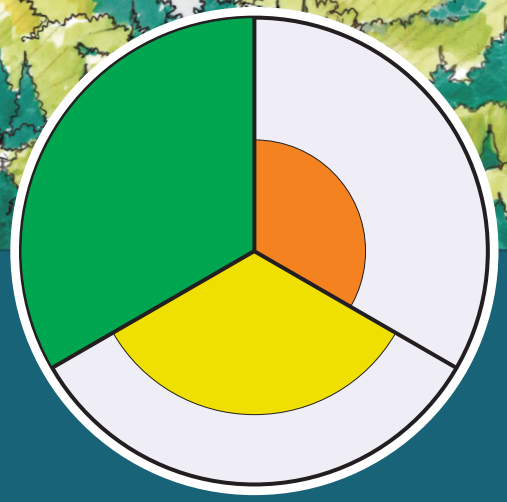
UniverCity Assessment



Sustainable Community Rating Tool
SCORE Tool

The UniverCity SCORE Assessment

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Forward

While sustainable urbanization is now widely recognized as integral to achieving global sustainability goals, no one framework for monitoring the sustainability performance of urban areas has been adapted into planning practice by multiple scales of government.

A variety of actors, including non-governmental organizations, professional organizations and government agencies, have developed sustainability indicators, frameworks and assessment tools. However, there is a missing link in assessment tools that evaluate the sustainability performance of *occupied* neighbourhoods, with a firm grounding in community development theory. By assessing the performance of neighbourhoods that have already been developed, the Sustainable Communities Rating (SCORE) Tool (the Tool) under development by the Centre for Sustainable Community Development (CSCD) at Simon Fraser University (SFU), fills that gap.

The Tool is intended for use by academics, professional planning consultants, developers, and local government authorities to monitor and ultimately enhance their sustainability performance. It offers a set of meaningful indicators, which measure sustainability outcomes that are the result of policy, programs, legislation or behaviour change. The tool makes it possible to measure sustainability performance as a snapshot or baseline as well as measuring it over a period of years, providing a window into trends.

This report documents a pilot test of the Tool, used as an initial proof of concept and to support SFU Community Trust (the Trust), the master developer of a 160-acre high density community in Burnaby, BC, Canada, in its pursuit of sustainability. As such it gives us a snapshot where the community is at in terms of its sustainability performance; if repeated, it can be used to measure progress towards sustainability goals.

The purpose of this report is to summarize the results of the assessment, discuss the limitations uncovered through the pilot, and make recommendations to the Trust that guide sustainable urbanization practices locally.

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Key Definitions

Sustainable development described by the Brundtland Commission in 1987 is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'[1].

Sustainability, for the purpose of this assessment, is a state of existence achieved when a neighbourhood scores satisfactorily evaluated against a framework of balanced community capital assets.

Sustainability assessment (SA) is a process by which the implications of sustainability initiatives are evaluated, where the initiative can be a proposed or existing policy, plan, program, project, piece of legislation, or a current practice or activity[2].

Neighbourhood Sustainability Assessment (NSA) tools evaluate and rate the performance of a given neighbourhood against a set of criteria and themes to assess the neighbourhood's position on the way towards or success in approaching sustainability goals[3].

A ***neighbourhood*** is a smaller subset of a broader community. It consists of a mix of residential and non-residential buildings and land uses within a radius of approximately 400 meters - corresponding to a comfortable five minute walking distance from centre to edge or approximately 50 hectares[4].

Indicators are conceptual tools that measure progress toward (or away from) a goal or objective[5].

A ***benchmark*** is a standard or point of reference[6].

A ***target*** is an objective or result aimed at. In the case of sustainability assessment a target moves the bar higher towards an ultimate sustainability goal[7].

A ***threshold*** is a boundary. In the context of sustainability assessment, a threshold represents the boundary between good and poor sustainability practice. Some thresholds are well defined in research, while others are based on current practice[8].

A ***norm*** is a standard.

A ***relative norm*** maps elements of a population into a subfield, relative to the total observed dataset[9].

The ***median*** is the midpoint of a frequency distribution[10].

A ***quartile*** is one of three values of a variable dividing a population into four equal groups as regards the value of that variable[11].

Acronyms

BC: British Columbia

BMRA: Burnaby Mountain Resident Association

CSCD: Centre for Sustainable Community Development

CMHC: Canada Mortgage and Housing Corporation

DA: Dissemination Area

DU: dwelling units

FSA: Forward Sortation Area

GFA: gross floor area

GNH Index: Gross National Happiness Index

ICBC: Insurance Corporation of British Columbia

NSA: neighbourhood sustainability assessment

SA: Sustainability Assessment

SCORE Tool: Sustainable Community Rating Tool

SFU: Simon Fraser University

STIR: shelter-to-income-cost ratio

Introduction

Over half of the world's population currently lives in cities and that number is predicted to increase to 70% by 2050[12]. Urbanization is attributed with detrimental effects on the environment, which include climate change, biodiversity loss, and environmental pollution. Yet with 60% of their area still to be built before 2030, urbanization also represents an enormous opportunity to reduce our impacts by proactively guiding the shape of future cities to bring our global resource use within planetary boundaries and reach our global sustainability goals[13].

In the international policy arena, the 2015 UN Sustainable Development Goals (SDGs) are now underway, set to replace the Millennium Development Goals. Proponents of the Urban SDG hold that policymakers need to adopt a wider view of cities' use of space and resource footprints and recognize urban areas as drivers of environmental change at various scales.

Acknowledging this, municipal leadership has an increasingly important role to play in pursuit of sustainability as incubators of innovation and scaled implementation, agents of change, and the sphere of government closest to the people[14]. However, municipalities still do not have a widely agreed upon set of tools for translating sustainable development aspirations and concepts into implementable actions[15].

When it comes to assessment, practice is also evolving. Just as financial accountability is achieved through reporting, monitoring, controlling and auditing programs and initiatives, from a planning perspective, sustainability accounting helps us know if our efforts towards sustainability are actually producing proportionally constructive results.

Sustainability Assessment Tools

One of the formal ways to measure levels of sustainability is through an instrument of measurement. Sustainability assessment (SA) tools are increasingly recognized as important instruments for moving towards sustainability goals[16]. A variety of actors, including non-governmental organizations, professional organizations and government agencies, have developed sustainability indicators, frameworks and assessment tools. A comprehensive list of 46 SA frameworks is documented in "*Eco-City Frameworks – A Global Overview*" , of which 35 were released in the 5 years preceding the research.

SA tools provide information, generate knowledge, shape agendas, and serve as tools for performance management and engaging actors in 'social learning' and knowledge exchange[17]. Built on frameworks and indicators, SA tools ensure that outcomes of plans and activities make an optimal contribution to urban sustainability and create the possibility to compare one project to another[18]. Initially these tools were mainly focussed on the environmental performance of single buildings. However, since the turn of the century, there has been a growing recognition that

building environmental assessment alone is not capable of addressing the large volume of sustainability challenges facing urban communities. Scaling sustainability assessment up to the neighbourhood and city-wide levels is regarded as an effective way of taking account of the complexities of an urban system[19].

Neighbourhood Sustainability Assessment

SA tools can be classified based on their geographical scale, with many examples developed for application internationally, nationally, and locally. Examples of internationally-applicable SA frameworks that apply at a city-wide scale include Eco2Cities, which is an open-access framework that incorporates process-oriented indicators with content-related indicator targets that are locally adapted; and the Green City index, a technical tool for assessing and comparing the sustainability of over 120 populous cities based on global data. Well-known neighbourhood-scale frameworks include Building Research Establishment Environmental Assessment Method (BREEAM) Communities and Leadership in Energy and Environmental Design Neighbourhood Development (LEED-ND), both of which are multi-stage rating and certification schemes for urban developers that can be classified as “spin-offs” of building assessment tools[20].

At the neighbourhood scale, neighbourhood sustainability assessment (NSA) tools evaluate and rate the performance of a given neighbourhood against a set of criteria and themes to assess the neighbourhood's performance in relation to sustainability goals[21]. While no one method of assessment is appropriate for all situations, focusing on the neighbourhood scale provides some benefit that is not possible at the city-wide scale:

a) The neighbourhood scale is relevant to large development projects and links to neighbourhood planning;
b) It is easier to take an integrated view at a smaller, more tangible scale;
c) It is an easy scale at which to engage stakeholders because changes directly affect citizens where they live, shop, and work;
d) Comparing neighbourhood sustainability outcomes may help to mobilize citizens to change behaviours by appealing to neighbourhood identity and belonging.

Although neighbourhoods are considered the building blocks of our cities, few sustainability assessment tools are used at this level, and many of the common NSA tools do not cover all the components of sustainability[22]. A useful comparative analysis of popular NSA tools is available in *“A critical review of seven selected neighborhood sustainability assessment tools”* (Sharifi & Murayama, 2013). The majority of these tools use prescriptive or “enabling” indicators, which make recommendations for design or activities[23] and these mainly focus on the development stage. Based on an analysis of assessment tools and frameworks inventoried in “*Eco-City Frameworks – A Global Overview*” , the CSCD has identified a missing link in assessment tools:

- between the neighbourhood and other (larger and smaller) scales;
- between neighbourhoods in the planning or development stages and neighbourhoods post-development.

The Neighbourhood SCORE (Sustainable Community Rating) NSA tool piloted in this research project fills the gap in assessment tools by considering plans as well as post-occupancy performance. Measuring the outcomes of sustainability initiatives at the neighbourhood scale against a six capital framework grounded firmly in sustainable development theory has not been done before to the best of our knowledge.

Pilot Testing the SCORE Tool

This project pilot tested the SCORE tool in a community setting: the UniverCity neighbourhood, a 'complete community' on Burnaby Mountain. Following its commitment to environmental stewardship and education, SFU Community Trust has contracted this work be done in order to assess sustainability performance of UniverCity and to test the prototype tool.

The Trust's interest in sustainability assessment dates back to Cynthia Girling's 2009 performance report of the East Highlands Neighbourhood Development[24], and more recently the September 2013 Foundation for Sustainable Area Development symposium on urban area assessment[25].

The pilot test of the SCORE Tool will be used as an initial proof of concept for The Tool and will help to define to what extent it is possible and useful to measure sustainability outcomes at a neighbourhood scale insofar as whether there are substantial gaps between what we want to measure, and what data is available. Finally, this study will contribute to a comparative analysis of assessment systems used at UniverCity to be conducted by Master in Resource Management (Planning) candidate Kiri Bird. This research will leverage this unique Canadian application of new and different NSA tools to compare and learn from the experience.

The SCORE Tool can help define expectations for development planning, and can be used to evaluate the success of policies, regulations, and programs in community visions for sustainability. This report gives us a snapshot of where the UniverCity community is at in terms of its sustainability performance; if repeated, it can be used to measure progress towards sustainability goals.

About UniverCity

In the mid-1990's SFU Community Trust was established to oversee the development and transitional management of a 65-hectare parcel adjacent to Simon Fraser University into “UniverCity”. UniverCity would be a model sustainable “complete community” with a diverse range of housing choices, shops, services and amenities. Developing the land would also make SFU itself more sustainable, both by creating a supportive enclave for students, faculty, staff and others who wanted to live in a quiet, beautiful and ecologically responsible community, and by directing net revenues into an SFU Endowment Fund that would support teaching and research over the long term[26].

The UniverCity Official Community Plan was adopted by Burnaby City Council in September, 1996. UniverCity first residents moved into the development in 2004; it is now approaching 10 years of occupancy. In its continued commitment to sustainability leadership and education, the SFU Community Trust is interested in knowing whether they are delivering on sustainability goals and performance targets, as defined by the SCORE Tool.

UniverCity is a master-planned community – compact, mixed use, and transit-oriented – built upon Four Cornerstones of Sustainability:

Environment

- Provide a full range of transportation choices
- Preserve and improve the natural heritage of Burnaby Mountain• Design buildings and public spaces that respond to local context
- Provide sustainable, cost-and resource-efficient infrastructure and buildings

Economy

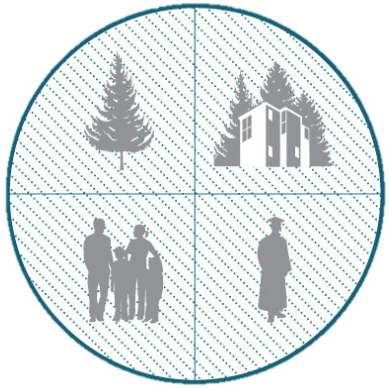
- Maximize the long-term value of SFU's endowment fund
- Encourage opportunities for innovative commercial and community economic development by working with all stakeholders

Equity

- Create a healthy, safe, livable, and complete community
- Provide an appropriate mix of housing types and tenures that reflect the entire lifecycle

Education

- Enhance university life, academic structure, and activities
- Create a model sustainable community that educates and inspires residents to pursue lifelong learning



UniverCity's goals and some performance targets have been set out in adopted plans, including the *Simon Fraser University Official Community Plan*[27], *Development Guidelines and Requirements*[28], the *Watercourse and Stormwater Management Plan*[29] and guiding documents including the *Community Character and Social Composition Report*[30]. Progress on these goals is reported on in progress reports such as the *Four Cornerstones of Sustainability: A UniverCity Progress Report*[31].

Girling (2010) produced a third party peer reviewed evaluation of the East Highlands Neighbourhood or Phase 1 of the development, using an evaluative framework based in theory of smart growth, against measures of density, completeness, connectivity, accessibility, habitat preservation, hydrology and water quality[32]. This report complements the work done by Girling using an evaluative framework based in sustainable community development theory: the community capital framework developed by Mark Roseland in his book *Towards Sustainable Communities*[33].

About the Tool

The SCORE tool measures the outcomes of sustainability initiatives at the neighbourhood scale against a six capital framework. Intended for use by academics, professional planning consultants, developers, and local government authorities, the SCORE tool helps to monitor and ultimately enhance their sustainability performance by connecting sustainability outcomes with policy intent.

The Tool evaluates neighbourhoods post-occupancy and emphasizes assessment of *outcomes* over *activities*. The SCORE Tool relies on themes (capitals), criteria (stocks), indicators and thresholds to account for sustainability challenges facing urban communities.

Sustainability Framework

Sustainability is a holistic concept. Its complexity demands a multi-criteria measuring system in order to ensure a comprehensive coverage of sustainability issues. In order to develop and select appropriate indicators for measuring sustainability performance, it is helpful to situate indicators within a larger sustainability framework. The sustainability framework chosen for the SCORE Tool is the Community Capital Framework developed by Mark Roseland, Director of the CSCD, which considers *six forms of community capital*.

The Community Capital Framework explains sustainable community development as the process of developing community capital: a number or collection of local assets or community resources that can produce other benefits through investment[34]. The Community Capital Framework uses six forms of capital to describe sustainable community development:

- Natural Capital
- Physical Capital
- Economic Capital
- Human Capital
- Social Capital
- Cultural Capital

This approach ensures a comprehensive coverage of sustainability issues, firmly grounded in sustainable development theory.

The Community Capital Framework has been designed with a systems thinking perspective that regards each form of community capital as a sub-system of the larger whole community system[35]. The sustainability framework encourages users to consider the effects of decision-making on each form of community capital, as well as to think strategically and holistically with regard to existing community capacity[36].

According to the Community Capital Framework approach, sustainable development is seen as the balanced development of the six community capitals. 'Sustainability' then becomes when each of the criteria (stocks) are satisfied above a defined threshold. The SCORE Tool presents the results of its assessment in the form of a spider diagram, which becomes more whole as you move closer to a complete community.

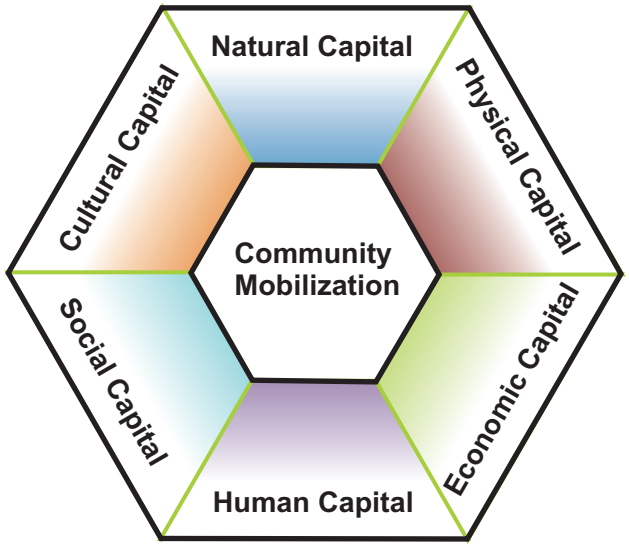


Figure 1
Community Capital Framework

Capitals and Stocks

The Community Capital Framework uses six forms of capital to describe sustainable community development: Natural, Physical, Economic, Human, Social and Cultural Capital. Each of the capitals becomes a 'theme' area, under which to organize criteria (stocks), indicators and thresholds. Each of these forms of capital is broken down into stocks, which in turn are broken down into indicators.. For each indicator, a threshold and a target are established in order to rate the actual performance against standards. When performance exceeds a threshold, it is considered an asset; when it is below the threshold, it is considered a liability. The performance for each stock is calculated by totaling the performance for each component indicator, and the performance for each capital is calculated by totaling the performance for each component stock. This method maps sustainability outcomes as the total of the community capital assets.

Sustainability Indicators

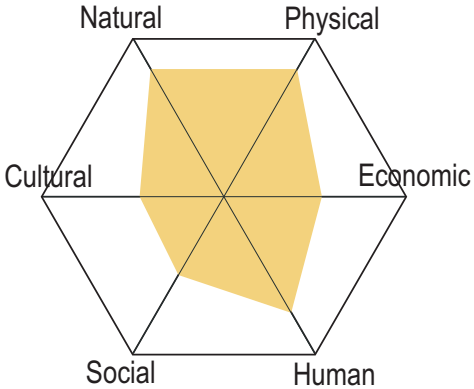
Situated in the context of a sustainability framework, indicators are tools that measure progress toward (or away from) a goal or objective. Their role is to 'indicate' performance and as such they provide a basis for setting targets and for comparing one means to achieve that target relative to another. An indicator consists of two major components--the concept (description) and metrics (how performance for the indicator is measured)[37].

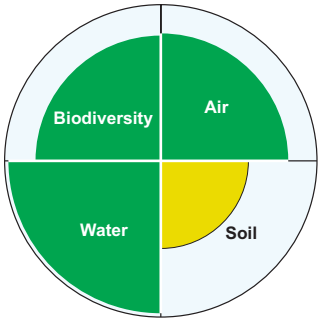
Targets and Thresholds

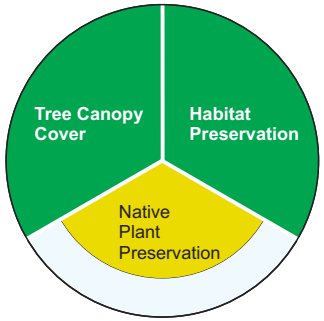
In order to evaluate the performance of the subject being measured, targets and thresholds must be defined. A target describes an ultimate sustainability goal whereas a threshold describes a boundary. Thresholds in sustainability assessment may define standards of best practice (benchmarks) or dangerous boundaries to cross The Tool requires users to define five values, which determine colour code achievement. Methods for determining targets and thresholds are explained in detail in the Scope, Methods, and Limitations section.

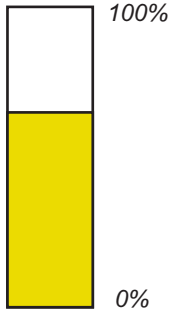
Figure 2: Score Tool Presentation of Results

The Overview diagram illustrates the capital scores, the Capital View diagram illustrates the stock scores, etc.









Overview:
Sustainability Hexagon

Natural Capital: 84%
Physical Capital: 84%
Economic Capital: 49%
Human Capital: 80%
Social Capital: 58%
Cultural Capital: 56%

Capital View:
Natural Capital

Composite Score:
84%

Stock View:
Biodiversityl

Composite Score:
84%

Indicator View:
Native Plant Preseervation

Composite Score:
65%

SCORE Tool Stocks and Indicators

In total 66 indicators are used to measure neighbourhood sustainability performance. These indicators broken down and numbered below, under their respective stocks and capital areas.

1. Natural Capital

Stock	Indicator
1.1 Air	1.1.1 Air quality
1.2 Soil	1.2.1 Contaminated sites
	1.2.2 Farmland preserved
	1.2.3 Growing Space
1.3 Water	1.3.1 Water availability
	1.3.2 Surface water quality
1.4 Biodiversity	1.4.1 Habitat preservation
	1.4.2 Native plant preservation
	1.4.3 Tree canopy cover

2. Physical Capital

Stock	Indicator
2.1 Land Use	2.1.1 Floodplain avoidance
	2.1.2 Mix of use
	2.1.3 Compact development
	2.1.4 Population density
2.2 Built Environment	2.2.1 Access to public space
	2.2.2 Quantity of residential building stock
	2.2.2 Quality of residential building stock
	2.2.4 Green residential building stock
2.3 Infrastructure	2.3.1 Access to energy
	2.3.2 Access to clean potable water
	2.3.3 Access to safe sanitation
	2.3.4 Access to reliable communications
	2.3.5 Stormwater management: volume of runoff
	2.3.6 Stormwater management: peak flows
2.4 Transportation Systems	2.4.1 Access to transit
	2.4.2 Modal split
2.5 Materials and Waste	2.5.1 Access to waste management systems
	2.5.2 Waste diversion rate

3. Economic Capital

Stock	Indicator
3.1 Labour	3.1.1 Unemployment rate
	3.1.2 Dependency on the safety net
	3.1.3 Age composition of the labour force
3.2 Households	3.2.1 Living wage
3.3 Business	3.3.1 Incorporations
	3.3.2 Bankruptcies
	3.3.3 Local ownership

4. Human Capital

Stock	Indicator
4.1 Education	4.1.1 Access to primary education
	4.1.2 High school completion
	4.1.3 University attainment
4.2 Health	4.2.1 Access to GP
	4.2.2 Composite Health Index
	4.2.3 Health practices
	4.2.4 Perceptions of physical health
	4.2.5 Perceptions of environment
	4.2.6 Time balance
4.3 Well-being	4.3.1 Life satisfaction
	4.3.2 Positive-negative experience
	4.3.3 Material well-being
	4.3.4 Mental well-being

5. Social Capital

Stock	Indicator
5.1 Citizenship	5.1.1 Voter participation
	5.1.2 Confidence in government
5.2 Community Cohesion	5.2.1 Social support
	5.2.2 Social cohesion
5.3 Safety	5.3.1 Traffic accidents
	5.3.2 Break & Enter
	5.3.3 Auto crime
	5.3.4 Robbery
5.4 Housing	5.4.1 Core housing need
	5.4.2 Rental vacancy rates
	5.4.3 Shelter-cost-to-income ratio
	5.4.4 Resident turnover
	5.4.5 Resident satisfaction

6. Cultural Capital

Stock	Indicator
6.1 Cultural Vitality	6.1.1 Cultural access
	6.1.2 Public Programing
6.2 Diversity	6.2.1 Ethnic diversity
6.3 Built Cultural Heritage	6.3.1 Public art
	6.3.2 Registered heritage sites

Scope, Methods, and Limitations

Scope

This report builds on the work of a team of researchers at SFU - Julia Berry, Kiri Bird, Ashley Hardill, Sarah Wongkee, and Terry Sidhu – who, under the supervision of Mark Roseland and Peter Whitelaw, collaboratively developed the first version of the SCORE Tool through an Advanced Planning Workshop at SFU. The first version of the tool was then refined by M.R.M (Planning) candidate Kiri Bird – under the supervision of Mark Roseland, Peter Whitelaw, and John Davegos – and piloted in the community setting at UniverCity to assess its performance. This report addresses the refinement of the tool and the pilot assessment.

Study Area

UniverCity is a master-planned, 160-acre high-density community situated on Burnaby Mountain, BC, adjacent to SFU. Currently Phases 1 and 2 of the development are complete, and Phases 3 and 4 are under development. Roughly 3500 people live at UniverCity (3118 from the 2011 census), which will ultimately be home to more than 10,000 people. About 47% of the residents have an affiliation with SFU as students, faculty or staff members, etc.

The neighbourhood boundaries, for the purpose of the sustainability assessment, are determined by the development area boundary (see below). Survey data, and data collected by the SFU Community Trust and private environmental consultants correlates to this definition of neighbourhood.

Figure 3 UniverCity Neighbourhood: Development Area Boundary

However, census data, and data made available by various levels of government, are collected and reported upon at different scales. Neighbourhood parameters, therefore, differ depending on the indicator. The most commonly used geographical areas for data collection are Dissemination Area (DA), Forward Sortation Area (FSA), and the city scale. Relating to the UniverCity neighbourhood, these parameters are illustrated below.

Each DA is assigned a four-digit code. In order to uniquely identify each DA in Canada, the two-digit province/territory (PR) code and the two-digit census division (CD) code must precede the DA code. In the case of UniverCity the code associated with UniverCity is 59 15 3695, or DA 3695 for short.

FSA codes are based on the first three characters of a postal code. The FSA that relates to the UniverCity neighbourhood is V5A, illustrated below.

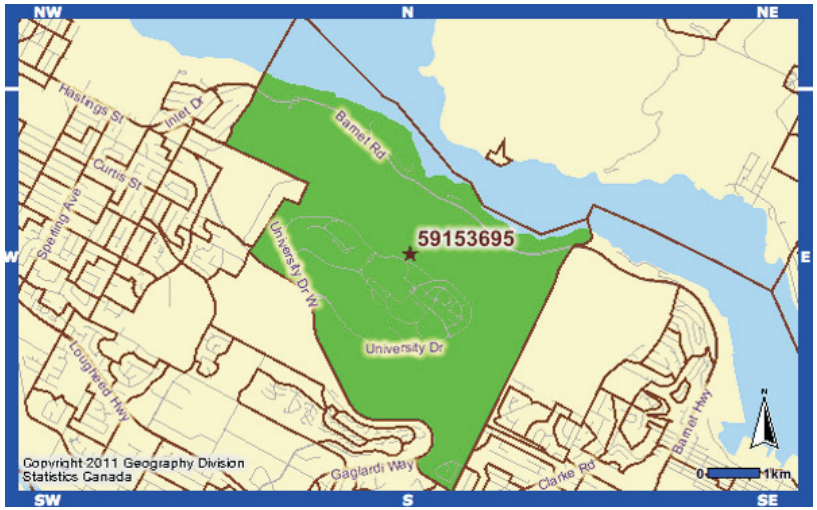


Figure 4 DA 3695 as illustrated by Statistics Canada

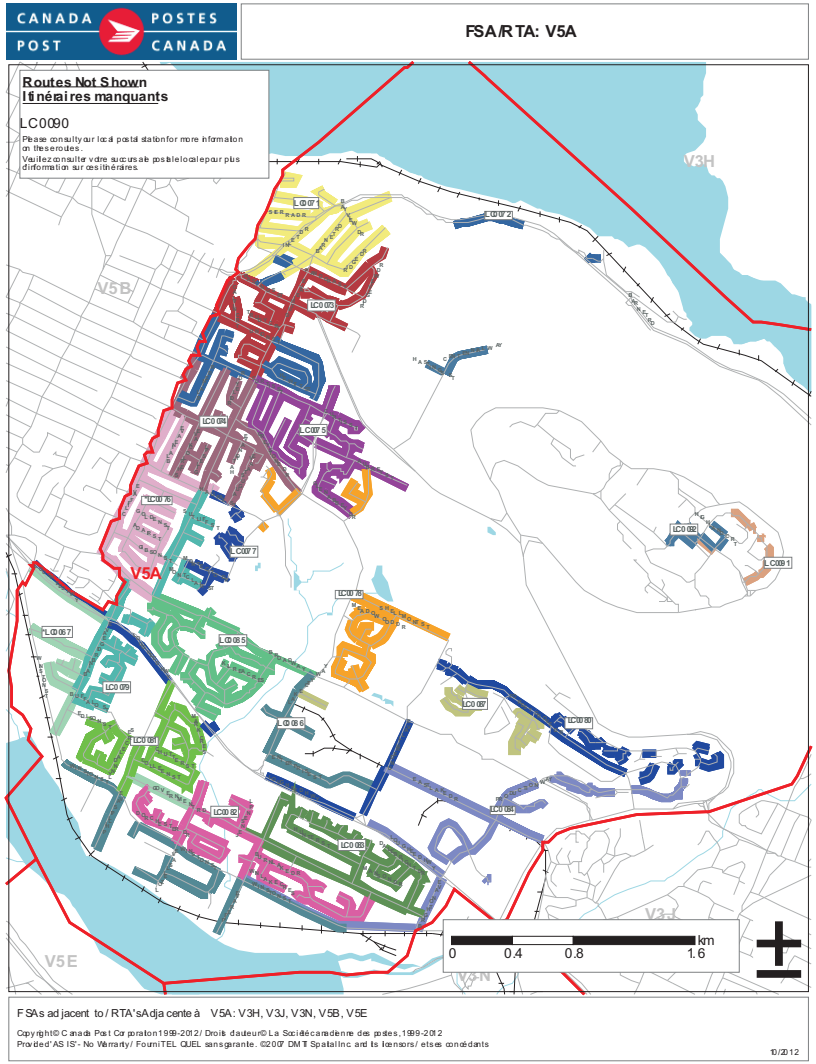


Figure 5 FSA V5A as illustrated by Canada Post

Finally, many indicators are answerable with data available only at the Census Subdivision (CSD) scale. . CSD is the city scale. Below is map of Burnaby, as illustrated by Statistics Canada.

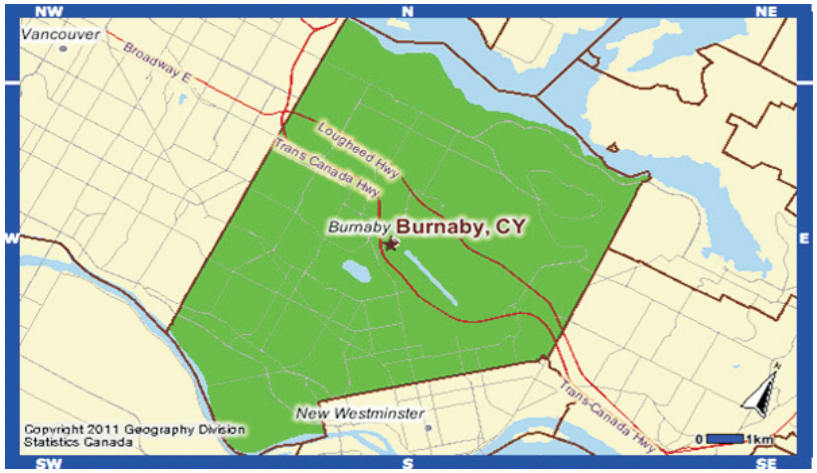


Figure 6 CSD City of Burnaby as illustrated by Statistics Canada

Methods

The assessment process was iterative, involving identifying metrics and data sources for all indicators, refining the indicators to produce a refined set of indicators based on three criteria: data availability, relevance of available data, and meaningfulness. In total the refined tool has 66 indicators.

The indicators selected focus on sustainability performance of completed parcels of the UniverCity development, post occupancy. The metrics used are mostly directionally positive: framed in such a way that an increase in each indicator will contribute to an increase in neighbourhood assets, and thus filter up to an increase in community capital, and ultimately sustainability. In accordance with our concern for sustainability *outcomes*, rather than *activities*, the reporting period considered for most indicators is 2013 or earlier, the latest period for which performance data is available.

54 of 66 (82%) indicators are objective and quantitative – based on data acquired from public or open source databases. However, literature suggests that a comprehensive picture of sustainable social well-being should integrate subjective and objective indicators[38]. Therefore the SCORE Tool combines objective variables such as income, housing, and labour statistics with subjective variables such as personal life satisfaction, perceptions of environment, and confidence in government. The other 11 of 66 (18%) indicators are subjective and quantitative, assessed via a Gross National Happiness (GNH) Index survey developed by The Happiness Initiative in Seattle.

Data Sources

Objective, quantitative data was gathered from public or open source databases. Data sources include the 2011 Canadian Census Survey, 2011 National Housing Survey, City of Burnaby, ICBC, CMHC, Environment Canada, BC Stats, Walk Score, peer-reviewed literature, and SFU Community Trust's own offices – which includes data from privately contracted firms.

Survey data was collected from UniverCity resident respondents to the GNH Index survey.

Survey

The GNH Index survey method takes a non-monetary multidimensional approach that measures satisfaction and advancements across various life domains. This opt-in, anonymous survey was

administered online, accessed by a link posted on the SFU Community Trust website. The survey was promoted to UniverCity residents through an email sent by the SFU Community Trust to their community email list, as well as through a mail out invitation inserted to UniverCity's August 2014 Community Update. The survey link was active between July 28 and August 15, 2014. Aggregate responses were calculated by The Happiness Initiative in Seattle and provided to the research team. A 2% response rate was considered to be a statistically relevant sample size, representing 68 people for UniverCity's population. In total 99 residents completed the survey.

Targets and Thresholds

While targets and thresholds are key to delivering results on sustainability initiatives, internationally recognized targets for sustainable urbanization are still under development, with thresholds even less common. Initially the research team wished to use City of Burnaby targets as a reference for establishing thresholds. However, the City of Burnaby, as a general policy, does not define performance targets. In lieu of such targets, four methods of defining targets and thresholds were used in this assessment:

- Method 1. Targets and thresholds are based on a percentage/scale of 0 to 100
- Method 2. Targets and thresholds are well defined in research or in policy
- Method 3. Targets and thresholds are based on current practice and expert opinion
- Method 4. Targets and thresholds are based on relative norms, drawing on comparative data from municipalities across Metro Vancouver

Further explanation of each method is given below.

Method 1

Method 1 of defining targets and thresholds is concerned with framing indicators so their metrics are directionally positive, and a proportion of a whole (100%) - rather than a rate, or an abstract value. This allows us to clearly define the lowest point on the scale as 0 and the highest point as 100, and divide this range evenly by four in order to define thresholds. Method 1 was used to define targets and thresholds for 31/66 (47%) of indicators. Examples include the GNH survey questions, Walk Score indicators, and indicators concerning a proportion of population – such as the proportion of neighbourhood residents earning a Living Wage, or a proportion of land area – such as the proportion of parcels outside of the floodplain.

Method 2

Method 2 was applied to cases where research has been found to support the targets and/or thresholds of the indicator. This is the most rigorous and transparent method of establishing targets and thresholds. Further research is needed in order to develop targets and thresholds for each indicator based on peer-reviewed research and/or international sustainable development policy. Method 2 was used to define targets and thresholds for 15/66 (23%) of indicators. Examples include the unemployment rate, stormwater management runoff coefficient, and indicators of biodiversity: tree canopy cover, native habitat retention and native plant preservation. This assessment made use of a number of targets and thresholds established by Kellet et. al (2009) in their white paper report prepared for CMHC: *Specification of*

indicators and selection methodology for a potential community demonstration project[39].

Method 3

Method 3 was applied to cases where no research or policy was found to support targets and/or thresholds for the indicator, and where relational norms are not appropriate. Often, these indicators were custom developed for the assessment, based on available data. Method 3 was used to define targets and thresholds for 6/66 (9%) of indicators. Examples include the two indicators of water quality and availability, which were developed with the input of environmental consultants Nancy Hill and Ron Kistritz. Another example would be the health practices indicator, which was developed by the principle researcher, and (informally) validated by the Fraser Health Authority. Further research is needed to formally validate these indicator metrics and valuation methods.

Method 4

Method 4 was applied to cases where no research or policy was found to support targets and thresholds for the indicator, however, there exists large datasets of comparable information for other neighbourhoods or municipalities. When applying Method 4 for valuation of a sustainability assessment indicator, the indicator no longer tells how the neighbourhood performs against an international standard of sustainable urbanization – but rather, how the neighbourhood performs in the regional context. An interquartile range calculator was used to establish the lowest point, highest point, median, and first and third quartile points of regional datasets. Method 4 is used to define targets and thresholds for 14/66 (21%) of indicators. Examples include core housing need, number of bankruptcies, voter participation and number of registered heritage sites indicators.

Presentation of Results

As described previously, the SCORE tool relies on themes (capitals), criteria (stocks), indicators and thresholds to assess sustainability. In the following pages you will find the results of the assessment presented in a series of diagrams depicting

a) a summary of the six capitals shown as a hexagonal spider diagram,
b) a summary assessment of each of the capitals, and –
c) a summary of each of the stocks.

Within the capitals summary there is no aggregate score given for the whole assessment. The SCORE tool does not provide an aggregate score because the community capital approach does not support balancing one kind of capital assets against another: the aim of sustainable development is to develop capital in all asset classes, in contrast to conventional development, which usually seeks to develop financial capital without regard for other forms of capital..

Following the sustainability hexagon, each capital is described in detail accompanied by

a) a composite score,
b) a capital summary diagram,
c) a summary table of stocks,
d) a statement of dataset limitations,
e) a concluding statement.

Immediately following the capital summary, each stock within that capital is discussed in brief and illustrated with diagrams. A summary table of indicators supports each stock, giving background on how the indicators were measured against identified targets and thresholds to produce the assessment results.

Limitations

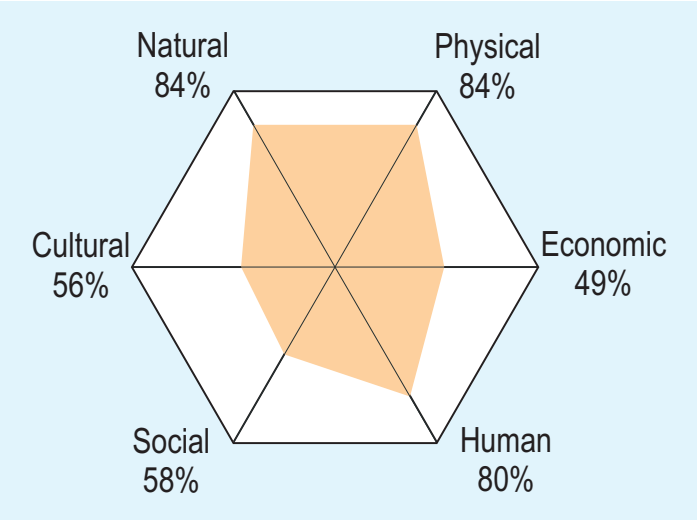
The pilot exposed several limitations with respect to data availability at the neighbourhood scale. The geographical boundary of measurement differed depending on the indicator, so in some cases, a wider area was used as a proxy for study area performance.

The process of defining targets and thresholds is also subject to debate, as we do not yet have one widely agreed upon comprehensive list of sustainable development indicators with clearly defined targets available to inform sustainability assessment globally. The International Standard Organization's (ISO) ISO 37120 - published in May 2014 – offers a meaningful set of indicators and targets for sustainability assessment at the city scale, however, it does not take a community development approach as does the SCORE Tool, nor does it look at the neighbourhood scale.

The SCORE Tool provides a snapshot of sustainability performance at UniverCity in 2013. As a measurement at a single point in time, it does not provide information about whether UniverCity is on *the path* to sustainability. Repeating the assessment over time as the neighbourhood reaches build out is necessary to determine if UniverCity is making progress on its sustainability goals.

Although we acknowledge there are conceptual and empirical problems inherent in producing such a snapshot, the research team believes this was a useful exercise to:

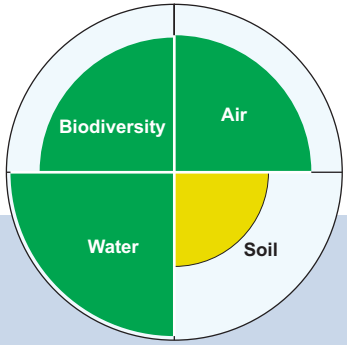
a) make the range of targets and thresholds for NSA more apparent,
b) establish at least an approximate baseline for future assessments,
c) set up a framework for further analysis,
d) point out areas in need of more research, and
e) stimulate additional research and debate.



Results

The overall assessment results are shown in the diagram above. This diagram articulates the community capital generated by UniverCity against the six forms of capital. The capital scores should always be considered together but not in the aggregate, as it is the balanced development of each form of capital that characterizes sustainable communities.

UniverCity scores exceptionally well in the Natural Capital, Physical Capital and Human Capital areas, with lower scores in the socio-economic capitals. At this time, we do not know how UniverCity, a model sustainable “complete community”, scores against a typical neighbourhood built in the last 20-30 years. Future application of the SCORE Tool to a variety of neighbourhood types may provide a reference point for understanding the achievements made within a master planned eco-neighbourhood such as UniverCity.



Natural Capital

Composite score: 84%.

Natural Capital refers to any stock of natural assets that yields a flow of valuable goods and services – "ecosystem services" – into the future. These stocks are air, soil, water and biodiversity. At a neighbourhood scale, emissions of pollutants such as heavy metals, greenhouse gases, and nitrogen oxides can damage these stocks, as can development and overuse of natural green spaces. Practices that limit the use of toxic chemicals, remove toxins from waste streams, and create habitat can conversely enhance Natural Capital.

Natural Capital Stocks

Stock	Score	Strengths	Weaknesses
Air	85%	Air quality	
Soil	67%	Soil contamination	Dedicated space for urban agriculture
Water	98%	Water quality	
Biodiversity	84%	Habitat retention, Native landscaping	

Summary

Overall, UniverCity has substantial Natural Capital, a result of its location on clean land removed from major sources of air pollution and surrounded by the Burnaby Mountain conservation area, which was protected as part of the agreements that enabled the development, and initiatives such as stormwater management that serve to reduce impacts on the receiving environment.

Dataset Limitations

In measuring air as a community asset, we initially planned to measure light and noise pollution, and GHG emissions. However, there is little or no data available to support measurement of these indicators. Light pollution, typically considered to have a negative impact on wildlife and hence a liability to biodiversity[40], is not monitored in Canada, and available data (e.g. http://www.jshine.net/astronomy/dark_sky/) does not offer enough granularity to be useful for a neighbourhood sustainability assessment. Similarly, noise in the City of Burnaby is only measured on a complaints basis - meaning there are no continuous noise monitoring stations on which to base performance measurement. For GHG emissions, energy use data is collected by utilities, but it is protected as private data when aggregated at a building scale in British Columbia (under the Freedom of Information and Protection of Privacy Act), and to date utility companies were not willing to aggregate their data to the neighbourhood scale, where it would not be protected. While GHG emission data is available at the municipal scale, as calculated by LiveSmart BC's Community Energy and Emissions Inventory reporting, we did not use this data because it would not help distinguish UniverCity from other neighbourhoods.

Unique, detailed data was available from SFU Community Trust for Water and Biodiversity stocks. As a result, performance measurements in these areas are

more detailed than would be typical of a neighbourhood elsewhere. Future applications of the SCORE Tool may have to identify alternative measures for these indicators. This pilot suggests that efforts to monitor in these areas more consistently, as envisioned in some Integrated Stormwater Management Plans, would be a useful management tool and should be a focus for investment.

Conclusions

UniverCity scores highly in Natural Capital because it has from its outset set a goal of preserving and improving the natural heritage of Burnaby Mountain.The development's commitment to environmental stewardship has framed planning, implementation, monitoring and reporting in practice to positive ends. The analysis of Natural Capital at UniverCity suggests that their pioneering environmental policies are in fact contributing to the intended sustainability outcomes.

The report also suggests areas for some improvement, such as institutionalizing the use of 100% native plants in their development guidelines and significantly increasing the amount of growing space per dwelling unit for agricultural production. At a neighbourhood scale, productive land is usually focused in gardens, which are an important way to support a local food system that helps respond to major shifts in the global food system.

In conclusion, UniverCity's environmental policies, institutionalized through their Development Guidelines and Requirements, appear to be having a positive effect on the Natural Capital of the development area, and in turn on sustainability at the neighbourhood scale.

Air

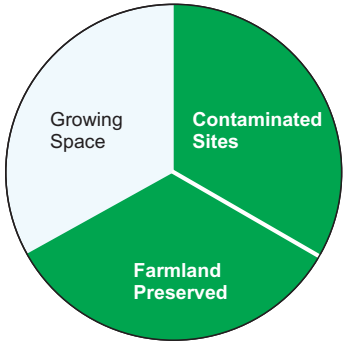
Composite Score: 85%

Air is an asset when it is clean, free from harmful particulates, and noise and light pollution. Greenhouse gases could also be included in this stock because they are components of air and influence its temperature, which is an important characteristic of this stock. Unfortunately, noise pollution and light pollution are not centrally monitored on an ongoing basis so there is no data for these indicators. The research team also encountered problems in collecting energy use data for the community.

Air Indicators

Indicator	Value	Thresholds	Colour Code	Source
Air Quality Health Index	1.8	Target 0	Green	Environment Canada

Due to the availability of data at the neighbourhood scale, **air quality** was measured for UniverCity with a single indicator: the Air Quality Health Index (AQHI). The AQHI was developed by Environment Canada as an aggregate measure of a number of pollutants. The AQHI is calculated every hour, and averaged across 3 to 4 regional monitoring stations; the value used for this report is the average AQHI for all of 2013. However, this index is calculated based on a very large area – the Northeast quadrant of Metro Vancouver – and is not available at a smaller scale. Therefore neighbourhood air quality performance is inferred from regional air quality performance. The AQHI identifies thresholds at: Low Risk (1-3); Moderate Risk (4-6); High Risk (7-10); Very High Risk (10+).



Soil

Composite Score: 67%

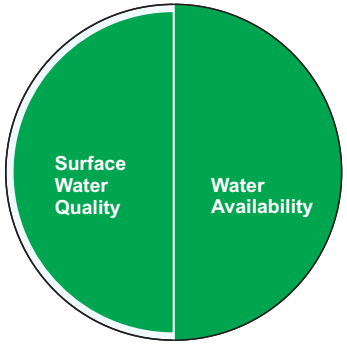
Soil is essential to life, as healthy soil is needed to grow food and to support all vegetation and therefore the ecosystems that sustain human and other life. It can be improved only slowly. Productive agricultural soil is a valuable community asset, while contaminated soils, especially those that restrict food production or release pollutants to be ingested by other organisms, are a significant long-term liability.

Soil Indicators

Indicator	Value	Thresholds	Colour Code	Source
Contaminated Sites	100%	Target 0	Green	BC Ministry of Environment
Farmland Preserved	100%	Target: 100%	Green	SFU Community Trust
Growing Space	0 m^2/DU	Target: 6.5 m^2/DU	Red	SFU Community Trust

UniverCity has no registered contaminated sites and is situated on a mountain, where it did not displace any agricultural land. The neighbourhood therefore receives perfect scores on these indicators of sustainable neighbourhoods.

However, as of 2013 there was no formal gardening space available for community members. It is important to note that Phase 4 of the UniverCity anticipates 141.5 m2 of community gardening area in park space, plus an additional 69.7 m2 of gardening space at the Polygon Homes development, which would improve performance, but will fall well short of the target of 6.5 m2/dwelling unit suggested by LEED ND. SFU is also embarking on a campus wide strategy, including UniverCity, for community gardens that may create more growing space for residents in the future.



Water

Composite Score: 98%

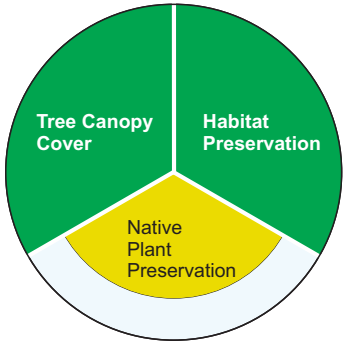
Water is a neighbourhood asset when it is amply available for human and ecosystem use, and is free from pollutants. While both groundwater and surface water are important for communities, where groundwater is not extracted, it is not monitored in quantity or in quality. On Burnaby Mountain the groundwater is not accessible, and therefore there is no data on this indicator. As a result, measurement of the water stock focuses on surface water quantity and quality.

Water Indicators

Indicator	Value	Thresholds	Colour Code	Source
Water Availability	0 days	Target 0	Green	AECOM
Surface Water Quality	4%	Target: 0% Benchmark: 10%	Green	R.U.Kistritz COnsultiing

Surface **water quantity** is measured through downstream base flows. The monitoring station MA2, set up at the base of UniverCity's East Highlands development, demonstrated no drought conditions in the year 2013, earning the neighbourhood a perfect score in this indicator.

The **water quality** of streams is measured through exceedances of pollutant concentrations following storms. Water quality monitoring station MA2 also obtains discrete storm water samples using an ICO 3700 Auto Sampler during 3 storm events each year in Summer, Fall and Winter. Exeedances of pollutants are measured against Water Quality Guidelines for the Protection of Freshwater Aquatic Life set out by the Canadian Water Quality Guidelines. The number of exceedances during each storm event is an indicator of how much pollution from upstream urban development is moving into the aquatic environment. The indicator considers 10 exceedances per storm surge (30 total) a benchmark for low pollution (~10% of total samples taken). Downstream of the East Highlands neighbourhood, water quality monitoring reports showed low exceedances for the year 2013.



Biodiversity

Composite Score: 84%

Biodiverse ecosystems are an important natural capital asset. At a neighbourhood scale, riparian areas must be protected, along with trees and native plants. Preserving biodiversity has impacts for both provisioning (such as providing food for animals) and regulating (such as water purification) ecosystem services.

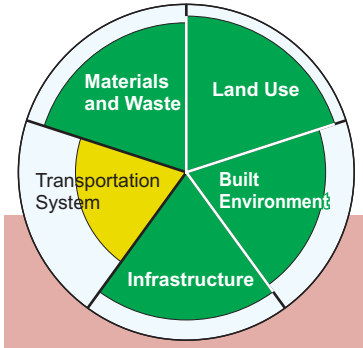
Water Indicators

Indicator	Value	Thresholds	Colour Code	Source
Habitat Preservation	20%	Target: 20%	Green	SFU Community Trust
Native Plant Preservation	65%	Target: 100%	Gold	SFU Community Trust
Native Plant Preservation	30%	Target: 40%	Green	SFU Community Trust

The benefits of **conservation areas** within urban developments include the provisioning of ecosystem services but can also have a positive impact on quality of life, human health and wellbeing[41]. Kellet et al. (2009) suggest that at least 20% of a neighbourhood's land area should conserve, preserve or create native habitat[42].

The use of **native plants** is another important feature of maintaining biodiversity and hydrological systems. Since its beginnings, UniverCity has advocated for the use of native plant species in its development guidelines (later requirements) and in doing so has succeeded in replanting the East Highlands neighbourhood with 100% native vegetation, including over 220 young native trees[43]. Overall the site has an average of 65% native vegetation, and this number is expected to increase as Phases 3 and 4 of the development are built out.

In their set of neighbourhood sustainability indicators prepared for the Canadian Mortgage and Housing Corporation (CMHC), Kellet et al (2009) explain the benefits of tree canopy cover: **tree canopy** is fundamental to several key ecological functions, such as stormwater management, carbon sequestration (carbon capture and storage), “heat island” mitigation, habitat protection, and air quality improvement. Trees help to manage stormwater by absorbing rainfall and reducing surface run-off. They sequester carbon and improve urban air quality by absorbing carbon dioxide. They also increase urban habitat and mitigate the “urban heat island” effect through cooling and shading[44]. The report sets a benchmark of 20% tree canopy cover, with a target of 40% for urban areas. The UniverCity East Highlands neighbourhood boasts a ~30% tree canopy cover, an impressive figure, which will increase as trees mature and Phases 3 and 4 are built out.



Physical Capital

Composite score: 84%.

Physical Capital is the familiar set of built assets that make up the urban environment of a neighbourhood and which enable residents to meet their basic needs and that support their daily activities. The physical assets of a neighbourhood include land, buildings, infrastructure, transportation and waste management systems. The design of the physical environment has a significant influence on the other forms of capital because it directly serves human needs (e.g. water infrastructure meets the need for drinking water) and affects the natural environment (e.g. public transit reduces traffic congestion consequently air pollution). Nevertheless, Physical Capital is a distinct and important class of community assets in its own right.

Stock	Score	Strengths	Weaknesses
Land Use	93%	Density, Mix of use	
Built Environment	83%	Quality housing, Living Building Challenge	More green buildings to be built
Infrastructure	88%	Access to core infrastructure, peak flows	
Transportation	66%	Access to transit	Modal split
Materials and Waste	89%	Waste disposal	Waste diversion

Summary

UniverCity's compact, low-impact development patterns, critical infrastructure and services articulate many of the qualities of sustainable urban neighbourhoods. While the composite score of Physical Capital captures the strength of UniverCity's urban design and buildings, it excludes the efficiency of building water, heat and electricity consumption because privacy and technological concerns limit access to data at the building scale.

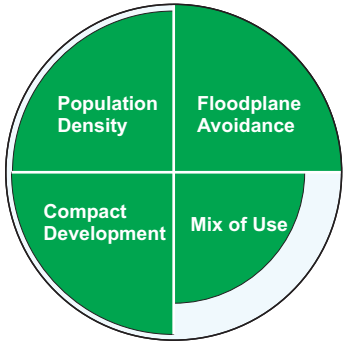
Dataset Limitations

Likely the most unfortunate discovery of this pilot test: data on the efficiency of water and energy use was not available at the neighbourhood scale. In Burnaby, residential water use is not metered.

Conclusions

The lack of data availability pertaining to resource consumption at the neighbourhood scale proposes a challenge to neighbourhood sustainability assessment. This gap in data availability is conversely an opportunity to engage decision makers in a conversation about changing these restrictions so that we have a greater chance of success at achieving local, regional and global resource consumption goals. For example, reporting waste diversion and disposal rates for neighbourhoods could prove to be a promising tactic to influence occupant behaviour and help municipalities to reach their sustainability goals.

As we have seen, data availability is a crucial input to sustainability assessment frameworks, and in turn to the success of sustainable development initiatives. The difficulty accessing data suggests a need for improved data collection at the neighbourhood scale, as this is valuable data for encouraging behavioural change amongst residents.



Land Use

Composite Score: 93%

Land use describes the intensity of activity that takes place in a community, and the type of activity (e.g. living, shopping, working, and playing), described in terms of classes of use (e.g. residential, commercial, industrial). More intense developments enable residents to live close to jobs and services and enable the many human interactions that support social and cultural richness.

Land USe Indicators

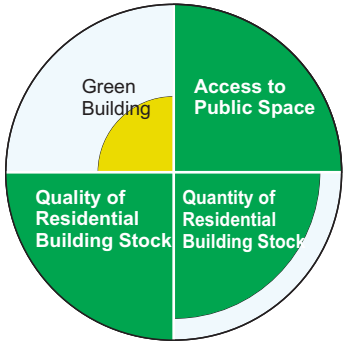
Indicator	Value	Thresholds	Colour Code	Source
Floodplain Avoidance	100%	Target: 100%	Green	Trust SFU Community
Mix of Use	78%	Target: 100%	Green	Walk Score
Compact Development	5.8	Target: 6.0	Green	SFU Community Trust
Population Density	144 p/h	Target: 150 p/h	Green	SFU Community Trust

Mix and intensity of use is measured in this report by the Walk Score index, which assigns a numerical walkability score to neighbourhoods and unique addresses. The walkability index takes into account the proximity of daily destination ranging from schools to restaurants and parks, as well as population density, average block length, intersection density, link/node ratio, and route directness. It is comparable across any address in Canada, United States, UK and Australia, giving us a broad basis for comparative analysis. Averaging Walk Score calculations for all the postal codes in the neighbourhood, UniverCity scores a 78/100 in mix of use, meaning that most daily errands can be accomplished on foot.

The built-up area that is exposed to natural hazards is an important aspect of the long-term resilience of a community. **Flood risk**, measured as the extent to which the neighbourhood is in a flood plain, has become an increasingly important indicator in light of research on climate change and sea level rise. It is also easily measured from widely available data, so is the natural hazard indicator of choice for this tool. Situated on top of Burnaby Mountain, UniverCity is not at risk of floods. Risks of other natural hazards, such as steep or unstable slopes, were not assessed because the data required is typically harder to obtain.

The indicators for **compact development** and **population density** are built upon targets suggested by LEED ND. The goal of compact development is to promote land development patterns that support a diverse regional economy and employment close to where people live. UniverCity's mix of commercial and residential density scores a 5.8/6, according to LEED ND's compact development indicator scoring system.

The indicator for population density has been developed by Kellet et. al (2009) building off of LEED ND recommendations. Neighbourhoods of a scale similar to UniverCity are issued a 150 person/hectare density target. UniverCity achieves a high score in this indicator, given the current population density of 144 person/hectare.



Built Environment

Composite Score: 83%

The built environment is defined here not only as buildings but also of the space between them. Buildings are an essential community asset, both in terms of their condition and the total amount of space. The public space between buildings is sometimes forgotten but equally important, because it supports social interaction, businesses, and recreation, and because it represents much of the public, community-owned space in a neighbourhood.

Built Environment Indicators

Indicator	Value	Thresholds	Colour Code	Source
Access to Public Space	100%	Target: 100%	Green	SFU Community Trust
Quantity of Residential Building Stock	87%	Target: 6.0	Green	National Housing Survey 2011
Quality of Residential Building Stock	0%	Target: 0%	Green	National Housing Survey 2011
Green Building (Residential)	45%	Target: 100%	Green	SFU Community Trust

Access to **public space** is measured as the proportion of neighbourhood dwellings that lie within a 5 minute (400m) walk of a park or plaza. At UniverCity, due to its compact development and human scale design, that is 100% of dwellings. This indicator is drawn directly from LEED ND.

Residential buildings are used as a proxy of all buildings in a neighbourhood because consistent data is available for them, and it is easier to compare a single class of buildings across neighbourhoods. Both the quantity of suitable buildings in a neighbourhood and the quality or condition of those buildings factor in calculating the built environment stock as a neighbourhood asset. The Canadian National Housing Survey (NHS) measures both of these variables in a federal reporting and monitoring initiative every four years.

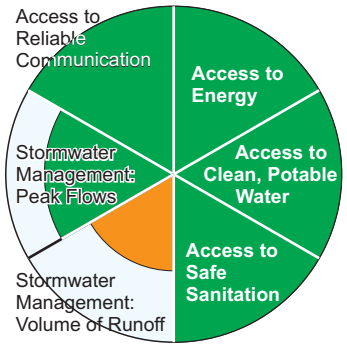
Quantity of residential building stock: The 2011 NHS defines *suitability* as whether the dwelling has enough bedrooms for the size and composition of the household, as calculated using the National Occupancy Standard. Based on the 2011 NHS, 87.5% of dwelling units (DU) in UniverCity (corresponding with Dissemination Area (DA) 3695) are suitable for occupation.

Quality of residential building stock: Based on the 2011 NHS, 95% of DU in UniverCity are not in need

of major repairs or improvements.

Green Buildings: Increasingly, cities are recognizing that buildings are sinks of natural resources throughout their lifecycle, including energy, materials, and water. Green building certification programs such as LEED in North America BREEAM in Europe certify buildings based on their anticipated performance. To assess how “green” the building stock is, the proportion of DU built to LEED Gold standard or greater is used. The unit of measurement is tied to DU and not the number of buildings nor gross floor area (GFA) because resource use is closely tied to occupant behavior, which relate most closely to the number of DUs. 45% of UniverCity's completed DUs are built to LEED Gold standard or higher, a significant proportion. With increased performance requirements for new phases of development, it is expected that this percentage will increase over time.

While the resource efficiency of public or commercial buildings is not taken into account in this measure, we note that UniverCity completed Canada's first Living Building Challenge certified building with the construction of the UniverCity Childcare Centre in 2013, demonstrating further leadership in green building practice.



Infrastructure

Composite Score: 88%

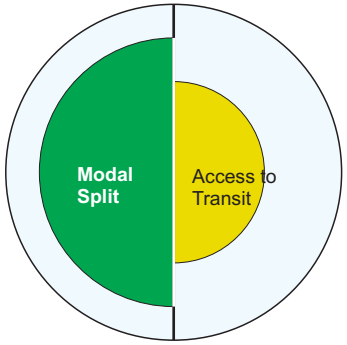
Land Use Indicators

Indicator	Value	Thresholds	Colour Code	Source
Access to Energy	100%	Target: 100%	Green	SFU Community Trust
Access to Clean Potable Water	100%	Target: 100%	Green	SFU Community Trust
Access to Safe Sanitation	100%	Target: 100%	Green	AECOM
SM: Volume of Runoff	60%	Target: 0% Benchmark: 30%	Orange	AECOM
SM: Peak Flows	5.8	Target: 6.0	Green	SFU Community Trust
Access to Reliable Communication	100%	Target: 150 p/h	Green	SFU Community Trust

Infrastructure describes various shared systems that distribute resources through a community and collect wastes, including energy, water and sanitation, stormwater, solid waste, and communications. Most of these systems are an integral part of larger natural systems (e.g. water, sewer, and stormwater form part of the natural water cycle), so infrastructure describes those parts of the larger system that are distinct built assets. Because it is difficult to assess infrastructure condition and suitability at the neighbourhood scale, and because resource efficiency is a key concern for neighbourhood sustainability, the focus of this stock is on: access to safe, efficient and reliable infrastructure; and efficiency of resource use.

Because **access to infrastructure** and basic services is required by provincial building code and ensured through the municipal permitting process, every resident of UniverCity has access to every category of basic infrastructure.

Another important aspect of infrastructure is **stormwater management**. In developed environments, unmanaged stormwater can be a liability for ecosystem health, the protection of individual property, and cost municipalities in the form of insurance. Stormwater management systems can be measured using two metrics: volume of runoff and peak flow. The volume of runoff which *does not* return to the natural ecosystem is measured by the runoff coefficient. The UniverCity OCP sets a target of “maintaining pre-development stormwater runoff rates, volumes and seasonal variations to maintain existing downstream hydrologic patterns”. Runoff coefficient tables show that an undeveloped area would typically have a runoff coefficient of 10% to 30% depending on soil composition and vegetative cover. Downstream watercourse monitoring reports by environmental consultants AECOM provide evidence that UniverCity is not meeting its target given that the average runoff coefficient at monitoring station MA2 for 2013 was 60%. This means that 60% of rainfall was not returned to the natural ecosystem. Peak flows measure the flow of stormwater discharges in l/s/ha. In this area, UniverCity performs exceptionally well. The range of acceptable peak flows is between 2 and 4 l/s/ha, and UniverCity monitoring stations are showing a 2013 average of 2.3 l/s/ha.



Transportation Systems

Composite Score: 66%

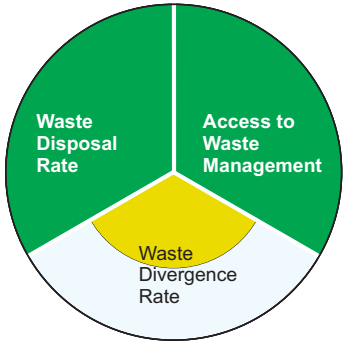
Transportation systems enable neighbourhood residents to meet their needs by accessing shops, services, and workplaces elsewhere in the city, and enable the movement of goods. Public transportation is a community asset, which produces benefits health, emissions output and social cohesion. The transportation stock measures the effectiveness of transit policies implemented through two indicators: access to transit and the modal split.

Transportation Indicators

Indicator	Value	Thresholds	Colour Code	Source
Access to Transit	54%	Target: 100%	Gold	Walk Score
Modal Split	47%	Target: 59%	Green	National Housing Survey 2011

Access to transit is measured by the third party transit index Transit Score, produced by Walk Score, which assigns a numerical transit connectivity score to neighbourhoods and unique addresses. This score considers transit options within a 5-minute (400 m) radius. UniverCity's Transit Score is 54/100. This is qualified by Walk Score as: Good transit, many public transportation options. Transit Score does not take into account localized initiatives to reduce car dependency such as car sharing, or the Community Transit Pass instituted by the SFU Community Trust (now cancelled) or the proposed Gondola project. If the Gondola were constructed and adopted into the public transportation system, this would reflect positively on UniverCity's Transit Score in future assessments.

Modal split is measured by the proportion of residents in DA 3695 who use a motor vehicle to get to work, using NHS 2011 data. 47% of UniverCity's working population aged 15 and over use a motor vehicle to commute to work. This study uses a target of 48.8% (20% less than the municipal rate) for performance measurement. UniverCity sits just below this target, suggesting that UniverCity residents are more likely to use alternative modes of transportation to get to work, however, there is still room for improvement.



Materials and Waste

Composite Score: 89%

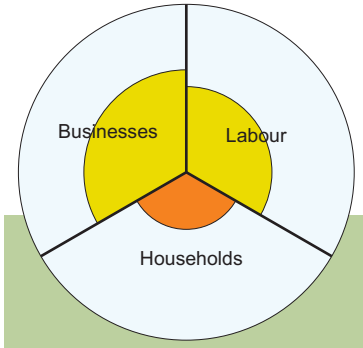
The materials in our homes and businesses are important physical assets, and when they are discarded as **Waste**, they become liabilities that need to be managed. This stock measures access to waste management services, and the rate at which waste is disposed as a good proxy for the amount of materials flowing through the community net of those that are being recycled or otherwise diverted from the waste stream.

Materials and Waste Indicators

Indicator	Value	Thresholds	Colour Code	Source
Access to Waste Management	100%	Target: 100%	Green	SFU Community Trust
Waste Diversion Rate	47%	Target: 70%	Gold	City of Burnaby
Waste Disposal Rate	0.17 tons/cap.	Target: 0.17 tons/capita	Green	City of Burnaby

Burnaby's waste collection rates are measured against the sustainability objectives outlined by the Metro Vancouver regional government. Metro Vancouver has identified a target of 70% **waste diversion** by 2020 for all collected residential and business materials, as well as a reduction in **waste disposal** per capita by 10% from 2010 levels.

In 2013, Burnaby just barely hit Metro Vancouver's waste disposal target. However, 10% isn't a significant reduction in waste disposal to begin with. This example illustrates the importance of international standards for measures of sustainable development. As stated in the dataset limitations section, waste collection data is not available at the neighbourhood scale, so we cannot know how much or how little UniverCity residents are contributing to the achievement of Metro Vancouver's stated goals.



Economic Capital

Composite score: 49%

Economic Capital refers to the ways in which a community is earning income for private and community purposes by allocating scarce resources and (financial) means. The way that income is generated and the distribution of it are essential for building a stable and viable economy. Economic Capital within a neighbourhood consists of its business and labour stock, and the financial resources available to households and neighbourhoods.

Economic Indicators

Stock	Score	Strengths	Weaknesses
Labour	51%	Density, Mix of use`	Unemployment
Households	34%		Living Wage
Businesses	61%	Local Ownership	Bakruptcies

Summary

According to this assessment, UniverCity's economic capital is not thriving. The age distribution of neighbourhood residents and high proportion of students is a neighbourhood asset in terms of human capital and labour vitality; however, it is a liability in terms of earnings and unemployment at the neighbourhood scale. This in turn has negative impacts on businesses because few residents have significant disposable income.

Dataset Limitations

The scale of data availability is an issue for economic indicators of neighbourhood sustainability. The dependency on the safety net indicator is measured only at the municipal scale, as are new business incorporations. Ideally, this information would be calculated using Forward Sortation Area (FSA) codes – which are closer to the neighbourhood scale.
Another interesting indicator for measurement of the labour market at the neighbourhood scale would be the job vacancy rate, which gives an idea of jobs available from the perspective of employers. Unfortunately this data is only produced at the provincial scale, and is thus not very useful for neighbourhood sustainability analysis.

Finally, an important indicator: net tax base or debt-service ratio – would assess the net financial capital relating to a neighbourhood. In other words, it would assess whether the gross taxes paid on income and property for a neighbourhood are proportionate to the cost of providing infrastructure and services to the neighbourhood. This indicator was not included in our report because the information on asset management and operating costs was not available at the neighbourhood scale.

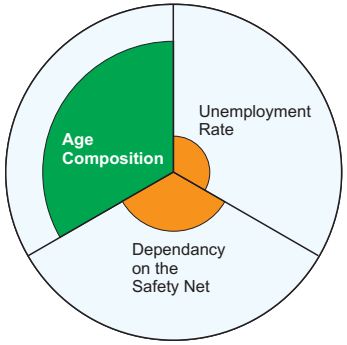
Conclusions

Besides the challenge of data availability, there is some criticism of the relevance of measuring Economic Capital at the neighbourhood scale. Our economies are more interconnected and interdependent than ever. People more than often work outside of their neighbourhood boundaries, work from home or work online. There is an extremely high level of education in the UniverCity neighbourhood, while the jobs available there are mostly service positions paying below a living wage.

There is also some tension between the principles of economic development and the principles of community economic development. According to community economic development principles ,prioritizing local, independent business, should circulate money in the community and increase economic stability because firms will be more rooted in the community. However, the higher than median number of bankruptcies at UniverCity and anecdotal accounts from the SFU Community Trust suggest that independent, local businesses have a harder time surviving in a community of only 3,500 residents and a large commuter population.

More research is needed to develop the economic capital indicators of the SCORE Tool. Recommendations for future versions of the assessment tool include a) in-depth assessment of community economic development indicators for neighbourhoods and b) identification of the appropriate scale for analysis of traditional economic indicators relative to community needs.

Nonetheless, the results suggest that UniverCity is currently challenged in achieving their equity goal.



Labour

Composite Score: 51%

A community's **labour** force is one of its greatest assets. It is by the input of labour that added value is being created for the local economy.

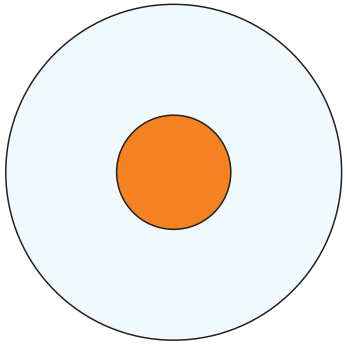
Labour Indicators

Indicator	Value	Thresholds	Colour Code	Source
Unemployment Rate	6%	Target: 0.5%	Orange	National Housing Survey 2011
Dependency on Safety Net	3.6%	Target: 1.2%	Orange	BC Ministry of Social Development & Social Innovation
Age Composition	7.8	Target: 10	Green	National Housing Survey 2011

The **unemployment rate** is the most widely cited indicator of the labour market. The proportion of neighbourhood residents who are unemployed, meaning of working age and looking for a job, is indicative of the economic vitality of the community. Expert practitioners state 0.5%-3% as an ideal unemployment range. The NHS allows us to extract the unemployment rate for DA 3695 and gives us a value of 6%. While this is not unique to UniverCity (the provincial unemployment rate is 5.9%; federal is 7%), it is above what international norms would recommend for economic vitality. Further research is required to investigate factors in unemployment rate at UniverCity, but it could be explained by a larger than average proportion of new entrants (such as graduating students) and re-entrants (such as former homemakers) living in the community, as well as by economic conditions in the region.

The **composition of the labour force** is an indicator of the earning capacity of a neighbourhood. This indicator, validated at the Telos Centre for Sustainable Communities in the Netherlands, directed by John Davegos, suggests that UniverCity has a very high earning capacity as a neighbourhood, due to the quantity of young people available to work in the community.

Dependency on the safety net is an important indicator of economic capital because a high proportion of neighbourhood residents receiving income assistance or employment insurance could have implications for both the economic vitality of the neighbourhood and the labour market. *Relative norms* for the proportion of citizens receiving income assistance or employment insurance were calculated by exacting the proportion of residents receiving some form of social assistance from each of the municipalities in Metro Vancouver, and identifying *median* and *interquartile* values for that range. As a basis for comparison, Langley City represents the bottom of the range, with 5.8% of the population receiving Basic Income Assistance and/or Employment Insurance, and West Vancouver at the top of the range with 1.2% of the population receiving some form of social assistance. Burnaby reported 3.6% of the population receiving some form of social assistance in 2012. Unfortunately this data is not available at a neighbourhood scale so we cannot know to what extent UniverCity residents contribute to the municipal numbers overall.



Households

Composite Score: 34%

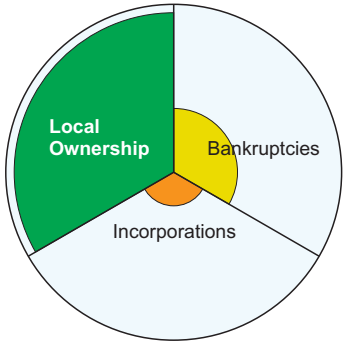
The amount of income available to households is an important asset for equality within a community. Two traditional indicators for measuring income equality are the median household income and income distribution. The Living Wage indicator is a concise indicator that combines these two indicators while giving us a definitive target for achievement.

Household Indicators

Indicator	Value	Thresholds	Colour Code	Source
Living Wage	34%	Target: 100%	Orange	National Housing Survey 2011

A **Living Wage** is defined as a wage that is high enough to maintain a normal standard of living. Since we want every working member of a neighbourhood to be earning enough to maintain a normal standard of living, a target of 100% is used to measure this metric. The living wage in Metro Vancouver is calculated in 2014 at $20.10 hourly or an annual salary of $41,808. As a proxy we have measured the proportion of neighbourhood residents who are earning a $40,000 annual salary or higher. This method of calculation gives us a value of 34%. This suggests that a large number of residents of UniverCity are not able to maintain a 'normal standard of living'.

It is likely that a high proportion of students living at UniverCity are using student loans or parent's money to live while in school. This reflects negatively on declared income and brings down the Living Wage and Shelter-to-Income Ratio (STIR) indicators. UniverCity's unique community demographic makes them an outlier in this respect. More research is needed to develop unique thresholds for student neighbourhoods.



Businesses

Composite Score: 61%

Income is generated in all kinds of businesses and organizations: small, large, social, owned by local entrepreneurs, part of multinationals, etc. A neighbourhood's business stock is therefore an important community asset, which furthers its economic capital. UniverCity's **business** stock is measured in three ways: through new incorporations, bankruptcies and local ownership.

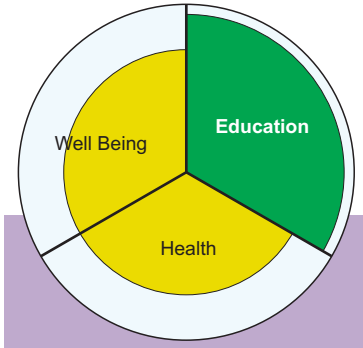
Businesses Indicators

Indicator	Value	Thresholds	Colour Code	Source
Incorporations	6	Target: 16	Gold	BC Stats
Bankruptcies	2	Target: 0	Orange	The Office of the Superintendent of Bankruptcy
Local Ownership	95%	Target: 100%	Green	SFU Community Trust

New business **incorporations** indicate innovation in firms and job creation for the local economy. The annual number of incorporations, which is available at the municipal scale, has been framed as a rate per capita. *Relative norms* for the number of incorporations per capita were calculated by exacting values from all of the municipalities in Metro Vancouver, and identifying *median* and *interquartile* values for that range. Burnaby scores in the moderate/average range relative to the Metro Vancouver data set. This indicates that there is a healthy amount of new business creation and innovation in the municipality, with room for improvement.

The number of **bankruptcies** in a neighbourhood is an indicator of economic stability. This information is available from the Office of the Superintendent of Bankruptcies at the Forward Sortation Area (FSA) scale. The data collected tells us that are a high proportion of bankruptcies in UniverCity's FSA area – V5A - relative to the rest of British Columbia. Once again, relative norms were established by analyzing the number of bankruptcies (5 year average) for all FSAs in British Columbia. The high number of bankruptcies in the V5A area provides evidence to back up qualitative reports of high merchant turnover rates for the commercial properties in the UniverCity neighbourhood development.

UniverCity's stated sustainability goals prioritize opportunities for community economic development by encouraging commercial leases to **local, independent businesses**. Since opening its commercial rental properties, 95% of businesses were considered to be local and independent. A target of 100% local, independent businesses is used to evaluate achievement of this indicator.



Human Capital

Composite score: 79%

Human Capital is the knowledge, skills and other attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. Access to health and education services is likely to produce healthier and more educated neighbourhoods.

Human Capital Stocks

Stock	Score	Strengths	Weaknesses
Education	94%	Educational Attainment	
Health	73%	Health demographics, mental and material well-being	
Well-being	73%	Perceptions of environment	Time Balance

Summary

UniverCity is a highly educated and healthy community with substantial Human Capital by quantitative measures. In addition, Gross National Happiness (GNH) Index survey measures of perception of health and well-being are included in this stock. UniverCity residents score higher than the GNH Index sample population in all categories of health and-well-being. New Urbanist design principles aim to increase Human Capital through walkable neighbourhoods and planning public spaces for people. Many of these design principles have been incorporated into the Development Guidelines and Regulations at UniverCity, perhaps contributing to the high score in this capital.

Dataset Limitations

Community health demographic indicators are measured at the municipal scale based on data produced by BC Stats. Health data is not available at a neighbourhood scale, because at that scale the sample size is not large enough to be statistically valid.

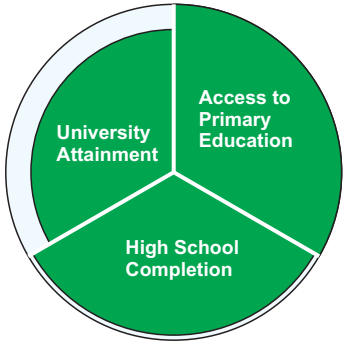
Educational statistics are made available by the NHS at the DA scale.

The remaining subjective indicators of health and well-being are measured through the GNH Index Survey.

Recommendations

It would be useful to gather data on health practices at the neighbourhood scale in order to analyze how urban design and environment might be affecting health in a localized way. The Fraser Health Authority has acknowledged this gap in public health knowledge resources and is attempting to address this with their My Health, My Community survey, piloted in 2014. The results of their survey will likely be made public in 2015. Future adaptations of the SCORE Tool may consider integrating the My Health, My Community survey – even in place of the GNH Index survey, as there are substantial overlaps between the two.

It is interesting to note that the majority of UniverCity residents are not earning a Living Wage, but the GNH Index survey shows that they see themselves as healthy and financially seure. The lowest score of perception of personal health is in the area of time balance – though this is still similar to the GNH Index survey population.



Education

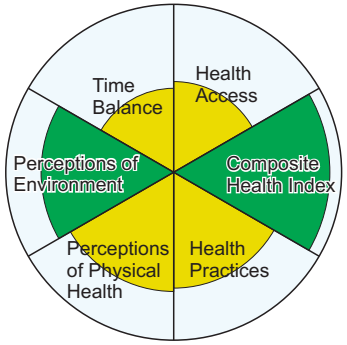
Composite Score: 94%

Educational assets in a neighbourhood include both the physical public amenities of schools and centres of lifelong learning as well as the intellectual capacity of the neighbourhood, represented by the educational attainment of neighbourhood residents.

Education Indicators

Indicator	Value	Thresholds	Colour Code	Source
Access to Primary Education	100%	Target: 100%	Green	National Housing Survey, 2011
High School Completion	98%	Target: 100%	Green	National Housing Survey, 2011
University Attainment	51%	Target: 100% Benchmark: 23%	Green	National Housing Survey, 2011

Three measures of educational assets at the neighbourhood scale are: **access to primary education**, **high-school completion** and **post-secondary attainment**. UniverCity has an exceptionally high stock of education – with almost 100% high school completion and substantially higher levels of university attainment than the British Columbia average. This is likely related to the fact that some 36% of neighbourhood residents are affiliated with Simon Fraser University. A target of 100% is used for access to primary education and high school completion, while a benchmark of 23% (the provincial average) is used to assess levels of university attainment.



Health

Composite Score: 73%

Health is both the absence of disease and pain and a general feeling of wellness. Environmental quality and human-nature connectivity are also positively correlated to personal health. Healthy citizens can be conceptualized as community assets because they contribute to their local economies and communities through paid and unpaid labour, skills and knowledge contributions. This report addresses both community health demographics and residents' own personal assessment of health.

Health Indicators

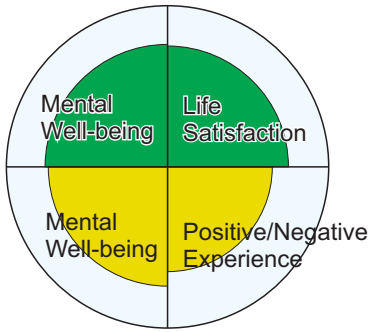
Indicator	Value	Thresholds	Colour Code	Source
Health Access	82 GPs	Target: 112 GPs	Gold	BC Stats
Composite Health Index	-0.80 CHI	Target: -0.97	Green	BC Stats
Health Practices	69%	Target: 100%	Gold	BC Stats
Perceptions of Physical Health	71%	Target: 100%	Gold	Prime
Perceptions of Environment	79%	Target: 100%	Green	Prime
Time Balance	51%	Target: 100%	Gold	Prime

Health Access is calculated based on the rate of physicians per capita in Burnaby.

The **Composite Health Index** gives a score based on life expectancy and weighed causes of death (disease, suicide, homicide) and offers rankings of all municipalities of British Columbia.

The **health practices** indicator offers a measure of lifestyle practices that affect health such as smoking, exposure to second hand smoke, being physically active, healthy eating, and having regular health check ups. Burnaby has a high composite health index in relation to the rest of BC, but a lower than average rate of physicians per capita. In terms of health practices, Burnaby residents do well on not smoking (3% smoke) and having contact with an MD (81%), while only 45% admit to eating 5+ servings of fruit and vegetables per day, and 44% of the population admit to being overweight or obese.

Subjective measures of health are the result of UnvierCity residents own personal assessment of health using the Gross National Happiness (GNH) Index survey scores on **perceptions of physical health**, **the environment**, and **time balance**. UniverCity residents score higher than the GNH Index average population in all three categories of health, with a much higher score in the area of perceptions of environment (+12 points).



Well-being

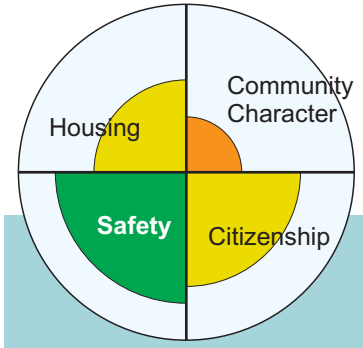
Composite Score: 73%

Personal **well-being** includes the full range of factors that influence what we value in living, reaching beyond its material side.

Health Indicators

Indicator	Value	Thresholds	Colour Code	Source
Life Satisfaction	75%	Target: 100%	Green	Prime
Positive/Negative Experience	65%	Target: 100%	Gold	Prime
Material Well-being	74%	Target: 100%	Gold	Prime
Mental Well-being	76%	Target: 100%	Green	Prime

Satisfaction with life, **material possession**, and **perceptions of mental health** are indicative of community well-being. Measured by the GNH Index survey, UniverCity residents score in the 65-76% satisfaction range for each of the dimensions of well-being. Interestingly, residents report a high-perceived personal financial security, even given the low proportion of residents earning a Living Wage.



Social Capital

Composite Score: 58%

Social Capital constitutes the glue that holds our communities together. It is community cohesion, connectedness, reciprocity, tolerance, compassion, patience, forbearance, fellowship, love, commonly accepted standards of honesty, discipline and ethics and commonly shared rules, laws and information. Basic needs such as personal security and affordable housing are foundational to the development of social capital. It is also closely related to land use in that compact development, diverse uses and public spaces, as well as cultural and community institutions support development and maintenance of social capital.

Social Capital Stocks

Stock	Score	Strengths	Weaknesses
Citizenship	33%		Voter Participation Confidence in gov't
Community Character	66%	Social Support	Social Cohesion
Safety	78%	Few traffic accidents, few robberies	Break & enters
Housing	55%	Housing conditions, core housing need	STIR resident turnover

Summary

The SCORE Tool measures Social Capital as a combination of citizenship, housing affordability, safety and community character. UniverCity scores adequately overall, but lacks a culture of engagement amongst its residents, as measured by low scores in voter participation and social cohesion indicators; this is reinforced through anecdotal accounts. UniverCity is a safe neighbourhood for cyclists and pedestrians, with notably few traffic accidents. There were however, a substantial number of burglaries and auto crime accounts in 2013.

Dataset Limitations

Housing data is mostly available at the neighbourhood scale, made available by the Canadian Mortgage and Housing Corporation (CMHC). However, targets and thresholds are not identified by the CMHC. More research is needed to develop these thresholds and improve accuracy of valuation.

The parameter for voter participation is a little bigger than the UniverCity neighbourhood. Voting Districts are designed around voting stations. UniverCity falls within the City of Burnaby's Voting District 4.

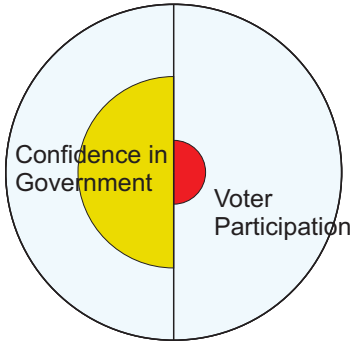
Similarly, the Burnaby RCMP do not recognize 'neighbourhood' boundaries. Burnaby is policed by 4 community districts. UniverCity falls into District 2, which encompasses Burnaby Mountain, Lougheed and Burnaby Heights. A preferable unit of analysis for neighbourhood crime would probably be more localized and aggregate a) crimes against person and b) crimes against property. While the data can be aggregated at a smaller scale, at the time of writing of this report, the Burnaby RCMP did not have the resources necessary to do so .

Finally, we would have liked to include some measures of hazard and risk assessment in this report, however, no index is available to provide comparable ratings in this complex field of study. The City of Burnaby also expressed concerns about reporting on this key area of safety without a validated methodology.

Conclusions

The study shows a lack of social cohesion and engagementat UniverCity, correlated with extremely high resident turnover rate (relative to provincial norms) . This is balanced by the quality of the place, where there are few traffic accidents, and good housing conditions..

These results suggest several opportunities to engage residents about citizenship, safety and social cohesion. For example, voter participation rates in UniverCity are very low - demonstrating this information graphically to could be a useful tool for mobilizing change leading up to the fall 2014 municipal election.



Citizenship

Composite Score: 33%

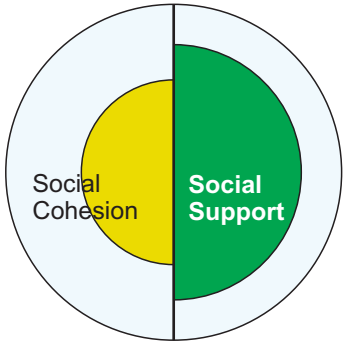
Citizenship refers to the level of political engagement of neighbourhood residents. Trust in institutions can be measured in confidence in government. An engaged and trusting citizenship is linked to democracy and is thus an asset of a social capital. A high voter turnout is preferable to a low turnout because it means that the government will likely reflect the interests of a larger share of the population.

Citizenship Indicators

Indicator	Value	Thresholds	Colour Code	Source
Voter Participation	75%	Target: 100%	Red	Prime
Confidence in Government	65%	Target: 100%	Gold	Primel

UniverCity residents scored extremely low in **voter participation** compared to municipal voter turnouts across BC. The lowest municipal voter participation rate in the province was 14%, while UniverCity residents achieved only 19%.

The **confidence in government** indicator, measured by the GNH Index survey, offsets the results of the voter participation indicator that may reflect aspects other than social cohesion. UniverCity residents rated their confidence in government as a 57/100 - 6 points higher than the average GNH Index score. The low score of UniverCity's citizenship stock may be described by the large number of young people living in the neighbourhood (53% of population is 15-29), high resident turnover (29% movers), or the fact that Burnaby's mayor, Derek Corrigan, has been re-elected every municipal election since 2002.



Community Character

Composite Score: 66%

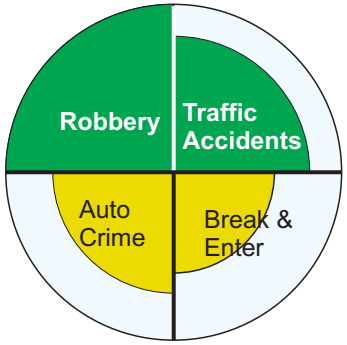
Community character encompasses social support, community vitality and participation. Social solidarity between citizens and the opportunity for citizens to build networks between each other are important for the advancement of social capital. Community character is measured using GNH Index survey.

Community Character Indicators

Indicator	Value	Thresholds	Colour Code	Source
Social Support	76%	Target: 100%	Green	Prime
Social Cohesion	55%	Target: 100%	Gold	Primel

UniverCity residents scored 76/100 in **social support** using the GNH Index survey, which addresses loneliness and support from friends and family.

Social cohesion, which addresses trust in neighbours, sense of personal safety and volunteering receives a lower score of 55/100.



Safety

Composite Score: 78%

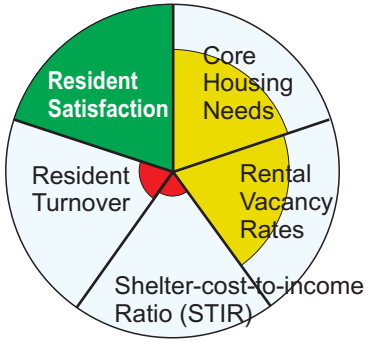
A sense of personal and community **safety** is essential to a high quality of life. When citizens feel safe from harm against person and property, and have access to support systems that encourage safety, it contributes to a neighbourhood's social capital. Communities should be protected from crime as well as danger from traffic accidents, natural disasters, etc. Streets should also be safe to drive, and safe for pedestrians and cyclists.

Safety Indicators

Indicator	Value	Thresholds	Colour Code	Source
Traffic Accidents	0.32	Target: 0	Green	ICBC Crashes at Intersections Database
Break and Enter	5	Target: 100%	Gold	Burnaby RCMP
Auto Crime	7		Gold	Burnaby RCMP
Robbery	0		Green	Burnaby RCMP

Street safety is measured in **traffic accidents**, as a rate of causalities per 1000 residents. According to the ICBC Crashes at Intersections database, UniverCity has experienced 1 crash per year (5 year average) within neighbourhood boundaries. Thresholds for safe neighbourhoods are not clearly defined by ICBC at this time and more research is needed to develop thresholds and improve accuracy of this assessment. However, using target of 0 crash causalities per 1000 residents, we can confidently say that a rate of 0.32 is a high score for this indicator.

Measures of neighbourhood crime including **break & enter**, **auto crime** and **robbery** are measured by the Burnaby RCMP, who also establish relative norms for the intensity of crime. Robbery different from break & enter (burglary) when a person is robbed in his/her immediate presence. The values and thresholds used in this report are extracted from Community Policing Reports for District 2, published bi-monthly by the Burnaby RCMP. District 2 sees very few auto crimes and robberies, but a moderate number of business and residential break & enters.



Housing

Composite Score: 78%

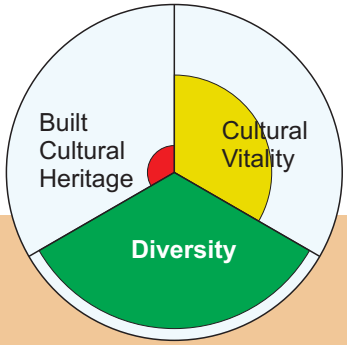
Safe and comfortable **housing** is fundamental to our sense of well-being. Adequate access of housing for every citizen in a neighbourhood is necessary to produce Social Capital.

Housing Indicators

Indicator	Value	Thresholds	Colour Code	Source
Core Housing Need	13%	Target: 0%	Gold	CMHC
Rental Vacancy Rates	2.9%	Target: 4%	Gold	CMHC
STIR	58%	Target: 0%	Red	National Housing Survey, 2011
Resident Turnover	29%	Target: 0%	Red	National Housing Survey, 2011
Resident Satisfaction	93%	Target: 100%	Green	Mustel Survey

Housing suitability is not a major issue at UniverCity, resulting in a **core housing need** in line with the national average. Similarly, UniverCity maintains a healthy **rental vacancy rate** in line with the Ministry of Finance benchmark. However, an analysis of the **shelter-to-income-ratio** (STIR) of DA 3695 tells us that 58% of residents are spending 30% or more of their income on shelter costs. This result may be explained by the number of students collecting loans to pay for living costs, as loans may not be included in the income calculation. The STIR thus may not be an accurate indicator of housing affordability for communities with a high student population.

Resident turnover thresholds were established using the same methodology, and we found that UniverCity experiences a high level of resident turnover (29%) compared to the rest of Metro Vancouver (median 12%). Nonetheless, UniverCity's own **resident satisfaction** survey found that 95% of residents would recommend living in UniverCity to a friend.



Cultural Capital

Composite score: 58%

Cultural Capital is the product of shared experience through traditions, customs, values, heritage, identity, and history. It is the cultural and traditional resources of a community, including built and natural heritage, as well as a sense of place and identity. Policies that preserve, promote and maintain built cultural heritage, and subsidize arts, culture and recreation help to enhance Cultural Capital at the neighbourhood scale.

Cultural Capital Stocks

Stock	Score	Strengths	Weaknesses
Cultural Vitality	58%		Cultural access, Public programming
Diversity	93%	Ethnic Diversity	
Built Cultural Heritage	16%	Investment in public art	Registered heritage sites

Summary

UniverCity is a new neighbourhood built on previously undeveloped land. As such, this is not a site with rich culture and heritage, First Nations or otherwise. The neighbourhood is also relatively isolated - situated on top of Burnaby Mountain, it does not connect at its parameter to a broader community. That context suggests that UniverCity would score low in the area of Cultural Capital. The results of this assessment, however, highlight the success of UniverCity's investments in culture, such as public art projects, and serve as a baseline for analyzing resident engagement and satisfaction with arts and culture opportunities.

Dataset Limitations

Culture is certainly not limited to neighbourhood boundaries, and governments that invest in cultural celebrations draw citizens from across neighbourhoods. Similarly, prominent cultural institutions generally serve whole cities or regions. Therefore, measurement at neighbourhood scale focuses on local heritage, access to culture, and resident engagement with neighbourhood arts, culture and recreational opportunities.

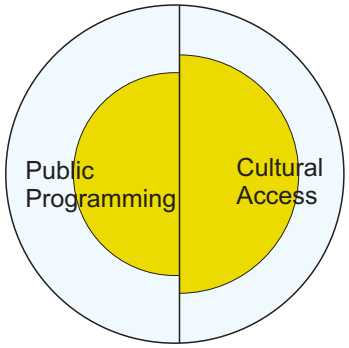
Measurement of public programming relies on participation at public City facilities, which may not be an accurate representation for UniverCity given that many residents may instead access university facilities instead.

Conclusions

Celebrating diversity, catering cultural programs to community needs and embracing public art are all means to enhance Cultural Capital in a community. In trying to measure culture, the research team would have liked to embrace a wider definition of culture that includes “community culture” and identity. Identity is a concept closely tied to placemaking at the neighbourhood scale. Some measure of placemaking should be developed to help fill this gap in neighbourhood sustainability assessment.

Cultural Capital could also be measured in the capacity and quality of public cultural knowledge sector, e.g. the number of cultural institutions in city and/or the number of employees employed in the cultural heritage sector, however, more research is needed to develop targets and benchmarks for these variables.

Natural cultural heritage is an important subset of Cultural Capital, not measured in this assessment. Natural heritage inventories (such as interpretive plaques) or celebrations should also be considered cultural assets. Unfortunately, there are no well-established targets or benchmarks for these key areas of cultural sustainability.



Cultural Vitality

Composite Score: 58%

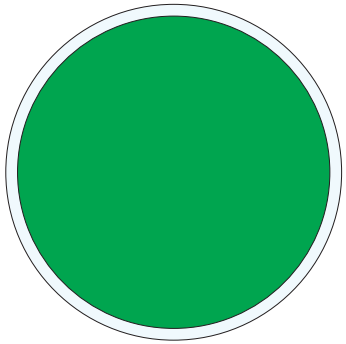
Cultural vitality is present when art is encouraged and celebrated and when a community acknowledges traditions and celebrations. Cultural vitality is an asset of Cultural Capital since it contributes to a sense of place and identify within a neighbourhood. We have selected two measures of cultural vitality: perceptions of cultural access and participation in public programming. In an effort to produce a tool that is comparable across neighbourhoods, only participation in public (City of Burnaby) programs is considered. Residents of UniverCity do have further access to SFU cultural and recreation facilities through the Community Card program. While this is not reflected in public programming indicator, resident perceptions of cultural access to all facilities should be captured in the cultural access indicator.

Cultural Vitality Indicators

Indicator	Value	Thresholds	Colour Code	Source
Public Programming	60%	Target: 85%	Gold	City of Burnaby
Cultural Access	65%	Target: 100%	Gold	Primel

Cultural access is a subjective well-being indicator taken from the GNH Index survey. This is the only indicator of happiness in which UniverCity residents did *not* score higher than the average GNH Index score (-2 points).

Public programming is concerned with participation rates in municipal parks, rec and cultural programs at the neighbourhood community centre. The overall participation rate in programs was 60% in 2013. Using a target of 85% participation ,there is room for growth in Parks, Recreation and Cultural Services offerings on Burnaby Mountain. More research is needed to identify why participation rates are low: it could be that residents either do not know about available programs, the programs are not meeting the needs of residents, competing programs (e.g. through the university) are more accessible, or residents do not feel they have enough time or money to participate.



Diversity

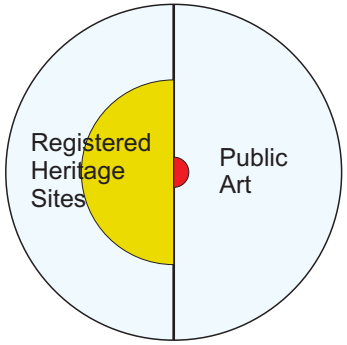
Composite Score: 93%

Diversity is thought to be a community asset when diversity of culture and tradition is practiced and celebrated. SFU Community Trust considers diversity to be one of four critical elements to the long-term community character and composition of the neighbourhood.

Diversity Indicators

Indicator	Value	Thresholds	Colour Code	Source
Ethnic Diversity	93%	Target: 100%	Green	National Housing Survey, 2011

The **ethnic diversity** indicator analyzes whether UniverCity's resident population is representative of the municipal ethnic composition, at the continental level, e.g. what percent of the community is from Latin America or Africa. The NHS gives us detailed information about ethnicity at the DA scale. It turns out that the ethnic composition of UniverCity residents is 93% consistent with the ethnic composition of Burnaby, with slightly higher Asian residents, and slightly less residents from of Caribbean and Africa descent.



Built Cultural Heritage

Composite Score: 16%

Built cultural heritage is the number of monuments, groups of iconic buildings, and the preservation of heritage sites in a neighbourhood. Built cultural heritage must also be maintained as a contribution to Cultural Capital. As a new community with no preexisting cultural sites or First Nations history, SFU Community Trust had no requirement to preserve cultural heritage in the development of UniverCity. It is, so to speak, a clean slate. However, just as it is important to avoid 'food deserts' at the neighbourhood scale, 'cultural deserts' are similarly unwanted – it is for this reason that an indicator for registered heritage sites remains in the tool.

Cultural Heritage Indicators

Indicator	Value	Thresholds	Colour Code	Source
Registered Heritage	4	Target: 44	Red	City of Burnaby Heritage Register
Public Art	55%	Target: $1.00/ft^2	Red	SFU Community Trust

The **registered heritage sites** indicator is measured through the Burnaby Heritage Registrar, which identifies 14 unique historic neighbourhoods in Burnaby. Relative norms for the number of registered heritage sites in each historic neighbourhood were established based on the parameters provided by the registrar. UniverCity's historic neighbourhood (Lochdale/Burnaby Mountain) includes substantially fewer heritage sites than other Burnaby neighbourhoods.

Public art is an important feature of placemaking and indicative of a commitment to cultivating arts and culture within a neighbourhood. With all new Phase 2, 3 and 4 developments, SFU Community Trust charges $1 per sq ft of buildable area to its development partners for investment in public art. While the total amount spent on art previous to 2013 is quite low, as Phases 2, 3 and 4 of the neighbourhood reach build out this indicator will increase substantially.

Conclusions

The SCORE Tool assessment results highlight many positive outcomes of sustainable development efforts at UniverCity. From a sustainable community development perspective: while there is significantly more Natural Physical and Human Capital than Social, Economic and Cultural Capital, the neighbourhood has ample community assets in each class.

Conclusions of UniverCity SCORE Tool assessment will be discussed in reference to the stated sustainability goals of SFU Community Trust. The Trust's Four Cornerstones of Sustainability and the goals within each of them frame their sustainability and development planning. The SCORE Tool can be used to evaluate the success of the supporting policies, regulations and programs in achieving the Trust's vision for community sustainability.

Cornerstone 1: Environment

- *Provide a full range of transportation choices*

UniverCity has good public transportation access, and has reduced car dependency by 20% below the municipal average for 2013. Both the modal split and access to transit indicators could likely be improved through increased transit access such as the proposed Burnaby Mountain Gondola Project.

- *Preserve and improve the natural heritage of Burnaby Mountain*

UniverCity is meeting many of its ecological goals. The Development Guidelines and Regulations have done a fantastic job of ensuring the preservation and improvement of the natural heritage of Burnaby Mountain through the use of native plant species and conservation of important habitat. The SCORE Tool reports excellent results in the stock areas of Natural Capital including biodiversity, soil, air and water. Water quality and stormwater management monitoring programs in place at UniverCity make a meaningful contribution to this tool, suggesting that efforts to monitor in these areas more consistently, as envisioned in some Integrated Stormwater Management Plans, would be a useful management tool and should be a focus for investment in other communities.

- *Design buildings and public spaces that respond to local context*

UniverCity's human scale design and mix of uses is reflected positively in the Walk Score and public spaces indicators, where the neighbourhood achieves a near-perfect score. There are lots of parks, and access to wild trails for residents to enjoy.

- *Provide sustainable, cost-and resource-efficient infrastructure and buildings*

The quantity and quality of UniverCity's Physical Capital are reflected in a very high score of 84%. The residential building stock meets the community's needs and in excellent condition, reflecting its recent development. The entire community has access to essential

infrastructure and services to support a high quality of life. A substantial proportion (45%) of the residential building stock has been built to LEED Gold standard or better. Unfortunately, it was not possible to evaluate the resource-efficiency of buildings because data was not available about residential water use and energy use.

Cornerstone 2: Economy

- *Maximize the long-term value of SFU's endowment fund*

This is a unique goal to SFU Community Trust, and not a component of the SCORE Tool. It was not measured.

- *Encourage opportunities for innovative commercial and community economic development by working with all stakeholders*

At the moment, UniverCity does not score particularly well in innovation, economic vitality and economic stability. The SCORE Tool reports that merchant turnover and bankruptcies are high within the area. The substantial labour assets in the community - with respect to a highly educated and youthful labour force, are not being capitalized upon in new business incorporations. The low median income, small residential population, and large commuter population likely contribute to the low score in Economic Capital. As the neighbourhood reaches build out, approaches its target population of 10,000 people, and sees establishment of businesses well-suited to the community, it will likely see increases in Economic Capital.

Cornerstone 3: Equity

- *Create a healthy, safe, livable, and complete community*

UniverCity residents are very healthy, very educated, and quite happy overall. Residents report particularly high scores in perceptions of health, access to nature and satisfaction with the neighbourhood. The community sustains notably few vehicle accidents – pointing to thoughtful street and traffic planning initiatives. The community however, lacks a culture of engagement demonstrated through low scores in community character, trust and citizenship. While most residents feel supported through their own personal networks, levels of neighbourhood social cohesion are average. There was a substantial amount of burglary and auto crime in 2013.

- *Provide an appropriate mix of housing types and tenures that reflect the entire lifecycle*

UniverCity boasts a healthy rental vacancy rate and a low core housing need. The growing number of families in the community are serviced by a new state of the art childcare centre within the development area.

Cornerstone 4: Education

- *Enhance university life, academic structure, and activities*

The SCORE Tool is not designed to specifically reflect upon the enhancement of university life, academic

structure, and activities. However, The Tool can comment on the cultural vitality of the campus community. The Trust's public art and the Community Card programs demonstrate a commitment to this goal. However, UniverCity still lacks cultural institutions and third spaces (such as community gardens, public libraries, yoga studios, etc.) that enhance neighbourhood identity and vitality. Planned community gardens and interventions such as the temporary bike park may improve cultural vitality and engagement results in future.

- *Create a model sustainable community that educates and inspires residents to pursue lifelong learning*

SFU Community Trust's commitment to sustainability assessment is making an important contribution to the building and assessment of model sustainable communities internationally. In the last few years, SFU Community Trust has used four different sustainability assessments to assess the sustainability of UniverCity development: LEED ND, the FSA Assessment Tool, the SCORE Tool, and Cynthia Girling's (2009) smart growth-based assessment. This unique Canadian application of new and different tools offers an opportunity to compare and learn from the experience, elevating the discussion of sustainability assessment internationally.

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