



Hidden in Plain Sight

Rotch Traveling Scholarship
Final Competition Brief 2021

Hidden in Plain Sight

(Architecture and latency)

In early 2021, our context is equally physical and digital. We transact remote business and engage remote learning via Zoom. We conduct remote social and cultural exchange through the transfer of bits and bytes from our kitchens and couches to the world and back via Tik-Tok, YouTube, and Instagram. The immediate ether of the internet connects us to each other in real time even as we remain physically distant from one another due to the COVID-19 pandemic.

While our increasingly immersive access to the internet is tangibly invisible, it has a very real physical manifestation in the built environment. Vast data processing centers sit mute at the edge of our cities to serve our internet habits. With the impending rise of the internet of things, edge computing, and the corollary requirement for minimal latency, these nondescript buildings designed for data transfer and management (rather than human occupation) are migrating toward sites that occupy urban core territory to support our growing dependence upon instantaneous information transfer. This brief outlines the requirements for the design a “lights off” data processing center and landscape that drives a new era of information processing and public leisure in Boston’s Seaport district.

la·ten·cy¹

1. the state of existing but not yet being developed or manifest; concealment.
“tension, and the latency of violence, make the greatest impressions”
2. the delay before a transfer of data begins following an instruction for its transfer.
“poor performance due to network latency”

¹ Definition provided by Oxford Languages

Architecture for remote-ness

You will design urban form that serves the parallel needs of our digital and physical lives; that provides an architecture for machine needs at the core and human leisure at the edges. The processing program – a data hotel where server space is rented by the square foot, and where performance is measured in latency, energy efficiency, and cooling capacity – will be dark and hidden from sight. Public access to the site will be digital, remote, and invisible but also immediate, tangible, and visible.

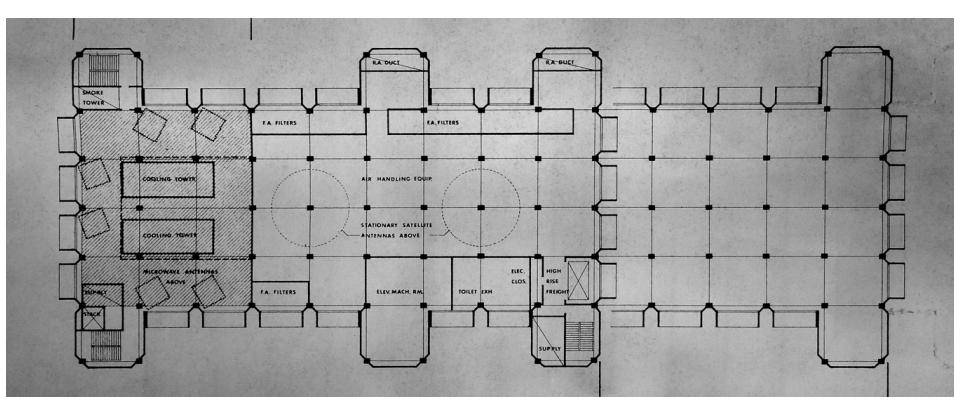
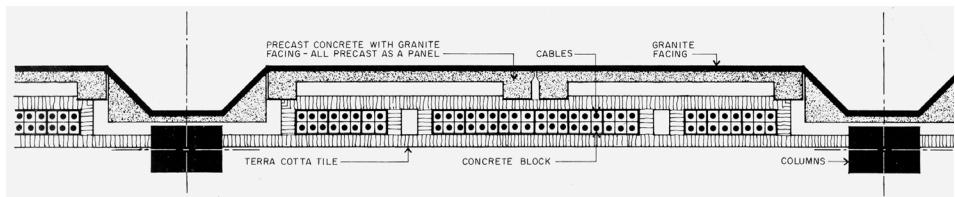
While the brief overtly requires a re-design of 20th century industrial and infrastructural site for a new era of industrial use, the designer is also asked to consider the disposition of an architecture that supports a contemporary condition in which the history of human culture is ready for retrieval at any moment, in which our perception of time and place is called into question. What is the disposition of “the cloud” when translated into form and structure? How might we negotiate the effortless and placeless experience of our digital lives with the physical mass and environmental toll required to enable it? What does it mean to feel and see the internet in architectural terms?



AT&T Long Lines Building

New York City, 1974

A telephone exchange and server center, a previous generation of architecture as urban infrastructure. Street view (left). Exterior wall plan with cable ducts (below). Tower mechanical equipment plan (bottom). Read more about the AT&T Long Lines Building [here](#).



Site

Boston's Seaport is a marine industrial district and designated port area that is undergoing significant re-development. Existing infrastructure easily breeds new infrastructure in the Seaport, where robust lines of access and service are already in place; shipping docks, trucking lines, power substations, and subsurface ventilation define and meter the landscape.

The downtown-proximate Seaport is also a rapidly urbanizing district sitting on valuable but vulnerable property fronting the Boston Harbor. New uses include luxury residential, retail, office space, and cultural program. Much of the waterfront development is already at risk of flooding during storm events and the site is increasingly vulnerable to storm surges and the effects of sea level rise.

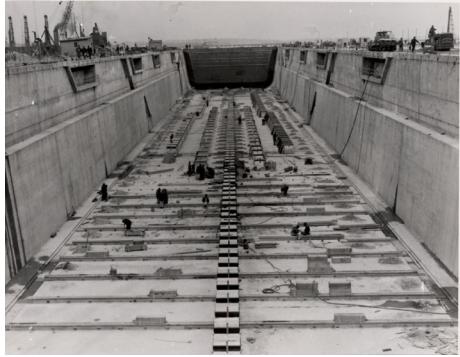
Dry Dock No. 4, a decommissioned US Naval repair site for ships, and the site of this brief, is situated within this context. The site is an infrastructural relic, completed during the late years of World War II, now languishing in this semi-industrial infrastructural landscape on a piece of high-potential public waterfront. Dry Dock No. 4 fronts the Boston Harbor main channel to the north and west, a public performance pavilion to the south, and seafood processing, tunnel ventilation, and an electrical substation to the east.

On this site, the Commonwealth of Massachusetts is tasked with protecting both the public's interest in its waterways and existing water-dependent industries. Future design on the dry dock site must maintain the industrial and infrastructural character of the designated port area and also promote public use along the water's edge. This brief imagines a future in which Bostonians may pursue public leisure in parallel with the machine functions that enable it.

The re-imagination of Dry Dock No. 4 may be conceived as a single or multiple buildings, a series of human and non-human rooms, or a data landscape. The site will always be "on" in service of the 24-hour space of the internet. Externalities such as sea level rise and technological obsolescence may also factor into the design. As technological capacity surpasses our need to physically host data as we think of it now, the site – already a ruin from a previous industrial era – may face status as a new infrastructural relic in less than a decade.

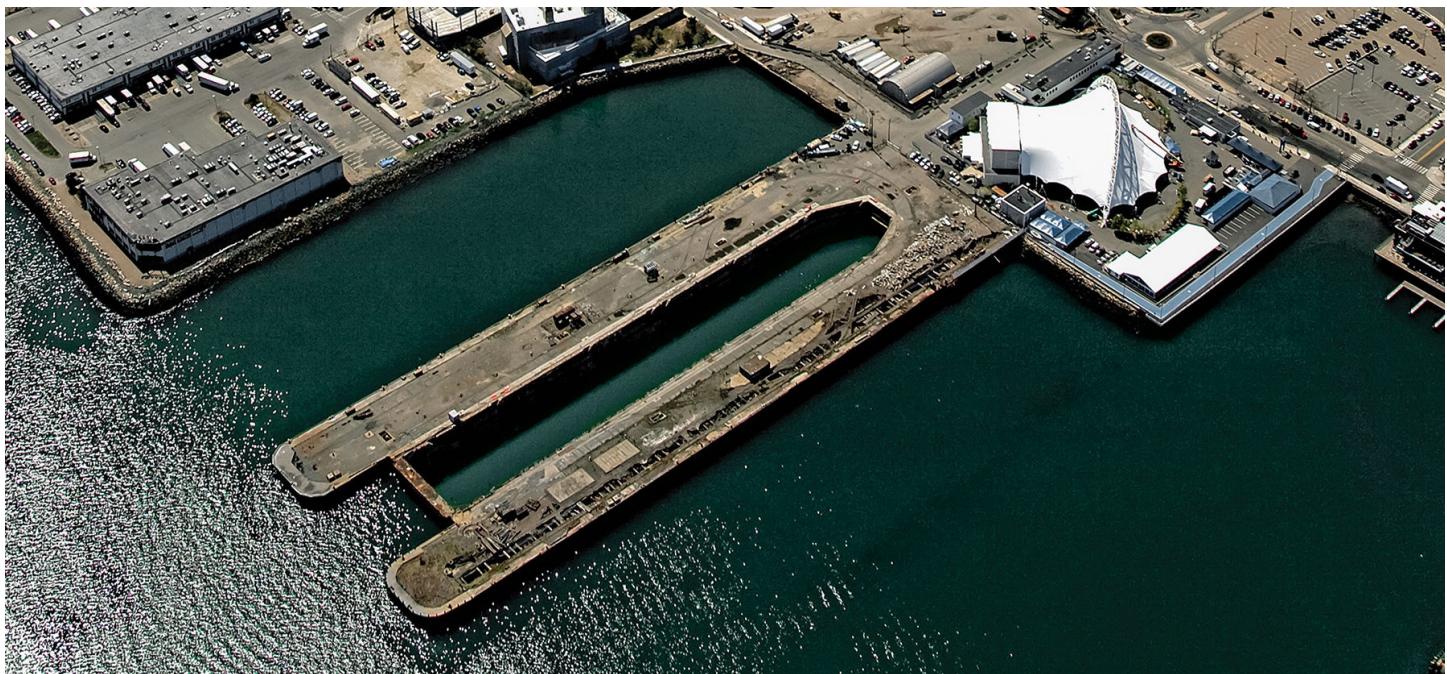
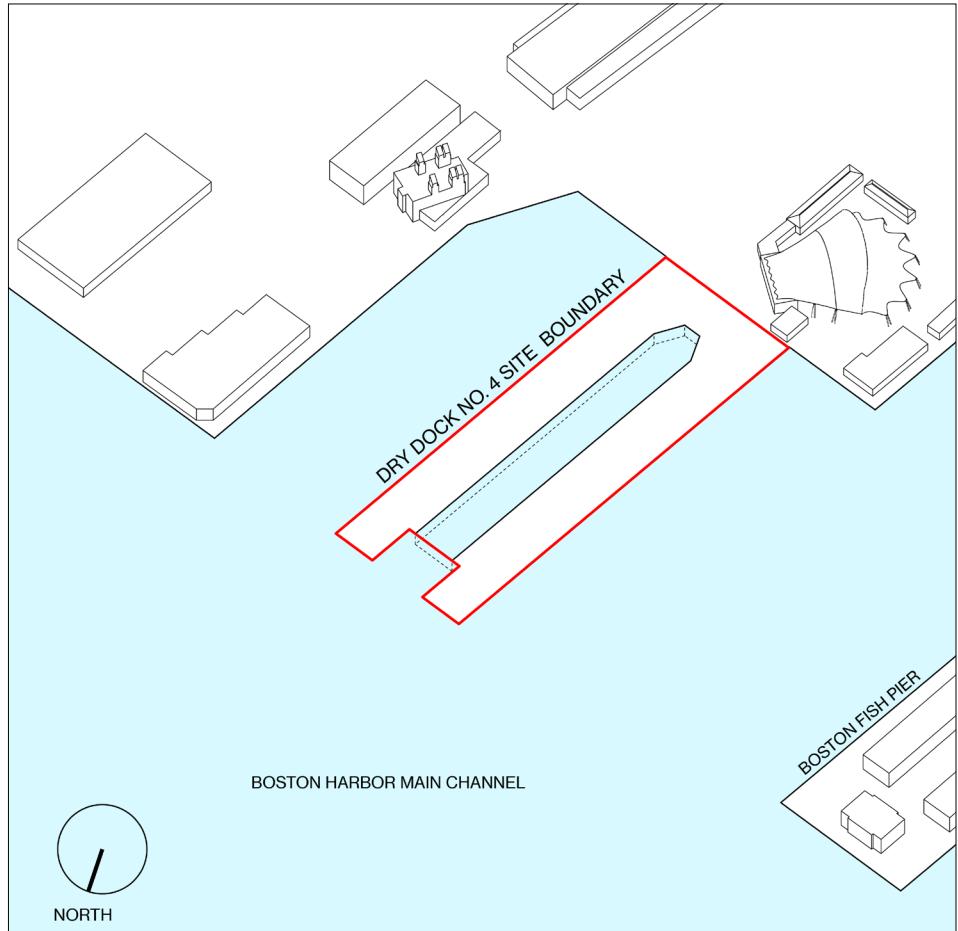
Site constraints

- Due to the flight paths to and from Logan Airport, located directly across the main channel, building height may not exceed 250 feet
- Provide public use of the entire site perimeter that abuts the water edge, including an extension of the Boston [Harborwalk](#) across the site, to fill the existing gap in Harborwalk public access
- At least 80% of the site must be dedicated to public leisure at grade



Dry Dock No. 4

Under construction in 1943 (above) and in its current state (below). The 3D site geometry (right) provided in this package includes key contextual information, site dimensions, and site boundary data.



Program

The following programmatic requirements must be met in order to maximize public use of the waterfront and to ensure that processing capacity and efficiency is adequately provided.

Machine space: dry, continuously cooled, private

The physical consequences of binging Netflix on the weekend are real and quantifiable in terms of energy loads and heat dissipation. While sources such as [Gartner Research](#) and Wikipedia offer background on [data centers](#) and [server rooms](#), for general reference, designers are encouraged to think expansively about the thermal and structural design of this program, which is essentially a dense grouping of data servers, racks to hold them, power to serve them, and fiber to connect them. The following are specific criteria for the Dry Dock No. 4 center.

- Lights-out data center populated with 48,000 cubic feet of server racks, operated remotely and without lighting to minimize energy loads and eliminate human staffing; space for occasional human maintenance access to the servers must be provided
- Heatsink strategy to continuously cool processing equipment; liquid cooling that utilizes the natural resource of the harbor to optimize energy efficiency may be utilized but a dry server environment must be maintained
- Server scale, density, location, and arrangement will be driven by the conceptual design of the thermal strategy (see chart at right for reference)
- Raised floors or plenums between server levels circulate air and host wire-based connectivity; floor-to-floor heights are optimized for energy efficiency and processing capacity



Equinix New York NY4

Secaucus, NJ

Floor plenums ensure continuous cooling and wire-based connectivity in NY4, a data center that transacts trillions of dollars of trading on Wallstreet each day. Read more about this data center, originally published in Bloomberg, [here](#).

Typ. rack sizes	Small	Medium	Large
Rack dimensions (W, D, H)	2' x 2' x 2'	2' x 2' x 4'	2' x 2' x 8'
Number of racks	6,000	3,000	1,500
Rack volume (cubic feet)	48,000	48,000	48,000

Server requirement breakdown

Any server rack size is acceptable; typical dimensions and corollary quantities required to achieve 48,000 cubic feet of volume are outlined above. Server rack size, density, and distribution may be driven by cooling strategies, approaches to public program, or other/conceptual agendas.

Human space type I: dry + wet, interior, private

While the processing levels are self-sufficient and remotely managed, a small amount of human space is provided within the processing center for operational and communication-related functions.

- Receiving and loading area, serviced by either truck (via land) or boat (via water)
- Security and communications center (500 SF)
- Equipment storage (1,000 SF)
- Restrooms (500 SF)



Chanel Spring Summer 2017

Karl Lagerfeld translates the condition of connectivity and networked grids of into textile, garment, set, event, and media on the 2017 runway. Watch the runway show [here](#).

Human space type II: dry + wet, interior, public

Because the center is located on public land, public educational program on the history and future of marine industry and technology is also provided.

- Exhibition and display space holds interactive displays and artifacts, including a scaled model of a ship that is 12' wide x 40' long x 30' high (8,000 SF)
- Office and support space (500 SF)
- Archive (1,000 SF)
- Restrooms (500 SF)

Human space type III: wet, exterior, public

The character of four-season public leisure program is determined by the designer and may be any combination of exterior landscape or semi-interior program at, above, or below grade. Any use at grade must be flood-able to accommodate occasional storm surge.

- Public recreational access the waterfront and views of it
- Public restrooms (500 SF)

Additional Information

The site is located at 290R Northern Avenue in Boston and can be located [here](#) via Google Maps.

3D model documentation is provided in .dwg and .skp formats. If you have not received this information please contact:

chart@architects.org

The jury will evaluate the capacity of each submission to reason and imagine the architectural parameters in this brief, as summarized here:

Evaluation Criteria

1. [Conceptual] Engagement with the issues outlined in the brief; resolution and legibility of the scheme
2. [Visual] Representational capacities to describe the above strategies
3. [Verbal] Verbal acumen of a presentation to the jury

Designers are encouraged to think carefully and critically about our current condition of remoteness and digital living when developing a representational strategy for their design response to the brief. Representational technique and scale are left to the discretion of the designer.

Documentation

The submission is limited to no more than ten 16 x 9 format slides. Your drawings or other media should be clearly labeled and a descriptive text provided outlining the conceptual framework, agenda, and a basic description of the proposed design not to exceed 200 words. The following represents the minimum documentation required:

- One site plan, including ground floor plan
- Key upper level plan(s)
- Two site sections or sectional perspective views
- Site axonometric or aerial view
- Ground (or sea) level perspective views
- Suggested diagrams: thermal diagram to describe cooling processes, structural system diagram, program diagram demonstrating the relationship between human and machine space
- Other representation at the discretion of the designer

The Rotch Committee reserves the right to use the submission materials for publication. Problem solutions submitted in the final competition become the property of the Rotch Traveling Scholarship and can only be used with its express written consent.

Submission of Materials

Electronic submission

All proposals will be submitted and reviewed electronically. Materials will be submitted in a single, multi-page PDF document. PDF files may be emailed if smaller than 15 MB or transferred using a service such as WeTransfer or Dropbox if larger than 15 MB. Be sure to include your full name on each slide and to optimize your drawings and file for digital viewing.

Send to: chart@architects.org

Due by: 12:00 PM (EST) on 22 March 2021

Statement of Sole Authorship

Sign and digitally submit the statement of sole authorship on the following page along with your digitally submitted materials.

Presentation

Submissions will be judged on 26 March 2021 via Zoom meeting. On that day, finalists should arrive in the virtual waiting room at least 5 minutes prior to your presentation. You will have 10 minutes to present your work, followed by 15 minutes to respond to questions from the jury and general discussion.

Statement of Sole Authorship

I hereby assure the Rotch Committee that I am the sole author of my submission for the 2021 Rotch Competition. I have not received criticism, suggestions, or help of any sort other than through the use of books and other published literature.

Signed:

Print Name:
