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UniverCity: Building a New Green Neighborhood

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If North American cities are to make the significant technological, physical, and social-cultural shifts necessary to reduce greenhouse gas emissions, urban form will have to change dramatically. Many urban regions are beginning to rise to this challenge, taking steps to control sprawl, air and water pollution, and the fragmentation of urban ecosystems. One region that has made notable progress is greater Vancouver, British Columbia.

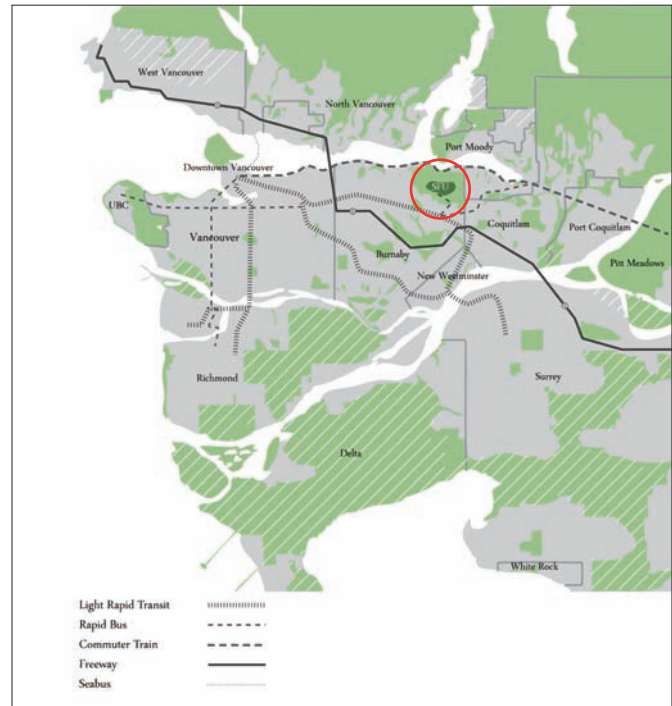
Since passage of Vancouver's Livable Region Strategic Plan in 1996, aggressive steps have been made to encourage more sustainable development patterns based on core goals: protect the region's Green Zone (agricultural and environmentally significant lands); build complete communities¹; and achieve a compact metropolitan form that offers increased transportation choice. Under the plan, attempts are being made to direct regional growth inward toward nodes of density, connected by commuter train, passenger ferry, light-rail transit, rapid bus, and, in the case of Vancouver itself, local bus.

It has recently been shown that the reduction of greenhouse gas emissions from residential areas depends on several interrelated factors: the form and density of neighborhoods must enable easy access to shared public services; alternative modes of travel such as transit, walking, and biking must become viable as alternatives to private automobiles; and the general building stock must become more energy efficient.² To meet these objectives, proponents of Smart Growth have espoused including services and places of work within residential neighborhoods. Robert Cervero, a professor of city and regional planning at the University of California, Berkeley, among others, has demonstrated the equal importance of bringing housing to employment nodes.³

UniverCity, a new development adjacent to a major university campus, attempts both to address these general principles and implement Vancouver's regional sustainability goals. By bringing homes to jobs and building a compact, mixed-use neighborhood, it is creating a new community that integrates ecosystem preservation with a polycentric view of regional growth.

From Fringe to Center

UniverCity is being built adjacent to Simon Fraser University (SFU), in Burnaby, one of twenty-one municipalities in the Vancouver region. Like many Canadian universities, when it was first developed in the 1960s, SFU was sited far from the central city—in its case atop locally prominent Burnaby Mountain. It was also endowed with extensive land for expansion. In 1995, the city of Burnaby granted permis-

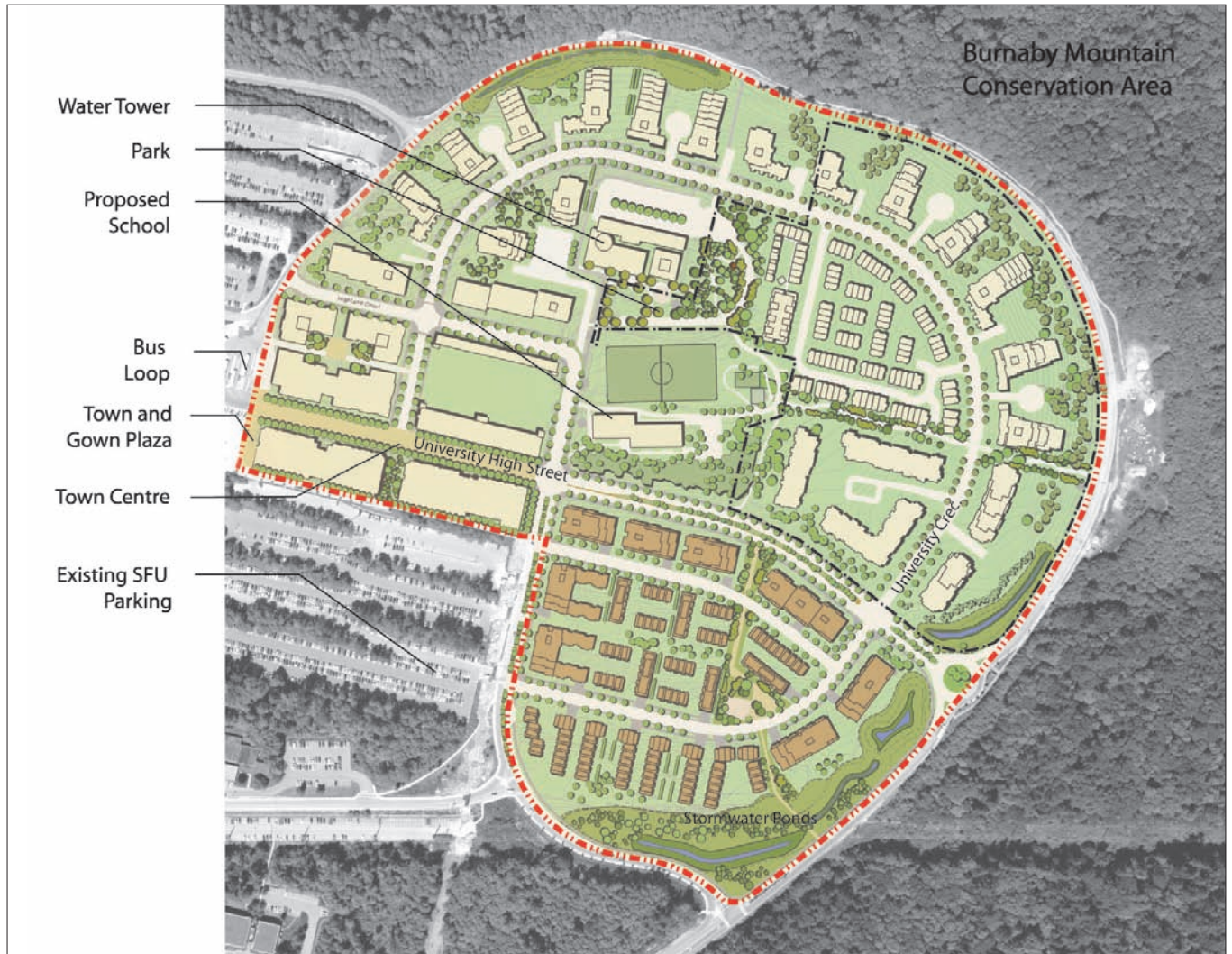


sion to the SFU Community Trust (SFUCT) to develop 65 hectares (161 acres) of this endowment.⁴ In exchange, SFU agreed to deed 332 hectares (820 acres), considered important habitat, to the city so these lands could become part of the region's permanent conservation zone.

On its portion of the land, SFUCT has committed to developing a dense, mixed-use community emphasizing alternatives to private automobile use. It has also promised to promote high standards of environmental protection, particularly regarding water resources and habitat. Now that the first phase of UniverCity's construction is complete, an initial evaluation can be made of it in relation to efforts to diminish the role of urban development in creating climate change.⁵

Layout and density. UniverCity will eventually embody two neighborhoods. As its name indicates, its East Neighborhood, currently under construction, borders the SFU campus to the east. East Neighborhood's plan emphasizes pedestrian linkage between campus and community, and at the juncture between the two are a public space (Town and Gown Plaza) and a mixed-use town center arrayed along a High Street. Close by are a neighborhood park and a site for an elementary school.

Residential construction will eventually completely enclose this town center to the east and northeast, offering



a mix of for-sale private townhouses, stacked townhouses, and apartments in low- and midrise buildings. One completed mixed-use building includes at-grade retail space and offices on its first two levels, with three levels of rental housing above. Offering more than sixteen shops, it provides a range of commercial services to the neighborhood. A second such building, due to open in 2009, will include a supermarket and pharmacy.

As of June 2008, the East Neighborhood was about 30 percent complete. More than 1,100 units, housing about two thousand residents, have been built. Some 36 percent of households include faculty, staff, or students of SFU. About two-thirds of households are adult-only; 20 percent include one to two children.⁶

At build-out, plans call for the East Neighborhood to include 3,475 dwellings on 29.5 hectares (73 acres) and a total of about ten thousand residents. The net density will be 194 units per residential hectare (78 units per acre), or about 258 persons per gross hectare (104 persons per acre).

By June 2008, progress was being made toward these goals. The net density was approximately 167 units per

Opposite: The greater Vancouver, B.C., region, is composed of twenty-one municipalities. Transit lines and the Green Zone are highlighted. Protected agricultural land is hatched.

Above: Illustrative plan of the East Neighborhood of UniverCity, spring 2008. Source: Hotson Bakker Boniface Haden architects + urbanistes.



residential hectare (68 units per acre), representing a gross density of 89 persons per hectare (36 persons per acre). This ratio already well surpasses the suggested minimum target density of 25 units per hectare for transit-oriented development, and it approaches the density of several highly walkable inner-Vancouver neighborhoods.⁷

Building practices. So far, green building practices have been encouraged, but not required at UniverCity. Three buildings have sought LEED silver or gold certification, but the balance are not particularly innovative, and there is room for significant improvement.

At the same time, attached forms of housing have been shown to be far more energy efficient than detached ones. A recent study in Toronto found that an apartment consumes only about 4.8 percent of the energy required by a single-family home.⁸ It is therefore significant that UniverCity includes *no* single-family detached homes. Some 18 percent of its units are townhouses; 25 percent are apartments in lowrise structures; and 56 percent are apartments in midrise ones. In neighboring Burnaby, 45 percent of housing units are single-family detached homes; 9 percent are townhouses; 27 percent are apartments in lowrise buildings; and 19 percent are apartments in highrises.⁹

With all its housing as attached units, and 82 percent of the units being apartments, UniverCity will generate significantly fewer greenhouse gases than other residential areas of Burnaby, or the region. Moreover, guidelines for additional phases of the construction will require that new buildings perform 45 percent better than British Columbia codes in terms of energy efficiency.

Transportation. Plans for UniverCity have included an aggressive transportation strategy intended to reduce private automobile use. Transit service to SFU and UniverCity is excellent, with two stops in the neighborhood from which frequent express buses connect to a nearby regional rapid-transit station. Walkability and bicycling were also objectives of UniverCity's design, and a fine grid of streets and paths enhances the pedestrian experience. A survey of residents indicates that only 60 percent drive personal vehicles to work, while 34 percent take transit, and a significant 19 percent walk or bike.¹⁰

In neighboring areas of Burnaby, 69 percent of trips to work are made by vehicle, 25 percent are by transit, and 5 percent are by foot or bicycle. Thus, despite being 13 kilometers from Burnaby center and 17 kilometers from downtown Vancouver, fewer UniverCity households drive and more use alternative modes to get to work than in Burnaby where a regional rapid transit station is located.

The urban forest. A major objective of the UniverCity

plan has been to mitigate the impacts of urban development on the natural environment by establishing conservation areas, creating new habitat, eliminating typical stormwater impacts, using native plants, and planting new trees.

The role that forests play in mitigating air pollution is well known.¹¹ Trees absorb gaseous pollutants, intercept particulates, reduce ozone, and sequester carbon dioxide. To combat the effect of removing approximately 19 hectares (47 acres) of second-growth forest to build UniverCity, some 20 percent of the site (6 hectares) will eventually be preserved as conservation land, between built areas and the adjacent Burnaby Mountain Conservation Area.

Extensive tree planting is also occurring. At the conclusion of phase one, with approximately 24 percent of the site developed, more than 4,500 trees had been planted, 48 percent of them native to the region. Presently, the individual tree canopies are small, and cumulatively, they cover roughly only 3 hectares. But in two decades, when each tree has grown to produce an average 7.5-meter canopy, they may essentially replace the forest lost to construction.¹² What these trees will never be able to cover will be the rooftops of ten-story buildings. Presently, there is only one green roof in the project, but new guidelines will provide strong incentives for more.

Building Better Cities

UniverCity provides an instructive example of green neighborhood development, particularly one that brings residences to a somewhat remote, job-centric urban location. The decision to build adjacent to the relatively isolated SFU campus will significantly reduce household-vehicle miles traveled, one of the most significant contributors to greenhouse gas emissions.¹³ UniverCity's compact building forms further mean that its residents will use less energy in occupying their homes, thus reducing their carbon footprint and the amount of greenhouse gases they produce.

UniverCity also exemplifies a Vancouver model of regional high-density smart growth that aggressively engages environmental protection. The initial decision to establish a five-to-one ratio of protected habitat area to allowable development is crucial to this effort. On the down side, much of this development is on a greenfield site, and it will take two decades to partially replace lost forest canopy and lost carbon sequestration.

This neighborhood and several others either under construction or on drawing boards in the greater Vancouver region clearly demonstrate that market-based development can reduce the greenhouse gases and carbon-dioxide wastes typically associated with cities.¹⁴ Over the longer term, considering the shifts needed to control the impacts of climate

change, this development is a small step in the right direction. However, if a new goal—to be carbon neutral within five years—is met, it may prove even more instructive.¹⁵

Notes

1. According to principles enunciated by the regional organization Metro Vancouver, "complete communities" support public desire for a wider range of opportunities for day-to-day life. These opportunities include more jobs closer to where people live and accessible by transit; shops and services near home; and a wider choice of housing types. See www.metrovancouver.org >Planning >Regional Development>Livable Region Strategic Plan.
2. See Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen, "Growing Cooler: The Evidence on Urban Development and Climate Change," Urban Land Institute, 2008.
3. Robert Cervero and Michael Duncan, "Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mix?" *Journal of the American Planning Association*, Vol. 72, No. 4 (2006).
4. SFU Community Trust is a nonprofit development arm of SFU, charged with developing UniverCity. Net earnings from the development go to the SFU Endowment.
5. The author obtained source information for this article directly from SFUCT, from the City of Burnaby, and from consultants to the developer: Hotson Bakker Boniface Haden architects + urbanistes; PWL Partnership Landscape Architects Inc.; Lanarc Consultants Ltd.; and CH2M HILL.
6. Mustel Group Market Research, "UniverCity Resident Survey," for SFU Community Trust, June 2007.
7. Smart Growth B.C.: www.smartgrowth.bc.ca.
8. Jonathan Norman, Heather L. MacLean, and Christopher A. Kennedy, "Comparing High and Low Residential Density: Life Cycle Analysis of Energy Use and Greenhouse Gas Emissions," *ACSE: Journal of Urban Planning and Development*, March 2006.
9. Statistics taken from the Canada 2006 census.
10. Mustel Group Market Research, "UniverCity Resident Survey." Mustel does not explain why these do not add up to 100 percent; likely it is because there are more than one worker per household.
11. For example, McPherson found that the large, mature tree canopy in older areas of Sacramento stores 2,343 kilograms of carbon per tree (approximately 172 tons per hectare). See E. G. McPherson, "Atmospheric Carbon Dioxide Reduction by Sacramento's Urban Forest," *Journal of Arboriculture*, Vol. 24, No. 4 (1998), pp. 215-23.
12. Derived from NRCS Plants database: plants.usda.gov.
13. Cervero and Duncan, "Which Reduces Vehicle Travel More?"
14. Southeast False Creek and East Fraserlands, in Vancouver, are the most advanced and most notable of these.
15. A neighborhood energy utility is planned in the next phase.

Opposite: View along University Crescent, phase one of East Neighborhood showing townhouses at grade, with ten-story apartment buildings above (top). Restaurants and shops at the Town Center (middle). The residential and university communities share lunch hour at Town and Gown Plaza (bottom). Photos courtesy of SFU Community Trust.