

Big Dig Building
Project title

NA05_ANLTC
Office ID

Project data	Author and contact
<p>City Cambridge</p> <p>Country United States</p> <p>Type Architecture (housing)</p> <p>Status of planning Preliminary design stage</p> <p>Start of construction March 2007</p>	<p>Name Hong, John S, m, 1969</p> <p>Profession Architect</p> <p>Organization SINGLE speed DESIGN</p> <p>Address 171 Brookline Street</p> <p>Zip Code 02139</p> <p>City Cambridge</p> <p>State MA</p> <p>Country United States</p> <p>Language english</p> <p>Phone 617 576 9300</p> <p>Fax 617 576 7200</p> <p>E-Mail info@singlespeeddesign.com</p> <p>WWW www.singlespeeddesign.com</p>



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Project description	
<p>Most are familiar with Boston's ongoing "Big Dig" - the Central Artery Tunnel Project that is one of the largest, most complex infrastructural undertakings in American urban history. Few, however, give thought to the massive amount of waste that accompanies construction on this scale, namely the dismantling of the existing elevated highway and the miles of temporary structure used and discarded throughout the project.</p> <p>As an alternative to this urban scale waste, the Big Dig Building proposes to relocate and reuse these infrastructural materials as building components, adapting them to uses ranging from structural systems to cladding. Moreover, if time=money, proven highway fabrication technologies can be utilized to construct Big Dig Building(s), drastically expediting the construction sequence. Finally, as this recycled infrastructure offers the potential to create architecture that can withstand much higher loads than conventional systems, landscape can be easily brought to the roof and upper levels of the building, increasing useable open space, controlling runoff, and bringing natural environments closer to building users.</p> <p>So far, public and local governments have remained tacit about the future of millions of tons of materials that must be disposed of as this monumental endeavor comes to a close. Like the urban renewal frenzy of the original elevated highway, the heroic effort of building an artery through downtown Boston involves the erasure of existing structures in the name of "progress." Where the failure of the original structure can now be clearly measured by the way it divided neighborhoods, the downside of the Big Dig's "progress" is more elusive yet just as severe: it has the potential to negatively impact the environment and economy if salvageable materials that contain a high degree of embodied energy are destroyed.</p> <p>In terms of the regional urban planning process, the implications of Big Dig Building reaches far beyond the realm of architectural design by becoming a model process for other cities to adapt. For example, what if the paradigm of infrastructural re-use had been integrated into the way the Big Dig work was implemented? As the elevated artery is deconstructed, the reconstruction of the materials into dwelling units would become a viable strategy to alleviate Boston's housing crises. Public money going toward storage, demolition, and the long-term consequence of wasted embodied energy, could instead be productively directed toward the creation of new housing. Finally, as specialized</p>	<p>infrastructural workers become increasingly out of work as the Big Dig comes to a close, these same workers would enjoy longer durations of employment leading to the political and economic sustainability of such a venture.</p>

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Statement target issues	Self assessment
<p>Quantum change and transferability</p> <p>Re-using infrastructure not only contributes to sustainable construction by harvesting embodied energy with materials that also contain high thermal mass, it also allows the merging of landscape and architecture through its high load-bearing capacity. Dismantled and relocated, these materials can be utilized in both large and small scale projects as well as for a wide variety of programs, as structural spans are greater than standard framing. Based on a 'kit-of-parts', if a Big Dig building becomes 'obsolete', its components can be dismantled and re-used in another building instead of going to the landfill. Proven infrastructure building techniques can cross over into the architectural realm, allowing for expedited, cost-saving construction sequences.</p>	★★★★★
<p>Ethical standards and social equity</p> <p>As in Boston, infrastructural improvements go hand-in-hand with booming economies and rising housing costs. When an elevated artery is deconstructed, materials slated for destruction can instead be reconstructed into affordable dwellings. As open space and community also go hand-in-hand, the ability to merge landscape and architecture also contributes to the social well-being of the community.</p>	★★★★★
<p>Ecological quality and energy conservation</p> <p>Massive amounts of embodied energy is saved in re-using infrastructure. These benefits are enhanced through passive heating, cooling, and day lighting strategies, as well rebate-based energy generation. Planted roofscapes allow for efficient land-use while minimizing the impact of run-off. Efficient, low-impact infrastructure-building techniques are applied to the construction sequence.</p>	★★★★★
<p>Economic performance and compatibility</p> <p>Instead of public funds going toward destroying infrastructure, funds can go toward public building projects incorporating these materials. Regionally this would employ a labor force that is typical unemployed after an infrastructure effort is completed. Since construction is expedited and materials are 'free', public projects that utilize these materials will benefit greatly in added savings.</p>	★★★★★
<p>Contextual response and aesthetic impact</p> <p>Big Dig Building allows a merging of the natural and man-made. Through cantilevered gardens and planted roofscapes, open space brought closer to everyday activities can positively impact inhabitants, particularly in dense urban environs. Moreover, longer spans allow for programmatic flexibility and multiplicity in an era where notions of home and work are becoming increasingly blurred.</p>	★★★★★

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1. Large-scale elevated landscape elements are merged with the architecture as the recycled structure is able to withstand enormous loads

I-93 offramp loops in East Cambridge have been dismantled with portions saved for reuse in this project.

The overpass is constructed of concrete and steel inverted panels supported by steel columns and beams.

Dismantled and relocated these materials can easily become a structural building module adaptable to a variety of sites and programs.

what is the potential for millions of tons of obsolete infrastructural materials?

2. From highway to housing - instead of discarding 'obsolete' infrastructure, a second life for these materials is viable

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LOAD COMPARISONS:

Standard Framing: 40 psf / 50 psf - only standard "residential" objects and programs can be accommodated

Existing Inverset Overpass: 250 psf - Interstate-93 designed for HS20-44 military loading

Recycled Big Dig Building: 200psf - How might a structure that can sustain 4x the load of standard residential construction change the way we dwell?

view of townhouse type: the heavy loading capacity allows the "backyard" to be placed on upper levels allowing the structure to be adapted to tight urban conditions while providing ample open space

3. Load comparisons

inversets level

cantilevered inverset bays

disrupted inverset bays

5. Facade as vertical landscape



7. Court - salvaged boxbeams

LONG INTERIOR SPANS = FLEXIBILITY OF INTERIOR ARRANGEMENTS

DUPLEXES

- 3-bedroom with pool
- office-house with garden
- in-law house within a house
- 3-bedroom with playground

FLATS

- open live-work studio
- 2 bedrooms generic
- young parents with playground
- bachelor's pad with way too much stuff

9. Long-span allows flexibility

1. Detached Buildings
2. Party-Wall Townhouse
3. Single-Width Slab
4. Cluster Buildings
5. Double-Width Slab
6. Mid-Rise Block

4. Big dig typologies

1. recycled formwork and aggregate
2. salvaged box beams over sugrade parking lid
3. steel salvaged for building framing
4. salvaged inverset concrete slabs as floorplates
5. lighter structures bear on big dig framing
6. salvaged wood piers milled into siding

6. Construction sequence

photovoltaic laminate

planted roofscapes and runoff control

planting bed

light reflector

operable sunscreen

seasonal trombe wall

upswing door

runoff control landscape

parking

live/work unit

pre-cast rain screen

radiant floor

salvaged inverset panels

planting bed

salvaged wood piers milled into siding

salvaged box beams

8. Typical section

parents with playground: the ability to cantilever inversets allows larger scale outdoor spaces to enter into an upper story dwelling

heavy dwelling: objects too heavy for a normal residence can be easily accommodated

duplex with swimming pool: outdoor spaces overlap with indoor environments forming continuous transitions between landscape and architecture

10. Interior views