

Passive design uses a building's form and orientation to reduce energy consumption and improve thermal comfort. The passive design approach reduces reliance on mechanical systems and improves the quality of the indoor environment. Examples include improved insulation to reduce heat loss, enhanced natural lighting to reduce electricity loads and effective shading to reduce reliance on mechanical air conditioning.

Building Design that Responds to the Local Climate

In their analysis of energy reduction strategies, the Millennium Water team looked at how to best design the buildings to respond to their environment within the existing site and climatic constraints. Four areas were explored:

- **Building orientation, massing and configuration** – addressed in early energy studies and building configuration schemes.
- **Quality envelope options** – envelopes should eliminate heat loss and increase air tightness to maximize insulation effectiveness.
- **Building mass** – materials can be chosen based on their ability to influence heat gain and loss. For example, concrete slabs absorb heat and release it over time.
- **Façade treatments** – protecting buildings and helping them respond to rain, wind and solar radiation through balconies, screens, window areas and views.

Innovation: Passive Design Toolkits

The City of Vancouver's Sustainability Office is using its Olympic Village experience to encourage passive design in new buildings citywide. In 2009, the City published passive design "toolkits" detailing best practices to educate the industry. View them at www.vancouver.ca/sustainability/building_green.htm.

City of Vancouver Encourages Passive Design

This project paved the way for future sustainable design in Vancouver through an unprecedented agreement between the City and the developer. To encourage passive design strategies such as thicker walls for improved insulation, wider stairwells and corridors for daylighting, and deeper balconies for shading, the City granted area exclusions for any additional floor area required to meet passive design requirements. The developer was thus able to include passive strategies without forfeiting developable (and saleable) area.

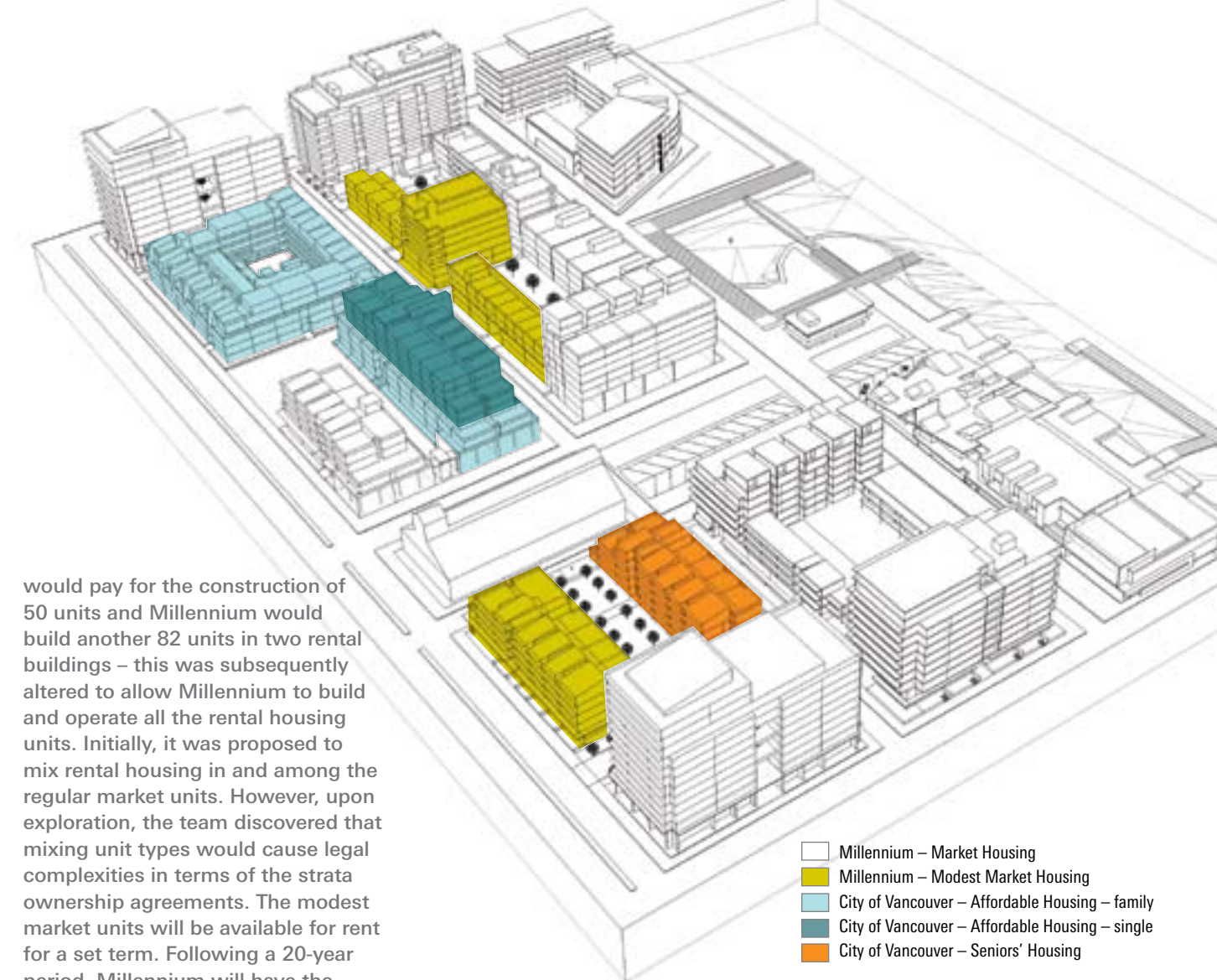


Shading is a key passive design strategy that can be achieved by incorporating balcony overhangs, plants and trees, and active blind systems.

Housing Mix: "Modest Market" Housing

One of the provisions in the SEFC Official Development Plan was to develop a mixed-use neighbourhood that accommodates a diversity of residents with a range of incomes. This goal supports the aspiration of maintaining a sense of balance and promoting social equity. Market condominiums would be complemented by the development of "affordable" (subsidized) housing and "modest market" housing. Modest market housing refers to a middle ground between regular market and affordable housing. For the purposes of this project, modest market came to refer to rental housing, which would welcome a demographic that is not in the position to purchase but is not eligible for subsidized housing.

In their rezoning proposal, Millennium brought back the notion of modest market housing that the new Council had removed from SEFC's housing requirements. In return for this additional housing type, the neighbourhood's social mix was augmented and Millennium received bonus density. Under the original plan, the City of Vancouver



- Millennium – Market Housing
- Millennium – Modest Market Housing
- City of Vancouver – Affordable Housing – family
- City of Vancouver – Affordable Housing – single
- City of Vancouver – Seniors' Housing

This wireframe drawing illustrates the mix of market housing, modest market housing and affordable housing that was proposed in the August 2006 rezoning.

would pay for the construction of 50 units and Millennium would build another 82 units in two rental buildings – this was subsequently altered to allow Millennium to build and operate all the rental housing units. Initially, it was proposed to mix rental housing in and among the regular market units. However, upon exploration, the team discovered that mixing unit types would cause legal complexities in terms of the strata ownership agreements. The modest market units will be available for rent for a set term. Following a 20-year period, Millennium will have the option to sell the units or continue the rental program.

CHALLENGE

For Federal, Provincial and Municipal authorities to enact planning, development and building regulations that facilitate sustainable community development based on the implementation of passive design and the application of incentive programs aimed at securing compliance with both Green Building strategies and carbon emission reduction targets.