STUDIO HANDBOOK

TEACHING TEAM

J. Yolande Daniels, Associate Professor
J Jih, Associate Professor of Practice
Adam Modesitt, Lecturer

TA TEAM

Alireza Khalatbari, MArch ‘27
Jordan Walters, MArch ‘27

STRUCTURES INSTRUCTORS

Caitlin Mueller, Associate Professor
Holly Samuelson, Associate Professor

BT TA

Lili Boenigk, PhD BT
Akshata Atre, MArch

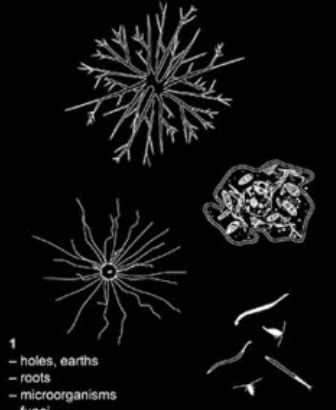
CONTENTS


CARBON
CONSTR
RECIPRO
SEDIMENTARY ROCKS
palimpsest city
foundations
- 10 METRES
extraction
ROCKS
ATMOSPH
EXCAVATIO
KARS
RARE MINERALS
- 50 METRES
EROSION
volcano
MAGMATIC ROCKS
Plates tectonic
buried vestiges
ARTIFICIAL ROCKS
CONTINENTAL CRUST

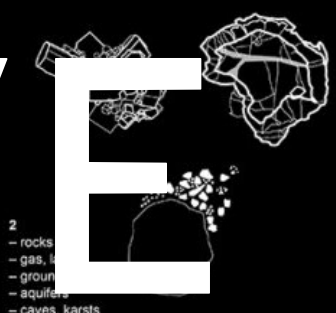
N

RUCTIVE

OCITIES

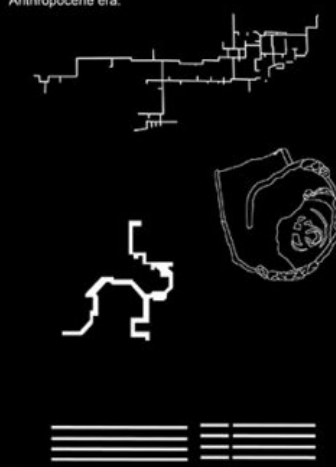


1
– holes, earths
– roots
– microorganisms
– fungi



2
– rocks
– gas,
– groun
– aquifer
– caves, karsts

cts":
ments that alter the composition-
the living soil and which constitute the
real soil of anthropized territories in the
Anthropocene era:



4
– pipelines network
- miscellaneous pollution and
hydrocarbon contamination of soil
- stone remains of the first humans

Terra Forma, "INSIDE" Terrestrial Trilogy,
Frédérique Aït-Touati

COURSE INTRODUCTION

STUDIO FRAMEWORK

Core III is the concluding studio of the MArch1 Core Program. It is integrated with Building Technology 4.463 and cross listed with the undergraduate program.

Carbon Constructive Reciprocities describes how cooperative and constructive climate actions by one component can trigger reciprocal, positive actions to create a powerful feedback loop that accelerates efforts to address climate change.

Carbon is an essential element. The Earth would be as lifeless as the moon without it. All life on Earth is carbon-based; carbon is the fundamental element required to form the structures of all known living cells. The constant movement of carbon (atoms) links all parts of the ecosystem together. Carbon (atoms) flow between Earth's atmosphere, oceans, land, and living organisms through the carbon cycle. Carbon flows in processes from photosynthesis (taking CO_2 from the atmosphere into plants) to cellular respiration (releasing CO_2 from plants and animals) to decomposition (releasing carbon from dead organic matter into the soil) to the burning of fossil fuels (releasing carbon into the atmosphere) to the exchange of gases between the ocean and atmosphere.

Carbon is stored in minerals, rocks, and sediment. Carbon is stored in the ocean, atmosphere, and biosphere in living organisms and soils. The human impact on the climate and life on Earth comes from carbon emissions—the release of stored carbon--primarily in the form of carbon dioxide (CO_2) from burning fossil fuels. The carbon buildup from emissions enhances the

Earth's natural greenhouse effect, leading to global warming and climate change, which causes severe weather, rising sea levels, and ecosystem disruption. Human activities are the primary cause of this imbalance by releasing carbon at a rate that natural processes cannot absorb, resulting in environmental and social consequences like ocean acidification, food scarcity, and economic instability.

Building construction practices impact the future capacity of cities and their inhabitants. The UN has reported that the building and construction industries contribute 37% of global emissions and that resource extraction is a significant cause of the climate crisis. The Carbon Constructive Reciprocities framework encourages architectural design explorations that advance an integrated approach toward buildings and the environment and provides the opportunity to envision reciprocal and regenerative constructive systems and urban ecosystems. Studios will explore building strategies that address the flows of carbon in building lifecycles and the ecosystem.

Students are encouraged to explore alternatives to extractive practices in building design and construction by investigating reciprocal and regenerative approaches through scalar and time-based material explorations toward a semester-long building project for the design of a 27,000 sf Environmental Center in South Boston.

STUDIO SECTION STATEMENTS

Each studio section will work from the same course framework and review deliverables while reflecting the qualitative approach and directions of the individual critics. Studio instructors will work with each student group and individual to support the development of a design process that emphasizes the exploration of design options through drawings and models, experimentation and clarity in representations, and the exploration of material and construction techniques.

MICRO-MESO-MACRO ECOSYSTEMS
J. YOLANDE DANIELS

What constructive reciprocities materialize in architecture across small, intermediate, and large scales and durations? At what scale and within what timeframe do we design? The Gaia hypothesis conceives Earth as a self-regulating system that sustains life through coordinated actions that maintain balance in nature.

Visible 60 miles away, Tribute in Light's 88 xenon lamps project twin beams four miles above Lower Manhattan each 9/11. The beams can trap migrating birds that navigate by natural light, prompting scientists to monitor flight patterns and periodically switch off the lights for 20 minutes. This interplay of a design, disruption, and adaption introduces a cross-species, spatial, and temporal consciousness into the design process.

This studio section asks how architecture might coordinate across environments and species. Students will explore the formal, tectonic and spatial potential of designing and assembling atmospheres, materials, and spaces for multispecies inhabitation to foster diurnal and scalar reciprocities between organisms and ecosystems.

CONSTRUCTION ECOLOGIES, CONSTRUCTION ECONOMIES
J. JIH

This section positions construction and its attendant transformations of carbon as mediator between ecologies and economies. If ecology can be understood as the study of organisms and their interactions with surrounding environments (including humans in our anthropocentric frameworks), and economy as an area of production, distribution, and trade, construction might be re-contextualized as a mediator between landscape and labor.

Our program will be a Center for Constructive and Environmental Praxis. Expanding upon German models of trade education as well as those seen in notable American schools such as the Haystack Mountain School of Crafts, Yestermorrow, and the North Bennett Street School, the Center will educate, exhibit, and innovate upon relations between built and natural environments.

Students will each select a relation between ecology and economy by defining a position on landscapes of production, remediation, restoration, and extraction, and setting the choreography of a building's assembly as a transformative, relational instrument.

EVER AFTER
Adam Modesitt

The narrative of efficiency promises redemption, an "ever after" in which managerial metrics solve ecological crisis. Yet efficiency often reinforces the very systems it claims to critique. Materials are not neutral commodities, they are products of the regulatory, cultural, and economic value systems that govern how they are produced, circulated, and discarded.

Ever After will probe architecture's role in these entanglements. Each group will select a single material and design a center dedicated to it, foregrounding its multiple identities as product, byproduct, artifact, and residue. While programmatically centered on one material, buildings needn't be constructed solely from it, or from it at all. Rather, projects will operate as lenses forinvestigating how materials embody value systems, and how those systems might be reframed.Tectonic experiments and tactile exploration will take precedence over statistical abstraction.

Students will attend to irregularities, wastes, and overlooked consequences, imagining architectures that stage reciprocity among resources, labor, and culture. The ambition is not permanent solutions, but to articulate provisional afterlives and continuities—an "ever after" without end.

PROGRAM DESCRIPTION

Aerial photograph from 1965 of Boston's Fort Point Channel, capturing the industrial heart of the city as it was shaped by railyards, warehouses, and the iconic Gillette factory. Visible are the bustling rail lines, bridges, and working waterfront—testament to a pivotal era in Boston's history of commerce and transformation.

The Carbon Constructive Reciprocities framework encourages the development of an architectural design proposal with an integrated understanding of the material, spatial, structural and environmental conditions and performances of buildings through an integrated approach toward buildings and the environment. By advancing reciprocal and regenerative practices in the design of an Environmental Center with Research, Exhibition, Education and Cultural Programs, students will explore and critique the patterns of building material production, distribution, and construction. The Environmental Center will be a collaborative hub for research, innovation, education, and culture to address the climate crisis by advancing climate action and sustainable urban ecosystems.

The Environmental Center and Park will create a new natural landscape within the existing urban infrastructure to seed a more balanced ecosystem and connect to the network of green spaces envisioned throughout the greater Boston area. Drawing from the rich industrial history of Fort Point and South Boston, studios will consider how architecture might better balance the environmental impact of construction

processes. Studios will explore the potential for the design and operations of the Center to serve as a model for sustainability and regenerative design strategies.

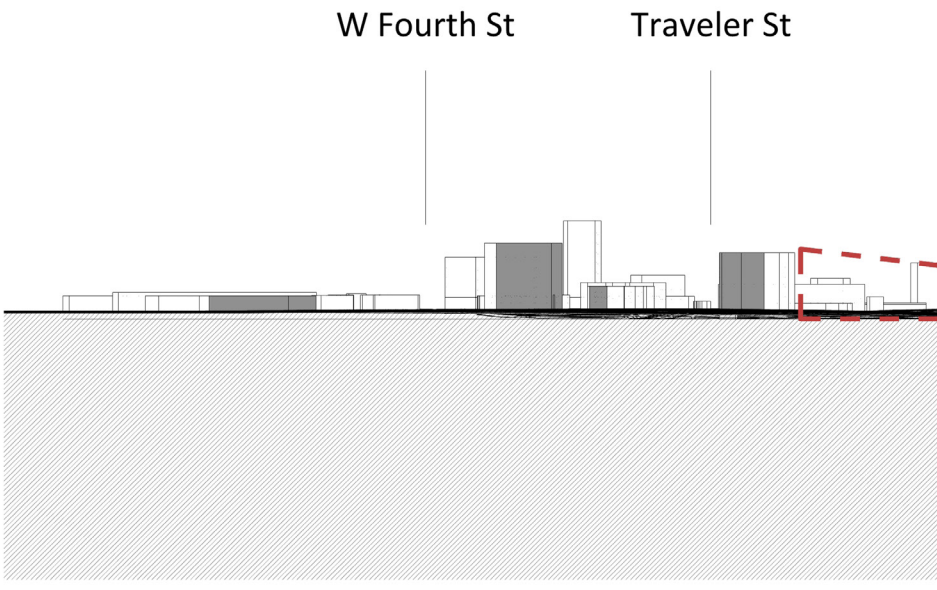
The project area is within a 30-acre redevelopment site owned by P&G Gilette that is geographically situated at the south end and head of Fort Point Channel in South Boston that was the parking lot for the former P&G Gilette World Shaving Headquarters. Proposals have included a park, cultural building, housing and commercial offices situated along the channel. The proposals have also included a continuation of the Boston Harborwalk, a 43-mile dis-continuous walkway along the Boston Harbor and several channels. The Harborwalk is part of the long-term redevelopment plans for the Boston shoreline to connect waterfront neighborhoods in a series of interconnected paths, parks, and piers.

The Fort Point Channel Environmental Center and Public Park further the vision outlined in the 100 Acres Open Space Concept Plan for Fort Point that calls for a network of interconnected parks to provide recreation, improve connections to the waterfront, enhance community resilience and climate-resistance. Students are encouraged to explore circular and regenerative building practices that aim to move beyond sustainability to create buildings and areas that actively improve the environment and community by designing waste out of the system, closing material loops, and regenerating natural systems. Regenerative design uses a systems approach approach to create net-positive outcomes, while circularity focuses on strategies like designing for deconstruction, reusing materials, and utilizing renewable energy to maximize resource value and minimize pollution throughout a building's entire life cycle.

Aerial view of the historic Gillette factory along Boston's Fort Point Channel—where over a century of razor manufacturing has shaped both local industry and the city's waterfront. The expansive campus stands as a landmark of innovation and transformation in South Boston's industrial landscape.

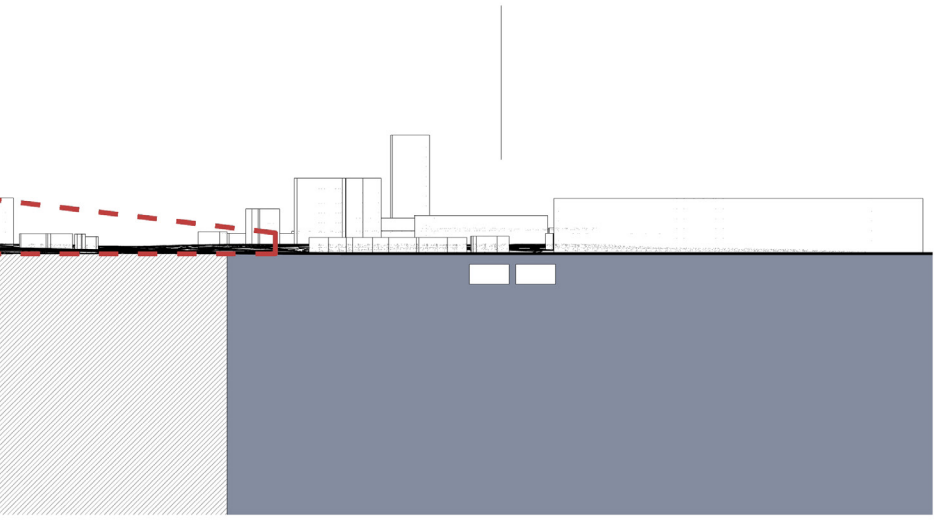
SITE

Site Loca



tion Map

Ted Williams Tunnel



PROGRAM AREA DISTRIBUTION

ENVIRONMENTAL CENTER

Total Building Area 27,000gsf (gross square feet)

CONDITIONED SPACES

- Public Lobby (includes 500sf unconditioned Visitor Drop-off) 2,000sf
- Living Laboratory (includes conditioned Research and Exhibition Spaces) 11,000sf
- Education Spaces 3,000sf
- Event Space (+/- 250 person @ 12sft/person) 3,000sf
- Cafe (varied conditioning requirements) 2,000sf
- Cafe Kitchen + Storage 1,000sf
- Administration Spaces 2,200sf
- Storage 1,000sf
- Public Restroom (6 gender neutral, 2 accessible) 500sf
- Building maintenance space 300sf
- Corridors and Mechanical spaces +/-1000sf

CONDITIONED SPACES

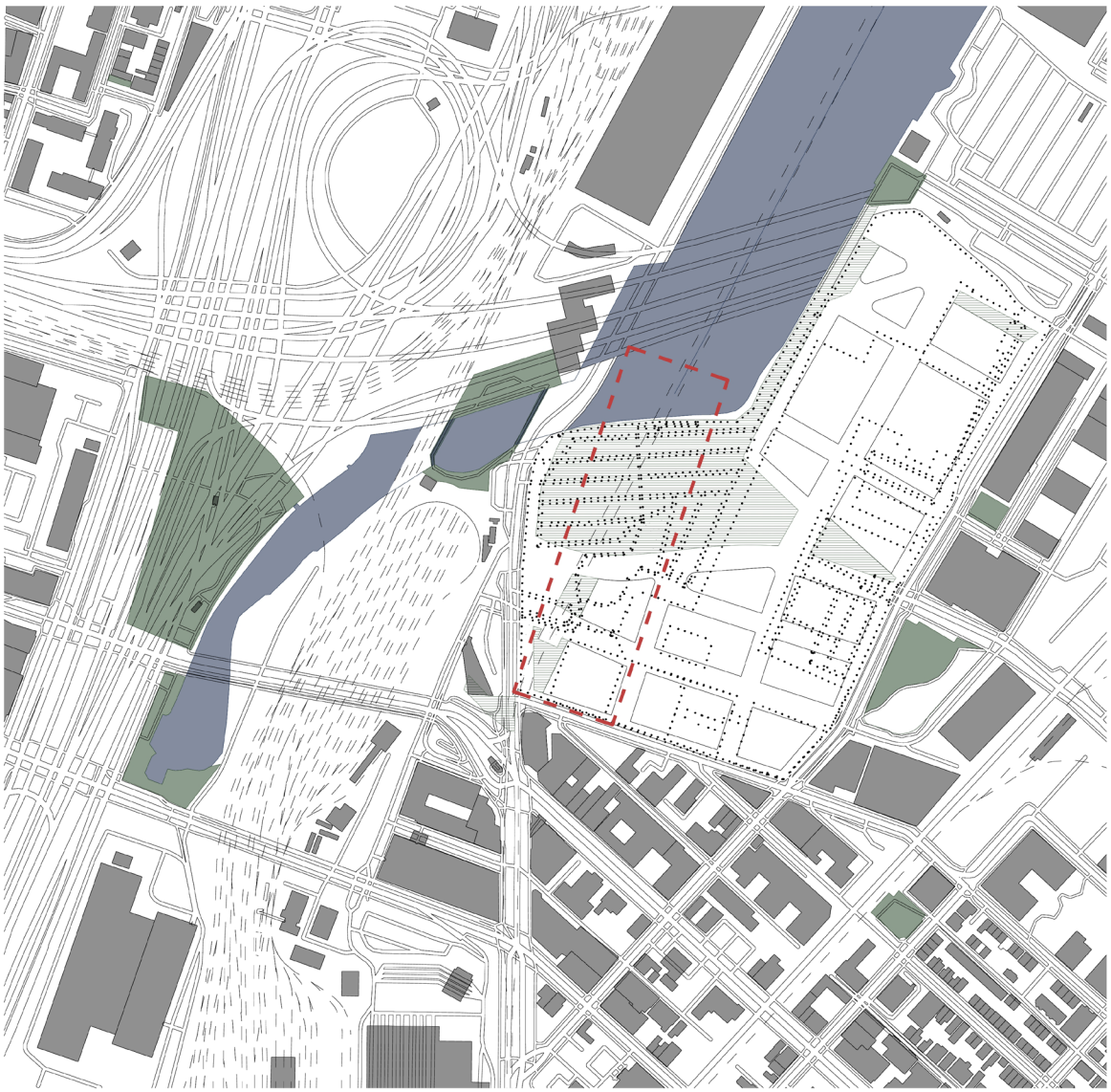
- Exterior Public Spaces 4,500sf
- Exterior Car/Bike Parking
- Exterior Kayak/Boat Dock
- Exterior Delivery/Unloading
- Exterior Accessible Pathways/trails (Walking, Running, Biking)

Note: All interior spaces are to be within a climatic adaptive conditioned building envelope

PUBLIC PARK

- Total Park Area 6.5-acres

SITE PLAN



500'

FORT POINT CHAN

OVERVIEW

The Boston harbor spans from Indigenous trading to the American Revolution to the harbor playing a key role in trade and military defense to becoming infamous for pollution in the 1970s to the current visions for redevelopment and climate mitigation. The modern revitalization of Boston harbor began from the 1980s to the 1990s.

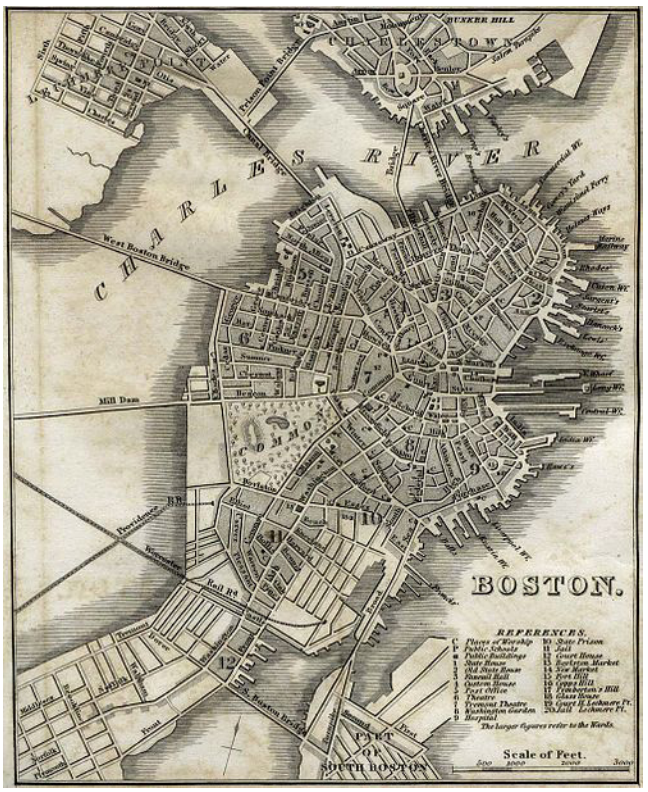
Fort Point has evolved from a colonial-era tidal estuary to a bustling industrial hub in the nineteenth century, to an artist enclave in the 1970's, to landmarked status for late 19th and early 20th century industrial building stock in 2009. Visions for the Fort Point channel have led to the expansion as an Innovation District.

The Fort Point District is approximately 100 acres (0.40 km2) within South Boston. It is defined by the Fort Point Channel to the west, Summer Street to the north, the Bypass Road to the east, and West 2nd Street to the south. The Fort Point Channel extends from the Boston harbor into the South Bay area and separates the downtown Boston peninsula from the Seaport District. The channel is crossed by the Summer Street Bridge which separates Boston from South Boston. Eastbound travelers are welcomed to South Boston; the same sign welcomes westbound travelers to Fort Point.

Boston in 1775 (Fort Point is the hill)

NNEL

Leveling Fort Point in 1869



South Boston in 1842

The Fort Point neighborhood is named for a colonial-era hill that once provided the advantage of a "point" for defensive cannons in Boston Harbor. During the Civil War, the Fort Point area was a vital strategic point for the city. An actual fort was used to protect the channel, safeguarding Boston from potential attacks. Between 1866 and 1872, the City of Boston leveled the hill to create more space for business facilities, significantly altering the area's topography. The Fort Point channel was created through extensive landfilling, which included filling in parts of the South Bay.

Boston Wharf Company

FORT POINT VIEW

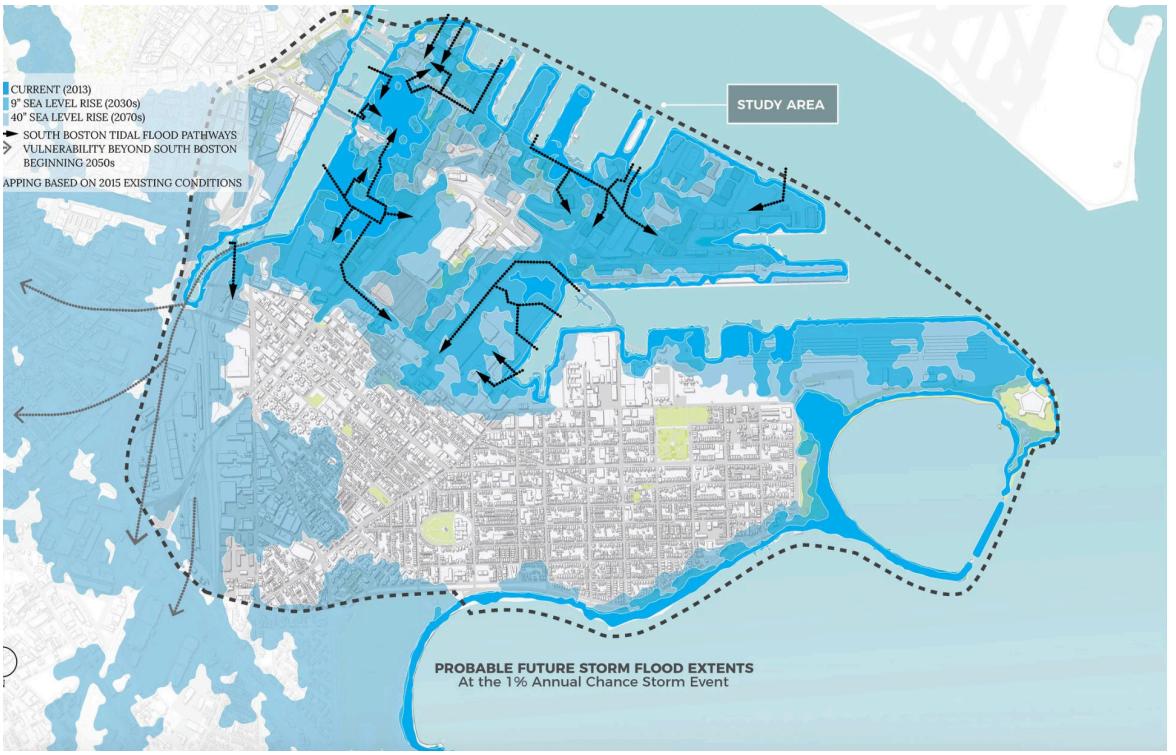
The development of the Fort Point channel is largely tied to the growth of Boston and South Boston, involving extensive land reclamation and industrialization. The Fort Point channel was engineered in the 1830s by the Boston Wharf Company, which filled in marshlands to provide essential water access to South Boston and South Cove. As owner of the district, the Boston Wharf Company parceled out the lots, laid out the street and docks, and developed the industrial warehouses. The streets are named after the officers and tenants of Boston Wharf Company.

The channel grew to become a shipping and warehousing hub that housed industries such as wool and textile mills, sugar refining, lumber storage, and heavy machine construction. The channel also became a major center for storing and transferring goods, including lumber, bricks, iron, and leather. During the late 19th and early 20th centuries, the industries in Fort Point made Boston the main production and marketing center for wool for clothing and fabrics.

The area's industrial activity declined in the mid-20th century as the wool trade declined and the rise of the automobile diverted industries to other areas. In addition, the size of ships that could navigate the channel decreased. The district's buildings were abandoned.

In the late 20th century, the large industrial lofts that sat empty attracted artists, who grew to form the Fort Point Arts Community and revitalized the once-abandoned buildings. Since most of the structures were designed by the Boston Wharf Company's architects there is a distinctive uniformity to the blocks and buildings. The Fort Point Channel Historic District consists of approximately 55 acres (0.22 km2) of land on the south side of the channel.

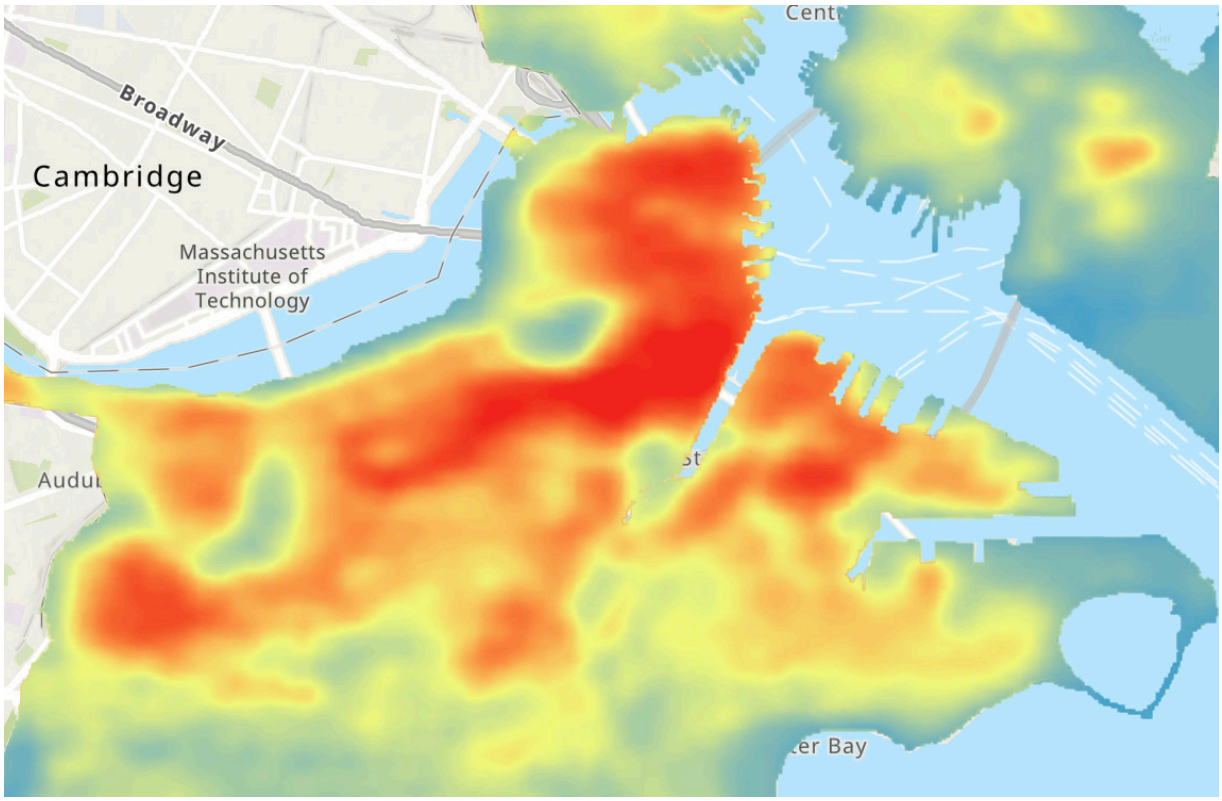
RISKS



Climate Ready South Boston Flood Projections

CLIMATE IMPACTS

Fort Point Channel is susceptible to flooding because it was built on filled-in tidal flats and marshes which places much of the land at or just above sea level its' low elevation.



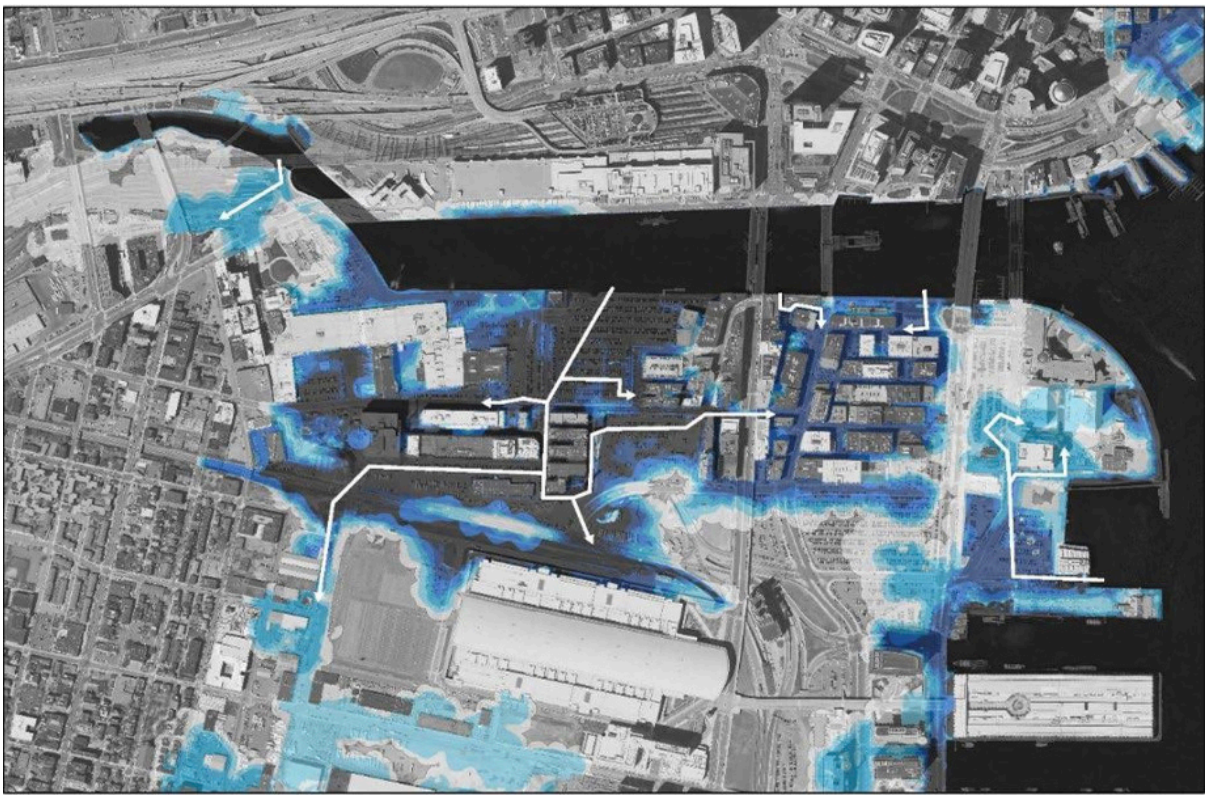
Boston Heat Map Explorer

URBAN HEAT ISLAND EFFECT

The heat island effect occurs when cities are hotter than surrounding areas because of their high concentration of heat-trapping surfaces and limited green spaces. Although this mitigated at the coastal areas the Fort Point neighborhood is a significant urban heat island. Local assessments identify it as having a major heat risk due to dense impervious surfaces from historic industrial areas, modern development, and extensive parking lots have created a heat-absorbing environment that raises local temperatures.

UNSTABLE SOIL

Since the current landmass of Fort Point was created by filling in the marshes between islands, much of the land mass is composed of landfill which is less stable soil that is most susceptible to erosion. To mitigate this, building on the land requires varying degrees of physical soil amendments and stabilization and the use of pile foundations.



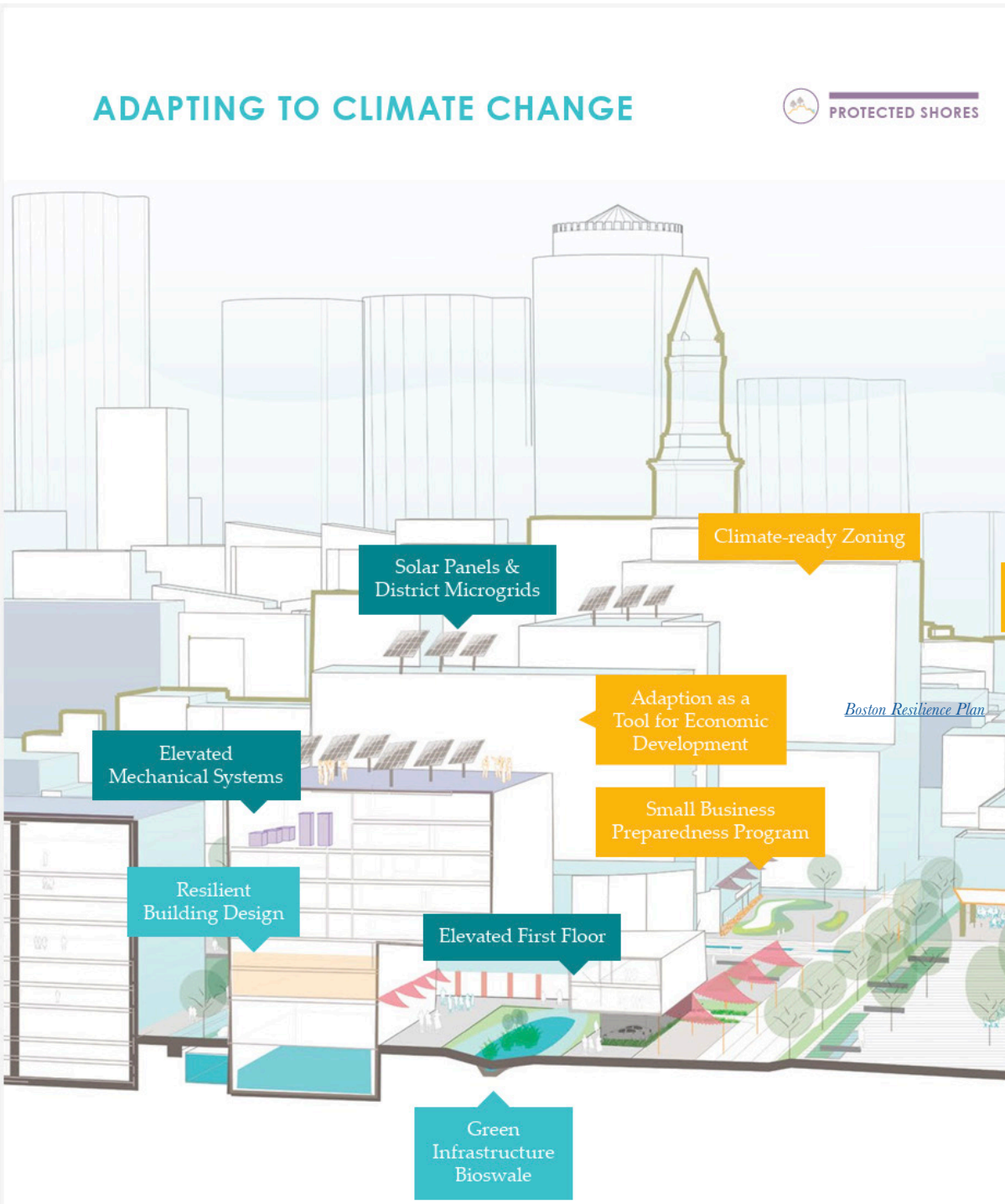
Fort Point Channel Flood Pathway

FLOODING

Fort Point Channel is vulnerable to high tides and storm surge. Through a large combined sewer and stormwater pipe network, the channel is also an urban drainage basin covers approximately 2,600 acres that includes parts of Downtown, South Boston, the South End, and Dorchester. The land along the channel, including the historic Fort Point Landmark District, is susceptible to flooding from lunar high tides and is designated as a FEMA Special Flood Hazard Area.

An increase in the frequency of flooding, the susceptibility of the channel's banks to flooding, future sea level rise, and the escalation of heat place the area at risk of causing damage to transportation, infrastructure, businesses and residences in the surrounding areas with increased frequency. If flooding is extensive, a shutdown of South Station could disrupt the public transit system citywide and major facilities including Boston Medical Center and the Boston Fed tower could become isolated.

Sea Level Rise is a threat to all of the coastal areas of the Boston harbor. Since 2000, areas along the Boston shoreline are +/-3 inches higher and scientists and policymakers believe that will increase 9 more inches over the next few decades. The Climate Ready plans of the City of Boston have projected a rise of 40 inches, or about 3.5 feet, by 2070.



RESILIENCE STRATEGIES

The expected increase in frequency and severity of storms and the resulting damage because of climate change and future sea level rise have led to the development of Climate Resilience guidelines for the City of Boston.

The 100 Acres Master Plan for the Fort Point District and the City of Boston Resilient Fort Point Channel Infrastructure Project are climate resilience plans in development that aim to reduce flood damage by building permanent berms, flood walls and flood control systems, a storm surge barrier, floodwalls, infrastructure, utilities, and structures to protect nearby residents

Climate Ready South Boston

while also drawing new industries to create an Innovation District.

As design guidelines for shoreline protection in the Fort Point Channel area to insure buildings against flood damage, Climate Ready Boston initiatives and related resiliency projects recommend a 15.5-foot flood elevation and expanding the use of green infrastructure and other natural systems cooling strategies and resilient infrastructure to manage stormwater, mitigate heat, and provide additional benefits.

SCHEDULE

WK 1

Tu Sept 08	Studio Preview (Registration)
Th Sept 10	Studio Critic Presentations | Studio Framework + Module 1 Introduction
Fr Sept 11	Desk Crits (Registration Deadline)

WK 2

Tu Sept 15	Desk Crits
Th Sept 17	Desk Crits
Fr Sept 18	Student/TA Work Sessions

WK 3

Tu Sept 22	Desk Crits
Th Sept 24	Review-Module 1
Fr Sept 25	Module 2 Introduction + Site Visit

WK 4

Tu Sept 29	Desk Crits
Th Oct 01	Desk Crits
Fr Oct 02	Student/TA Work Sessions

WK 5

Tu Oct 06	Desk Crits
Th Oct 08	Review-Module 2
Fr Oct 09	Module 3 Introduction | Desk Crits

WK 6

Tu Oct 13	Desk Crits
Th Oct 15	Desk Crits (NOMAS Conference 10/14-18)
Fr Oct 16	Student/TA Work Sessions

WK 7

Tu Oct 20	Desk Crits
Th Oct 22	Midterm | Module 3 Review
Fr Oct 23	Module 4 Introduction | Desk Crits

WK 8

Tu Oct 27	Desk Crits
Th Oct 29	Desk Crits
Fr Oct 30	Student/TA Work Sessions

WK 9

Tu Nov 03	Module 4 Pin-Up | Desk Crits
Th Nov 05	Desk Crits
Fr Nov 06	Student/TA Work Sessions

WK 10

Tu Nov 10	Veteran's Day Holiday
Th Nov 12	Desk Crits
Fr Nov 13	Student/TA Work Sessions

WK 11

Tu Nov 17	Penultimate Review-Module 4
Th Nov 19	Desk Crits
Fr Nov 20	Student/TA Work Sessions

WK 12

M Nov 23	BT Review (10am/Critics attend)
Tu Nov 24	Desk Crits
Th Nov 26	Thanksgiving Holiday
Fr Nov 27	MIT Holiday

WK 13

Tu Dec 01	Final Review Mock-up
Th Dec 03	Desk Crits
Fr Dec 04	Student/TA Work Sessions

WK 14

M Dec 07	Final Review (includes Modules 1+2+3+4)
(Date TBD)	Semester's Project Archived (TAs assist)

LEARNING OBJECTIVES

Core III consists of a semester long building design that explores sustainable and regenerative constructive and thermal building systems. Students must show an ability to integrate structural, enclosure, climate, in architectural design strategies and understand the carbon impacts of material and construction system choices.

Students should be able to engage with an increasing level of design research through iterative studies and move fluidly between different modes and scales of operation. Design representation and communication conventions and experimentation will be explored through various modes of drawing and modeling. Students will need to demonstrate the application of analytical and design skills, an understanding of drawing and modeling conventions, and an ability to sustain an increasing level of research in the projects over the semester.

EVALUATION CRITERIA

Grades will be assessed according to the following criteria:

1. Clarity of design concepts through the stages of design development.
2. Design concept translation in response to the program, site, building and detail scales.
3. Synthesis of the concept with the representational means.
4. Precision and rigor across representational modes (drawings, models, and fabrications).
5. Capacity to reflect upon and self-critique the work produced regularly and effectively.
6. Ability to establish an iterative design process to explore and synthesize design options.
7. Clarity of physical and oral presentation (from desk-crits to class discussions and juries).
8. Active and constructive involvement in class discussions (both formally and informally).
9. Effectively respond to criticism from instructors, classmates, and outside jurors.
10. Attendance

EVALUATION METHODS

Quantitative Evaluations

Completion of the course deliverables which all studio groups share, in addition to the specific instructions of the studio critic, and the integration of building technology in the architectural design projects. The integration of building technology will be evaluated through a demonstrated understanding of section, construction assembly and construction detail drawings in the studio projects (and through their problem sets in BT).

Qualitative Evaluations

In addition to the completion of deliverables, the development of each student's design process, design research skills and understanding of design integration across scales in architecture is evaluated through presentations, and discussions. The rigor in process and clarity in representation, and the overall qualitative progress of the semester (including participation and attendance) will be fundamental to completing the course.

In addition to conventional desk-crits, reviews and pin-ups, there will be presentations, workshops, tutorials, discussions, and field trips led by the faculty and teaching assistants. This mix allows for a range of discursive formats to engage students, faculty, and external guests in conversation on students 'design projects and will enable a range of voices and views to provide input and feedback toward the development of the proposed building designs.

Self-Reflective and Peer Evaluation

The intermeshing of skills in design analysis, representation and documentation paired with material research/experimentation provide space for self-evaluation and transitions between scales in architectural design. To foster reflection on their design work, students are encouraged after each project discussion to formulate a key question and list steps that they will initiate in response.

Student Participation

Participation is a critical component of the design studio. This ranges from participation in the studio process and collaborative teamwork to attendance, assignments, class discussions, desk crits, workshops, and tutorials pin-ups, reviews, and field trips.

Attendance Policy

The studio is an exceptional learning environment that requires your phyical and intellectual presence. Attendance for the full duration of each class is mandatory. It is understood that leaving the studio to use fabrication facilities may be necessary, but it must not conflict with scheduled events in the design studio. Review attendance is mandatory.

Three excused absences are allowed for the semester. An excused absence is one discussed with and approved by the professor at least 24 hours prior to the date of absence, or a family or medical emergency confirmed by your physician or a dean in Student Support Services. Unexcused absences will reduce the course grade by half a letter grade, at minimum. Late arrival or early departure from class will count as a partial absence. Absences beyond the three allotted will result in a decrease in your final grade. If you miss six or more studio classes, you will be asked to drop the subject or receive a failing grade.

Studio Culture

Work in studio will build sequentially. Therefore, your commitment to continual development daily is of paramount importance. It is important that you take advantage of the studio environment. Magnification of your development as a designer is made possible by the collective nature of the class. Group reviews are collective for a reason. Each of you has something to gain from your peers. Since the studio is a place for all, it necessitates careful attention to the needs of everyone in it. Please see your instructor and TAs if there are any problems you cannot resolve on your own.

Personal Conduct

Instructors, TAs, and students in this course are expected to act responsibly, ethically, and with respect for the dignity of all others, both within and outside the classroom. Issues relating to personal conduct, including discrimination and harassment, will be taken extremely seriously. Students should take the time to become familiar with MIT's major policies on personal conduct, which can be found here: MIT Policies: Conduct and Community Standards

Academic Integrity/ Honesty

Massachusetts Institute of Technology students are here because of their demonstrated intellectual ability and because of their potential to make a significant contribution to human thought and knowledge. At MIT, students will be given unusual opportunities to do research and undertake scholarship that will advance knowledge in different fields of study. Students will also face many challenges. It is important for MIT students to become familiar with the Institute's policies regarding academic integrity, which can be found here: Academic Integrity at MIT: A Handbook for Students

Use of Generative AI

The Architecture Design Core Studio III policy supports the use of AI for analysis and representation

GRADING RUBRIC

A: Excellent — Project surpasses expectations in terms of inventiveness, appropriateness, verbal and visual ability, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class.

B: Above Average — Project is thorough, well researched, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. Project is complete on all levels and demonstrates potential for excellence.

C: Average — Project meets the minimum requirements. Suggestions made in class are not pursued with dedication or rigor. Project is incomplete in one or more areas.

D: Poor — Project is incomplete. Basic skills including graphic skills, model-making skills, verbal clarity or logic of presentation are not level-appropriate. Student does not demonstrate the required design skill and knowledge base.

F: Failure — Project is unresolved. Minimum objectives are not met. Performance is not acceptable. This grade will be assigned when you have excessive unexcused absences.