

Country / City Toronto, Canada
University / School University of Toronto, John H. Daniels Faculty of Architecture, Landscape and Design
Academic year 2019 - 2020, MLA1
Title of the project Embodied Energy: Living Lab
Authors Agata Mrozowski and Madison Appleby

TECHNICAL DOSSIER

Title of the project	Embodied Energy: Living Lab
Authors	Agata Mrozowski and Madison Appleby
Title of the course	LAN 1012: Design Studio 2,
Academic year	2019 - 2020
Teaching Staff	Liat Margolis and Elise Shelley
Department/Section/Program of belonging	Masters of Landscape Architecture, Year One
University/School	University of Toronto: John H. Daniels Faculty of Architecture, Landscape and Design



Written statement, short description of the project in English, no more than 250 words

The contemporary city and its Modern urban infrastructure has been dependent on a linear stream of material and economic flows – starting at the site of extraction, moving through production, consumption with a final destination at disposal. This process of designed obsolescence has relied on the exhaustion of non-renewable natural resources often situated on the contested territories of Indigenous peoples. Our project takes into consideration embodied energy – the total sum of energy used to extract, manufacture, transport, and assemble materials for the built environment. Our project asks, what vernacular materials can we employ when designing for the west district of U of T campus to minimize the impacts of our ecological footprint? How can we increase the porosity of material surfaces to relieve the pressures off of the city's infrastructure? How do we implement a design that looks at closed loop systems of material and economic flow? At the same time, energy is also understood from a spiritual point of view. "Within many Indigenous worldviews, objects are keepers of memory, and even more than that, are inscribed with or possess an animacy of their own." [1]. In Embodied Energy: Living Lab, we wanted to encourage the praxis of 'land as pedagogy' by establishing the conditions for a 'living lab' that would further the study of urban ecology by examining the relationships between the city's materiality and robust, resilient, and adaptable species found within alvar habitats in Ontario.

[1] Bryan-Wilson, Julia. "Rebecca Belmore: Material Relations" in *Aftersall, A Journal of Art Context and Enquiry*, 2018 (45), 43-49.

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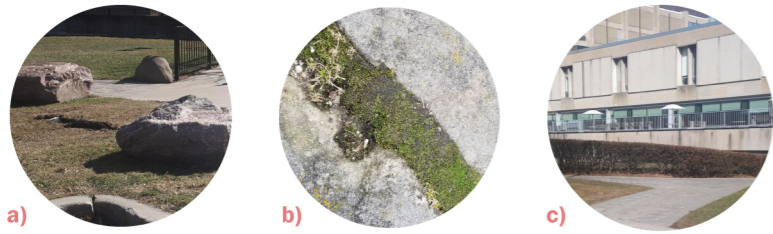
CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

Barcelona September 2020
SCHOOL PRIZE

Embodied Energy: Living Lab

Material Inventory



Three things stood out for us when walking the west campus of U of T,

a) Boulders that lined the streets and entrances in an attempt to direct circulation, prevent desire lines, as well as intended to shape a visual identity for the district

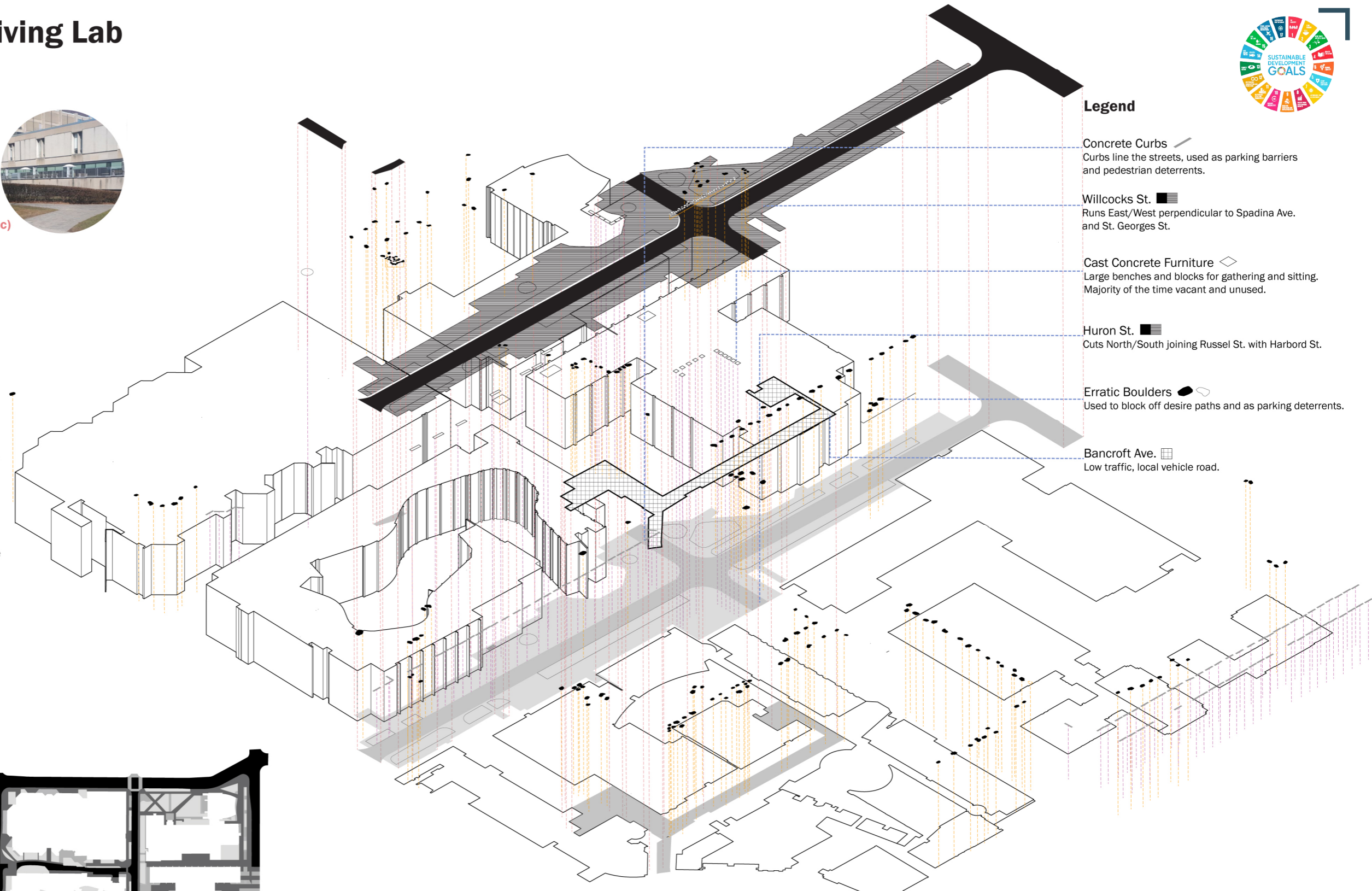
b) Tiny vegetation emerging from the boulders and pushing their way through paving patterns

c) The legacy of Modernist architecture evident in the liberal employment of concrete laid out in vertical and horizontal planes

All of these materials, as all materials, come from somewhere and hold their own energy footprints. They are historical artifacts of geologic time in a state of constant transformation and carry their own lifecycles and stories. Geological strata formed from millions of years of shifting tectonic plates, waves of magna crystallized, calcareous skeletons of marine creatures and plant material embedded and compressed, glaciation, deposition, and erosion - tell the story of deep time and energy flow.

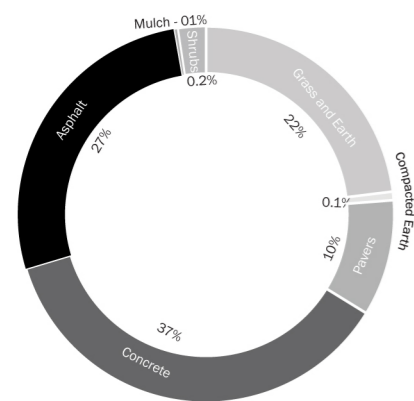
"The land, Aki, is both context and process. The process of coming to know is learner led and profoundly spiritual in nature."

- Leanne Betasamosake Simpson, Land As Pedagogy



Legend

- Concrete Curbs** Curbs line the streets, used as parking barriers and pedestrian deterrents.
- Willcocks St.** Runs East/West perpendicular to Spadina Ave. and St. Georges St.
- Cast Concrete Furniture** Large benches and blocks for gathering and sitting. Majority of the time vacant and unused.
- Huron St.** Cuts North/South joining Russel St. with Harbord St.
- Erratic Boulders** Used to block off desire paths and as parking deterrents.
- Bancroft Ave.** Low traffic, local vehicle road.

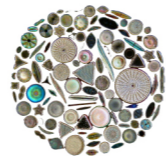


Existing Surface Materials



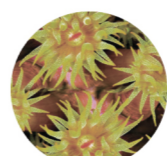
Asphalt : 902.22 m³
 Embodied Energy: 48, 568, 307.04 MJ
 Embodied Carbon: 70, 828.78 Kg

Material Story: Oil byproduct formed through the compression of living matter over millions of years.



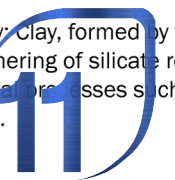
Concrete: 265.07 m³
 Embodied Energy: 28, 044,406 MJ
 Embodied Carbon: 13, 778.386 Kg

Material Story: Limestone, an organic sedimentary rock formed from the accumulation of shell, coral, algal and fecal debris.



Pavers : 169.42 m³
 Embodied Energy: 976, 875.72 MJ
 Embodied Carbon: 19, 537.514 Kg

Material Story: Clay, formed by the gradual weathering of silicate rocks, through natural processes such as rain and wind.

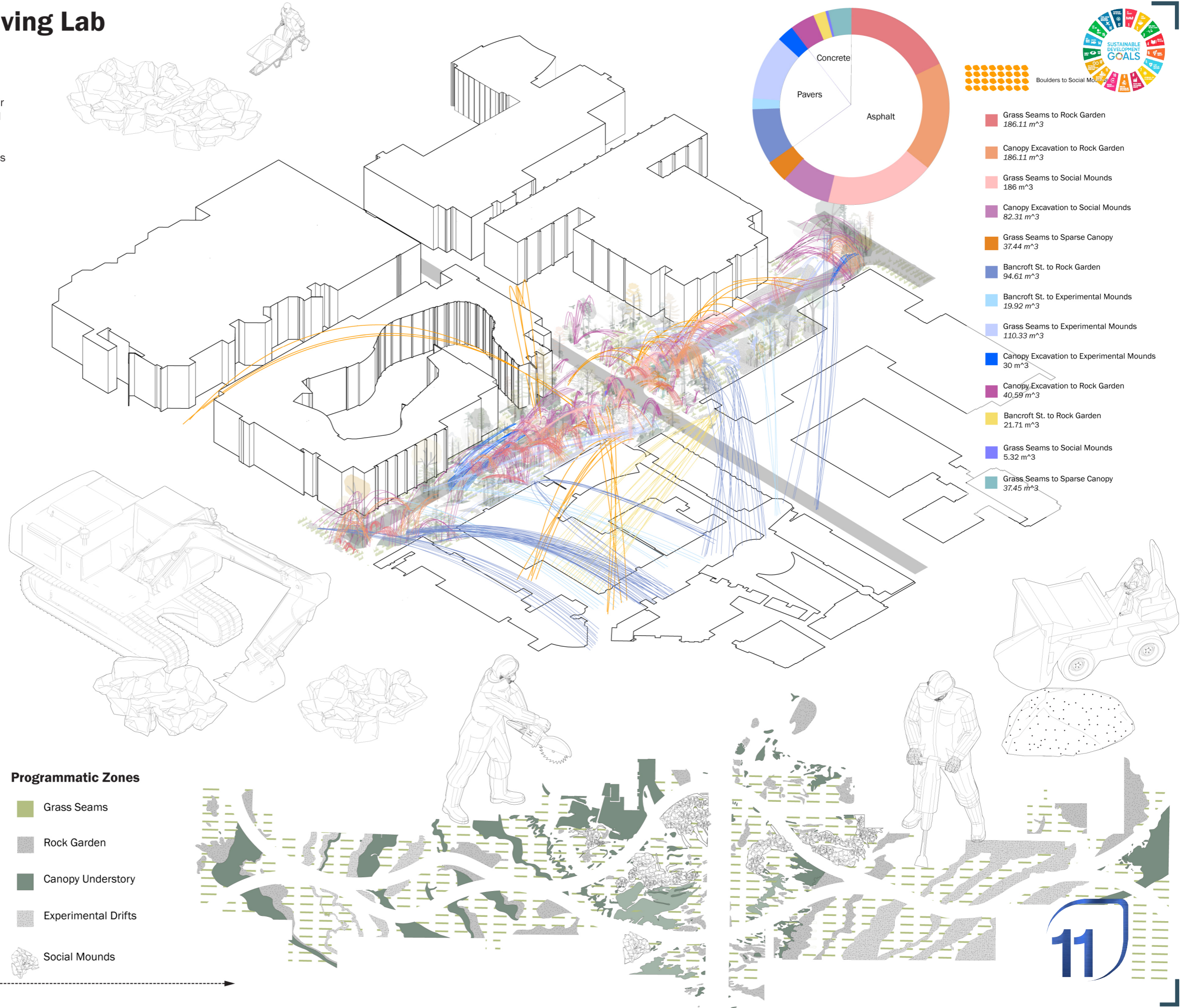


Embodied Energy: Living Lab

Design Process

We overlaid the geological map of southern Ontario onto Willcocks St. to serve as the composition for our paving pattern and programmatic structure. Inspired by the depositional features of glaciation – drumlins and eskers, and the natural cycles and processes that manifest these forms, we applied the techniques of excavation and piling – adding, subtracting, and redistribution - on macro and micro scales. We developed a series of **five** operations that were informed by programmatic zones.

We researched and imagined the people who would labour over implementation of this project, and the machines that would be necessary to transform this landscape.



Embodied Energy: Living Lab

Program Elements



Five programmatic zones:

1. Grass Seams

The underlying grass seam grid was created through a series of rectangular cuts. Planting of species emblematic of alvar prairies.

2. Canopy/Understory Layer

We extended out from the existing tree locations and incorporated much needed vertical diversity of shrubbery and understory layers.

3. Rock Gardens

The rock garden areas consisting of organized excavated deposits of piled concrete are organized within the imposed pattern of the geological strata of Southern Ontario. Pedestrians are encouraged to look down and notice signs of life in the rock gardens.

4. Social Mounds

Social mounds consisting of boulders accounted for in our inventory are stacked to create landmarks and gathering spaces.

5. Experimental Drifts

Experimental drifts host the 'living labs.' Laid out in lateral drifts using replication as a key component to experimental design, as well as a number of variables such as sun and shade, students and pedestrians are encouraged to look closely and investigate the changing state of species composition over time.

