Future Cities Collective

LaneZero

Ryerson University/University of Toronto Attached Housing

Project Summary

Major cities like Toronto are struggling to simultaneously densify while maintaining a sense of community. The sustainable future of our cities depends on finding new ways to inhabit existing infrastructure. LaneZero seamlessly integrates into currently thriving neighborhoods as an on-grade, net-zero energy laneway home.

Relevance of Project to the Goals of the Competition

In downtown Toronto, low density detached residential neighborhoods contain more than 250 linear kilometers of publicly owned laneways. This underutilized space sitting on valuable land provides a unique opportunity for unobtrusive densification. Future Cities Collective exemplifies possible laneway housing opportunities in Toronto, promoting the efficient use of public and private property in the city.

Design Strategy and Key Points

In order for LaneZero to achieve net-zero site energy, the design strategies employed follow a three-tiered design approach (1) Minimize conditioning needs through envelope, geometry, mass and orientation, (2) Passive conditioning strategies through natural ventilation, solar heat gains and daylighting, (3) Supplemental active conditioning through an efficient conditioning system. LaneZero brings life to laneways through comfortable, efficient housing, intended to make laneway homes a desirable and sustainable way to live.

Project Data

- Toronto, ON, Canada (43.6 N, 79.4 W)
- ASHRAE Climate Zone 5A
- 930 ft^2
- 1 Bedroom, 1 Bathroom, 2 Storeys
- Energy Use Intensity (EUI) =
- 26 $kBtu/ft^2/yr/unit$
- HERs Index Without PV = 51, With PV = 11
- Estimated Monthly Energy Cost = -$65.00 USD (Profit)

Technical Specifications

- Exterior Wall Thermal Performance = 40 ft^2-F-hr/Btu
- Foundation Thermal Performance = 35 ft^2-F-hr/Btu
- Roof Thermal Performance = 67 ft^2-F-hr/Btu
- Window U-Value = 0.14 Btu/ft^2-F-hr - 0.17 Btu/ft^2-F-hr
- Window SHGC = 0.3
- HVAC specifications =
  - Energy Recovery Ventilator SRE 0.88, TRE 0.65
  - SEER 13 (cooling), HSPF 11 (heating), EF 2.4 (DHW)