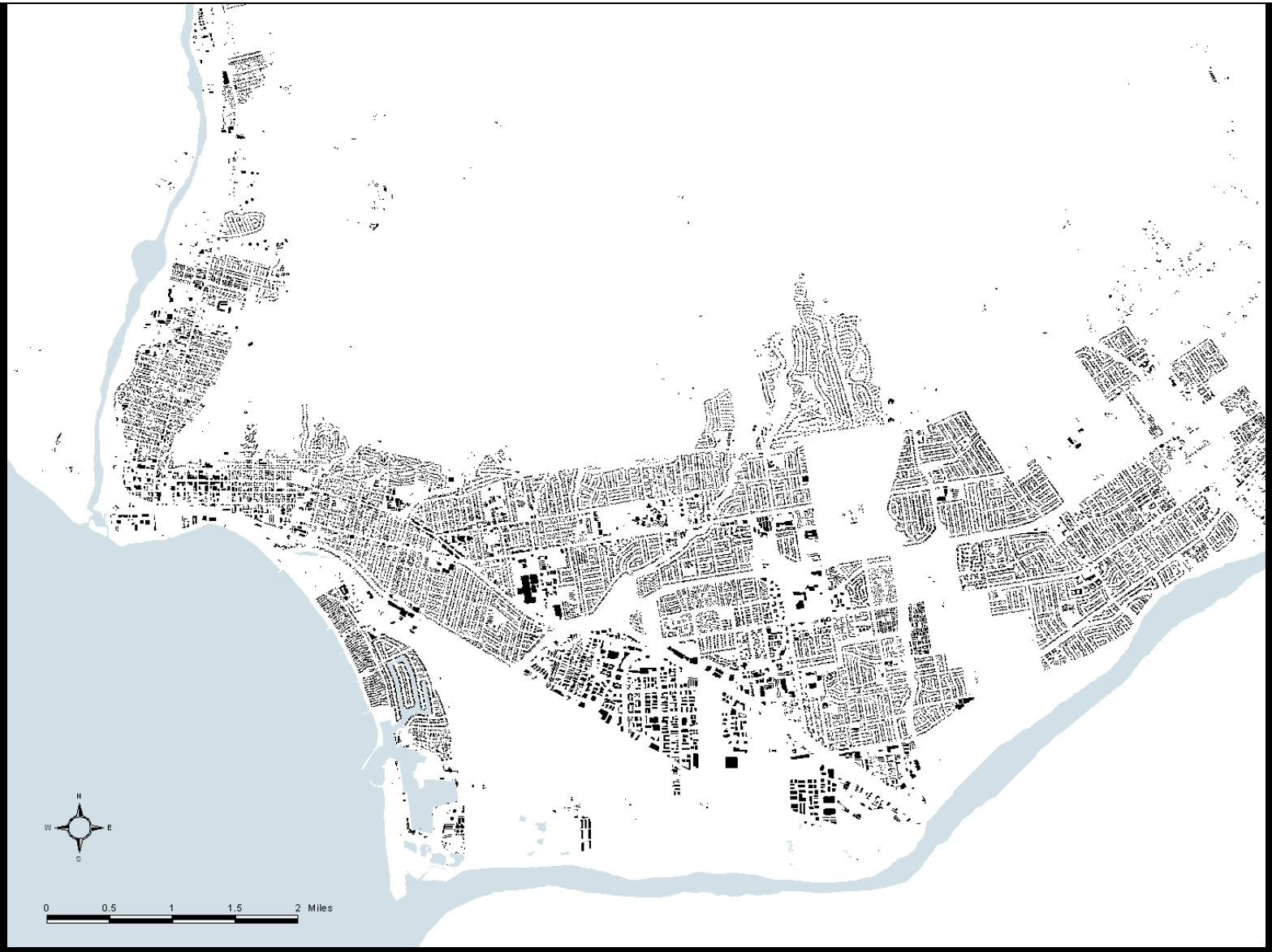
Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Ventura, California

Ventura, California / Fall, 2009

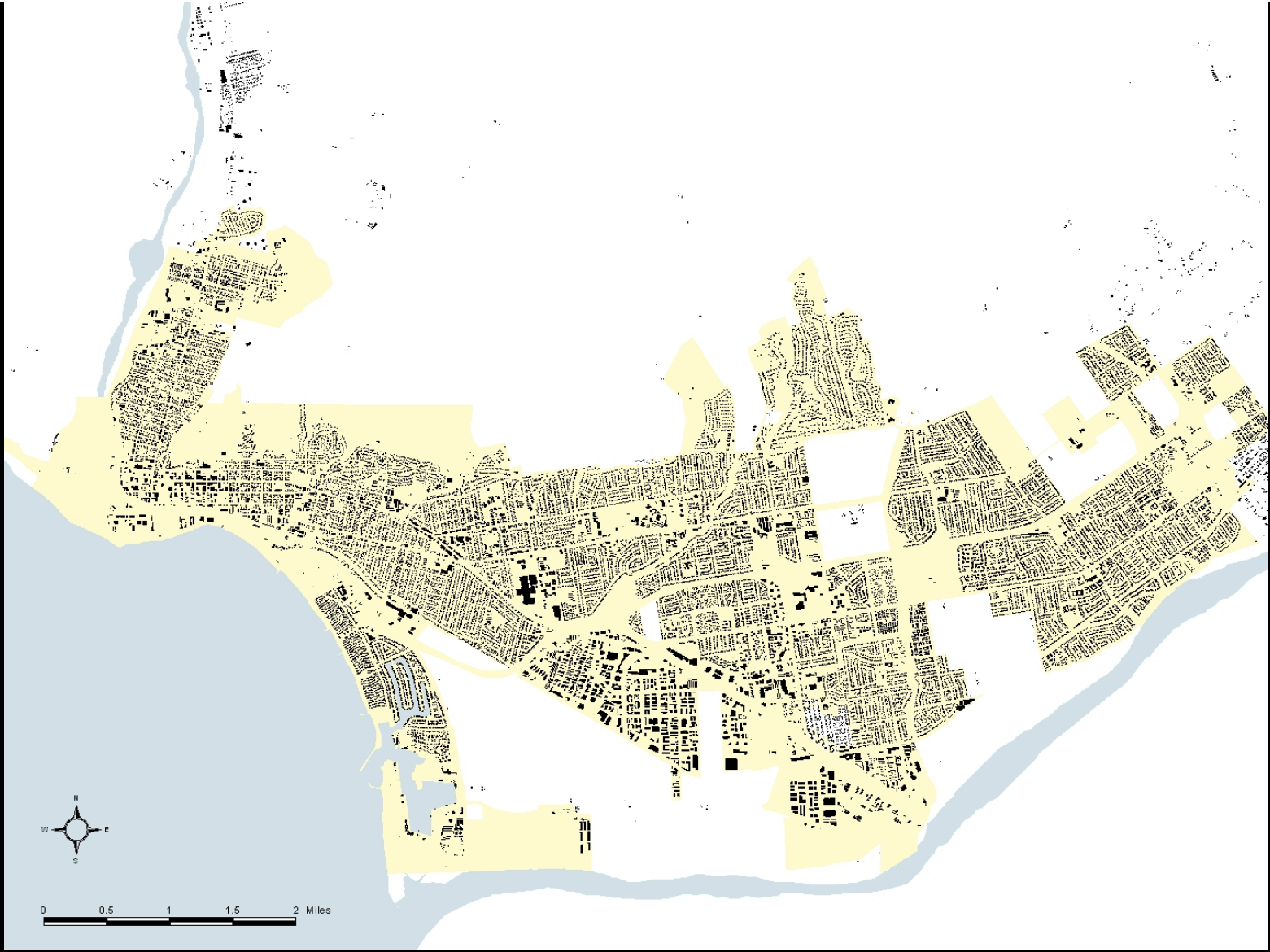
The University of Notre Dame School of Architecture Graduate Urban Design Studio



Existing Buildings in Ventura, California

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio



Existing Buildings in city limits of Ventura, California

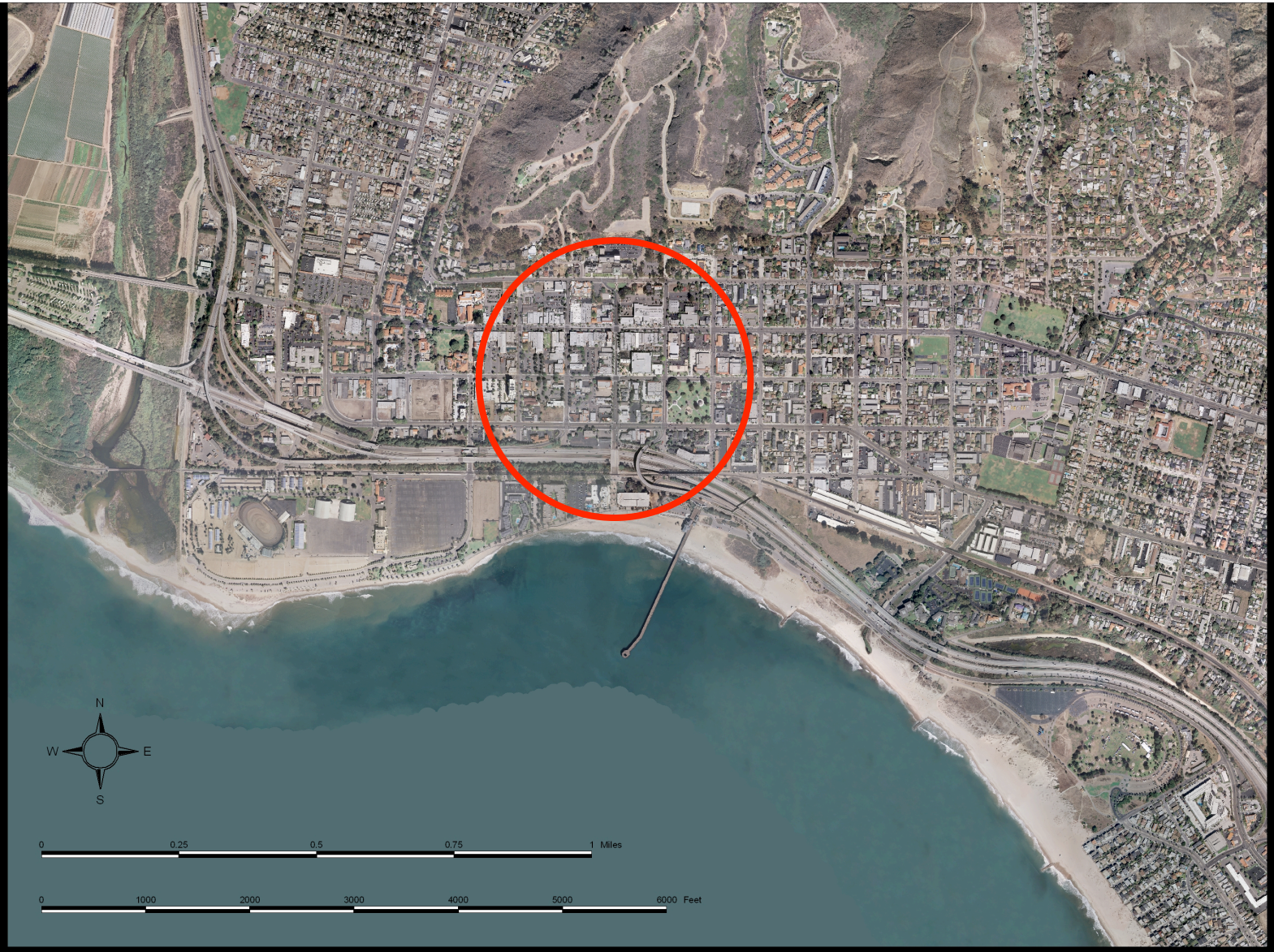
Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Area of Investigation and Proposed Intervention/s

Ventura, California / Fall, 2009

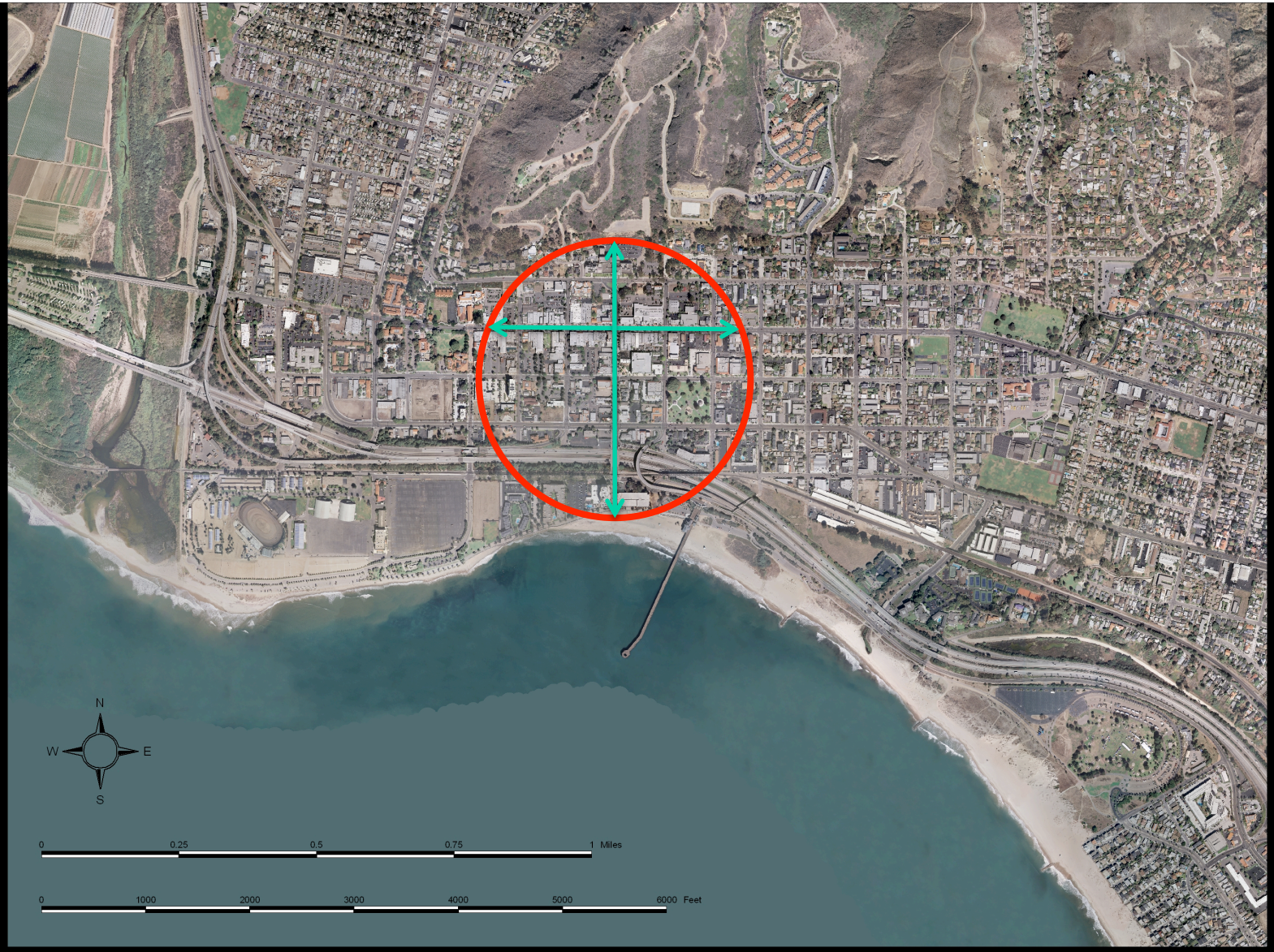
The University of Notre Dame School of Architecture Graduate Urban Design Studio



Area/s of Proposed Intervention/s: Downtown / Historic Center

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio



Area/s of Proposed Intervention/s: Downtown / Historic Center

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Area/s of Proposed Intervention/s: Downtown / Historic Center – “Heart of the City”

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Area/s of Proposed Intervention/s

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half Mile diameter circle / 10 minute walk : Downtown

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half Mile diameter circle / 10 minute walk : Mission

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half Mile diameter circle / 10 minute walk : Fairgrounds

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half mile diameter circle / 10 minute walk : Pier

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half mile diameter circle / 10 minute walk : State Beach

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Half mile diameter circles / 10 minute edge-to-edge walks

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Analysis of Existing Condition: Parks and Open Land

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Analysis of Existing Condition: Barriers and Boundaries

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Analysis of Existing Condition: Connected and Interrupted Streets

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Preliminary Freeway Intervention Proposals (for the moment set aside):
Freeway to Boulevard at existing freeway grade (top), Freeway to Boulevard at city street level (below)

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Large Freeway Cap – Master Plan

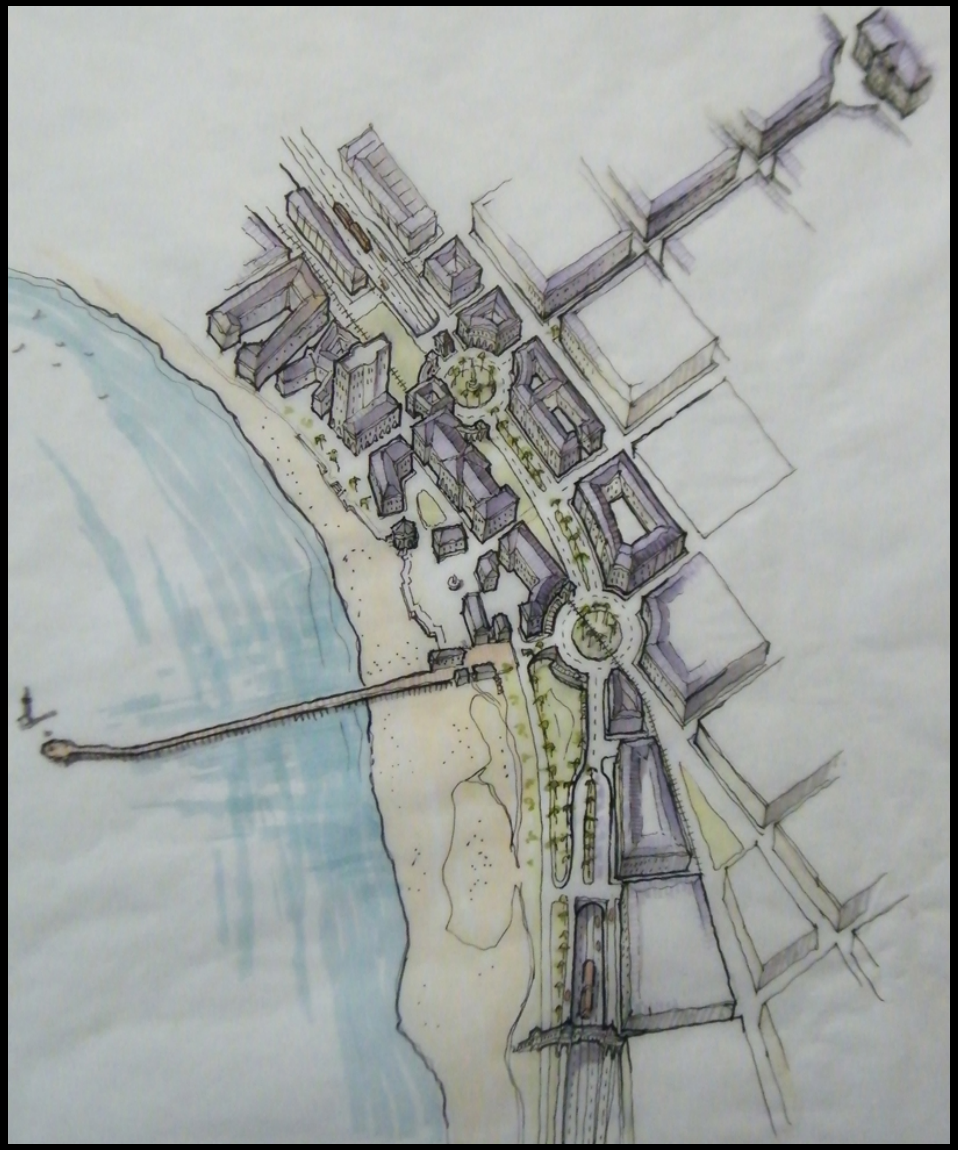
Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Freeway Existing Conditions

Ventura, California / Fall, 2009

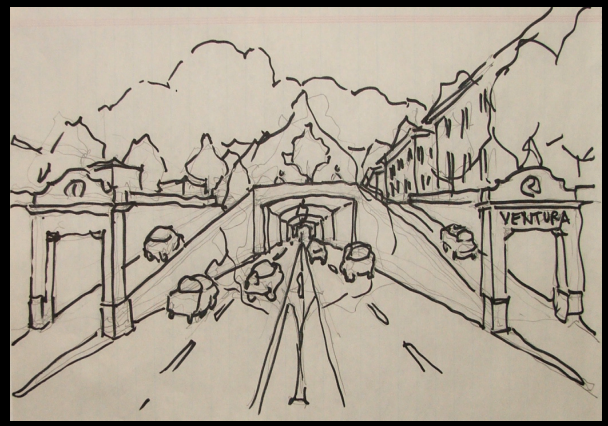
The University of Notre Dame School of Architecture Graduate Urban Design Studio

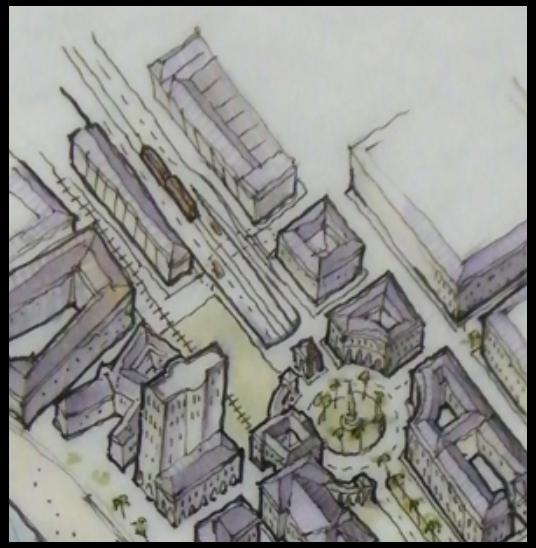


Large Cap – Axonometric view

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio





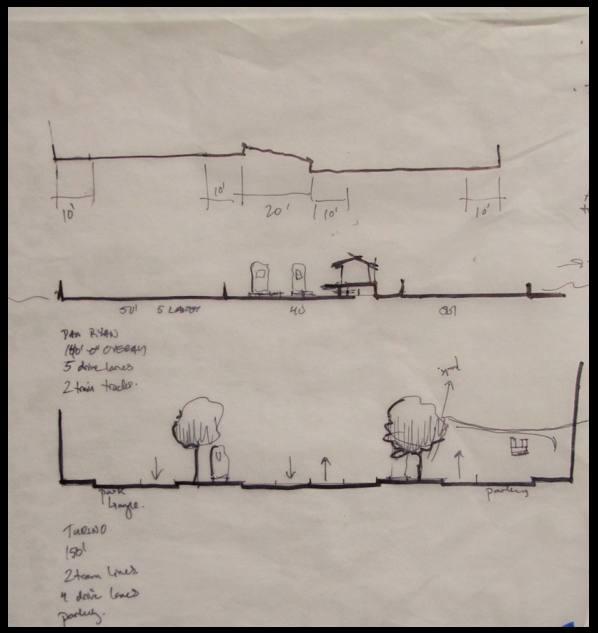
North Ramp

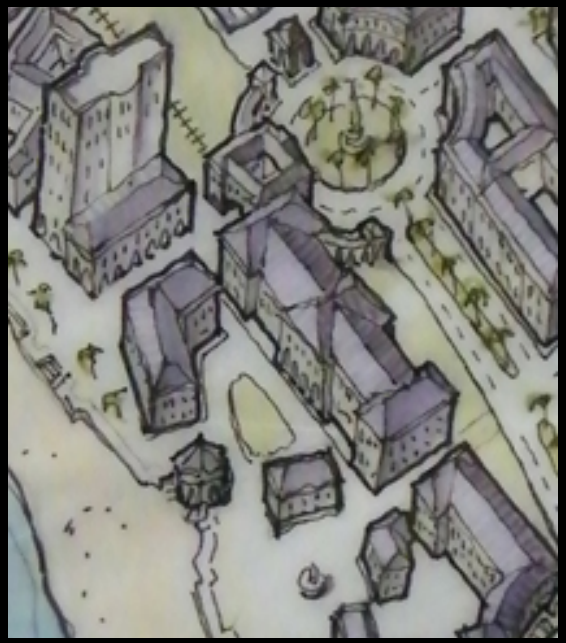
Large Cap – Freeway Intervention

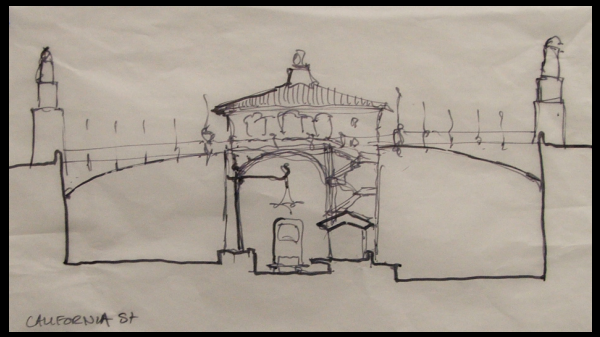
South Ramp

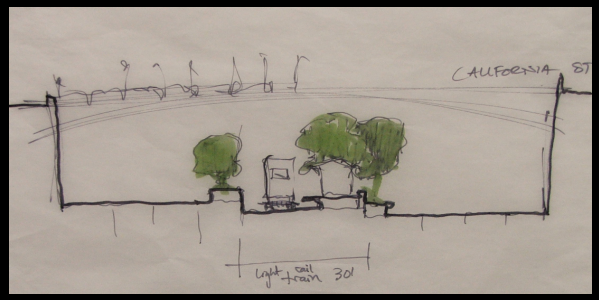
Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

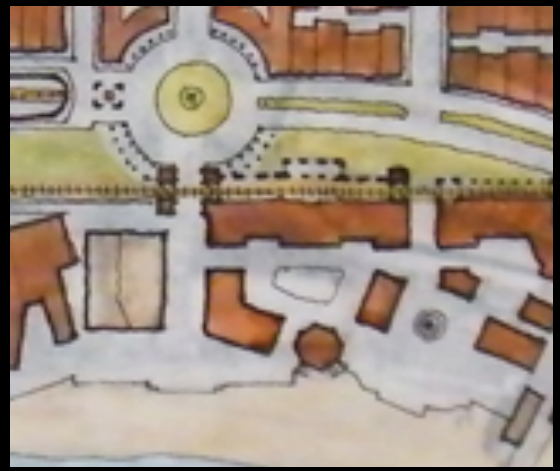








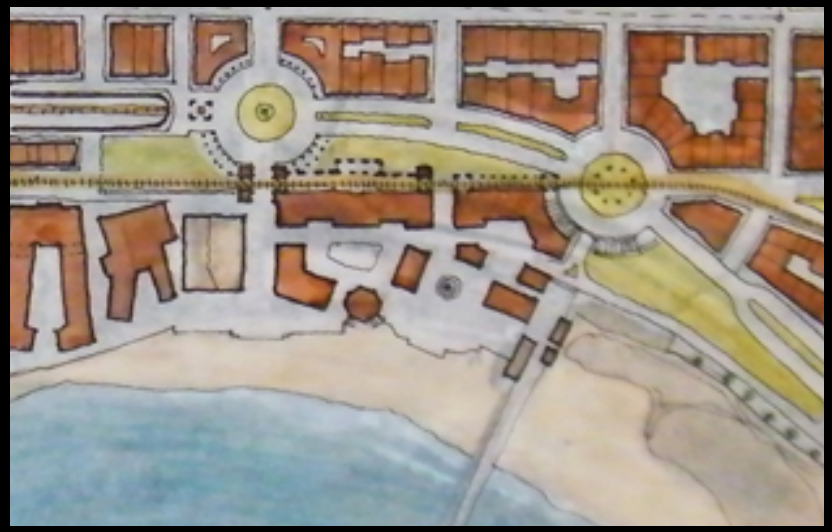
Large Cap – Train station

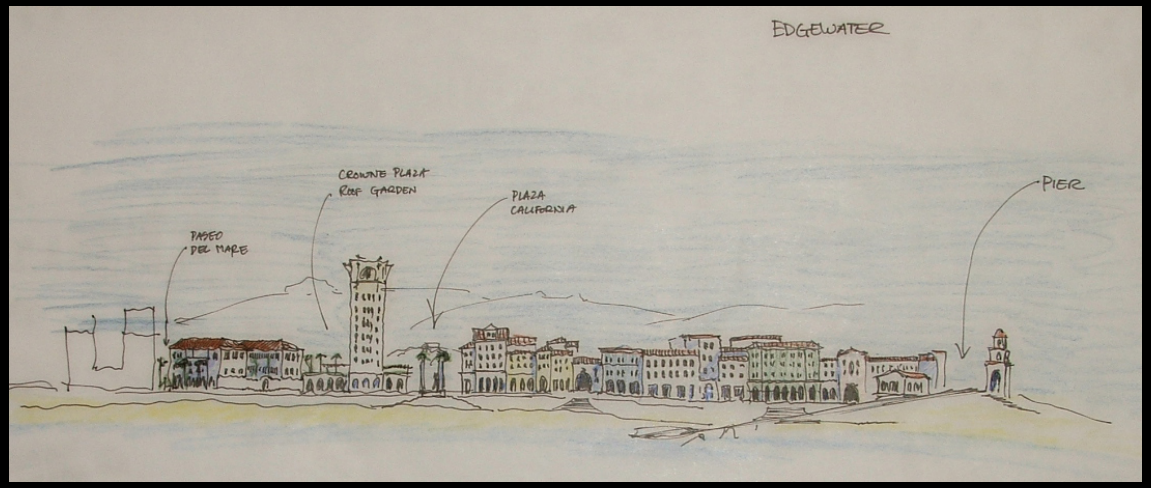


Large Cap – Light Rail

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

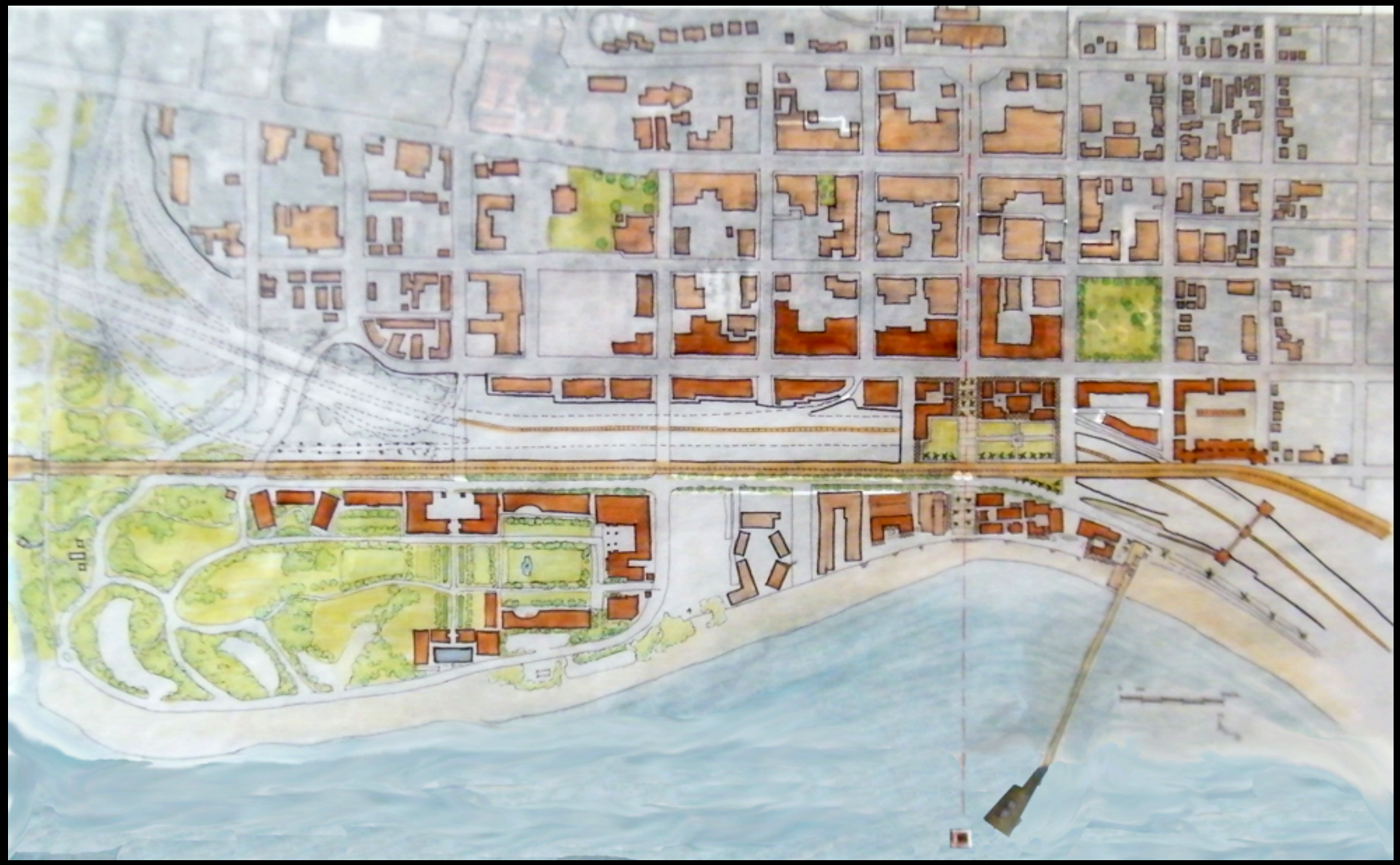




Large Cap – Edgewater Intervention

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio



Small Freeway Cap Proposal

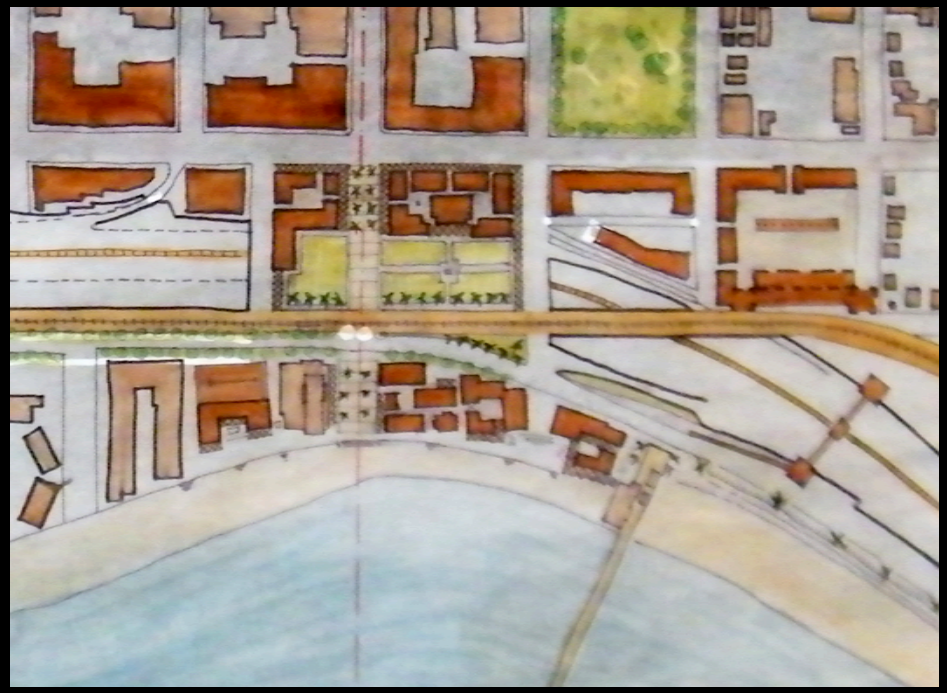
Ventura, California / Fall, 2009

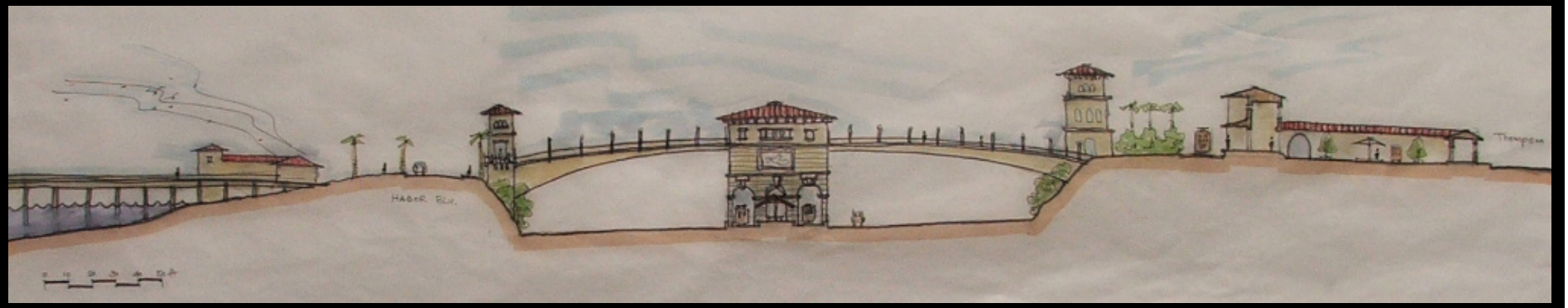
The University of Notre Dame School of Architecture Graduate Urban Design Studio

Freeway Existing Conditions

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

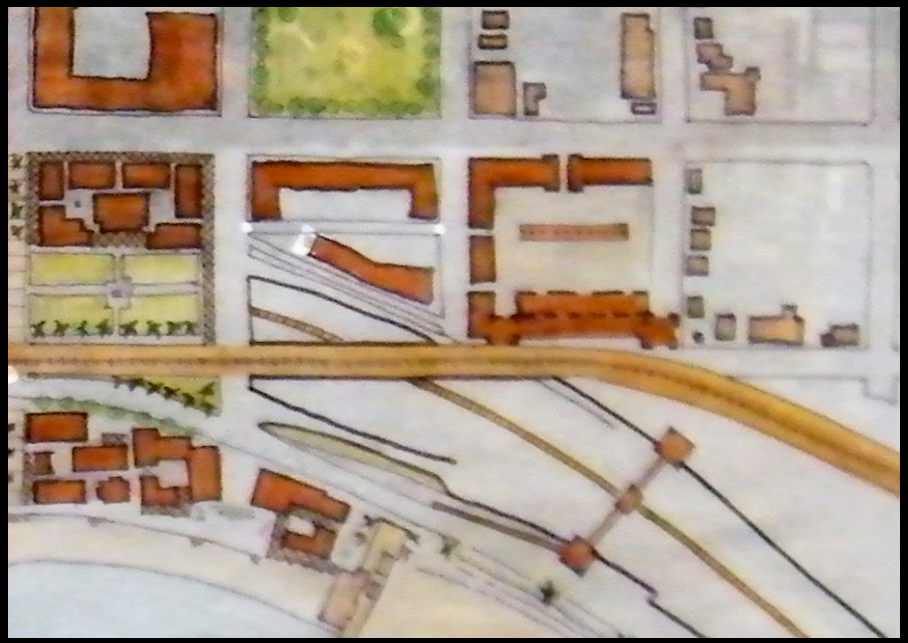


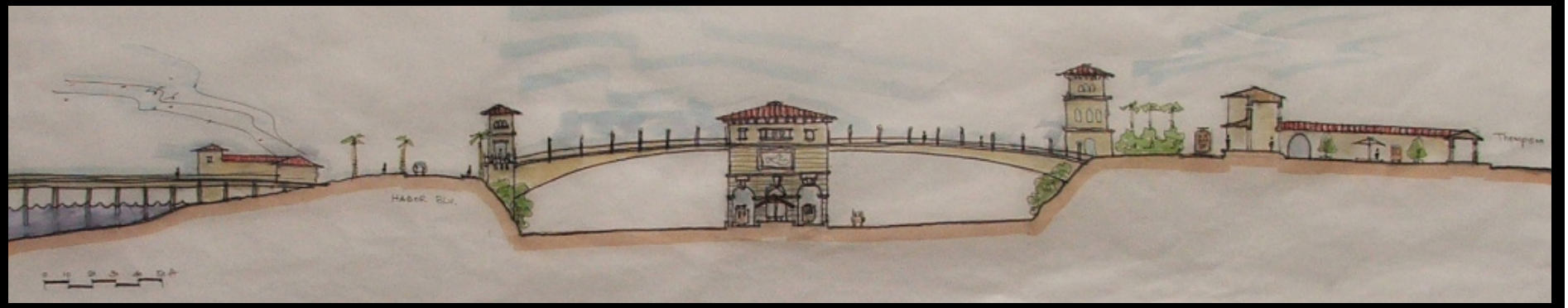


Small Cap Proposal

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio





Small Cap Train Station Proposal

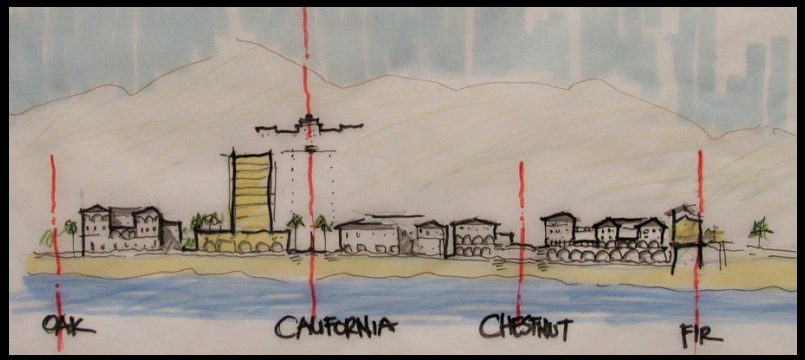
Ventura, California / Fall, 2009

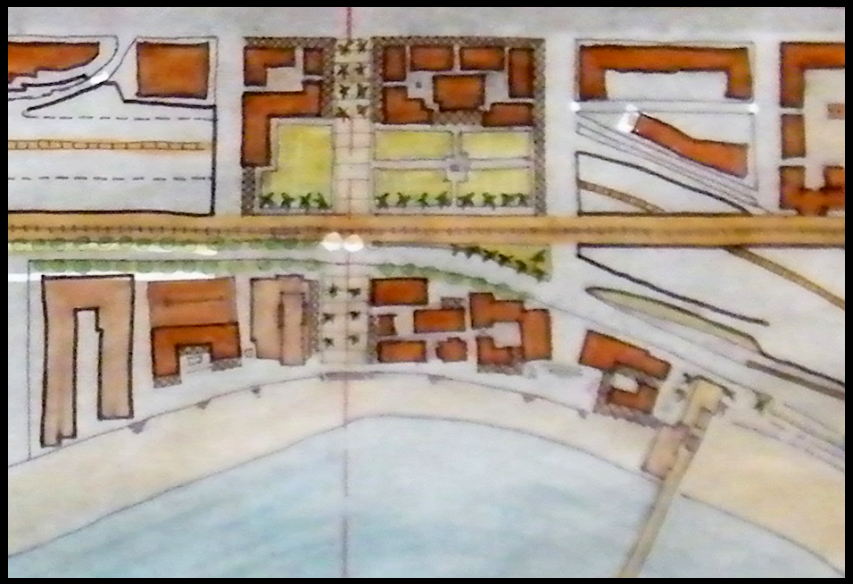
The University of Notre Dame School of Architecture Graduate Urban Design Studio

Small Cap - Fairgrounds Proposal

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

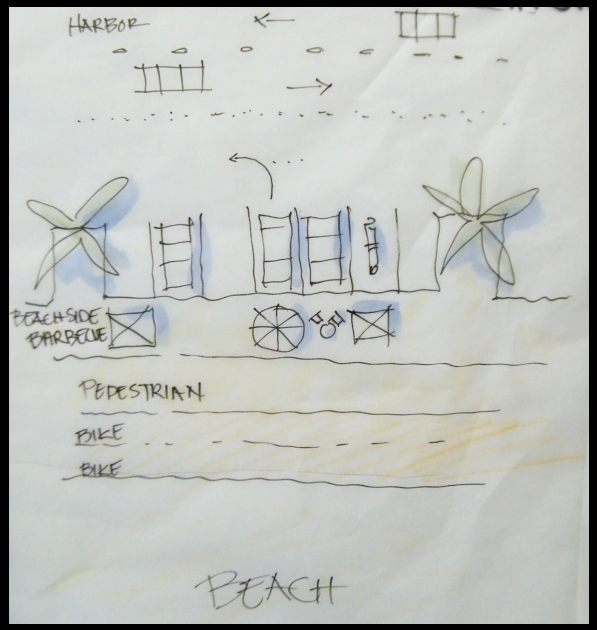


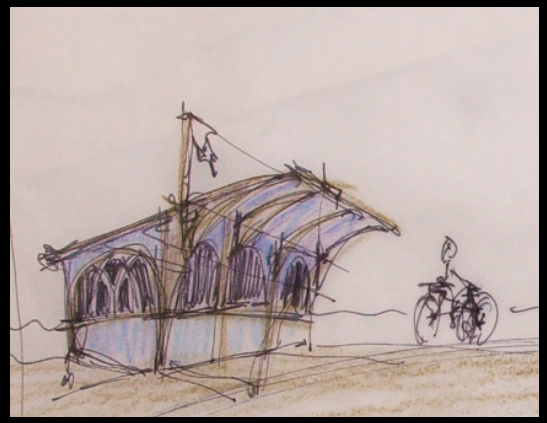


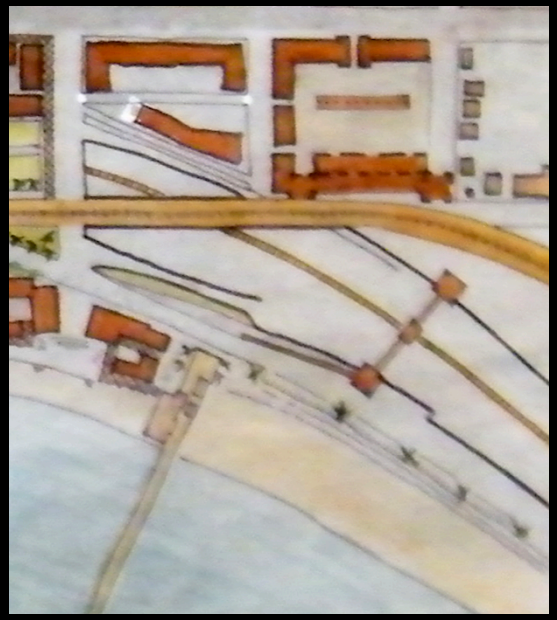
Small Cap - Edgewater Proposal

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio







Small Cap – State Beach Proposal

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Spatial Bridge Proposal

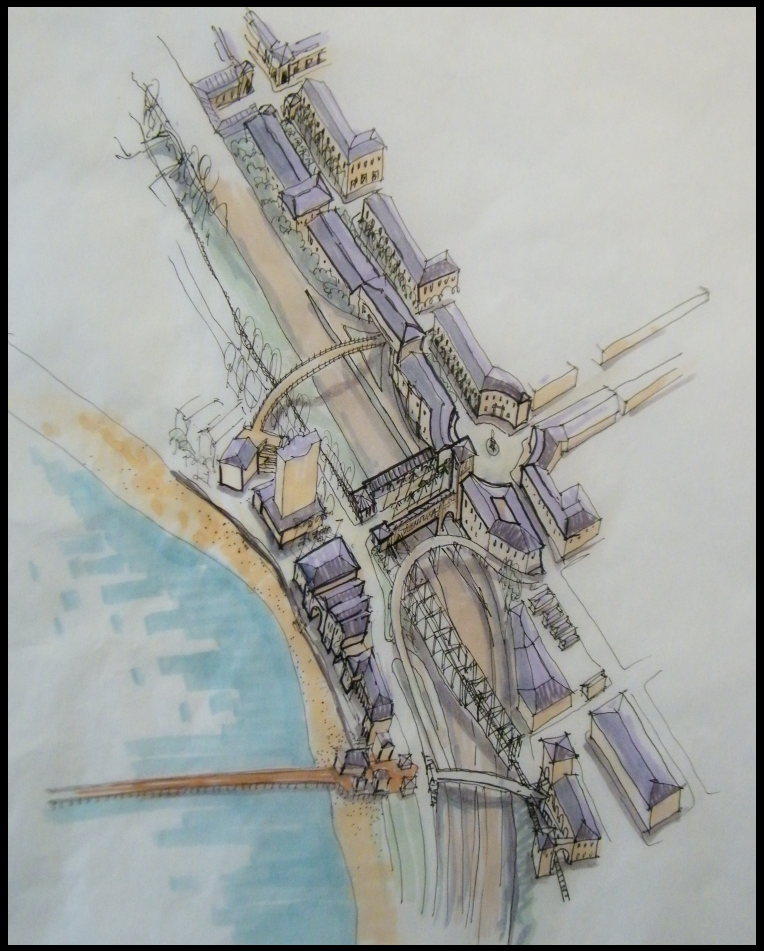
Ventura, California / Fall, 2009

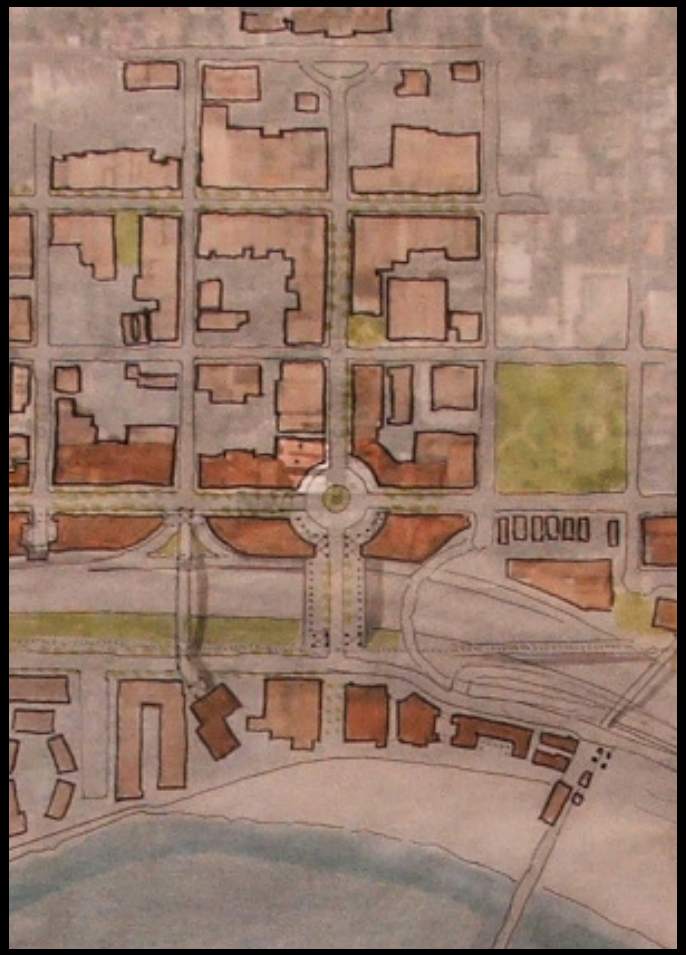
The University of Notre Dame School of Architecture Graduate Urban Design Studio

Freeway Existing Conditions

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

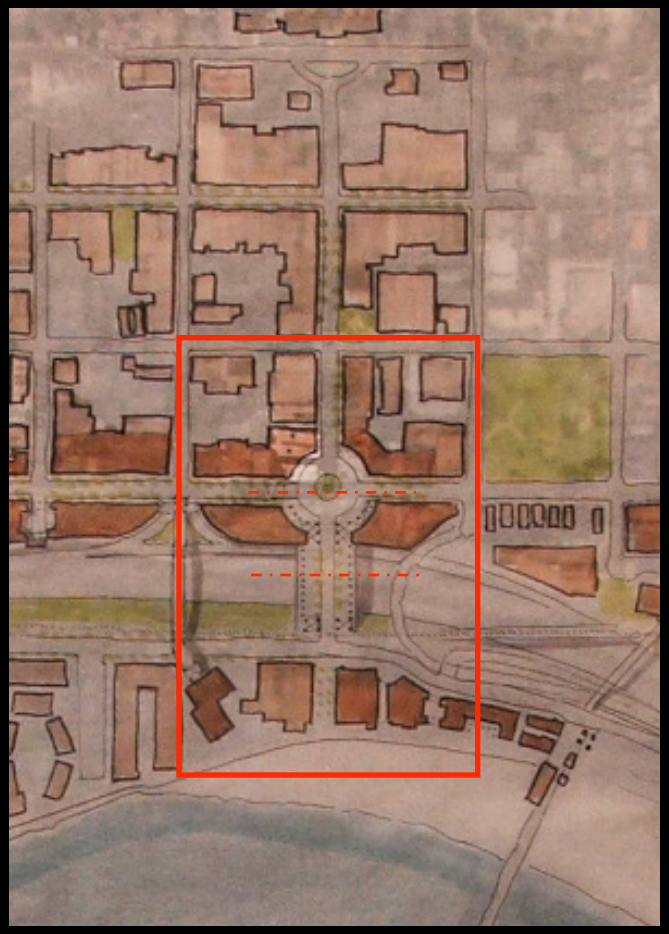




Spatial Bridge Proposal - Intervention At Freeway
Spatial Condition created by architecture and pavilions on California Street Bridge

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio



Spatial Bridge Proposal - Intervention At Freeway
Spatial Condition created by architecture and pavilions on California Street Bridge

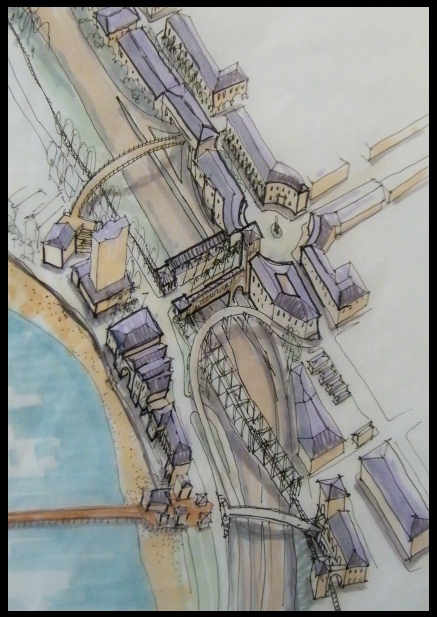
Ventura, California / Fall, 2009

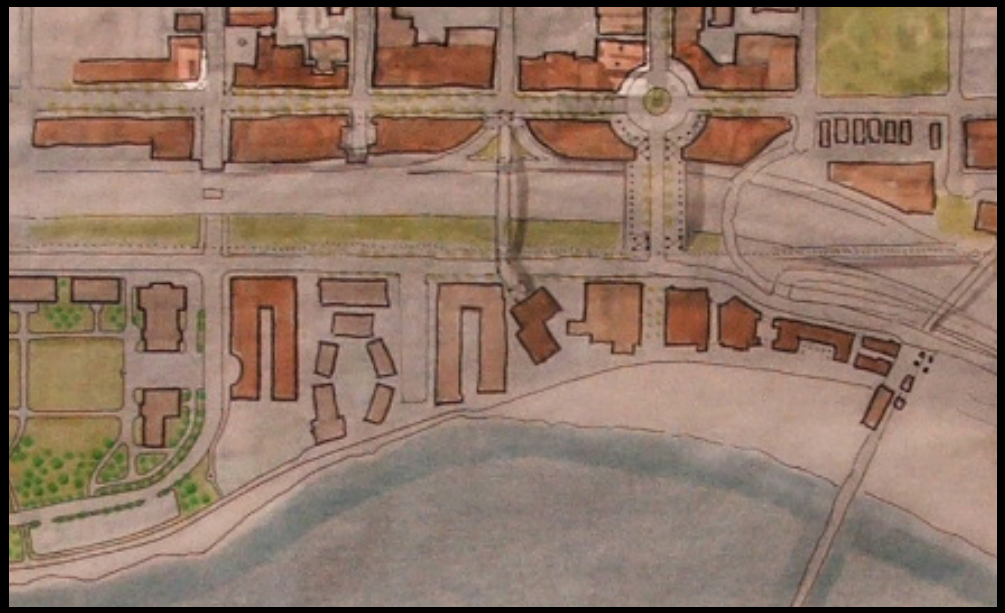
The University of Notre Dame School of Architecture Graduate Urban Design Studio

Spatial Bridge Proposal - Gateway Park
Permanent structures, natural realm, and connections to city,
while providing space for annual county fair

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

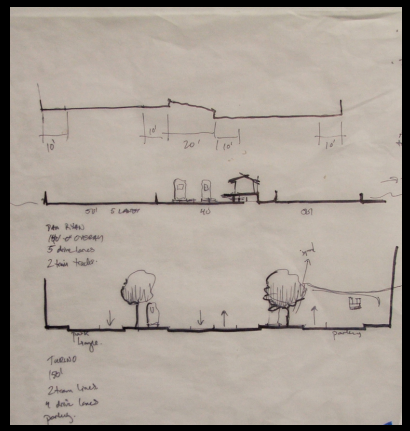


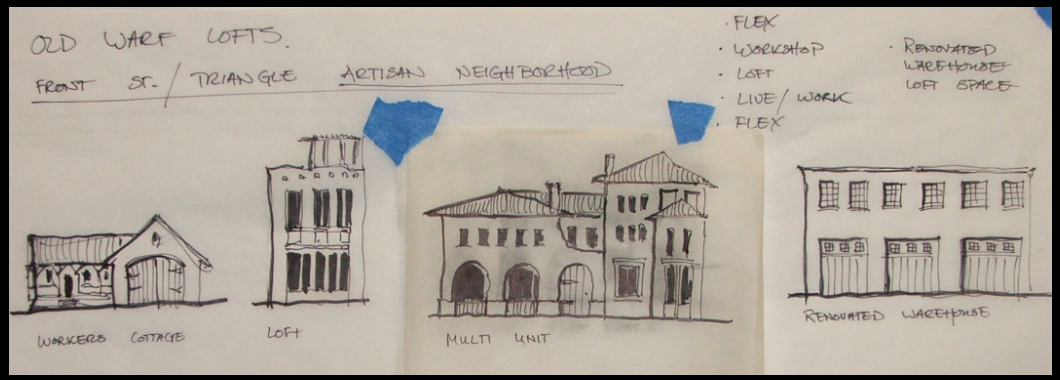


Edgewater development:
Animated pedestrian environment, promenade, and transportation links
for mixed use buildings along Ventura Beach

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio





Spatial Bridge Proposal - Multimodal Transportation Hub and links (above)
Triangle Wharfs neighborhood of lofts, flex space, artisan workshops, and affordable housing architectural studies (below)

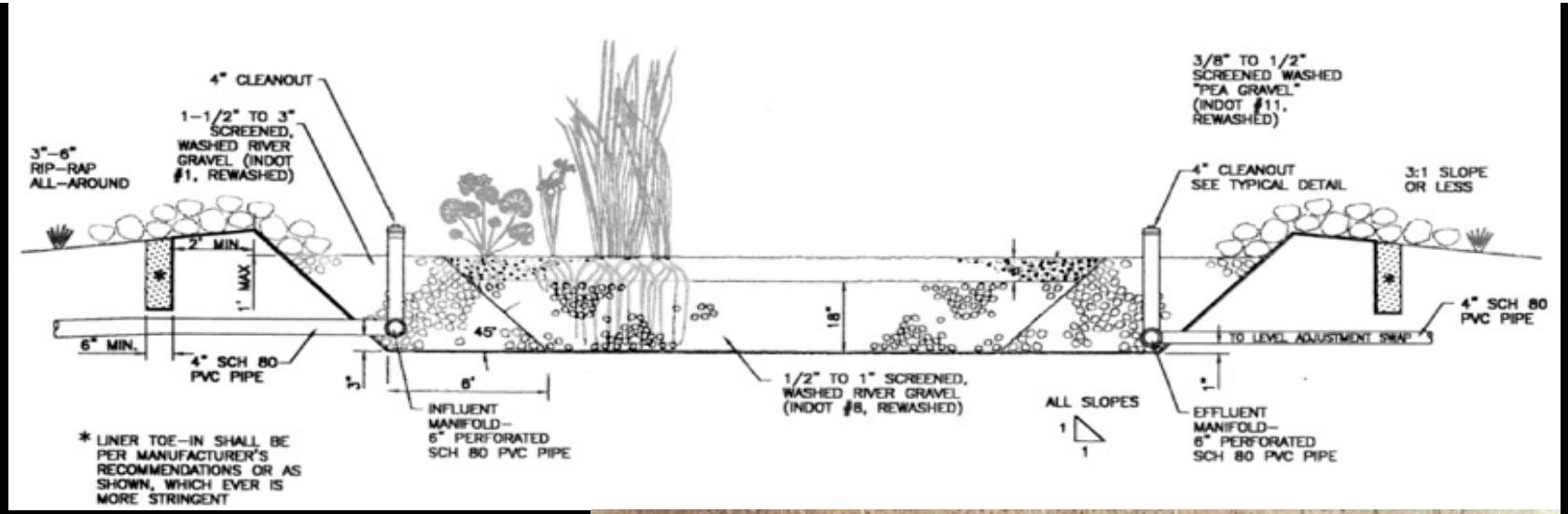
Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio

Appendices:
Constructed Wetlands Wastewater Treatment
Embodied Energy in Buildings

Ventura, California / Fall, 2009

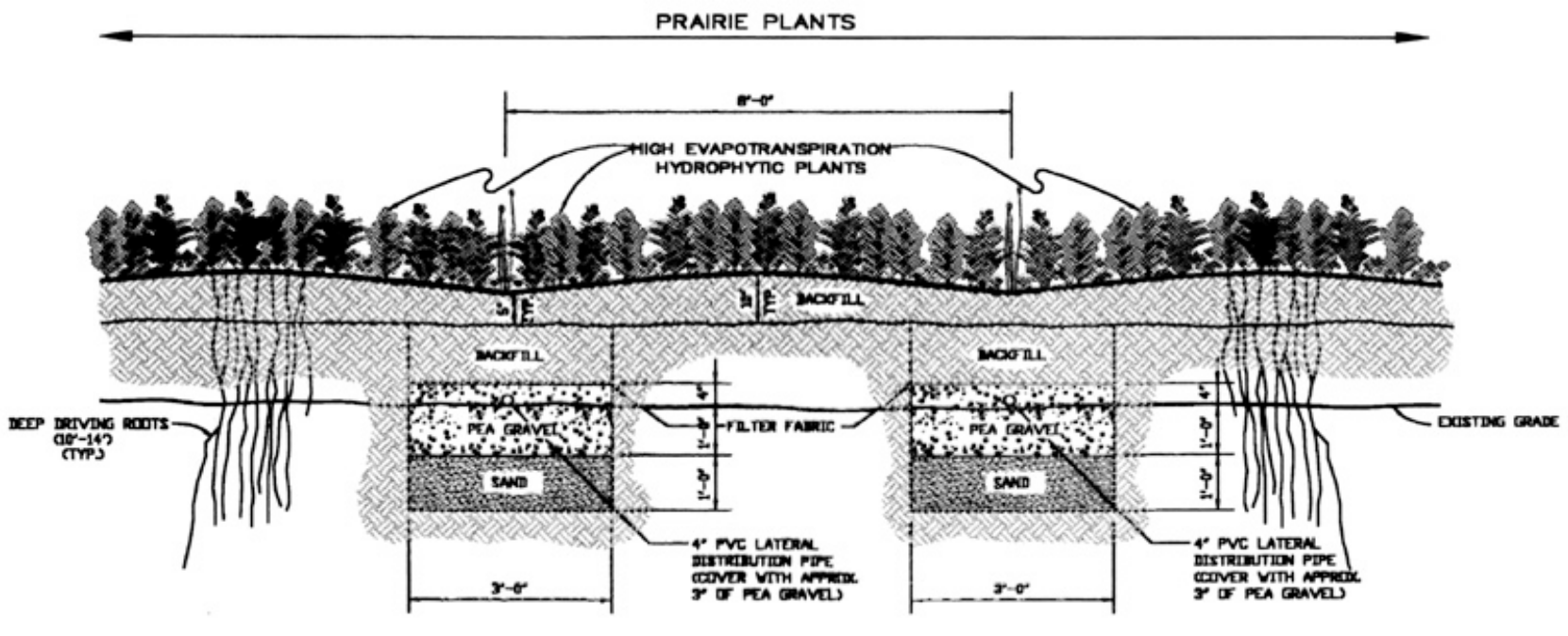
The University of Notre Dame School of Architecture Graduate Urban Design Studio



CONSTRUCTED WETLANDS:

- Purify waste water and return to ground drinking-quality water
- Are environmentally friendly
- Are odorless and dry to walk on
- Are cost-competitive, can be built incrementally, and require minimal maintenance
- Work in part anaerobically, making them suitable for even cold-weather climates
- Can be employed for aesthetic purposes

Constructed Wetlands Cell (Step 1 of 2)



BIO-FIELDS:

- Rushes and prairie grasses dissipate ammonia from water filtered through constructed wetlands cell, returning PURE WATER to ground (unlike conventional septic systems)
- Wetlands / Bio-field sizing info:
  - --1.2 s.f./gallon/day for wetlands; same for bio-fields
  - --150 gallons/day for first two bedrooms, 100 gallons/day for others
  - --4 bedroom house = 500 gallons/day = 600 s.f. cell, 600 s.f. bio-field
  - --3 bedroom house = 400 gallons/day = 480 s.f. cell, 480 s.f. bio-field
  - --2 bedroom house = 300 gallons/day = 360 s.f. cell, 360 s.f. bio-field

Constructed Wetlands Bio-field (Step 2 of 2)

What is "embodied energy" in buildings?

1. initial embodied energy, and
2. recurring embodied energy

Initial embodied energy refers to the non-renewable energy consumed in

- acquiring raw materials
- their processing, manufacture, and transportation to the site
- the construction of the building

and has two components:

1. direct energy
2. indirect energy

Embodied Energy

Embodied energy in building materials has been studied for the past several decades by researchers interested in the relationship between building materials, construction processes, and their environmental impacts.

What is embodied energy?

There are two forms of embodied energy in buildings:

· ***Initial embodied energy;*** and
· ***Recurring embodied energy***

The ***Initial embodied energy*** in buildings represents the non-renewable energy consumed in the acquisition of raw materials, their processing, manufacturing, transportation to site, and construction. This initial embodied energy has two components:

Direct energy the energy used to transport building products to the site, and then to construct the building; and

Indirect energy the energy used to acquire, process, and manufacture the building materials, including any transportation related to these activities.

The ***recurring embodied energy*** in buildings represents the non-renewable energy consumed to maintain, repair, restore, refurbish or replace materials, components or systems during the life of the building.

As buildings become more energy-efficient, the ratio of embodied energy to lifetime consumption increases. Clearly, for buildings claiming to be "zero-energy" or "autonomous", the energy used in construction and final disposal takes on a new significance.

	EMBODIED ENERGY	
MATERIAL	MJ/kg	MJ/m3
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

direct energy refers to the energy expended to bring building materials to a site and to construct the building itself; i.e., it concerns the proximate source of the building materials and the methods used for assembling them on site. For example: in South Bend, Italian marble requires more direct energy than Indiana limestone; and assembling a steel frame building with a crane requires more direct energy than laying up a solid masonry wall by hand.

Embodied Energy

Embodied energy in building materials has been studied for the past several decades by researchers interested in the relationship between building materials, construction processes, and their environmental impacts.

What is embodied energy?

There are two forms of embodied energy in buildings:

- ***Initial embodied energy;*** and
- ***Recurring embodied energy***

The ***initial embodied energy*** in buildings represents the non-renewable energy consumed in the acquisition of raw materials, their processing, manufacturing, transportation to site, and construction. This initial embodied energy has two components:

Direct energy the energy used to transport building products to the site, and then to construct the building; and

Indirect energy the energy used to acquire, process, and manufacture the building materials, including any transportation related to these activities.

The ***recurring embodied energy*** in buildings represents the non-renewable energy consumed to maintain, repair, restore, refurbish or replace materials, components or systems during the life of the building.

As buildings become more energy-efficient, the ratio of embodied energy to lifetime consumption increases. Clearly, for buildings claiming to be "zero-energy" or "autonomous", the energy used in construction and final disposal takes on a new significance.

	EMBODIED ENERGY	
MATERIAL	MJ/kg	MJ/m3
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

indirect energy is the energy used in the processing and manufacture of the materials themselves, including the cost of transporting their components from their point of origin in their raw state to their place of manufacture

In this chart, measured in mega-joules / kilogram (MJ/kg), it is evident that

1. the closer the finished material is to its natural state as taken from the earth---aggregate, straw bale, stone, lumber, brick---the lower its indirect embodied energy; and

2. the more complicated a material's manufacturing process---e.g. for plywood, fiberglass insulation, steel, linoleum, aluminum---the higher its indirect embodied energy

Embodied Energy
Embodied energy in building materials has been studied for the past several decades by researchers interested in the relationship between building materials, construction processes, and their environmental impacts.

What is embodied energy?
There are two forms of embodied energy in buildings:

- ***Initial embodied energy;*** and
- ***Recurring embodied energy***

The ***initial embodied energy*** in buildings represents the non-renewable energy consumed in the acquisition of raw materials, their processing, manufacturing, transportation to site, and construction. This initial embodied energy has two components:

Direct energy the energy used to transport building products to the site, and then to construct the building; and

Indirect energy the energy used to acquire, process, and manufacture the building materials, including any transportation related to these activities.

The ***recurring embodied energy*** in buildings represents the non-renewable energy consumed to maintain, repair, restore, refurbish or replace materials, components or systems during the life of the building.

As buildings become more energy-efficient, the ratio of embodied energy to lifetime consumption increases. Clearly, for buildings claiming to be "zero-energy" or "autonomous", the energy used in construction and final disposal takes on a new significance.

	EMBODIED ENERGY	
MATERIAL	MJ/kg	MJ/m3
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

Related to indirect energy, *recurring embodied energy* represents the non-renewable energy consumed to maintain, repair, restore or replace materials, components or systems over the life of the building; i.e., it is directly related to the durability of a building's materials and how frequently a building requires renovation. In other words: the use of non-durable building materials now requires more expenditures of embodied energy later

Embodied Energy

Embodied energy in building materials has been studied for the past several decades by researchers interested in the relationship between building materials, construction processes, and their environmental impacts.

What is embodied energy?

There are two forms of embodied energy in buildings:

- ***Initial embodied energy;*** and
- ***Recurring embodied energy***

The ***Initial embodied energy*** in buildings represents the non-renewable energy consumed in the acquisition of raw materials, their processing, manufacturing, transportation to site, and construction. This initial embodied energy has two components:

Direct energy the energy used to transport building products to the site, and then to construct the building; and

Indirect energy the energy used to acquire, process, and manufacture the building materials, including any transportation related to these activities.

The ***recurring embodied energy*** in buildings represents the non-renewable energy consumed to maintain, repair, restore, refurbish or replace materials, components or systems during the life of the building.

As buildings become more energy-efficient, the ratio of embodied energy to lifetime consumption increases. Clearly, for buildings claiming to be "zero-energy" or "autonomous", the energy used in construction and final disposal takes on a new significance.

	EMBODIED ENERGY	
MATERIAL	MJ/kg	MJ/m3
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

Ventura, California / Fall, 2009

The University of Notre Dame School of Architecture Graduate Urban Design Studio