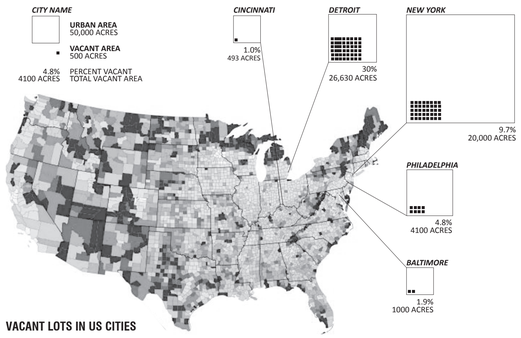
VACUFORM/

VACUFORM proposes a reconception of urban vacant lots as unique, productive material ecologies, suggesting policy alternatives to support 'soft' civic infrastructures and the emergent needs of urban communities. Radical reuse on the lots foster a landscape and an architecture of distinct topographies, using material collected from federally mandated civic maintenance and infrastructural improvements to sponsor new forms of civic life.

HOW DO WE RESPOND TO OUR CHANGING URBAN CONTEXT?



VACANT LOTS IN US CITIES

ABSTRACT STATEMENT

VACUFORM proposes a reconception of urban vacant lots as unique material ecologies, capable of supporting 'soft' civic infrastructures and the emergent needs of urban communities in shrinking cities, finding synergies amongst various stakeholders to expand resources already at play.

VACUFORM develops first as a soft infrastructure, using material collected from federally-mandated improvements to transform sites into a low-cost water retention systems, alleviating pressure on municipal water systems. Water migrates into the project's landscape from a network of structural tubing, facilitating capillary action, and is retained on site before re-entering the municipal system or aquifer. The project supplements the city's 'hard' infrastructures until they are no longer necessary to service the shrinking city.

Additional investment transforms VACUFORM into thickened service spaces for emergent urban programs, including longterm caregivers and mobile clinics, enabling the population to stay longer, live more healthful and productive lives, and contribute to the neighborhood's transitioning character.

VACANT CITIES | SHIFTING INDUSTRY

As cities worldwide transition to service economies, traditional 'industries' and the buildings that house them are ever more scarce, displacing urban populations, and leaving much of our city land vacant.

The average American city has over 64,426 acres of vacant land. These sites are often neglected, underserviced, and undertaxed, leading to decreased property values for city residents, and decreased revenue for the municipalities.

Philadelphia alone has over 40,000 vacant lots, accounting for over 4100 acres of land, over three times the size of the city center. Several of the lots, are priced at less than $10 per square foot.

Several of the lots are in neighborhoods where there is a high likelihood that the value of new construction will exceed the construction costs, suggesting that projects on these sites would represent a real return-on-investment.

SOFT INFRASTRUCTURE ►

In early phases, the project develops as a soft infrastructure, utilizing newly-collected material from nearby vacant lots to transform the topography of the site into a low-cost, functioning water retention and filtration system, alleviating some of the pressure on the city's drainage strategies, and fulfilling government mandates to improve water mitigation. Water migrates into the lot from a system of lightweight, networked structural tubing, facilitating capillary action from the saturated ground during water events, and pulling rainwater from neighboring roofs to assist draining. It is retained on site by the project's landscape, and re-enters the municipal system after events.

The project supplements the city's 'hard' infrastructure-its system of tunnels, pipes, and drains-through minimal and strategically placed valves and inlets, until such time as such systems are no longer viable or necessary to service the shrinking city.

- VACANCY
- UNDERUTILIZED PARTY WALL
- SECURITY ISSUES
- POOR DRAINAGE
- COSTLY MAINTENANCE
- UNDERUTILIZED CITY LOT
- TRASH
- LACK OF COMMUNITY SERVICES SPACE
- HIGH CRIME
- LACK OF PUBLIC SPACE

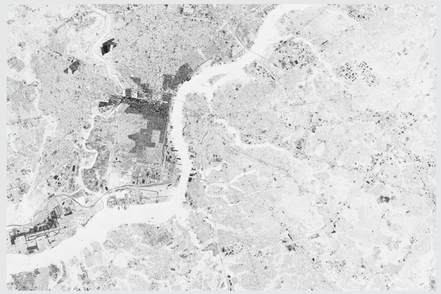
BEFORE | VACANT RESIDENTIAL LOT

AFTER | VACUFORM SOFT INFRASTRUCTURE | RETENTION LANDSCAPE AND CAPILLARY STRUCTURE

HOW CAN WE MATCH THE NEEDS OF THE PEOPLE TO NEW DEMANDS PLACED ON THE CITY?

MATERIALS AVAILABLE FROM THE MAINTENANCE AND REPURPOSING OF VACANT LAND

In Philadelphia alone, 3200 acres of green space and pervious surfaces will be needed by 2015.



RETURN ON INVESTMENT AREA | PHILADELPHIA CASE STUDY

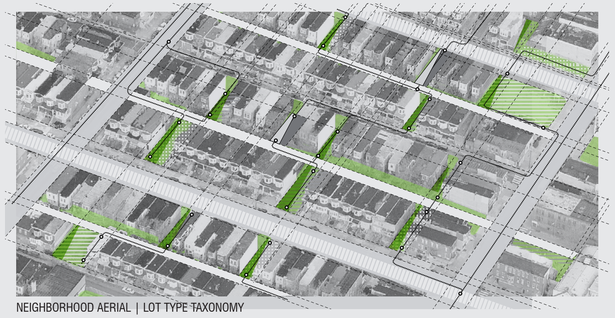
STORMWATER MANAGEMENT | NEW MANDATES REQUIRE ACTION

Managing stormwater is a basic government function. Since the Clean Water Act of 1977, government is mandated to capture and treat urban runoff before releasing it to natural watercourses. 44% of Philadelphia is covered in impervious surfaces. With climate change, Combined Sewer Overflow events are only expected to increase in frequency and intensity. Under new EPA mandates, Philadelphia and other major cities are spending significant sums to maintain their current systems and increase capacity.

CASE STUDY AREA | AVAILABLE VACANT LOTS

MATERIAL ECOLOGY| MUNICIPAL SOURCING

In order to prepare paved lots as permeable surfaces, the city must break up and dispose of acres of concrete and asphalt surfaces. In order to prepare lots with abandoned structures, the city must demolish existing buildings. The project reuses these "found" materials as integral elements in the construction of new community facilities. The project is built with material reclaimed by the City from the new repurposing of vacant lots. Some material is used 'as-is', other material is manufactured into prefabricated insulating and weather-tight panels to serve the low-cost, high-quality needs.



NEIGHBORHOOD AERIAL | LOT TYPE TAXONOMY

RECHARGE LOT

Several lots are developed as 'recharge lots', planted with native vegetation and maintained as pervious surface to allow urban runoff and excessive rainfall to recharge the natural aquifer. These lots are 'offline', requiring no hard connection to city services.

FILTER LOT

Larger and more sunlit lots are transformed into 'filter lots', incorporating surface filters, groundcover, and natural vegetation to filter excess runoff 'online' in major events. These lots double as neighborhood parks and playgrounds. Filter lots incorporate new grading and drainage strategies to pull runoff from sidewalks and streets.

COMMUNITY IMPROVEMENT LOT

Every tenth lot is developed as community services lot, incorporating material from the transformation and maintenance of the recharge and filter lots in the construction of the site and buildings. Residents on these lots help to maintain and publicly program the recharge and filter lots in the neighborhood.

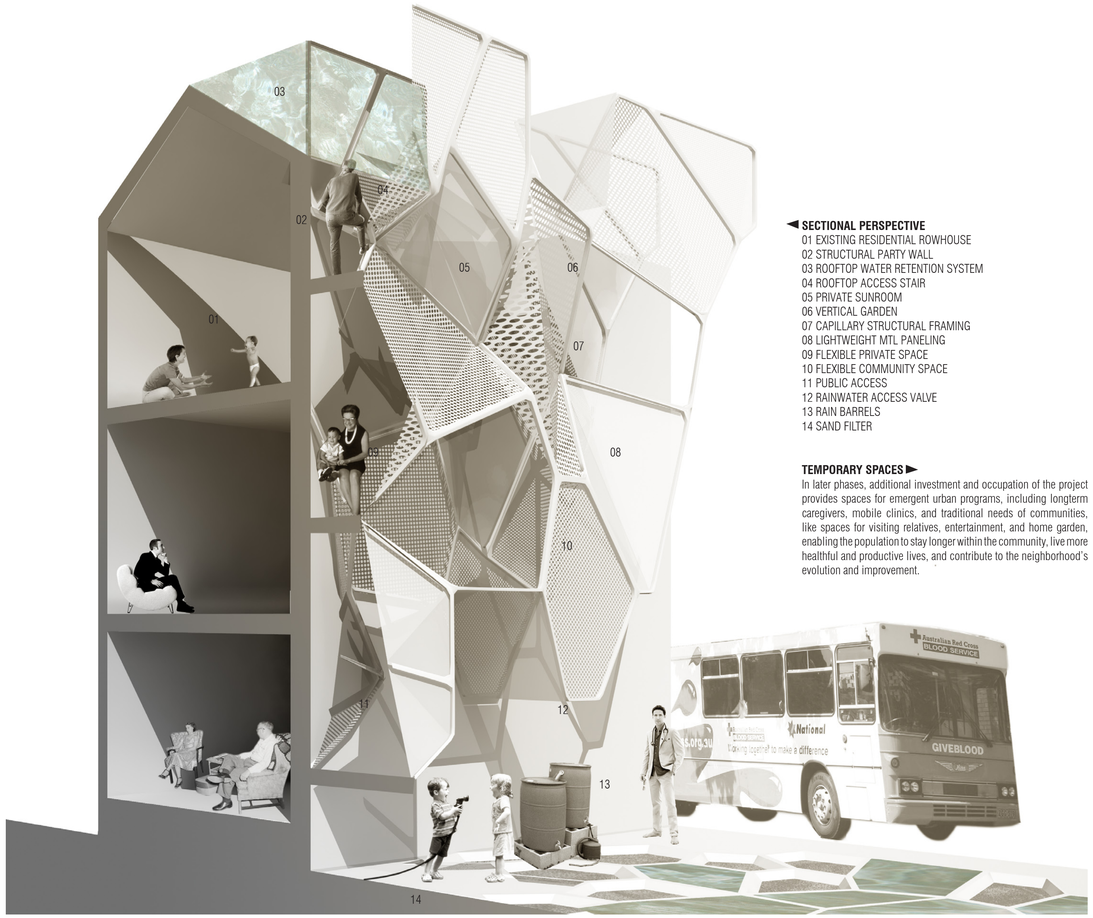
BIORETENTION AND DETENTION PONDS

Select lots incorporate retention and detention ponds to slow or stop the introduction of excessive runoff into the municipal system during flood events.

VACUFORM/

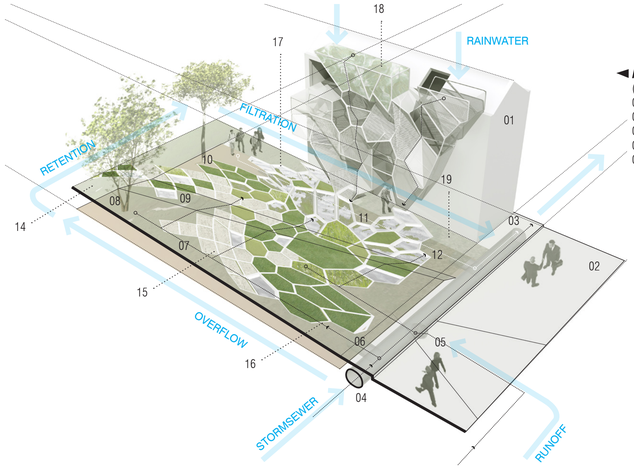
VACUFORM finds synergies in the goals and priorities of various stakeholders in order to expand the reach of activities and resources already at play. The project appropriates the abundance of party walls within the urban fabric as a new paradigm for construction, using lightweight material to create a thickened service space at the edge of rowhouses and industrial buildings, housing emergent programs conducive to our shrinking cities.

HOW CAN WE PROVIDE FOR THE EMERGING NEEDS OF OUR NEIGHBORHOODS AND COMMUNITIES?



◄ SECTIONAL PERSPECTIVE
01 EXISTING RESIDENTIAL ROWHOUSE
02 STRUCTURAL PARTY WALL
03 ROOFTOP WATER RETENTION SYSTEM
04 ROOFTOP ACCESS STAIR
05 PRIVATE SUNROOM
06 VERTICAL GARDEN
07 CAPILLARY STRUCTURAL FRAMING
08 LIGHTWEIGHT MTL PANELING
09 FLEXIBLE PRIVATE SPACE
10 FLEXIBLE COMMUNITY SPACE
11 PUBLIC ACCESS
12 RAINWATER ACCESS VALVE
13 RAIN BARRELS
14 SAND FILTER

TEMPORARY SPACES ►
In later phases, additional investment and occupation of the project provides spaces for emergent urban programs, including longterm caregivers, mobile clinics, and traditional needs of communities, like spaces for visiting relatives, entertainment, and home garden, enabling the population to stay longer within the community, live more healthful and productive lives, and contribute to the neighborhood's evolution and improvement.



◄ AERIAL DIAGRAM

(EXISTING CONTEXT)
01 EXISTING RESIDENTIAL ROWHOUSE
02 EXISTING CITY STREET
03 EXISTING PUBLIC SIDEWALK
04 EXISTING STORM SEWER
05 EXISTING DRAIN INLET

(VACUFORM SOFT INFRASTRUCTURE)
06 INFLOW REGULATION VALVE
07 PRETREATMENT
08 SEDIMENTATION CHAMBER
09 FILTER
10 GRAVEL BED
11 UNDERDRAIN
12 OUTFLOW REGULATION VALVE
13 FILTRATION CHAMBER

(PUBLIC FEATURES)
14 GROUNDCOVER PARKLAND
15 LOW SEATING/ RETAINING WALL
16 PLANTING AND PLAYGROUND
17 STAIRS AND SEATING
18 ROOFTOP RETENTION SYSTEM
19 RAIN GARDEN

POLICY OBJECTIVES | LEVERAGING PARALLEL INTERESTS

Almost half of our city is covered in impervious surfaces. In order to meet new federal regulations, we need to convert over 3600 acres of land in the city into greenspace and pervious surfaces by 2015. We will be spending millions of dollars and transforming much of the city over the next few years in order to meet this goal.

CITY

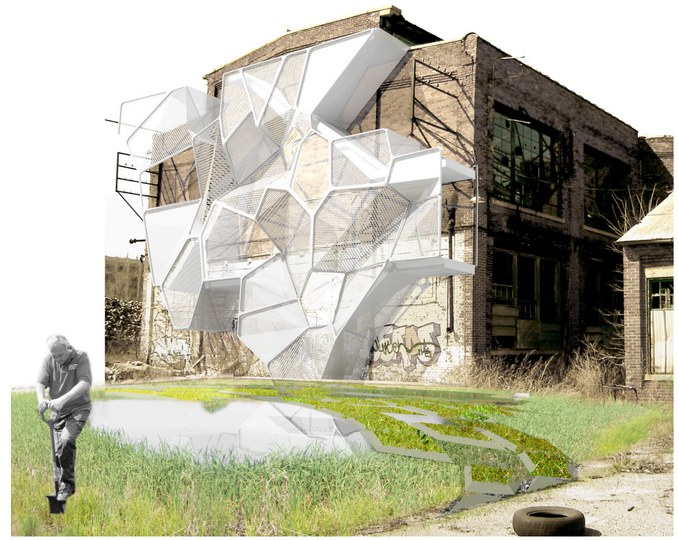
Vacant lots are destroying our property values and putting a strain on our infrastructure. They are eyesores and public nuisances, often centers of criminal activity and disease. Our neighborhoods need basic community services, like parks and playgrounds instead.

NEIGHBORHOODS

Owners in shrinking neighborhoods are losing incentives for staying put. With an aging population and changing family structures, there are fewer compelling reasons to stay. We need an easier, more manageable system of care, for our neighborhoods and their residents.

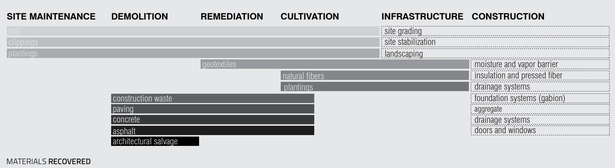
OWNERS

INTERIOR | FLEXIBLE COMMUNITY SPACE | NEIGHBORHOOD CLINICAL SERVICES



AFTER | VACUFORM RETENTION LOT AND COMMUNITY SERVICE CENTER

HOW CAN WE BENEFIT FROM THE MATERIALS AND PROCESSES ALREADY AT PLAY IN THE TRANSFORMATION OF THE CITY?



MATERIAL ECOLOGY | SCHEDULING

The project benefits from an economy of scale, capitalizing on the resources at play on a neighborhood block and repurposing them for the construction of structures that serve these unique communities.

VACANT LOTS IN PHILADELPHIA

CONSTRUCTION SYSTEM | RADICAL REUSE

The project is built with a combination of low-tech, prefabricated elements, provided by the city as a 'starter kit' for the occupation of the municipal site, and simple DIY elements, which can be assembled by the homeowner and neighborhood volunteers to mitigate labor costs. All elements are easily assembled and disassembled, ensuring the adaptability of the site and potential expansion of the home. The project benefits from a layer of recycled foam insulation, made from reclaimed styrofoam. The city has difficulty recycling most of its abundant styrofoam waste supply, and this is an appropriate and effective reuse. Above the insulation layer is simple reclaimed wood decking.

BEFORE | VACANT COMMERCIAL LOT

PROPOSED ECOLOGIES | MUNICIPAL MATERIAL

The city spends money and human resources everyday to maintain vacant lots, clearing the trash, mowing grasses, and removing invasive species. Under the project guidelines, these resources would be recast as material collection services, providing raw material for constructing gabion baskets and compressed insulation panels. The city, by promoting responsible stormwater management, would be able to tap into the resources available on the vacant lots, attaining renewable resources for the manufacturing of building assembly components. The abundant material would make one out of every 10 vacant lots viable as a subsidized community center.The caregiver in turn acts as a steward for the public lot on which the structure is built. The structure is cast as a "model" of ecologically sound development, and is available for the community as a learning tool of best practices in the reuse of construction material and sustainable living.

AFTER | VACUFORM FILTRATION AND RAIN GARDEN

PARTY WALLS | EXCESS STRUCTURAL CAPACITY

The vacant city is host to an overabundance of under-utilized party walls. With one neighboring wall demolished, these walls are only supporting half of their intended structural load. These walls are also newly unstable, losing the shear strength the adjacent construction once supplied. With the proposed simple, lightweight construction, this excess structural capacity of these walls is used once again. The new construction helps to stabilize the wall, and allow structural reinforcing for the walls to be opened, providing windows and doors to the newly discovered space of the vacant lot.

BEFORE| VACANT INDUSTRIAL BUILDING AND LOT