CITY OF **VANCOUVER**

POLICY REPORT
URBAN STRUCTURE

Date:	May 3, 2004
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TO: Standing Committee on Planning and Environment

FROM: Director of Current Planning, in consultation with the General Manager of Engineering Services, the General Manager of Parks and Recreation, the Chief Building Official, the Directors of Facility Design and Management and the Manager of Sustainability.

SUBJECT: Developing a Green Building Strategy for the City of Vancouver

RECOMMENDATION

A. THAT Council adopt a minimum requirement of LEED™ Silver (including full registration and certification under LEED BC and the Canadian Green Building Council) for all new civic buildings greater than 500 square meters funded out of future Capital Plans, unless otherwise determined by Council and that Council make the first 2 LEED points in the *Energy and Atmosphere* section mandatory to ensure a 20% energy reduction in all new civic buildings to support the recommendations of the "Cool Vancouver" Task Force in December, 2003 and as adopted by Council.

B. THAT Council adopt a green building standard or system similar to the green building strategy presented in Appendix A, without formal certification under the LEED system, for the first rezoning sub-areas of the Southeast False Creek (SEFC) community (to be refined and finalised prior to rezoning Public Hearing); and to use this strategy as a baseline for the public lands in SEFC as development progresses, with periodic review and adjustment for changes in green building technology, research and demonstration projects.

C. THAT Council approve a new temporary Planner 1 position, with classification to be subject to review by the Director of Human Resources, at an annualized cost of $92,000 and the total cost of the position's tenure to be $150,000, with the 2004 cost to be $58,000, to be funded from Contingency Reserve, and with

the 2005 cost to be $92,000, to be approved in advance of the 2005 operating budget without offset.

D. THAT Council approve new consulting, research, travel and related expenditures associated with the development and implementation of a new green building strategy, as laid out in Table 3 of this report, of $12,000 in 2004, to be funded from Contingency Reserve, and of $38,000 in 2005, to be added to the 2005 operating budget without offset.

E. THAT Council approve the work plan as set out in this report, and instruct staff to investigate the development and implementation of a new green building strategy for private sector development using knowledge gained in SEFC; to expand discussions with the development industry and other stakeholders to ensure the cooperative development of a green building strategy for new development in medium to high density residential zones, as well as commercial and industrial zones; and to continue to promote events, research and publications which promote green building development and more sustainable thinking;

F. THAT Council instruct staff to further develop a specific green roof policy as a part of the green building strategy.

G. THAT Council instruct staff to continue work with the LEED BC Steering Committee and continue its involvement with the Canadian Green Building Council (CAGBC) to further develop green building standards for the Vancouver and Canadian context; and to further development of a green building application guide for multi-unit residential dwellings (for possible formal adoption upon completion and stakeholder support).

H. THAT prior to recommendation of any green building strategy for the City of Vancouver beyond SEFC, Council instruct staff to report back on resolutions to outstanding issues identified over the work program period.

GENERAL MANAGER'S COMMENTS

The City Manager RECOMMENDS approval of the foregoing. This also acknowledges the support of the Urban Development Institute (UDI) and the Canadian Green Building Council (CAGBC).

DIRECTOR OF FINANCE COMMENTS

The Director of Finance notes that the authors have indicated that building to the LEED Silver standard in North American has cost developers of commercial, industrial and institutional buildings on average an incremental 1%-2%. However, the City's experience with building to the LEED Silver standard has been significantly more expensive: recently building the two works yard building to this standard cost the City an incremental 12% ($700,000), and indications are that the incremental cost associated with building the Number One Kingsway project to LEED Silver (currently under development) will likely be well in excess of 2%.

Further, in terms of payback o the incremental building costs through ongoing operating cost savings, the authors note that the temperate climate of the Pacific Northwest means that energy savings are not as significant here as they would be in the most other regions of North America. For these two reasons, it will be crucial that during the capital planning process, the Staff Review Group carefully assess the premium the City will have to pay to achieve LEED Silver as well as the associated life-cycle costing, and make capital spending decisions and trade-offs accordingly.

COUNCIL POLICY

The City of Vancouver has many policies which encourage energy efficiency and improved building environmental performance.

In regard to Southeast False Creek, the Council adopted Policy Statement for Southeast False Creek developed in 1999 suggested the need for green buildings, while the Sheltair Report (1999) developed performance targets for SEFC that recommended the implementation of guidelines for green buildings.

In November, 2001 Council approved that the new National Works Yard be developed to a minimum LEED Silver standard.

In June, 2002 Council approved a process for the development of the #1 Kingsway Community/Mixed-Use facility that would ensure that green building design principles be incorporated in the project as a pilot project to ascertain life cycle costs.

In July, 2002 Council approved a preliminary work program to review the LEED system for new civic buildings and report back on strategies for implementation, and potential mechanisms to encourage the application of LEED™ standards to private development.

In December, 2003 Council unanimously approved the Corporate Climate Change Action Plan that recommended the City address the application of the LEED rating system or comparable system to City facilities, and that the strategy specifically address energy reduction requirements.

In March, 2004 Council put forward a motion to develop a green roof policy as part of the green building program being put forward in this report.

REPORT SUMMARY

This Report outlines a process to move the City of Vancouver toward a green building strategy for both public and private sector buildings, as well as to move toward a long-term green building program within the City. The need for a comprehensive strategy for green buildings has gained significant importance over the last year, with significant Council decisions and commitments toward green house gas reductions, the creation of an Official Development Plan for Southeast False Creek (SEFC), the adoption of green building strategies for recent municipal buildings, and the support for sustainability and green buildings in the Olympic Bid. This Report seeks to bring forward a strategy for dealing with all of these elements in an integrated manner that includes City staff from a variety of departments and all elements of the private sector, including developers, architects, engineers, and the general public. The

creation of this report is already exemplary of that relationship, given the support from groups such as LEED Canada, APEGBC, the UDI, the AIBC, and the Southeast False Creek Stewardship Group.

This Report recommends that we address green buildings at three levels. The first is the level of municipal development, with a recommendation being that all new civic buildings greater than 500 square meters be developed to LEED Silver standards, with a focus on energy conservation. The second level is that of the SEFC sustainable community, with a recommendation that SEFC be developed to a minimum LEED Certifiable level as outlined in Appendix A, including a series of mandatory requirements that respect Council endorsed policy. Finally, that a strategy be developed in concert with all stakeholders and all City departments to move toward a city-wide green building strategy for all commercial, institutional, and high density residential developments. This city-wide strategy will be outlined in 18 months at the end of the proposed program, with likely extension into a full green building program and staff position for long-term implementation.

To date, this green building report has been a multi-departmental initiative that is being coordinated by Planning staff. The recommended staff position will rest in the Planning department for the term of the 18-month program, as much of the program and policy development to date has been housed in Planning. However, the position is designed to act as a coordinating role between all affected City departments, with particularly close ties to the Sustainability Group, Engineering, and the Office of the Chief Building Official. This will ensure that the technical issues and challenges are dealt with effectively, alongside the implementation and policy work. Additionally, a strong working relationship with stakeholders will be a cornerstone to the success of the program, along with continued relationships with ongoing task forces with LEED Canada, the LEED BC Steering Committee, and other green building groups. This cross-disciplinary approach both inside and outside of City Hall is imperative to the success of a city-wide green building program.

PURPOSE

This Report summarizes work to date on evaluating a variety of green building strategies including the Leadership in Energy and Environmental Design (LEED™) building assessment method, recommends the adoption of the LEED rating system on future new Civic buildings (over 500 square meters), recommends the adoption of a green building strategy for the first sub-areas of SEFC, and outlines a process for longer term development of a city-wide green building strategy. Included are:

- The draft green building strategy for SEFC as attached in Appendix A.
- Analysis of regulatory and non-regulatory barriers that need to be addressed to better promote green buildings.
- Discussion of on-going collaboration with stakeholder groups in developing a more universal green building strategy for all building types, including multi-unit residential buildings (medium and high density residential developments).
- A summary of progress at the federal, provincial, regional and municipal levels.

This work is recommended to encourage the development of green buildings in the City of Vancouver as a key component in the continuing path toward a more sustainable City and as a part of the reduction of GHG emissions as identified as civic priorities with the adoption of the Kyoto Accord and the creation of the Cool Vancouver Task Force and adoption of its recommendations by Council. It is not recommended that currently funded civic buildings (2003-2005 Capital Plan) be required to register for and attain LEED™ Certification, as approved funding levels did not contemplate LEED Certification so as to not sacrifice potential program space or facility quality as more is learned about the costs, challenges and values of green buildings over the next eighteen months.

BACKGROUND

Over the last two years Council has supported temporary staffing to investigate LEED™ for new Civic buildings and to understand the implications of applying LEED™ and/or other green building strategies to private development. On November 20, 2001, Council approved proceeding with two buildings in the new City Works Yard and in 2002 a joint-use project at #1 Kingsway as pilot projects for LEED™ for Civic buildings. As well, City staff participated with the Province, GVRD, BC Hydro and Terasen in selecting and developing a LEED™ system for British Columbia, including a Canadian adaptation guide. On June 18, 2003, LEED™ BC, including the Adaptation Guide was approved by the US Green Buildings Council.

The LEED™ BC Steering Committee has also helped promote and establish a Canadian Green Buildings Council (CAGBC). LEED BC's formal launch occurred on April 14, 2004 and the CAGBC will be operational by late spring, 2004 and will be administering LEED™ in Canada. The CAGBC now has full license to operate and administer LEED™ in Canada, including developing upgrades, local application guides, and specific rulings without deferring to the USGBC.

Most recently, staff developed and tested several SEFC green building strategy scenarios in order to assess ease of use, implementation, and level of support. The result of this working session was a direction toward a system using the strategies identified in LEED™ for the first rezonings in SEFC, as well as continued work with the development community also using LEED™ strategies as a baseline tool. This strategy has involved input from the Urban Development Institute (UDI) and has gained their support to move forward. The direct use of LEED™ as a design tool has been endorsed and supported by the CAGBC removing concern for copyright or trademark infringement, as per the letter attached in Appendix B. Ideally a LEED™ application guide for medium and high density residential developments will address most issues and can be formally adopted at a later date.

DISCUSSION

Why is Building Green Buildings so important?

Development and construction practices are main contributors to the depletion of natural resources and a major cause of air and water pollution, solid waste, deforestation, toxic wastes, health hazards, global warming, and other negative consequences. Buildings use one-quarter of the world's wood harvest. Buildings consume two-fifths of all material and energy flows. Fifty-four percent of North American energy consumption is directly or indirectly related to buildings and their construction. Building construction and operations account for 35 percent of North American CO_2 emissions.

As Vancouver grows, so does the need to create additional strategies to counter the negative impacts of rapid growth - degradation to air and water quality, natural resource depletion, and inefficient land use practices. The built environment represents a major opportunity for the City, along with local designers, engineers, developers, builders, lenders, appraisers, and other sectors of the building industry, to address local and global environmental degradation. Promoting energy and resource efficient building practices is one such strategy.

Green building practices provide the framework and tools to build in an efficient, healthy, and ecologically responsible manner. Encouraging green building practices is in the public's interest because these techniques:

- Promote Vancouver's energy, land use, and environmental policies.
- Conserve energy, water and other natural resources.
- Strengthen established policy related to increased density, mixed use and transit-oriented development, brownfield redevelopment, and increased bicycle and pedestrian access, as well as strengthening goals for stormwater and erosion control.
- Minimize local ecological degradation (habitat, air, soil, and water) through efficient site and building design, sustainable construction practices, and low impact building materials and operational practices.
- Support long-term greenhouse gas reductions in a cost effective manner.
- Save building owners and tenants money through increased operation and maintenance efficiencies.
- Improve indoor air quality and the health, well being, and productivity of occupants.
- Help reduce public infrastructure costs related to development.
- Keeps money in the local economy and creates new local industries and jobs.

The environmental, social, and full cost economics of green buildings should lead the push for a green building policy for the City of Vancouver. However, it must be recognized that the "hard" economics of building green (construction and development) remains an important factor in promoting green buildings within both the public and private sector. While the hard costs of building green continue to drop as materials and techniques become more mainstream, an undetermined premium still remains that is dependent on a combination of material costs, supply, and strategies specifically chosen by the design team. With this reality, it may be timely for the City to pursue a green building strategy that will work for the local development community and meets key sustainability objectives. This strategy should work in conjunction with the principles embodied in LEED™ as green building standards are further refined for local implementation. Nonetheless, the more holistic goals of sustainability should be the primary argument in the City's support for green buildings.

Why the LEED™ Building Rating System for Municipal/Civic Buildings?

LEED™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings and has been adopted by many major municipalities in North America to set a precedence for local development using a readily comparable tool. LEED™ was created to:

- define "green building" by establishing a common standard of measurement that is transferable and relatively easy to use.
- promote integrated, whole-building design practices by design teams.
- recognize environmental leadership in the building industry.
- stimulate green competition.
- raise consumer awareness of green building benefits.
- transform the building market.

LEED™ provides a complete framework for assessing building performance and achieving sustainability goals. Based on well-founded scientific standards, LEED™ emphasizes state-of-the-art strategies for sustainable site development, fresh water savings, energy efficiency, green materials selection and indoor environmental quality. LEED™ recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources. The LEED™ system has been developed largely for the commercial, institutional, and municipal sector and addresses many of their development needs and development economics. The point certification levels are as follows (detailed breakdown in Appendix C):

LEED™ POINT CERTIFICATION LEVEL	
Certified	26 points
Silver	33 points
Gold	39 points
Platinum	52 points
AVAILABLE POINTS	**69 points**

Central to the success of all LEED™ design projects is the requirement for the design and project teams to act, think and design in a fully integrated manner. The impetus for a sustainable project must be the focus from project concept and be the guiding philosophy throughout the design and construction processes.

The Momentum of the LEED™ Building Rating System

Over the last year the United States Green Building Council (USGBC) has experienced significant growth. In 2000, there were less than 250 LEED members; there are now close to 3,000 member organizations including cities, provinces, states and private corporations. The number of LEED™ registered projects has also increased from 14 three years ago to 903 in July, 2003. LEED™ is also gaining momentum in British Columbia with over 30 projects

currently registered (compared to 6 in 2002) and over 160 LEED™ accredited Professionals (compared to 57 in 2002). LEED™ registered projects in British Columbia are included in Appendix D.

North American Experience

Many North American cities have already adopted the LEED Building Rating System into civic policy for municipal structures. In the move towards LEED, the Cities of Seattle and Portland are often cited as the leaders.

The City of Portland formed an Office of Sustainable Development (OSD) in 2000 to explore and promote the growth of sustainability throughout the City. It's "Green Rated" program was tasked with several policy objectives from internal review to the development of city-wide sustainability programs. One of the primary objectives identified early on by the OSD was the need to better understand the implications of green buildings. The resultant research was formalized through the adoption of a green building policy embracing the LEED rating system for all Civic buildings in 2002. The City of Portland seeks to encourage the highest level of LEED possible in all civic developments, with LEED Silver the minimum recommendation. Additionally, the Portland Development Commission (a public/private entity) has also adopted LEED, and all buildings funded through the Commission must meet a minimum LEED Certified standard.

Since adopting LEED™ in 2000, Seattle has monitored the construction of new civic buildings built to the LEED™ Silver level. Results have been mixed; some buildings at or below the cost of conventional construction with others up to four percent higher than normal. Values over two percent are usually indicative of projects that have chosen to showcase particular innovative or less mainstream technologies at a premium to the project. Overall, it appears that costs are coming down as shown in USGBC statistics, and that incremental costs can be reduced through an integrated design process from the outset.

Both Calgary and Victoria have developed policy to bring the LEED rating system to all new civic buildings by the end of 2004. Both cities are currently expecting the adoption of a minimum LEED Silver standard. In 2000, the Resort Municipality of Whistler developed an Official Sustainability Plan (OSP) that placed a high priority on the development of green buildings in the public sector. Since that time, two civic buildings have been completed, and are in the process of LEED certification. The new civic Firehall is targeting LEED Gold and the new Whistler Convention Centre is under final review and is targeting LEED Silver.

The state of California has the highest representation of municipalities that have formally adopted LEED for all civic buildings. As of 2002, the cities of San Jose, San Francisco, San Diego, Santa Monica, and Los Angeles have all made commitments to various levels of LEED for municipal buildings. The city of Pleasanton has perhaps made the strongest commitment in North America, by passing an ordinance in early 2003 requiring that all public and private buildings meet a minimum LEED Certified standard.

The USGBC keeps a record of all LEED™ buildings. With increased building registration and completion, more data is available about design techniques and overall costs. The data shows that incremental costs of building green are coming down as the LEED™ principles are in integrated at the beginning of the design process and practitioners become more conversant with green design. While detailed and precise data on green buildings cost comparisons is

often a challenge, it is important to realize that additional costs are often factors of building size, location, specific technologies chosen, and the level of building quality. Recent cost comparisons can be used to illustrate nominal increases in the range of 1 to 2% for LEED Silver commercial, industrial and institutional buildings, but ultimately costs could be higher if specialized or demonstration technologies are chosen for reasons other than cost. Little specific cost information is available for residential buildings at this time due to limited project numbers to date.

Federal Government Directions

At the Federal government level, the Department of Public Works and Government Services Canada adopted LEED Gold as the minimum standard for all new projects over ten million dollars, and LEED Certified or Silver as the minimum standard for all new projects less than ten million dollars.

Recent GVRD Policy Directions

On June 27, 2003 the GVRD's Planning and Environment Committee adopted LEED™ as the primary tool in the region to promote green buildings, recommending the voluntary use of LEED™ to all member municipalities, and agreed to investigate LEED™ for all their new buildings.

Vancouver's Recent Experience

Through the pro-active approach of the City's Engineering Services, Council chose two new buildings in the National Works Yard as pilots for the LEED™ system. Given uncertainty about costs, $700,000 was approved by Council to attain LEED™ Silver (approximately 12% greater than a traditional budget). These buildings are now complete and are registered with the USGBC. While the ultimate LEED™ rating must await final review, staff are confident in achieving LEED™ Silver and very optimistic about receiving Gold. This is more significant when it is considered that the decision to pursue a LEED™ rating occurred after the design process had begun. In addition to undertaking items specifically for LEED, demonstration items were also incorporated as pilot projects such as a green roof and solar panels. Final cost of LEED™ will be the subject of a case study; however, it should be noted that the increased cost is dependent on the starting base budget and design tradeoffs made. For example, the higher the base budget, the greater the ability to trade off finishes or systems without adding to the project cost.

The City's new Mount Pleasant complex comprising of a community centre, library, and daycare at #1 Kingsway is being designed as a LEED™ Silver building. The expectation is that this project can achieve LEED™ Silver, with a goal that incremental costs be offset by ongoing operational savings. This offset is not guaranteed at this time, and will only be proven through time. It is important to realize that with long-term operational savings, it is likely a feasible decision to increase project funding to accommodate more efficient technologies with proven pay-back. While impacting the current project budget, the long-term benefit to the city both economically and environmentally would multiply the value extracted from increments in up-front capital expenditure. Current cost/expense data is difficult to quantify and compare across green buildings, as each building is highly specific in terms of performance targets, technologies chosen, and long term pay-back goals.

The Myths of LEED

There are many myths currently surrounding LEED™, particularly in relation to specific building types, material use, and ownership/administration of the program. It is important to dispel four fundamental myths surrounding LEED™ to ensure that bias is removed from this discussion.

Myth #1: The USGBC/LEED™ is a for-profit organization based in the United States and all projects must be certified in the United States.

The USGBC is a not-for-profit organization formed in the United States and expanding worldwide with several chapters and 2 new Councils - the CAGBC, and the WGBC (world). The CAGBC now owns the exclusive license and rights to administer and formally certify LEED™ projects in Canada and to revise and make modifications, local application guides, and interpretations as felt necessary without consent of the USGBC.

Myth #2: There is no LEED™ adaptation for the local context or Coastal Regions.

The new LEED™ Canada administered through the CAGBC was developed through the work of the LEED™ BC Steering Committee. This has resulted in the adoption of a LEED™ BC Application Guide for LEED™ in Canada. This guide will evolve as LEED™ evolves in the Canadian and local context.

Myth #3: LEED™ is not designed for multi-unit residential housing.

LEED™ is a tool designed for a variety of built form with 69 available points. Not all points are available to all building types, but no points are exclusive to particular built forms. LEED™ Version 1.0, 2.0, and 2.1 all state that *"LEED™ is a measurement system designed for rating new and existing commercial, institutional, and high-rise residential buildings."*

Myth #4: LEED™ biases against wood products by requiring FSC Certification.

LEED™ does not exclude the use of wood products. Wood products can effectively qualify for 17 LEED points given appropriate design decisions. Only 1 of these points is based on wood that is FSC Certified, leaving the remaining 16 points open to a variety of wood products, giving preference to wood products harvested and manufactured locally. (see *Guide to the Use of Wood in LEED™ Projects*, 2003).

Cool Vancouver and the Provincial Green House Gas (GHG) Discussion Paper

In a discussion paper of GHG reduction, recognizing the vast quantities of materials consumed, waste produced and energy used, the Provincial Government recommended pursuing greener buildings. Peter Busby, a leading green architect and a member of the Provincial Task Force has estimated that, changing 25% of our building stock to greener buildings would achieve 40% of Canada's Kyoto requirements.

The "Cool Vancouver" Task Force was established to explore a wide range of issues around climate change from the science of climate change and the City's history in addressing global warming, to opportunities for reducing emissions in our personal lives, businesses, city

development process, transportation, municipal management and others. The task force recommends that the City *"continue to move forward on the LEED™ BC initiative and consider how its recommendations could be integrated into the City's current building design guidelines and bylaws..."* while *"continuing to pursue green buildings in all of the City's facilities..."*. Council has recently adopted the recommendations of the "Cool Vancouver" Task Force *Corporate Climate Change Action Plan*, and as a result, will require a 20% reduction in energy consumption for all new civic buildings. In order to meet this goal, the City should mandate a minimum of 2 LEED™ points in the *Energy and Atmosphere* Section of the LEED™ rating system. In addition, the Task Force has recognized that improving the energy efficiency of new residential and commercial buildings will be fundamental to longer term green house gas reductions in the community.

2010 Olympic Games

Sustainability will be a cornerstone of Vancouver's 2010 Olympic Winter Games. The 2010 mandate intends to *"...showcase sustainability initiatives, technology and expertise of Canada and the host communities... and to ensure that we create sustainable legacies."* All of these legacies should be green buildings and promote the application of sustainable practices. The 2010 Organizing Committee promises to undertake *"specific environmental initiatives, which will include green buildings..."* among other elements of sustainability.

SEFC and a Green Building Strategy

Green building strategies have been discussed at length with private property owners in Southeast False Creek, generally located between 1st and 2nd Avenues running from Cambie to Main Street. A "package" of green building requirements has been put forward as a requirement for earning maximum density (Appendix A). This package will be the first application of a green building strategy in the private sector in Vancouver and the Lower Mainland. This strategy will be finalised with the private property owners prior to rezoning Public Hearing and would be held in place until such a time that a more formal green building policy for the City is developed over the next eighteen months. Adjustments and modifications can be made to this strategy up until the time of rezoning, to allow outstanding issues/concerns to be addressed and resolved (i.e.- minimum energy efficiency standards). This package is being identified as a strategy based on LEED™ as a design tool with additional identified requirements and is outlined in Appendix A. In brief, the package utilizes LEED™ as a design tool and developers must meet a minimum standard equivalent to LEED™ Certified as verified through a LEED™ Accredited Professional on the design team. The City would ensure this level of compliance through the development application and development permit and through a series of checkpoints or milestones (in conjunction with the staff person recommended herein) throughout project development. Additionally, there will be a specific parking strategy developed, as well as some additional mandatory green building requirements as identified by the SEFC Environmental Reports and the Cool Vancouver Task Force Recommendations. All of these additional mandatory requirements will assist in meeting the adopted green building standard.

Owners were initially concerned about increased costs. As information on quantifying costs focuses mostly on commercial and institutional buildings, the City retained a consultant to investigate higher density residential buildings. Six recently constructed buildings in Vancouver ranging from low to high-rise were reviewed and a cost increment was calculated for both LEED™ Certified and Silver (summary in Appendix E). The consultant's study looked at the least cost approaches to obtain the LEED Certified and Silver standards.

The consultant found that LEED™ Certified could be achieved with only minor design changes, and a small increase in cost largely attributed to meeting LEED™ prerequisites, documentation and registration. These increments for documentation and registration would be avoided with the green building strategy as proposed. For LEED™ Silver, additional costs of 1 to-1.5 percent were calculated, once again based on changes to an already completed design and does not factor in the realities of construction/implementation and full documentation. There may be additional costs for this documentation, but there may also be savings for an integrated process and the resultant design synergies. The consultant did not pursue this avenue of study. The findings of this consultancy have been discussed with the private property owners. It must be noticed that this consultancy addressed a "hypothetical" case and does not deal with real buildings at the pre-development stage, therefore cost data has been used only as a reference point for further discussion. Real costs are largely a factor of technologies and approaches chosen to meet specific objectives by the design team, and are therefore hard to discretely quantify in any discussion concerning green buildings.

CURRENT CHALLENGES

a) Regulatory Challenges

When designing green buildings, difficulties may be encountered when applying existing regulations such as building, fire, plumbing, sewer, electrical, parking and zoning, and development by-laws. Prescriptive type codes may complicate the implementation of environmentally friendly solutions. For example, the Plumbing and Sewer By-laws mandate the discharge of all storm water into the public storm sewage system, and does not allow for alternate means such as recycling of such water. Staff are aware of such issues and are working to find the appropriate changes to make the alternate solutions workable.

The introduction of an objective based building code in 2006 may address some of these concerns. Current code requirements which may inhibit environmentally friendly solutions may be addressed through equivalencies and is a process that is supported by the Chief Building Official. The issue of equivalencies will be dealt with as projects come forward by all staff involved in the specific development review.

A LEED™ BC Steering Committee commissioned study to look at regulatory concerns found problems and limitations in both City and Provincial regulations. As part of the City's periodic review of fees and charges, consideration will be given to reducing the fees for equivalencies and other charges on sustainable buildings and environmentally friendly materials and products. This is supported by the *Cool Vancouver Task Force.* As part of their report back to Council on the City's green building strategy, staff will be seeking approval on this, which would be a departure from Council's current policy of setting fees at either market or cost recovery levels. Further, the *Cool Vancouver Task Force* recommended that it is necessary to *"...establish a basic regulatory system that supports green buildings with lower GHG*

emissions" and *"...coordinate within the City the policy and regulatory approach to building design and approvals; and develop 'equivalencies' for green design directions to replace 'code' requirements where possible."* It should be noted that under an objective based building code, alternative approved design solutions could be developed where it has been determined that these solutions would meet the objectives and functional requirements of the code.

b) Non Regulatory Challenges

The development industry has expressed interest in understanding LEED™ and greener buildings. Their primary concerns relate to increased costs, particularly if it results in changes to standard building practices, and the willingness or ability of the consumer to pay for additional costs associated with green buildings. They also noted that while the additional cost associated with green buildings may be accepted in the higher end of the market, these costs may be a larger factor in construction of market affordable housing as the very narrow profit margins for this type of product may not be able to accommodate the additional cost increases. Further study will be done. Additionally, staff will look at the new notion of "green mortgages" where the mortgage provider will allow for a ratio of mortgage to income higher than 30% of income with the understanding that other monthly housing costs will be lower where a green building is involved, or other personal costs such as transportation will be lower because of the proximity of the residential unit to job locations.

Being that there is a definite additional cost for any LEED™ project as a result of LEED™ registration and documentation, the formal registration will not be required at this time for the first rezonings in SEFC. Instead, the intent will be that the green building strategy will be a fundamental part of Development Permit Application, making the green building strategy a condition of the development permit. On-going liaison with City development/green building staff will help ensure the obligations set out at development permit stage are met throughout the process. This strategy will avoid the fee that must be paid by any LEED™ project, but will then lose the valuable assistance, guidance, and credit interpretations provided by either the USGBC or CAGBC.

The development industry also strongly expressed the need to undertake demonstration projects to test the assumptions about green building standards, particularly as they apply to residential buildings and to the temperate climate of the Pacific Northwest. The first developments in SEFC will form a baseline of information, as they are expected to be the first to implement this strategy in the attempt to create a "model" sustainable community that the City can learn from. The industry notes it has worked hard to rebuild consumer confidence lost during the leaky condo crisis and it strenuously wants to avoid the unanticipated consequences of another new building standard. As such, it should be made clear that any green building strategy adopted by the City will be target and/or performance based (as is LEED™), so as to not impose any specific technologies. The strategy is a tool to reach specific environmental performance, rather than to impose specific building technologies; this shall remain up to the developer.
There has been significant discussion with industry within the high rise residential sector on the issue of glazing percentage vs. energy efficiency. The Chief Building Official's office is conducting a parallel effort on a proposal on updating the Energy Utilization By-law with a report to Council shortly after this report. In that report, there is an implementation plan on how to deal with the high rise residential buildings on energy efficiency which would explore the various paths of compliance to the energy codes.

The high-rise residential industry noted that there is a market demand for buildings comprised of a high percentage of glass in order to provide residents with more natural light and a better view to the outside environment. The industry believes that public education of consumers about the cost and consequences of energy consumption is the most effective approach to long-term energy reduction. It is important that any green building strategy does not dictate urban design.

Concerns such as energy reduction in residential buildings and material availability are important aspects of a green building strategy that will be addressed in a two-sided dialogue with the development industry. This past November, the City of Vancouver and the GVRD sponsored a session with a number of major developers in the Lower Mainland. This session was very successful as most developers had many of their concerns addressed through open discussion, however this was only a beginning. In addition to the consultation with industry on the Energy Utilization By-law update, recently staff have had several workshops with the UDI (Urban Development Institute), private developers, and the SEFC stakeholders concerning the development of a green building strategy. As a result of these working sessions, a *Green Building Strategy Steering Committee* involving the development, design, construction, and municipal and regulatory communities will be created as a part of this work program. The development community is eager to move forward, however they need to be included in the discussion. The green building work program will provide the means to facilitate this on-going discussion and build a strategy that works from both regulatory and development perspectives.

RECOMMENDED CITY DIRECTIONS AND ACTIONS

It is timely to build on the experience from our pilot projects and the momentum that both green buildings and the LEED™ rating system have generated. Within the next 3 months, LEED™ BC with the Canadian Adaptation Guide and a new reference guide for British Columbia will be in place. Within the year the Canadian Green Building Council will take over the Canadian administration of LEED™. While the CAGBC is now operational, they are currently allowing the USGBC to continue the certification process until such a time as the CAGBC is fully staffed.

Considering the above, timing is now optimum for the City of Vancouver to play a leadership role and make a strong commitment to green buildings by first setting a requirement of LEED™ Silver for all new Civic buildings with a requirement to achieve 2 additional points under the Energy and Atmosphere category to reflect Council supported recommendations for *Cool Vancouver*. Buildings less than 500 square meters (15,400 sq.ft.) will not be required to meet LEED™ Silver standards (but may do so if desired), as smaller buildings may not present the efficiencies and volumes necessary for financial feasibility. Additionally, the City is often responsible for developing facilities on difficult sites or with unusual program requirements that may not adhere well to the LEED™ system. If this can be proven through an early integrated design exercise, then Council may recommend that these buildings not be required to meet LEED™ Silver, yet Council should still require that through "best practices" they achieve as many green building strategies as deemed viable by the design team. Given cost data that is currently available, LEED™ Silver is recommended as the optimum balance between a high level of green building design and economic responsibility for municipal buildings.

It is also time for the City to adopt a green buildings strategy for Southeast False Creek, specifically for the first sub-area rezoning. A green building standard should be set for the SEFC community to ensure that green buildings are one of the cornerstones of this sustainable community. Current work and discussions with land owners (both public and private) have lead staff to recommend that the green building strategy for SEFC identified in Appendix A be adopted in principle with a finalized version ready for the rezoning Public Hearing stage. This green building strategy will form the baseline for on-going contact with the private sector and the *Green Building Strategy Steering Committee* will refine and develop an approach for all building types over the following 18 month work program. This work program will recognise and address the benefits and challenges of green buildings. An early focus on the barriers and opportunities for improved energy efficiency in new construction will be useful in informing the final Community Climate Change Action Plan that is scheduled for completion at the end of 2004. In preliminary and forward-thinking discussions with the development community, a clearer understanding of the benefits and challenges of green buildings has been established to guide the work necessary as laid out within this report. These are:
Benefits:

- To lead by example and illustrate through practice the upfront capital costs that may be recaptured through reduced operating costs.
- To encourage water conservation, stormwater management, waste management, and sustainable transportation.
- To encourage energy-efficient technologies and design approaches that significantly reduce operating costs, energy consumption and greenhouse gas emissions.
- To explore advances in renewable energy that stem resource depletion and greenhouse gas production.
- To encourage use of recycled-content products that reduce waste and greenhouse gas emissions.
- To support and utilize repairable, recyclable building materials.
- To encourage resource-efficient construction practices that conserve resources and generate less construction waste.
- To recognise that green buildings have emerged as a high priority in the City's GHG reduction action areas.

Challenges:

- To address the affordability of housing within the City of Vancouver. An assessment is needed of additional costs associated with green buildings as initial projects both within Vancouver and abroad are undertaken.
- To work with the LEED™ BC Steering Committee to form a task group to examine medium and high density residential and mixed-use developments (which will include the development industry), as to date no medium and high density development application guide exists. The construction, operation and energy consumption needs of medium and high density developments are different from industrial and commercial buildings and each building type functions in a different manner.

Additionally, potential cost for energy efficient technologies in market residential buildings is a factor, given that life cycle costing is less relevant for non owner-operators. It will be very important to carefully examine the LEED principles and rating system in the context of medium and high density developments to ensure that there are not implications for building functionality and long-term durability.

- To facilitate and track demonstration and/or leadership projects within the SEFC model sustainable community to test and refine green building principles for implementation in the larger Vancouver context in regard to market residential development and within the Vancouver climatic zone.

- To continue to work with the CAGBC and LEED™ BC to further refine the Canadian LEED™ Adaptation guide to suit local conditions and embrace Canadian environmental standards and ratings (for suppliers, materials, and resources) as the LEED™ program grows in Canada.

- To ensure that any green building system does not impact the quality of urban design represented in the City of Vancouver (e.g. - the ability to economically develop high glass percentage residential towers). Under the Energy and Atmosphere category, the LEED™ rating system has prerequisites that when applied to market high rise residential buildings may have cost impacts that could precipitate alternative urban design models not congruent with the Vancouver model. Accordingly, in developing a green building strategy it will be important to examine urban design, alternative building energy systems, possible additional capital costs for energy efficient glass/increased insulation, the length of the payback period to recover costs, and the willingness or ability of the consumer to pay higher upfront costs for energy efficiency.

Additionally, the Olympic Athlete's Village will be a showpiece of sustainable development and will likely achieve higher environmental standards than previously thought possible. This is because of additional funding possibilities for pilot and demonstration projects of highly advanced green technologies. Whether or not LEED™ will be used as the assessment system for the Athlete's Village is yet to be determined, given the potential creative green building solutions that may not currently be recognised within the LEED™ framework.

The new "LEED™ for Existing Buildings" program also requires further investigation. The results of pilot projects should soon be available, and considering the application of this new tool to the City's existing building stock will be a significant work item. This work should be done in partnership with the Director of Facility Design and Management. Additionally, ongoing work with the LEED™ BC Steering Committee and the CAGBC, will bring about a LEED™ Application Guide for Multi-Unit Residential Buildings, as well as provide input to new LEED™ programs such as LEED™ for Neighbourhoods and LEED™ Core and Shell which will be targeted at the market development side of the industry.

WORK PROGRAM

Table 1

The proposed tasks are generally laid out as indicated below:

TASK	Jun '04	Jul	Aug	Sep	Oct	Nov	Dec	Jan '05	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Consult with private land owners in SEFC & sub-area rezoning																		
Form Green Building Strategy Steering Committee																		
City-wide Green Building strategy development																		
LEED™ BC and other *LEED*™ initiatives (MEDIUM AND HIGH DENSITY DEVELOPMENT application guide)																		

BUDGET AND STAFFING

While this initiative may eventually be housed elsewhere in the Civic organization, at this point in time the continuing development and expansion of green buildings is best vested in the Planning Department. This home is supported by the Sustainability Support Group and other City staff that have been involved in the development of this work program, as the expertise and knowledge of staff in the Planning Department will be an asset in moving this program forward in a timely manner and will be well equipped to liaise with all other involved departments. Staff will continue to work with the GVRD, the Province, and with the development industry to define a new approach to building in the City and the Province. Planning staff will pursue discussions with other City Departments in order to incorporate development processing and review groups as well as sustainability initiatives from other departments such as Engineering and the Sustainability Group.

To carry out the Work Program outlined above, a Temporary Planner 1 is required for eighteen months. Supervision will be provided by an existing senior planner. In addition, funds are required for presentations, research, and associated travel - including a review of any cost or design implications for the broad range of City building types, and to contribute towards events, studies and publications which generally promote green design and sustainable development. The total budget is $200,000, with $70,000 from 2004 Contingency Reserve and $130,000 to be added to the 2005 operating budget. This will cover 18 months of a temporary planner plus associated costs.

This Planner 1 position is a new position and cannot currently be filled or reallocated from existing resources. The staff teams involved on the development of this program have been performing much of this work outside of existing work programs and are not able to allocate the time necessary to successfully build a new green buildings program that can be implemented in a way that is timely with the immediate needs of Southeast False Creek, Council commitments to greenhouse gas reduction, directions toward energy efficiency from the Chief Building Official, and other sustainability initiatives stemming from the Sustainability Support Group. The green building program is a key piece of all of these initiatives and must occur in advance and/or concurrently to them. This program has also committed to a great deal of public, industry, and staff consultation that cannot be done on a temporary basis from existing staff positions. This level of commitment and work requires a dedicated staff position that cannot be filled from existing resources. In addition, it is necessary to fill this position with an individual fully versed in LEED, green building rating systems, green building policy, and other sustainability endeavours. Staff that currently have this expertise are fully allocated to other demanding projects. Council is encouraged to approve this position so this work can be fully realized.

Table 2 - Budget

Staffing (Planning, 18 months, benefits, office, computer, etc.)	$150,000
Consultancies, public process, publications, and presentations	$40,000
Events, education, research, and associated travel	$10,000
Total	**$200,000**

Table 3 - Budget Breakdown

Item	**2004 Budget**	**2005 Budget**
Staffing (salary, benefits, office, etc.)	$ 58,000	$ 92,000
Consultants, public process, pub's.	$ 10,000	$ 30,000
Events, education, research, travel	$ 2,000	$ 8,000
Total	**$ 70,000**	**$130,000**
Source of Funds	2004 Contingency Reserve	2005 Operating Budget

CONCLUSION

Over the last few years significant progress has been made in furthering the development of green buildings in the Province, the GVRD, and in the City of Vancouver. The City has played a leadership role in the development of new policy including the creation of LEED™ BC and in the dissemination of information about LEED™ and green building practices. It is recommended that the City adopt LEED™ Silver for all new Civic buildings (greater than 500 square meters), recognise the adopted policy around the "Cool Vancouver" Initiative, and adopt in principle a green building strategy for all new buildings in Southeast False Creek that reflects the SEFC Policy Statement and specifics of residential development. The City should

continue to capture the momentum around green buildings and develop a broad green building strategy as a tool which can eventually be employed in the development of all buildings in Vancouver. This should be done in an open and collegial manner with various City Departments and the development, architectural, and construction sectors. The City should help in continuing to refine LEED™ for the Canadian and regional context, as well as help develop a residential application guide. It is noted that the City should be prepared to quantify and budget for any additional costs that may be incurred for the development of new Civic buildings for LEED™ Registration and Administration, and for additional development costs resultant from the implementation of new technologies. It is recommended that staff continue to report back to Council in a timely manner to ensure that all staff and the interested public are aware of new initiatives and progress.

* * * *

Appendix A -Green Building Strategy & Proposed Implementation

SEFC Green Building Strategy

A green building strategy for Southeast False Creek must achieve a minimum baseline of environmental performance in all facets of building design and construction. This strategy applies to all medium and high density residential (over 4 stories), mixed-use, commercial, institutional, and industrial developments in SEFC. This strategy is founded on the principles of the LEED™ green building assessment program, which provides a robust tool to guide development of a variety of green building types. Developed as a 69 point system with a variety of "levels" of green achievement, the system is flexible enough to allow residential and mixed-use buildings to gain significant points in the LEED™ system. Additionally, the local design and engineering community has embraced LEED™ as the preferred building performance tool.

The "requirement" of LEED™ certification as a mandatory standard for development is problematic. Being that the LEED™ rating is determined after construction and after occupancy, it is impossible to ascertain with confidence the exact level of final certification. As such, it is advised that a green building strategy for the City of Vancouver should use LEED™ as a design tool to shape development and set performance standards, creating a baseline for development in Southeast False Creek. Registration and completion of the program should not be mandatory at this time. In combination with the use of LEED™ as a design tool, certain technologies and/or points under the system will be required by the City to ensure that each project meets the specific goals of the SEFC Environmental Reports and the Cool Vancouver Recommendations. These required elements will not be onerous, and will help the developer to achieve some of the LEED™ identified objectives. All LEED™ points would be available to the developer, with a minimum 26 points plus all LEED™ prerequisites and City specific requirements as the baseline for developments using this strategy. The building must be designed and perform according to a minimum LEED™ Certified standard.

The developer will make their own choice as to if they choose to undertake the full registration and certification process with LEED BC and the Canadian Green Building Council. If a project is formally registered through the CAGBC/LEED™ BC to achieve a minimum LEED™ Certified level, and registration is submitted with the development permit application and approved as condition of the development permit, then the City's green building strategy can be waived. All projects not formally registering with the CAGBC will follow the proposed green building strategy, with firm commitment required through the development application and resultant development permit. Given Southeast False Creek's mandate to be a model sustainable community, it is apparent that this may be a key opportunity to first use LEED™ strategies to shape green building design in Vancouver.

The strategy below outlines those points in each LEED™ category that are "easily" attainable with little cost for a multi-unit residential building. This strategy assumes that all prerequisites can be met and an integrated design process (IDP) with a LEED™ Accredited professional on board is undertaken from the outset. Points identified in this strategy were chosen through an evaluation of all LEED™ multi-unit residential and mixed-use developments currently accredited and/or registered with the USGBC. Those points that were gained in nearly all projects were taken to be very viable. Those points attained by most projects were assessed against the development environment in Southeast False Creek (SEFC). Finally, "sustainable sites" points were determined solely on the basis of SEFC and its context.

PART 1: MANDATORY BASE LINE STRATEGY REQUIREMENTS

Energy

1.0 Minimum energy efficiency to meet ASHRAE 90.1 2001 (this prerequisite will be defined through further consultation with stakeholders).

1.1 Specify energy efficient appliances -- EnergyStar rated appliance and/or gas appliances, except for laundry dryer.

1.2 Energy efficient lighting to follow ASHRAE 90.1 2001.

1.3 Specify fireplaces listed as a heating appliance with a minimum combustion efficiency to meet or exceed ASHRAE/IESNA Standard 90.1 - 2001 heating appliance standards. No continuous pilot lights; interrupted power ignition is preferred. Electric fireplaces must be 100 percent efficient and offer heat/no heat modes.

1.4 Heating of domestic hot water to be done with high efficient boilers with a minimum efficiency of 87%.

Parking

Maximum parking standard is less than the vehicle ownership of communities adjacent to SEFC for comparably sized dwelling units and scaled generally in response to the size of the dwelling unit, but even for the smallest unit's one parking stall per unit is permitted.

1.5 The Minimum Permitted Parking shall be .5 spaces per dwelling unit for dwelling units under 50m^2 GFA, 1 space per dwelling unit for dwelling units greater than 82.5m^2 GFA and scaled to .5 spaces plus 1 space per 165 m^2 GFA for dwelling units between 50 to 82.5m^2 GFA.

1.6 The Maximum Permitted Parking shall be 1 space per dwelling unit for dwelling units under 50m^2 GFA, 2 spaces per dwelling unit for dwelling units greater than 189m^2 GFA and scaled to .65 space plus 1 space per 140m^2 GFA for dwelling units between 50 to 189m^2 GFA.

1.7 Designated visitor parking shall be separately required at a rate of 0.1 spaces per residential dwelling unit, and provided either on-site or at a centralized parking facility nearby.

1.8 Ensure that a car-sharing [or co-op] vehicle, accompanied by a designated parking space, be provided for sites with 50 to 149 dwelling units, and a second car-sharing vehicle and space for sites with 150 or more dwelling units.

1.9 For future car-sharing, one additional designated parking space, be provided per 100 dwelling units (but no less than one per site).

1.10 Specify that a minimum of 10% of parking spaces are designed as garages to accommodate conversion for a storage function (current outstanding City bylaw issue).

1.11 The provision of less than the minimum parking subject to approval by the General Manager of Engineering Services and Director of Planning of a site specific Transportation Demand Management plan that restricts residents' car ownership and supports other means of mobility.

Water

1.12 Dual flush toilets.
1.13 Low flow faucets and showerheads to meet current best practices.
1.14 High efficiency irrigation system (drip irrigation), stormwater reuse for landscape irrigation, or no permanent irrigation.

Waste Management

1.15 Composting for on-site gardens and/or landscaping.
1.16 3 streams of waste collection (on-site infrastructure should be provided for organic pick-up for future implementation if no organic pick-up is available at time of development application).
1.17 Management of construction and demolition waste, ensuring a minimum of 50% landfill diversion through construction process.

PART 2: THE STEPS TOWARDS A LEED CERTIFIABLE BUILDING

Note: a "?" in the "points" category indicates a potential low-cost point depending on the IDP and the parameters of site, design, material availability, etc.

	Category	**Points**
	Sustainable Sites	
Pre-Req. 1	- erosion and sedimentation control	Req'd.
Credit 1	- site selection	1
Credit 2	- urban redevelopment	1
Credit 3	- brownfield redevelopment	1
Credit 4.1	- alternative transportation; public transit	1
Credit 4.2	- alternative transportation; bicycle storage	1
Credit 4.3	- alternative transportation; alternative fuel refuelling st'n.	1
Credit 4.4	- alternative transportation; parking capacity	1
Credit 5.1	- reduced site disturbance; restore open space	0
Credit 5.2	- reduced site disturbance; development footprint	0
Credit 6.1	- stormwater management; rate or quantity	?
Credit 6.2	- stormwater management; treatment	?
Credit 7.1	- landscape and exterior design to reduce heat island; non-roof	1
Credit 7.2	- landscape and exterior design to reduce heat island; roof	1
Credit 8	- light pollution reduction	1
	Section Total	**10**
	Section Potential	**12**

	Category	Points
	Water Efficiency	
Credit 1.1	- water efficient landscaping, reduce by 50%	1
Credit 1.2	- water efficient landscaping, no potable use or no irrigation	1
Credit 2	- innovative wastewater technologies	0
Credit 3.1	- water use reduction; 20% reduction	1
Credit 3.2	- water use reduction; 30% reduction	1
	Section Total	**4**
	Section Potential	**4**

	Category	Points
	Energy & Atmosphere	
Pre-Req. 1	- fundamental building systems commissioning	Req'd.
Pre-Req. 2	- minimum energy performance	Req'd.
Pre-Req. 3	- CFC reduction in HVAC&R Equipment	Req'd.
Credit 1.1	- optimise energy performance; 20% new/10% existing	?
Credit 1.2	- optimise energy performance; 30% new/20% existing	0
Credit 1.3	- optimise energy performance; 40% new/30% existing	0
Credit 1.4	- optimise energy performance; 50% new/40% existing	0
Credit 1.5	- optimise energy performance; 60% new/50% existing	0
Credit 2.1	- renewable energy; 5%	0
Credit 2.2	- renewable energy; 10%	0
Credit 2.3	- renewable energy; 20%	0
Credit 3	- additional commissioning	?
Credit 4	- ozone depletion	1
Credit 5	- measurement and verification	0
Credit 6	- green power	?
	Section Total	**1**
	Section Potential	**6**

	Category	Points
	Materials & Resources	
Pre-Req. 1	- storage and collection of recyclables	Req'd.
Credit 1.1	- building reuse; maintain 75% of existing shell	0
Credit 1.2	- building reuse; maintain 100% of existing shell	0
Credit 1.3	- building reuse; maintain 100% existing shell & 50% non-shell	0
Credit 2.1	- construction waste management; divert 50%	1
Credit 2.2	- construction waste management; divert 75%	1
Credit 3.1	- resource reuse; specify 5%	?
Credit 3.2	- resource reuse; specify 10%	?

Credit 4.1	- recycled content; specify 20%	1
Credit 4.2	- recycled content; specify 50%	0
Credit 5.1	- local/regional materials, 20% manufactured locally	1
Credit 5.2	- local/regional materials, 50% of above 20% harvested locally	?
Credit 6	- rapidly renewable materials	?
Credit 7	- Certified Wood	0
	Section Total	**5**
	Section Potential	**8**

	Category	**Points**
	Indoor Environmental Quality	
Pre-Req. 1	- minimum IAQ performance	Req'd.
Pre-Req. 2	- environmental tobacco smoke (ETS) control	Req'd.
Credit 1	- carbon dioxide (CO2) monitoring	?
Credit 2	- increase ventilation effectiveness	1
Credit 3.1	- construction IAQ management plan; during construction	1
Credit 3.2	- construction IAQ management plan; before occupancy	?
Credit 4.1	- low-emitting materials; adhesives, & sealants	1
Credit 4.2	- low-emitting materials; paints	1
Credit 4.3	- low-emitting materials; carpet	1
Credit 4.4	- low-emitting materials; composite wood	?
Credit 5	- indoor chemical & pollutant source control	1
Credit 6.1	- controllability of systems; perimeter	1
Credit 6.2	- controllability of systems; non-perimeter	0
Credit 7.1	- thermal comfort; comply with ASHRAE 55-1992	?
Credit 7.2	- thermal comfort; permanent monitoring system	0
Credit 8.1	- daylight & views; daylight 75% of spaces	1
Credit 8.2	- daylight & views; views for 90% of spaces	1
	Section Total	**9**
	Section Potential	**13**

	Category	**Points**
	Innovation and Design Process	
Credit 1.1	- innovation in design	1
Credit 1.2	- innovation in design	?
Credit 1.3	- innovation in design	?
Credit 1.4	- innovation in design	?
Credit 2	- LEED accredited professional	1
	Section Total	**2**
	Section Potential	**5**

Project Totals	**30**
Project Potential	**49**

LEED Ratings:

CERTIFIED	26-32 points
SILVER	33-38 points
GOLD	39-51 points
PLATINUM	52-69 points

Appendix B - CAGBC Letter of Support and Endorsement

May 04, 2004
Dale Mikkelsen
Central Area Planning
City of Vancouver
Vancouver, British Columbia

Re: Green Building Strategy for the City of Vancouver

The Canada Green Building Council (CaGBC) has reviewed the Policy Report in Developing a Green Building Strategy for the City of Vancouver, dated March 29 2004. CaGBC wholeheartedly endorses the leadership shown by the city in pursuing a comprehensive green building strategy such as this. Adoption of such a strategy will clearly put Vancouver at the forefront among cities in Canada in making a contribution to addressing significant the environmental issues facing society.

CaGBC, as you are aware, is the exclusive license holder for LEED™ in Canada and is the implementer of LEED in Canada. This means that CaGBC has the sole right to register and certify any green building project in Canada using the LEED rating systems. This includes LEED BC which was launched on April 14, 2004, providing an adaptation of LEED to BC and making it easier to use LEED in a Canadian context. The CaGBC is in the final stages of seeking approval from the US Green Building Council for a Canada-wide adaptation of LEED. We anticipate that LEED Canada will be implemented in the summer of 2004.

The CaGBC would like to comment on specific recommendations in the City's green building strategy as they pertain to LEED.

1) CaGBC endorses Recommendation "A", adoption of a minimum requirement of LEED Silver for new civic buildings with registration and certification through the CaGBC.

2) CaGBC generally endorses the use of LEED as a design tool on any private or public sector project and endorses its use in this manner on the private and city-owned lands proposed in South East False Creek Green Building Strategy.

3) CaGBC foresees problems with stopping short of requiring actual certification as a method of determining environmental performance of SEFC projects. If actual certification is not sought through the CaGBC, an equivalent amount of effort will have to be expended by someone, presumably City staff, to ensure equivalent performance. We doubt that the level of skill and experience exists within the City to do so, given the rigorous procedure CaGBC goes through to find qualified assessors for this work. Also, without actually going through the CaGBC third-party certification process, actual performance achieved at these projects will always be in question and could be perceived as "greenwashing" of these projects with lower performance than that required under LEED. CaGBC has a serious concern with this and because we hold copyright to the LEED brand, CaGBC will, as a matter of copyright protection, dispute any claims made of equivalent performance.

4) CaGBC therefore cannot endorse Recommendation "B" for an equivalent system and urges the City to require full LEED certification for SEFC projects if the City wants to demonstrate LEED performance from those projects.

We would also like to point out that LEED is a market transformation tool which, when it is applied to private sector projects, works best with voluntary compliance and incentives.

Sincerely,

Alex J. Zimmerman

President, Canada Green Building Council
Vancouver Island Technology Park
Suite 2103 D, 4464 Markham Street
Victoria, BC, Canada V8Z 7X8
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email: azimmerman@cagbc.org
phone: 250 483 3242

Appendix C - LEED™ Points System

Version 2.1 Registered Project Checklist

Yes	?	No		
			Sustainable Sites	**14 Points**
Y			Prereq 1 **Erosion & Sedimentation Control**	Required
			Credit 1 **Site Selection**	1
			Credit 2 **Urban Redevelopment**	1
			Credit 3 **Brownfield Redevelopment**	1
			Credit 4.1 **Alternative Transportation**, Public Transportation Access	1
			Credit 4.2 **Alternative Transportation**, Bicycle Storage & Changing Rooms	1
			Credit 4.3 **Alternative Transportation**, Alternative Fuel Vehicles	1
			Credit 4.4 **Alternative Transportation**, Parking Capacity and Carpooling	1
			Credit 5.1 **Reduced Site Disturbance**, Protect or Restore Open Space	1
			Credit 5.2 **Reduced Site Disturbance**, Development Footprint	1
			Credit 6.1 **Stormwater Management**, Rate and Quantity	1
			Credit 6.2 **Stormwater Management**, Treatment	1
			Credit 7.1 **Landscape & Exterior Design to Reduce Heat Islands**, Non-Roof	1
			Credit 7.2 **Landscape & Exterior Design to Reduce Heat Islands**, Roof	1
			Credit 8 **Light Pollution Reduction**	1
Yes	?	No		
			Water Efficiency	**5 Points**
			Credit 1.1 **Water Efficient Landscaping**, Reduce by 50%	1
			Credit 1.2 **Water Efficient Landscaping**, No Potable Use or No Irrigation	1
			Credit 2 **Innovative Wastewater Technologies**	1
			Credit 3.1 **Water Use Reduction**, 20% Reduction	1
			Credit 3.2 **Water Use Reduction**, 30% Reduction	1
Yes	?	No		
			Energy & Atmosphere	**17 Points**
Y			Prereq 1 **Fundamental Building Systems Commissioning**	Required
Y			Prereq 2 **Minimum Energy Performance**	Required
Y			Prereq 3 **CFC Reduction in HVAC&R Equipment**	Required
			Credit 1 **Optimize Energy Performance**	1 to 10
			Credit 2.1 **Renewable Energy**, 5%	1
			Credit 2.2 **Renewable Energy**, 10%	1
			Credit 2.3 **Renewable Energy**, 20%	1
			Credit 3 **Additional Commissioning**	1
			Credit 4 **Ozone Depletion**	1
			Credit 5 **Measurement & Verification**	1
			Credit 6 **Green Power**	1
Yes	?	No		
			Materials & Resources	**13 Points**

Yes	?	No		
Y			Prereq 1 **Storage & Collection of Recyclables**	Required
			Credit 1.1 **Building Reuse**, Maintain 75% of Existing Shell	1
			Credit 1.2 **Building Reuse**, Maintain 100% of Shell	1
			Credit 1.3 **Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1
			Credit 2.1 **Construction Waste Management**, Divert 50%	1
			Credit 2.2 **Construction Waste Management**, Divert 75%	1
			Credit 3.1 **Resource Reuse**, Specify 5%	1
			Credit 3.2 **Resource Reuse**, Specify 10%	1
			Credit 4.1 **Recycled Content**, Specify 5% (post-consumer + ½ post-industrial)	1
			Credit 4.2 **Recycled Content**, Specify 10% (post-consumer + ½ post-industrial	1
			Credit 5.1 **Local/Regional Materials**, 20% Manufactured Locally	1
			Credit 5.2 **Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1
			Credit 6 **Rapidly Renewable Materials**	1
			Credit 7 **Certified Wood**	1

Yes	?	No		
			Indoor Environmental Quality	**15** Points
Y			Prereq 1 **Minimum IAQ Performance**	Required
Y			Prereq 2 **Environmental Tobacco Smoke** (ETS) **Control**	Required
			Credit 1 **Carbon Dioxide** (CO_2) **Monitoring**	1
			Credit 2 **Ventilation Effectiveness**	1
			Credit 3.1 **Construction IAQ Management Plan**, During Construction	1
			Credit 3.2 **Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1 **Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2 **Low-Emitting Materials**, Paints	1
			Credit 4.3 **Low-Emitting Materials**, Carpet	1
			Credit 4.4 **Low-Emitting Materials**, Composite Wood & Agrifiber	1
			Credit 5 **Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1 **Controllability of Systems**, Perimeter	1
			Credit 6.2 **Controllability of Systems**, Non-Perimeter	1
			Credit 7.1 **Thermal Comfort**, Comply with ASHRAE 55-1992	1
			Credit 7.2 **Thermal Comfort**, Permanent Monitoring System	1
			Credit 8.1 **Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2 **Daylight & Views**, Views for 90% of Spaces	1

Yes	?	No		
			Innovation & Design Process	**5** Points
			Credit 1.1 **Innovation in Design**: Provide Specific Title	1
			Credit 1.2 **Innovation in Design**: Provide Specific Title	1
			Credit 1.3 **Innovation in Design**: Provide Specific Title	1
			Credit 1.4 **Innovation in Design**: Provide Specific Title	1
			Credit 2 **LEED™ Accredited Professional**	1

Yes	?	No		
			Project Totals (pre-certification estimates)	**69** Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

Appendix D - LEED™ Registered Projects in British Columbia

- **BC Cancer Research Centre**, Vancouver
- **Building 14 (Discovery Parks)** , Burnaby
- **Cedar Corner**, Tofino
- **City of Vancouver National Works Yard**, Vancouver
- **Coast Capital Savings**, Victoria
- **Douglas Border Crossing (CCRA)**, Surrey
- **Envision Credit Union**, Langley
- **Electronic Arts (Canada) Inc.**, Burnaby
- **Hamilton Fire Hall**, Richmond
- **Heritage Mountain Secondary School**, Port Moody
- **International Terminal Building**, Richmond
- **National Research Council of Canada Laboratory**, Vancouver
- **RCMP Detachment**, Keremeos
- **River Street Water Treatment Plan**, Kamloops
- **Roger Hughes + Partners Architects Office Renovations**, Vancouver
- **Royal Inland Hospital (IHA)**, Kamloops
- **Sea Island Fire Hall #4**, Richmond
- **Semiahmoo Library + RCMP**, Surrey
- **Seymour-Capilano Filtration Plant**, Vancouver
- **The Silva Residential Building**, North Vancouver
- **Surrey Transfer Station (Wastech)**, Surrey
- **The Conservatory**, Kelowna
- **UBC TEF III**, Vancouver
- **UBC Life Sciences Center**, Vancouver, BC
- **VanCity Savings & Credit Union - Branch #46**, North Vancouver
- **Vancouver Port Authority**, North Vancouver
- **Vancouver Island Technology Park**, Victoria
- **Victoria Center Facility**, Victoria
- **West 16th Street and Lonsdale Retail Centre**, North Vancouver
- **Whistler Conference Centre Renovation**, Whistler
- **Whistler (Spring Creek) Fire Hall**, Whistler
- **Whistler Public Library & Museum/Archives**, Whistler
- **White Rock Operations Building**, White Rock

Appendix E - LEED™ Benchmarking Study (summarised)

IBKG
Professional Quantity Surveyors
LEED™ Consultants

LEED™ AUDIT REPORT

SOUTH EAST FALSE CREEK PROJECT

CITY OF VANCOUVER

May, 2003

INTRODUCTION

In December, 2002, TBKG was commissioned by the City of Vancouver to investigate the degree of sustainability inherent within six existing multi-family residential buildings using the LEED™ Building Evaluation System. In addition to this investigation, TBKG was to ascertain what additional effort and cost would be required to increase the sustainable content of the design. The results of the audits were to be used to assess the potential for application of a LEED™ building designation to the South East False Creek project.

All buildings investigated in this study are already in existence. TBKG was given access to the building plans and specifications that were submitted to the Planning Department of the City of Vancouver. None of the buildings was familiar to TBKG prior to the audits.

PROJECT DESCRIPTIONS

The study investigated three general types of multi-family buildings: high-rise, mid-rise and low-rise. Three of the buildings were categorized as high-rise, two of the buildings were categorized as mid-rise and one building was a 4-storey low-rise structure. In most cases, there was a small commercial component added to the mainly residential project. All of the projects included underground parking.

- Low-rise average building area: 101,000 sf
- Mid-rise average building area: 102,900 sf
- High-rise average building area: 325,000 sf

The buildings included in the study group represented over 1,300,000 sf of development with an approximate combined project cost of $250,000,000.

METHODOLOGY

TBKG carried out a 3-step process whereby each building was evaluated using the LEED™ building evaluation methodology. The investigation began with an evaluation of current market design in the Lower Mainland as it relates to LEED™ evaluation criteria and ends with a set of recommendations for improvements, including associated costs, which enhance the projects' sustainable characteristics.

The study team investigated four cumulative levels of information about each of the buildings:

- Evaluation to establish the current level of certification under the LEED™ building evaluation.
- Identification of additional elements required to qualify for LEED™ registration, including any missed LEED™ prerequisites, cost of documentation and the cost of LEED™ evaluation. The audit team assigned costs for any missing prerequisites; energy modeling and LEED™ registration costs in order for the project to become LEED™ registered. In addition, they identified the cost of registration and documentation.
- Determination of the cost/effort required to achieve LEED™ Silver designation.

RESULTS OF the REVIEW

Notwithstanding the costs of registration and certain LEED™ prerequisites, the results of the initial review are as follows:

Evaluation A: Current Design Status (notwithstanding LEED™ prerequisites)

	LOW-RISE	MID-RISE	HIGH-RISE	AVERAGE[1]
Initial LEED™ points	16	18.5	19	18.33
Initial LEED™ level	N/A	N/A	N/A	N/A

According to the initial evaluation, none of the buildings achieve the lowest level of LEED™ certification. This result was not surprising, considering that the projects had been designed without reference to LEED™ standards.

[1] The *averages* used in this report are a simple average of adding all of the points together from the buildings and dividing by 6. Similarly, the costs per points averages are the sum of the costs divided by the total assumed project costs. No weighting has been used to determine the averages.

Evaluation B: Cost to attain LEED™ Certified

In order to qualify for LEED™ registration, additional work is required. There is a registration cost and a cost for the LEED™ evaluators to complete a final evaluation of the project. A LEED™ certified consultant should be employed to properly compile and document the information. Finally, there is a requirement for additional documentation from the design team in a format that allows LEED™ evaluators to easily complete their work. Costs of registration include:

- the registration fee and the fee for evaluation by LEED™
- a LEED™ professional to carry out the documentation process

All of the projects excluded certain prerequisites required by LEED™ to qualify for registration. The buildings lacked a basic independent (i.e., non-contractor) commissioning, and basic energy modeling which is required to establish the energy performance. In addition, since the buildings cannot ban smoking, a test is required by LEED™ to ensure that individual units do not cross-pollinate corridors or other units. Modifications to the design documentation are also required.

The costs to comply with LEED™ requirements, actual construction costs to attain points to gain the LEED™ Certified status, and supervision and inspection of actual work carried out by the contractor by the design team are summarized as follows:

LEED™ CERTIFIED	LOW-RISE	MID-RISE	HIGH-RISE	AVERAGE
TOTAL AVERAGE COSTS	$450,000	$330,000	$580,000	$475,000
Cost per sf of Building	$4.34	$3.20	$1.78	$1.46
Percentage of Project Costs	1.98%	1.64%	0.89%	1.10%

The impact on the lower rise buildings is due to a number of factors, not the least of which is the lower starting point in terms of the initial LEED™ evaluation. Lower density development negates an easy LEED™ point and has a larger overall impact on the LEED™ requirements costs.

The cost to register a project is $0.01/sf, and the additional cost for evaluation by the LEED™ committee is approximately $5,000. The cost of the LEED™ professional to complete the required documentation will vary according to the value of the building and the LEED™ certification level attempted. Generally, the audit team used a range of $15,000 to $30,000 for LEED™ consultant fees. This amount will reduce as the design teams accumulate more experience with the LEED™ building evaluation tool.

The LEED™ requirements most often not included in market buildings are:

- independent commissioning
- energy modeling
- smoke control modeling and analysis

Some of the point costs are transitory. We have attributed additional costs for using low VOC paints and low VOC adhesives; however, as the use of these products becomes more common, the cost difference will reduce over time. A case in point is recycled carpet. It was initially valued at an additional $5.00/$m^2$ until December of last year. Since that time, recycled carpet has become available in the area at a price less than conventional carpet.

The general strategies for achieving the additional nine points are as follows:

- low reflectivity for roof membrane
- reduction in landscaping irrigation
- reduction in potable water use through low flow fixtures (20% perhaps 30%)
- increased effectiveness of the building envelope or heat recovery to increase energy performance (2 points)
- low VOC adhesives
- low VOC paints
- green carpets
- slight adjustments to the interior design for line of sight to outdoors

Evaluation C: Cost to attain LEED™ Silver

The audit team then investigated the cost and effort to bring the buildings from LEED™ Certified up to the LEED™ Silver standard. In most cases, it was achieved through adding 7 LEED™ points.

The following table summarizes the costs involved:

LEED™ SILVER	LOW-RISE	MID-RISE	HIGH-RISE	AVERAGE
TOTAL AVERAGE COSTS	($10,000)	$65,000	($19,000)	$29,000
Cost per sf of Building	($0.10)	$0.62	$0.06	$0.15
Percentage of Project Costs	(0.04%)	0.31%	0.03%	0.07%

The cost to attain the additional points worked out to be a very small percentage of the project total costs. This was attributable to one factor - a slight reduction in the amount of parking built. The audit team reduced the amount of parking for each project by 5%. These savings paid for most of the additional points required to attain the LEED™ Silver status.

This particular strategy will not be available for all projects; however, there are always synergies within LEED™ points that can reduce the overall cost of the project to reduce the overall cost impact of any additional points that may be required. An integrated design team will search out the potential synergies and bring them for consideration.

The general strategies for the additional eight points were as follows:

- reduction of 5% of the underground parking area
- storm water strategies to reduce site and building runoff and deletion of permanent irrigation for landscaping
- optimize envelope/heat recovery to increase energy performance
- 2 week building flush out (staged) and CO2 monitoring of the suites

Accumulated Costs to Achieve LEED™ Silver

The following table identifies the accumulated cost of achieving LEED™ Silver from the building original status:

ACCUMULATED TOTALS	LOW-RISE	MID-RISE	HIGH-RISE	AVERAGE
TOTAL AVERAGE COSTS	$440,000	$395,000	$580,000	$500,000
Cost per sf of Building	$4.34	$3.82	$1.84	$2.56
Percentage of Project Costs	1.94%	1.94%	0.89%	1.17%

CONCLUSIONS:

1. The South East False Creek site allows for 29 points with little additional or at a slightly reduced cost.

2. The push to LEED™ Silver is possible with a small increase in project costs.

3. The increase in costs will be minimized by system-wide and community initiatives.

4. The push beyond Silver will require attention to the Energy and Atmosphere and Materials and Resources sections of the LEED™ Building evaluation methodology. There will be additional costs for these items, but this can be reduced through system-wide initiatives and pre-design focus.