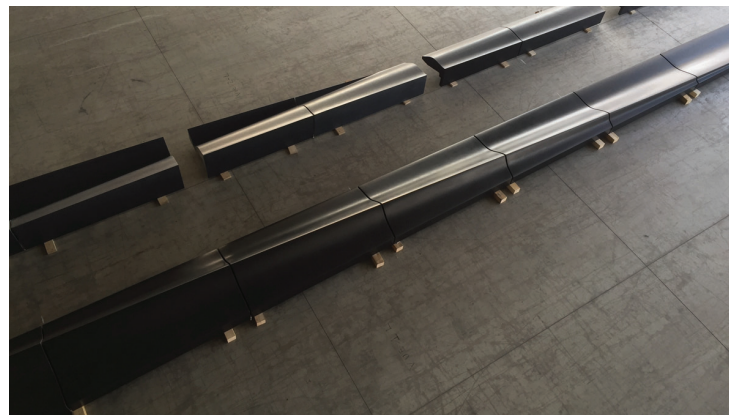
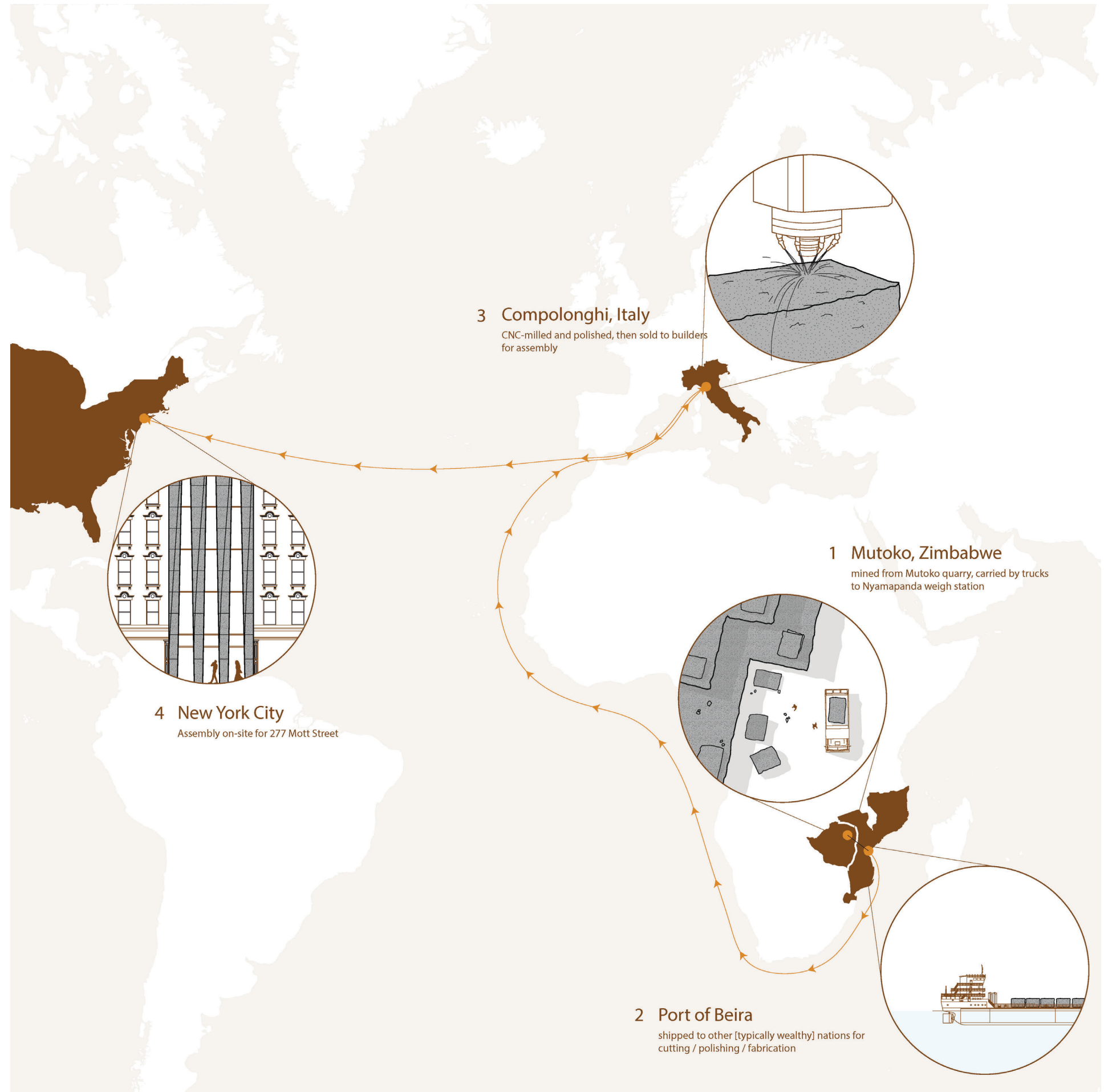


ZIMBABWE BLACK GRANITE: MATERIAL PRODUCTION

Precedent: 277 Mott St., New York, NY by Toshiko Mori Architects



277 Mott Street is clad in granite panels that were extracted from Zimbabwe, shipped from Port of Beira to a CNC milling facility in Italy, then shipped off to New York City as prefabricated panels to be assembled on-site.



ZIMBABWE BLACK GRANITE: MATERIAL ASSEMBLY

Precedent: 277 Mott St., New York, NY by Toshiko Mori Architects

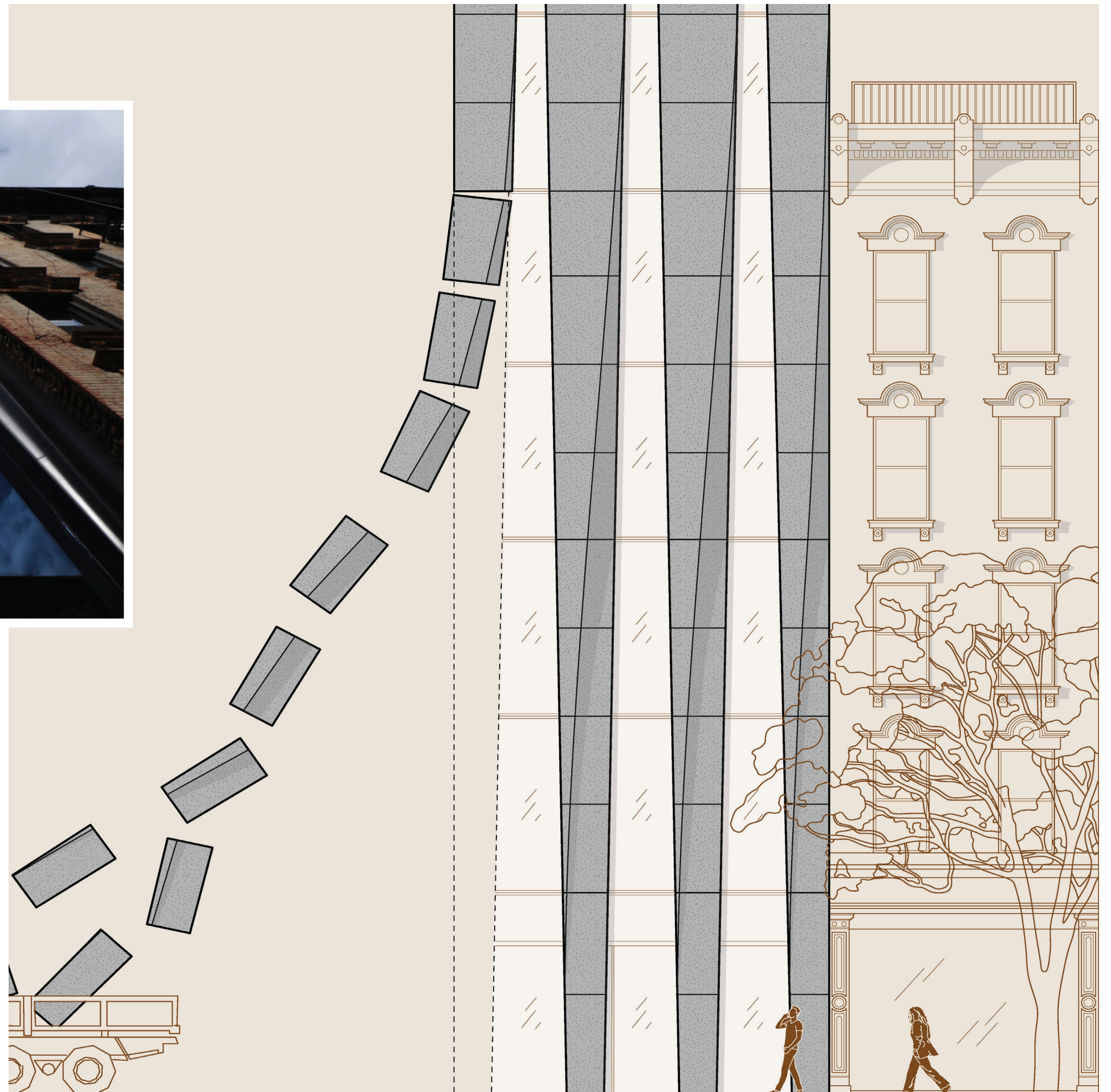


Table 1
Sources of demand for dimension stone products used in the construction industry in the United States

Category of use	Percentage share
Flooring	36.4
Cladding or walls	21.2
Monumental	15.2
Kitchen and bathroom tiles	12.2
Furniture	4.0
A mix of interior and exterior uses (patios, fire places, signs)	11.0
Total	100.0

Source: Antonides and Virta (1998).

Table 1 gives perspective on the demand for dimension stone products to be used as cladding, as implemented with the black granite for 277 Mott Street. The drawing to the right is meant to illustrate how the pieces arrive on site as prefabricated panels that are fastened in place.



ZIMBABWE BLACK GRANITE: MATERIAL "CURSE"

Precedent: 277 Mott St., New York, NY by Toshiko Mori Architects

Environmental Challenges

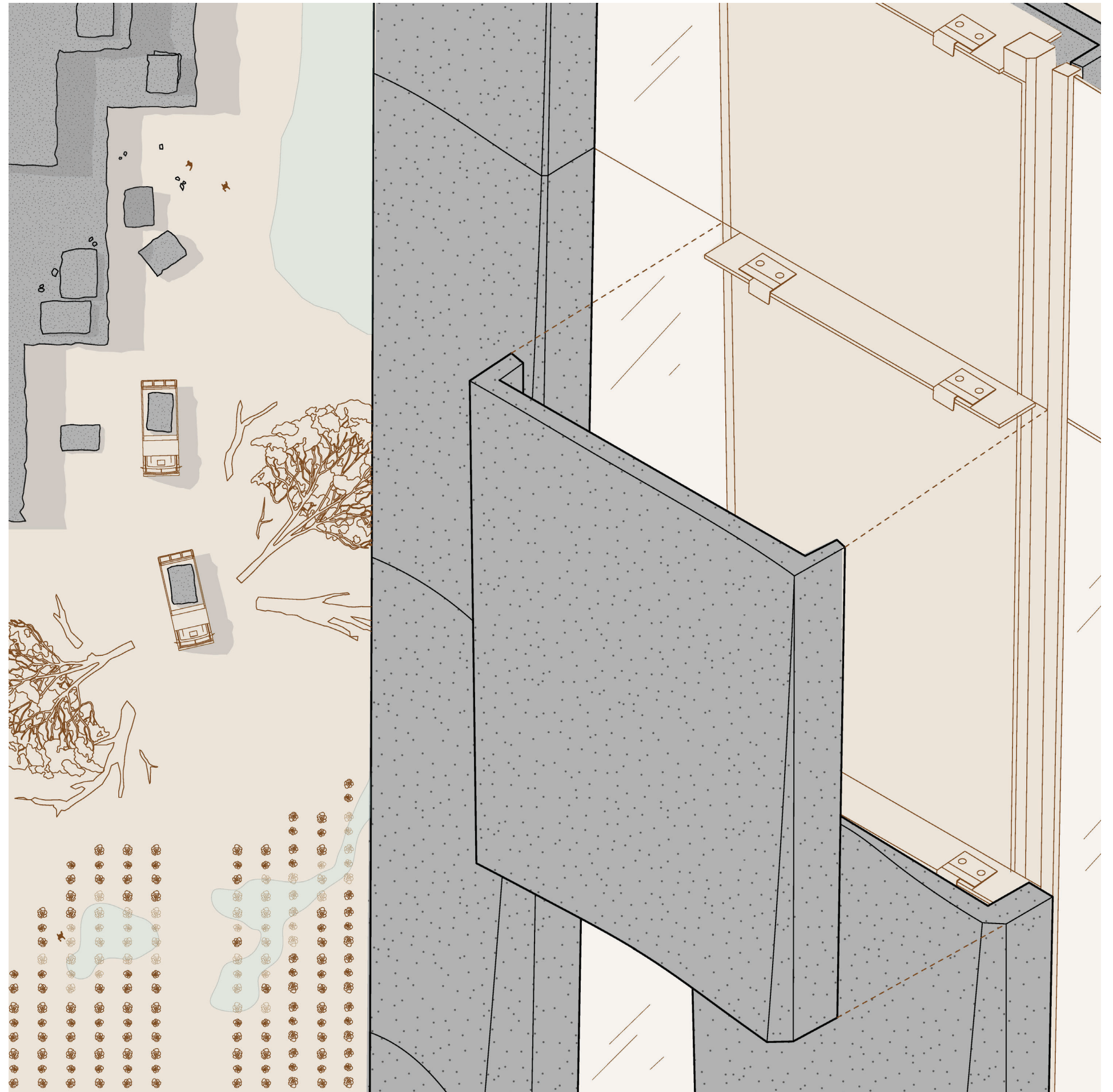
- Destruction of vegetation
 - Decreased rainfall
 - Clearing of forests for access roads
 - Dumping waste rock
- Destruction of animal habitats
- Toxic chemicals in dust
 - Disease in livestock, health of locals
- Diversion / blockage of natural drainage systems
 - Flooding into agricultural land
- Noise and vibration
- Caused migration of wild animals, disrupting food chain

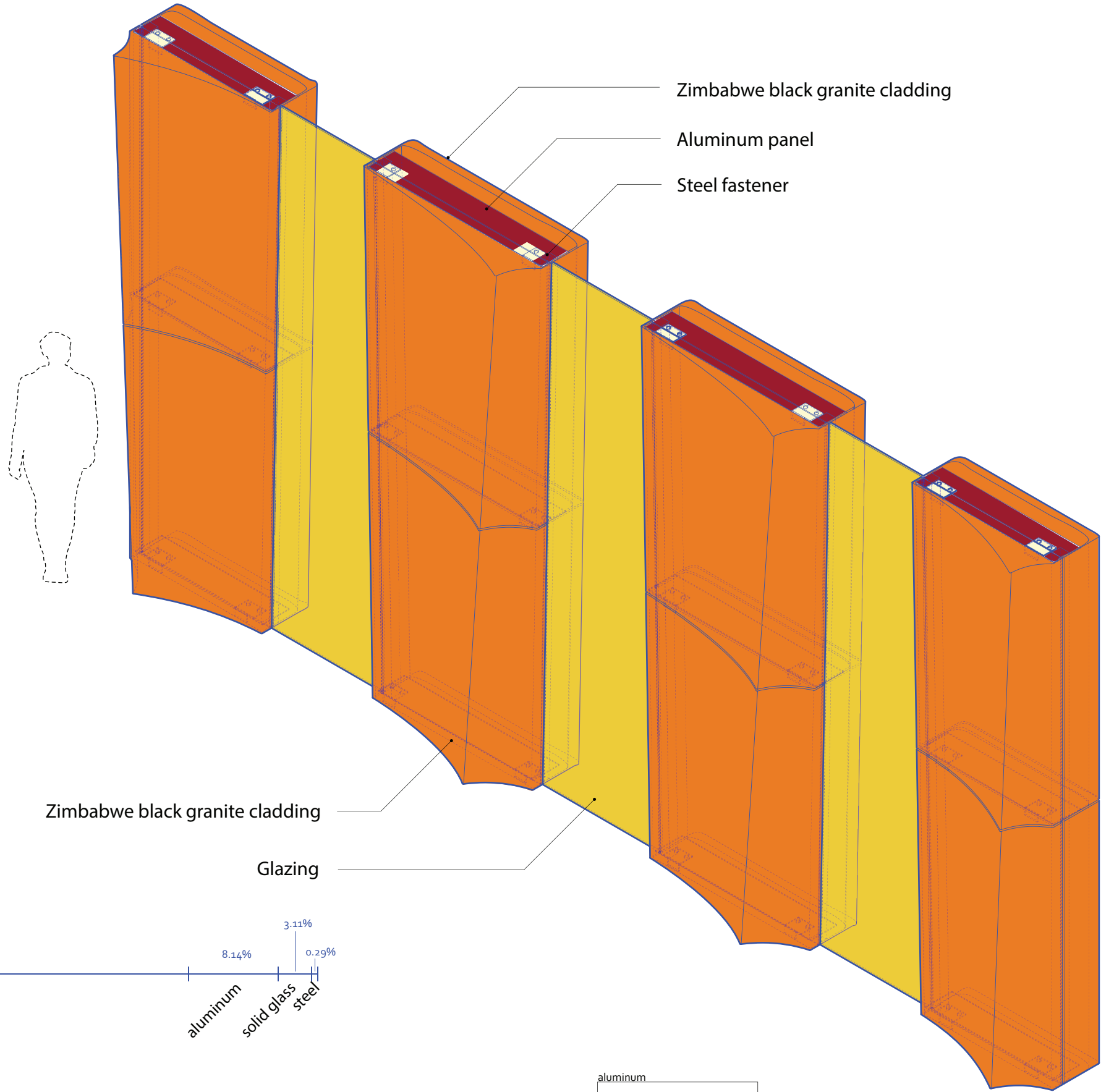
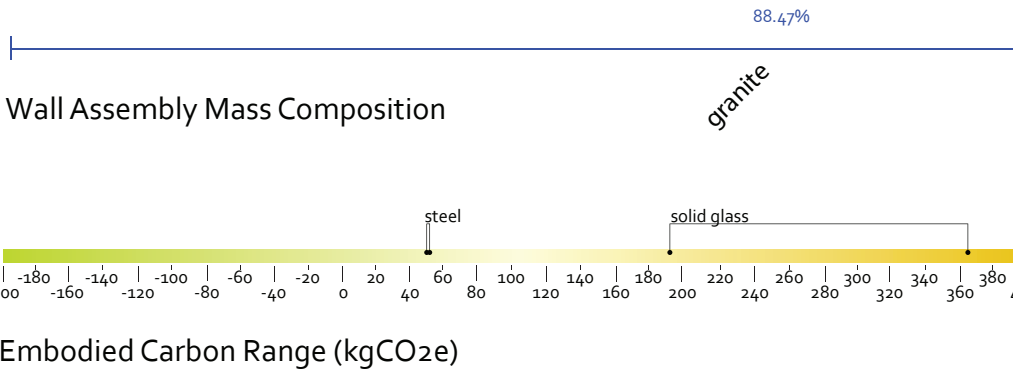
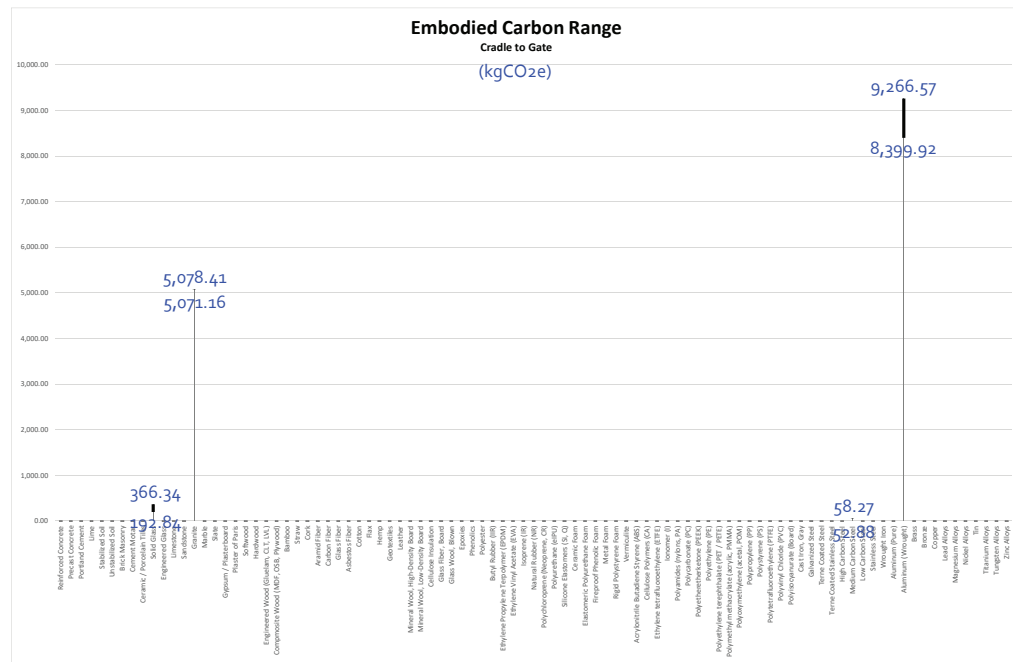
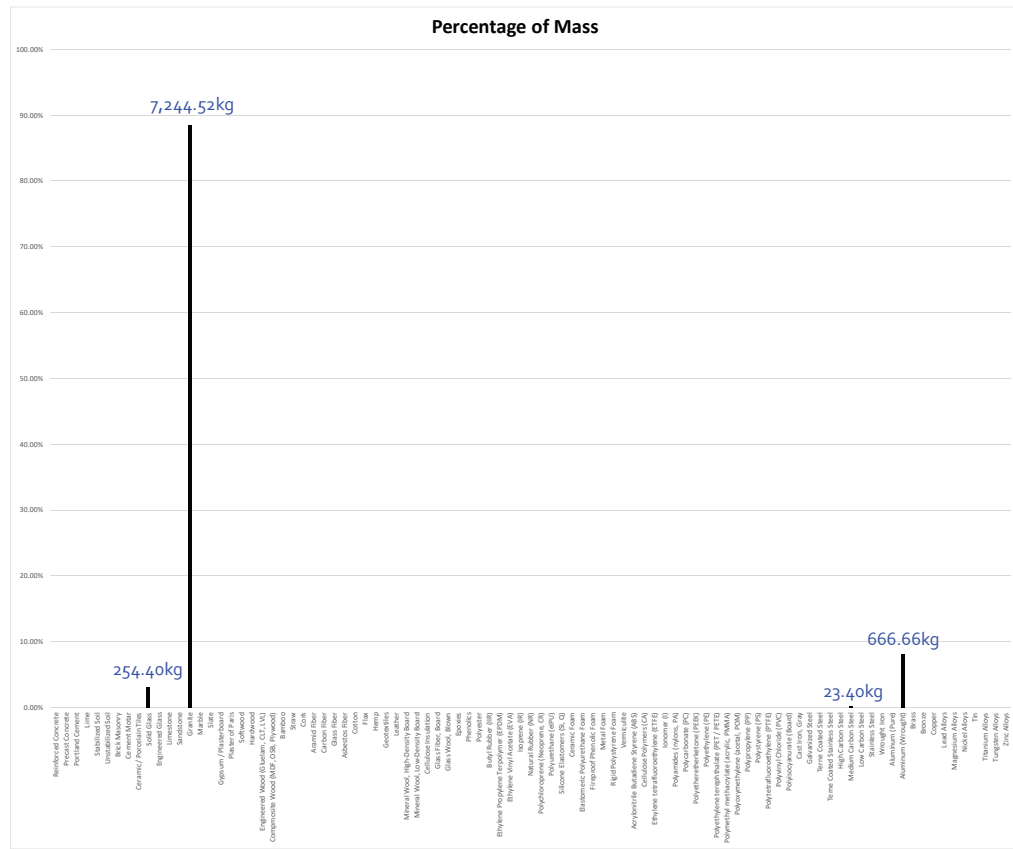
Cultural Challenges

- Caves, hills, mountains pivotal to Shona religious/cultural beliefs
- Ceremonies performed in caves
 - Communication links between people, the ancestral realm and God

Economic Challenges

- Mining companies not hiring locals
- Exploitation
- Area not being developed, impoverished
 - Mutoko is one of the poorest districts in the country

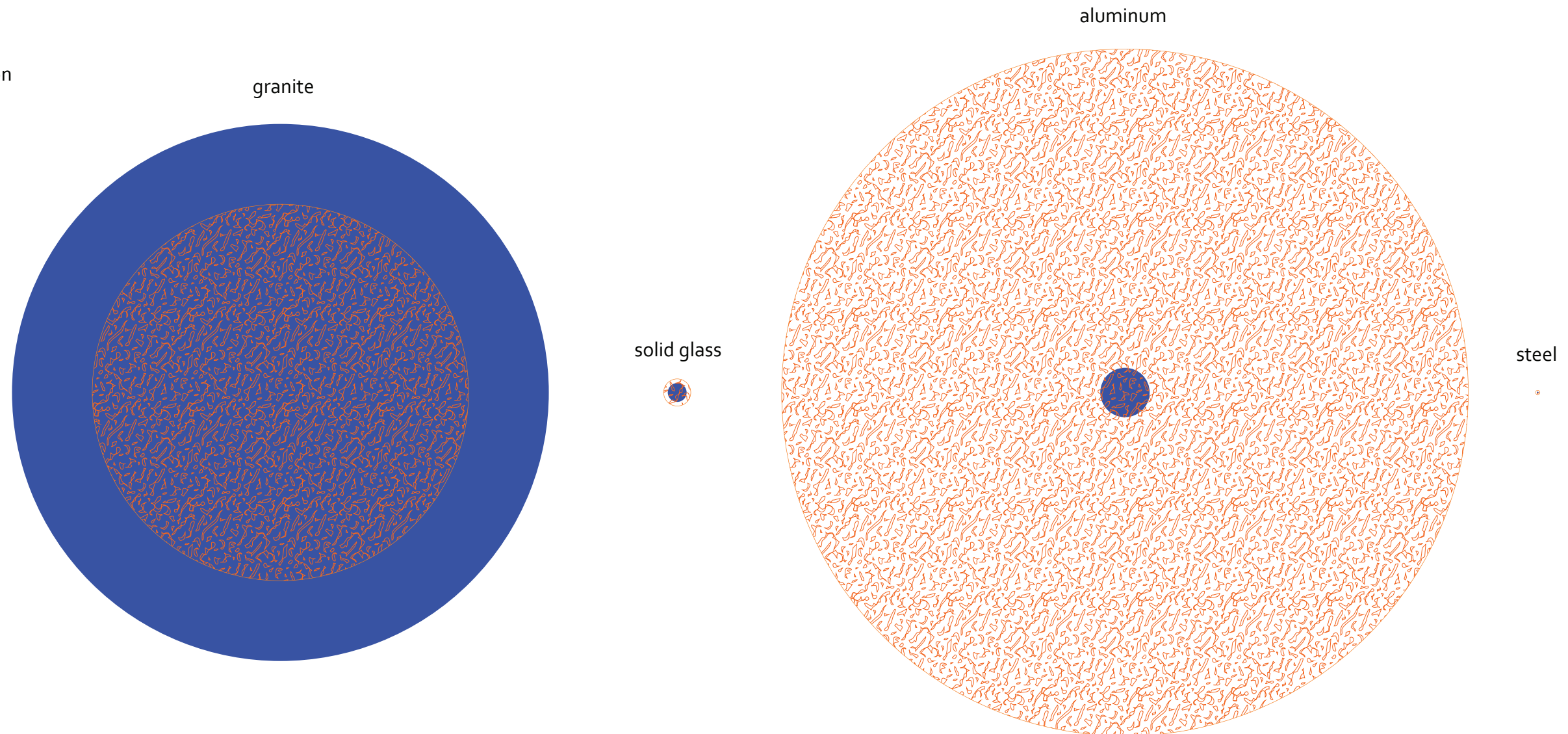




MATERIAL MASS VS. CARBON

This diagram illustrates the material mass and amount of carbon sequestered or emitted relative to each portion of wall assembly outlined previously. The method to create this diagram involved using Grasshopper for Rhino to translate the numeric values of physical mass (kg) and carbon (kgCO_{2e}) into radii of circles.

- Mass
- ▨ Embodied carbon



MATERIAL MASS VS. CARBON

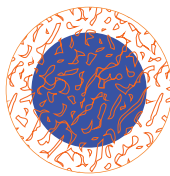
This diagram illustrates the material mass and amount of carbon sequestered or emitted without relation to the amounts of materials in each wall assembly. Flattening the scales of each material mass lets us more clearly see the embodied carbon properties of each material.

- Mass
- ▨ Embodied carbon

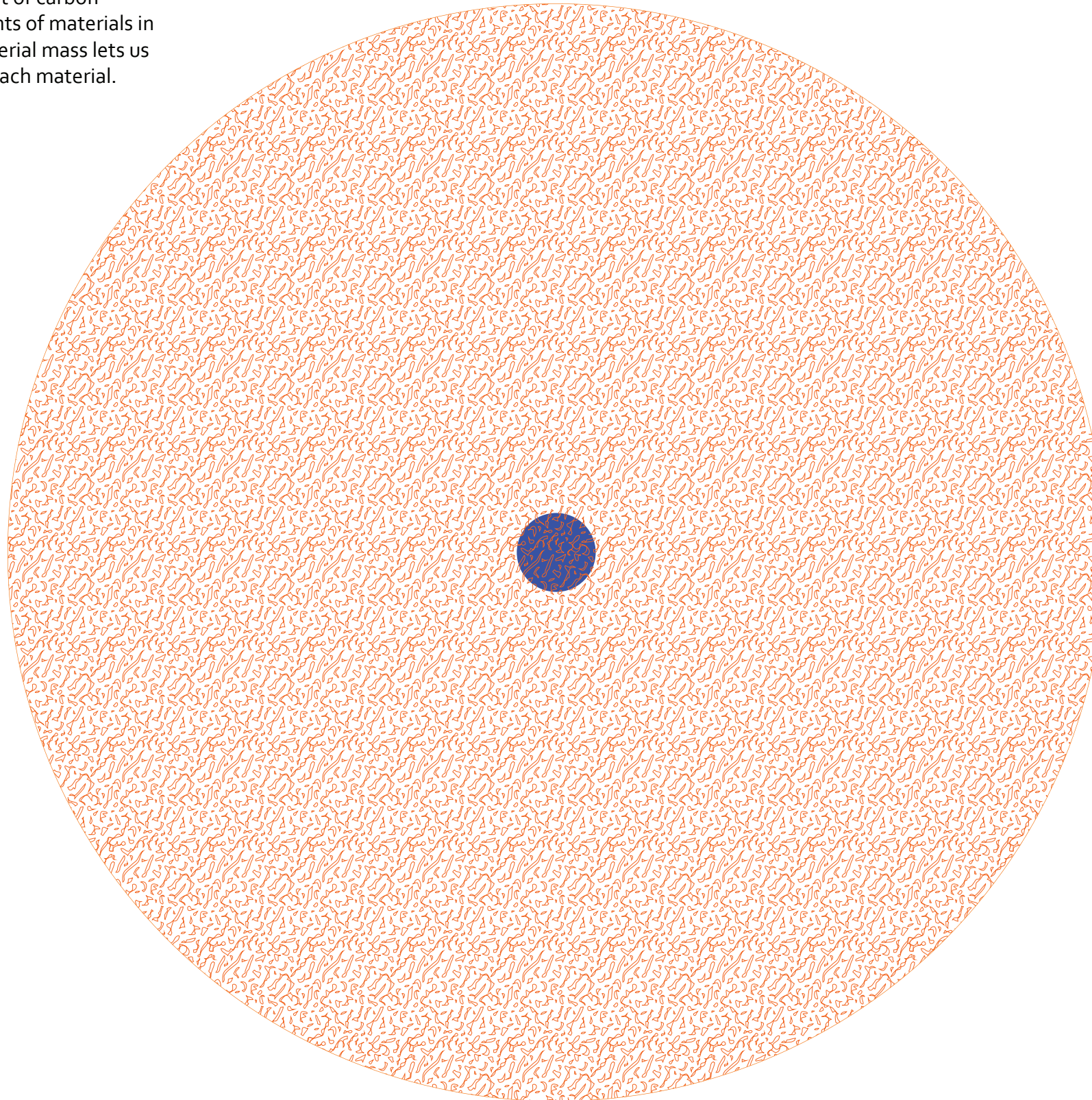
granite



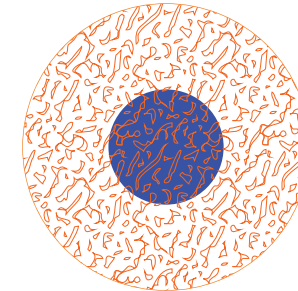
solid glass



aluminum



steel



RESEARCH SOURCES

WEB LINKS

277 Mott Street
<https://tmarch.com/mott>

277 Mott Street Facade
<http://caliperstudio.com/277-mott.html>

Toshiko Mori Architect greets the Lower East Side with CNC-milled granite (2019)
<https://facadesplus.com/toshiko-mori-architect-greets-the-lower-east-side-with-cnc-milled-granite/>

Zimbabweans in Granite Mining Areas See Little Revenue from Prized Stone (2018)
<https://globalpressjournal.com/africa/zimbabwe/zimbabweans-granite-mining-areas-see-little-revenue-prized-stone/>

Revealed: How illicit black granite 'exports' are prejudicing Zimbabwe (2020)
<https://www.thestandard.co.zw/2020/11/15/revealed-how-illicit-black-granite-exports-are-prejudicing-zimbabwe/>

MUTOKO - The extraction of the granite stone in parts of Mutoko... (2021)
<https://fb.watch/cR2lHO3LXg/>

The "curse" of black granite in Mutoko (2016)
https://www.youtube.com/watch?v=834ue_nKK1U&t=427s

JOURNAL ARTICLES

Maponga, O. Munyanduri, N. (2001). Sustainability of the dimension stone industry in Zimbabwe--challenges and opportunities.

Bhatasara, S. (2013). Black granite mining and the implications for the development of sustainability in Zimbabwe: The case of Mutoko communities.