REGIONAL DISTRICT OF NANAIMO

MEMORANDUM

TO: Paul Thompson
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DATE: April 28, 2008

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SUBJECT: **Green Building Policy for RDN Facilities**

PURPOSE

The purpose of this report is to propose a "Green Building Policy for Regional District Facilities" for the Regional District of Nanaimo (attached as Appendix A). The key feature of the policy is to establish an Integrated Design Process (IDP) as the foundation for all new construction and renovations undertaken by the Regional District.

BACKGROUND

In its simplest terms, the IDP involves establishing a vision, goals and objectives for a building and its performance, and relies on a collaborative design team consisting of a range of consultants engaged at the outset of projects. This sets the stage for a dynamic, flexible and cost-effective approach to green building that maximizes creative input from every member of the design team and ensures early recognition of all available opportunities for innovation and potential synergies across building systems and functions. The IDP stands in contrast to the conventional approach to design and construction that typically relies on an architect, or other prime consultant, to carry a project through a linear sequence of sub-contracted experts, each of whom is constrained by decisions made in previous steps. Opportunities for creative input and green design are correspondingly limited and achieve marginal environmental benefits, or require backtracking and redesign adding potentially significant costs and time to the design process.

The reasons for establishing the IDP as the foundation for a green building policy for RDN facilities are:

- To ensure that all new construction and renovations undertaken by the RDN falls within the scope of a green building policy, including buildings as well as structures not intended for habitation;
- To ensure that optimal energy performance and maximum reductions in greenhouse gas (GHG) emissions associated with building operations are given the highest priority at the outset of all projects;
- To facilitate third-party verified, green building certification (such as through the Leadership in Energy and Environmental Design (LEED®) certification process) by giving close consideration to the most appropriate standard to apply at the outset of each project, while retaining the ability to construct high performance, green buildings and structures in circumstances where certification would not be pursued; and
- To minimize the cost of green building features and certification processes by exploring and capitalizing on opportunities at the earliest possible stage in the design process.

Green Building Action Plan

In February of 2007, the RDN Board of Directors approved the Regional District of Nanaimo *Green Building Action Plan*, which has as its goal, "to increase the number of green buildings in the Regional District of Nanaimo." To achieve this goal, the plan sets out the objective of "establishing a policy regarding green buildings in the region".

To proceed efficiently toward the goal of increasing the number of green buildings in the region while also producing immediate results, two separate green building policies are necessary:

1. A readily implementable green building policy that affects only Regional District facilities; and
2. A policy developed over the longer term that first facilitates, then, upon consultation with local municipalities and approval by the Province, requires the development of green buildings in the region.

The policy under consideration here affects only Regional District facilities. In this form the "Green Building Policy for Regional District Facilities" functions as a policy that governs Regional District operations rather than as a building bylaw, and amounts to the RDN setting specific criteria for construction and renovations it undertakes in the future.

Overview of the Integrated Design Process (IDP)

The IDP is an approach to building design that seeks to achieve the highest possible levels of performance on a wide variety of environmental and social goals, while respecting the budgetary and scheduling realities of a project. Achieving this requires the client (in this case the RDN) and the design team coming together and setting performance targets for a broad range of parameters at the outset of a design process, followed closely by the development of preliminary strategies to achieve those targets. This will necessitate that the RDN play an active role in future projects, working with a multi-disciplinary, collaborative team to establish a shared vision for the project, and to facilitate the decision-making that will realize that vision. This process is based on the fact that changes and improvements in building design are relatively easy to make at the beginning of the process, but become increasingly difficult and disruptive as the process unfolds.

The IDP relies on a basic set of principles, all of which are vital to its success. These principles, their benefits, and potential results are summarized in Table 1 below:

Table 1

IDP Principle	Benefits of Successful IDP	Results
Broad collaborative team from outset	Early formation of a broad interdisciplinary team ensures necessary expertise is present when opportunities for impact are greatest. Collaboration harnesses the team's best effort and collective wisdom.	Realization of challenging goals and objectives.
Well defined scope, vision, goals and objectives	Investing in time up front ensures common understanding and 'buy-in'.	Realization of high performance (sustainable) buildings.
Effective and open communication	Transparency builds trust and increases team's sense of ownership. Respectful communication avoids disputes and harnesses a team's best effort and enthusiasm.	Good team relationships that may result in lasting partnerships for future projects.
Innovation and synthesis	Fostering open-mindedness and creativity leads to innovation and synthesis, which allows the team to achieve the complex requirements of a high performance building.	Maximizes benefits and quality.
Systematic decision making	A clearly defined and understood decision making process can lead to better choices. Tools like life-cycle costing can foster the type of holistic and long-term thinking necessary for sustainable design.	Minimizes cost.
Iterative process with feedback loops	Providing opportunities for feedback along the way allows lessons to be learned from start to finish.	Realization of more optimally integrated solutions.

Source: *Roadmap for the Integrated Design Process Part One: Summary Guide* (page 14).

An important advantage to the IDP lies in the fact that the vision, goals, targets and strategies laid out at the beginning of a building design process relate directly to the specific intent of the building under consideration. These will differ from building to building depending on program, site, budget, schedule or any other of a range of factors, and will evolve as the construction and related industries change over time, or as different priorities emerge over time. The result is a highly flexible, responsive process that produces designs for efficient buildings with minimized additional capital costs for green features, reduced long-term operating and maintenance costs, and designs that are intimately connected to the environmental, social and economic conditions of the day. Furthermore, in addition to enhanced environmental performance, the open, interdisciplinary discussion and collaborative approach that characterizes the IDP may also lead to unpredicted, but very fortuitous improvements in fundamental building components such as functional program, structural systems, and architectural expression.

The IDP stands in strong contrast to the conventional design process, which is much more linear and formulaic. Table 2, below, provides a comparison between the IDP and the conventional design process:

Table 2

Integrated Design Process		Conventional Design Process
Inclusive from the outset	**vs.**	Involves members only when essential
Front loaded – time and energy invested early	**vs.**	Less time energy and collaboration exhibited in early stages
Decisions influenced by broad team	**vs.**	More decisions made by fewer people
Iterative, non-linear process	**vs.**	Linear process
Whole systems thinking	**vs.**	Systems often considered in isolation
Allows for full optimization	**vs.**	Limited to constrained optimization
Seeks synergies	**vs.**	Diminished opportunity for synergies
Life-cycle costing	**vs.**	Emphasis on up-front costs
Process continues through post-occupancy	**vs.**	Typically finished when construction is complete

Source: *Roadmap for the Integrated Design Process Part One: Summary Guide* (page 8).

A New Direction for Green Building Policy

Establishing the Integrated Design Process (IDP) as the foundation for the "Green Building Policy for RDN Facilities" represents a new direction for green building policy that comes as a result of new information shared by experienced and knowledgeable speakers at the "Building Green in a Changing Climate" conference held in Courtenay, March 4-5, 2008, as well the "Building Sustainable Communities" workshop held March 19, 2008 in Nanaimo. It is a move away from the more conventional approach of adopting a policy that would require some construction and renovations undertaken by the RDN to achieve a recognized, certified standard for green building (most likely LEED®-Silver). The reason for this move relates to the various limitations imposed by a certification-based policy, namely the narrow range of building types that can fall within the scope of a certification-based policy, the tendency of a certification-based policy to set an upper limit on building performance, and the disconnect between certification requirements and existing policies and priorities, particularly with respect to energy conservation, greenhouse gas emissions and climate change.

Firstly, regional districts are responsible for providing a very wide range of services. Accordingly, they must build an extremely wide range of building types, housing administrative offices, recreational facilities, transit facilities, and waste and water treatment plants, to name a few examples. This broad range of buildings, including some that are largely unoccupied, or whose primary purpose is to house mechanical systems, does not mesh neatly with certification systems such as LEED® or Green Globes. To base a green building policy on certification would then require identifying the types of buildings that fit within the certification system, and exempting the rest from the policy. For the Regional District of Nanaimo, this would greatly limit the number of buildings falling within the scope of the green buildings policy.

In addition, certification is not free. While the cost may be proportionally insignificant to the budget of large capital projects, that proportion grows in relation to the overall budget as buildings become smaller or less complex. The inevitable result is that local governments often adopt green building policies that apply only to construction exceeding a specific size, often 500 m^2, again exempting the rest. This further narrows the field of buildings that fall within the scope of the green building policy.

By dramatically limiting the scope of a green buildings policy to a narrow range of buildings, potentially great opportunities for innovation in green building may be missed, and progress toward the goal of increasing the number of green buildings in the region is stunted. By contrast, the IDP can readily apply to all buildings, regardless of size, program or function. Every building and renovation project strives to the highest level of performance possible, making all buildings as sustainable or green as possible. On the occasions where certification is appropriate as determined by the RDN and the consultant team, it is established as a goal at the outset of the project, and pursued throughout the process.

Secondly, a certification-based policy promotes designing to the lowest standard permitted, rather than the highest performance level possible. If a specific standard becomes the basis for the policy, e.g. LEED®-Silver, then construction built to that standard will be the best that the RDN will get. This creates a disincentive to go beyond the established standard, which in turn may preclude opportunities to attain much higher levels of performance, even if they are relatively easy to achieve. Related to this, a certification- based standard may also create the potential for a building design process that is checklist driven, aiming at achieving the minimum number of points required for certification. A common critique of this approach is that designers are forced to add elements to a building that are otherwise unnecessary, or construction crews are required to add tasks that accomplish nothing. This is an inefficient use of materials, time and resources, and such tendencies are avoided when building designers follow the IDP.

Lastly, a good green building policy for the Regional District should harmonize well with established policies and priorities. In recent years, the Regional District of Nanaimo has made a strong commitment to reducing greenhouse gas emissions (GHGs), and doing whatever possible to mitigate the effects of climate change. By signing the Climate Action Charter, for example, the RDN has agreed to the goal of implementing programs, policies or legislative actions that facilitate reduced GHG emissions (*Climate Action Charter*, Section 4(d)); and in order to contribute to reducing GHG emissions, the RDN has agreed to develop strategies and take actions to achieve the goal of being carbon neutral in respect of its operations by 2012 (*Climate Action Charter*, Section 5(a)(i)). In addition, the RDN has developed a Corporate Climate Change Plan, which recommends, among other actions, minimizing growth in energy consumption, costs and emissions by adopting aggressive energy efficient standards for new corporate buildings and additions/renovations of existing buildings.

Based on these existing policies and priorities, as well as the widely recognized urgency to significantly reduce GHG emissions, it is important that the RDN's green building policy incorporate aggressive targets that will gradually lead toward carbon neutral buildings. This is far more aggressive than any current certification system. LEED®, for example has some prerequisites for points in the category of Energy and Atmosphere, but the category as a whole can be largely ignored as long as points are made up in another category such as Water Efficiency. As a result, a LEED®-Silver building may consume energy and emit GHGs at almost the same rate as a well built, conventional building, as long as water consumption in that building has been significantly reduced. While reductions in water use are undeniably important, they must not come at the cost of energy conservation, significant reductions in GHG emissions, and the ultimate goal of building carbon neutral buildings.

Carbon neutral buildings will be difficult to achieve, but aiming any lower will result in achieving a lower standard, resulting in a situation over time that will commit the RDN to a complicated and as yet undetermined system of purchasing and trading carbon offsets to achieve carbon neutral operations. Furthermore, the policy does not require the RDN to build carbon neutral buildings immediately. Rather, it establishes incremental targets to build increasingly efficient buildings over time. The critical point is that the concept of carbon neutrality be a prominent item for discussion at the outset of the Integrated Design Process, and that designers contemplate how to get as close to carbon neutrality as possible, for any given project.

ALTERNATIVES

1. That the Board approve the Green Building Policy for RDN facilities.

2. That the Board approve the Green Building Policy for RDN facilities with suggested amendments.

3. That staff be provided with further direction for developing a revised Green Building Policy for RDN facilities.

FINANCIAL IMPLICATIONS

There are two sorts of financial implications to be considered in conjunction with this policy:

1. The financial implications of building high performance, green buildings; and

2. The financial implications of following the Integrated Design Process.

With respect to green buildings generally, consensus across the wealth of available information, including that from speakers at recent conferences seems to indicate that building green results in a 2-5% increase in up-front capital construction costs[1]. It is reasonable to believe that this number is likely to be higher in the RDN due to lack of experience in the construction sector, potentially up to 10%. Accommodating this cost should be incorporated as a contingency in budgetary planning for capital projects. To justify this additional expenditure it is important to measure the life-cycle costs rather than solely the up-front capital cost of a building. Life-cycle costing includes operational costs (energy, water, etc.), as well as employee health and productivity, as examples. These costs, incurred over the life of the building, ultimately exceed the initial construction cost by an order of magnitude, and since the RDN is the owner, operator and occupier of the buildings it develops, it will ultimately have to pay these long term costs. The information available making the business case for green buildings suggests that minimizing these long term costs, and deferring savings to future taxpayers is more financially responsible than saving a small amount in the short term, and deferring unpredictable, and potentially high costs to future taxpayers. In addition, as other levels of government have made climate protection and energy efficiency a priority, there are currently significant loans and grants available to local governments that invest in the construction of green buildings and infrastructure. Pursuing these opportunities may further offset up-front costs, and justify a strong commitment to green building.

Regarding the Integrated Design Process, it is widely acknowledged that the IDP is the most effective way to minimize the additional construction costs associated with building green, including third-party certification when it is pursued. However, the collaborative nature of the process necessitates additional time and meetings at the pre-design and schematic design phases of projects, weighting design costs toward the beginning of a project, particularly when compared against the traditional model. Nevertheless, it is frequently noted that making this investment early does not increase the total cost of building design, and can in fact eliminate costly and time-consuming disruption later in the process, ultimately saving time and preserving relationships between clients and members of the consultant team.

[1] This is a consistent range whether 'green building' has meant LEED®-Silver, LEED®-Gold, or carbon neutral. The key cost variable generally cited for green building features is whether the features are contemplated early or late in the design process. If early, then the cost can be kept relatively low; if late then the cost is often prohibitively high.

DEVELOPMENT IMPLICATIONS

This policy is anticipated to have relatively significant development implications for the Regional District of Nanaimo, affecting all future construction and building renovations. The most noticeable immediate implication will be a shift in the development process, putting greater emphasis on consultant collaboration at the outset of all projects. This is by no means a difficult task, but it does constitute a departure from the traditional development model, and will require language about the Integrated Design Process to be integrated into Requests for Proposals for RDN development projects. As construction projects proceed, and as consultants gain comfort with the IDP, wider development implications are expected, including a maximum number of buildings operating at the highest possible level of performance, with ever-diminishing impacts on the environment.

As well, adopting this policy is expected to have a gentle ripple effect across the development sector in the region as the number of development consultants contracted to the RDN expands. As time passes, more consultants working with the RDN will become familiar with the IDP, catalyzing a transition to more collaborative, integrated design in the development sector. Hopefully, over time, by taking on this role, the RDN will facilitate the development of more green buildings in the wider community.

ENVIRONMENTAL IMPLICATIONS

By adopting this policy, it is anticipated that all new construction and renovations undertaken by the Regional District of Nanaimo will achieve a high standard of environmental performance. The result will be a trend toward increasing the number of buildings in the regional district that require less energy to operate, contribute fewer emissions to the environment, conserve water, generate less solid waste, provide more comfortable and productive interior environments for occupants, and are more sensitive to the local ecology and surrounding context.

PUBLIC CONSULTATION IMPLICATIONS

Adopting and implementing the "Green Building Policy for RDN Facilities" does not require public consultation. Once adopted and in effect, the policy will create opportunities for public outreach and education, thus fulfilling other objectives of the *Green Building Action Plan*.

SUMMARY

With the IDP as its foundation, the entire range of building construction and major renovation projects undertaken by the RDN will fall within the scope of the green building policy. This encompasses far more development than can be considered by a third party-verified certification system such as LEED®. As a result, the RDN will have the flexibility to establish specific goals that achieve the highest possible levels of environmental performance for each project, while acknowledging that the highest possible levels of performance will have a different meaning for different projects.

In addition, basing a green building policy on the IDP enables the RDN to establish aggressive targets for energy efficiency and GHG emissions reductions. Given the urgent need to act on climate change, as well as the responsibility of the RDN to act as a result of existing policies and commitments, emphasizing energy efficiency and GHG reductions should be a fundamental component of a green building policy. Since it is possible to achieve green building certification (e.g. LEED®–Silver) without making significant improvements in energy efficiency or GHG reductions, it is essential to include these features as additional, high-level priorities in the "Green Buildings Policy for Regional District Facilities".

Nevertheless, third party verified green building certification has value, particularly as a tool to promote the awareness that the RDN is committed to green building. There will be circumstances in which certification should be pursued, and the Integrated Design Process facilitates that pursuit by setting the goal to do so at the outset rather than at the end of the design process.

Finally, both green building and the Integrated Design Process will result in extra investment in the initial design and construction phases of projects. In order to justify these added costs, the "Green Building Policy for RDN Facilities" will require life-cycle costing when calculating the cost of a building. Since the RDN will have to pay for these long term costs, they should be considered in the budgetary planning for new buildings and renovation. Doing so will reveal that additional initial investment can yield considerable savings over the life of buildings.

RECOMMENDATION

That the Regional District of Nanaimo adopt the "Green Building Policy for RDN Facilities".

Report Writer	General Manager Concurrence
Manager Concurrence	CAO Concurrence

COMMENTS:

Appendix A

REGIONAL DISTRICT OF NANAIMO

P O L I C Y

SUBJECT:	Proposed Green Building Policy for RDN Facilities	POLICY NO: CROSS REF.:
EFFECTIVE DATE:		APPROVED BY:
REVISION DATE:		PAGE

1. An Integrated Design Process (IDP) will be the foundation for all new construction and renovations undertaken by the Regional District of Nanaimo.

    a. The IDP consists of seven phases, each with a particular process and outputs, as identified below. While all projects will be unique, this summary provides a useful guide in establishing the expectations for what an Integrated Design Process undertaken by the RDN should entail:

        i. Phase 1 - Pre-Design

        Process:

        - Establish a diverse team, include a facilitator;
        - Establish a foundation for the team, including fee schedules that provide incentives for consultants to incorporate high-performance, green building systems; and
        - Host key meetings including project preparation, visioning workshop, programming meeting, facilities management, etc.

        Outputs of Pre-Design:

        - Vision statement, goals, objectives and targets;
        - Pre-Design Report, including synopsis of visioning workshop;
        - Preliminary budget that includes cost of IDP activities; and
        - Communications protocol.

        ii. Phase 2 - Schematic Design

        Process:

        - Ensure an understanding of site challenges and opportunities;
        - Clarify functional program and program implications across disciplines; and
        - Host ongoing meeting as necessary to brainstorm, develop concepts, evaluate and refine ideas, and for team cohesiveness;

        Outputs of Schematic Design:

        - Goals and targets matrix;
        - Preliminary energy analysis;
        - Preliminary financial estimate;
        - Schematic design report; and
        - Roles and responsibilities matrix.

        iii. Phase 3 – Design Development

        Process:

- Introduce new/ additional specialists to the team, as necessary,
- Assess feasibility of green building strategies and technologies; and
- Simulate building performance, as required.

Outputs of Design Development:

- Design development report including energy simulation results;
- Detailed financial report using life-cycle costing; and
- Updated goals, roles and responsibilities.

iv. Phase 4 - Construction Documentation

Process:

- Coordinate Construction Documents between all disciplines;
- Include green building aspects in Construction Documents; and
- Ensure that the impacts of all changes are evaluated.

Outputs of Construction Documentation

- Project specifications with embedded performance criteria;
- Material substitution policy;
- Tender documents with clear explanation of innovative aspects, contractor responsibilities for green building documentation, and training and supervision of trades/ sub-contractors;
- Develop commissioning plan; and
- Updated goals, roles and responsibilities.

v. Phase 5 – Bidding, Construction and Commissioning

Process:

- Transition from the design team to the construction team;
- Train maintenance and operations staff and occupants;
- Include performance criteria in contract documents;
- Host pre-tender award meeting to discuss green design intent;
- Host an information session for contractor and trades; and
- Host regular site meetings.

Outputs of Bidding Construction and Commissioning

- Record drawings of the build project;
- Commissioning reports; and
- Operations and maintenance manuals as necessary.

vi. Phase 6 - Building Operation (Start-up)

Process:

- Transfer of knowledge between design team, commissioning agent, building operator and occupants;
- Transfer of all building documentation to owner;
- Establish tools and/ or process for ongoing monitoring;
- Share lessons learned; and
- Educate staff and occupants about green building features.

Outputs of Building Operations (Start-up):

- Training, education and outreach materials;
- Measurement and monitoring data; and
- Completed commissioning documentation

vii. Phase 7 – Post-Occupancy

Process:

- Establish a building performance evaluation team with a budget and meeting schedule, as necessary; and
- Put monitoring equipment and/ or methods in place.

Outputs of Post-Occupancy

- Continuous monitoring and evaluation of building performance.

b. In order to follow an Integrated Design Process, a diverse and knowledgeable team is required. This will vary, potentially significantly, from project to project. The following list indicates the range of team members that the RDN may need to draw from at the outset of an Integrated Design Process:

Core Team	Additional Team Members (as necessary)
RDN Representative/ Project Manager	Ecologist
Facilitator	Occupant representative
Architect	Programming specialist
Landscape Architect	Interior designer/ materials specialist
Structural Engineer	Planner/ Building Department representative to highlight code or other regulatory issues
Mechanical Engineer (with experience in energy modelling and analysis)	Lighting and daylighting specialist
Electrical Engineer	Soils or geotechnical expert
Green Design Specialist	Commissioning Agent
Civil Engineer	Others as required
Facilities Manager	
Cost Consultant with experience in Life-Cycle Costing	
General Contractor	

2. Within the context of an IDP, the RDN will set the goal that all new construction and major renovations will maximize building performance, optimize energy efficiency and minimize greenhouse gas (GHG) emissions as measured in annual tonnes of carbon dioxide equivalent (CO_2e). Based on the urgent need to achieve significant reductions in GHG emissions in the immediate term, use the concept of 'carbon neutral' buildings to guide discussion at the outset of the IDP for capital projects, and achieve the following:

   a. 50% reduction in tonnes of CO_2e for all new construction and major renovations starting in 2010, relative to the Model National Energy Code, and as measured by an energy modelling specialist;
   b. 60% reduction in tonnes of CO_2e for all new construction and major renovation between 2012 and 2014 relative to the Model National Energy Code, and as measured by an energy modelling specialist;
   c. 70% reduction in tonnes of CO_2e for all new construction and major renovation between 2015 and 2019 relative to the Model National Energy Code, and as measured by an energy modelling specialist;

d. 80% reduction in tonnes of CO_2e for all new construction and major renovation between 2020 and 2024 relative to the Model National Energy Code, and as measured by an energy modelling specialist;
e. 90% reduction in tonnes of CO_2e for all new construction and major renovation between 2024 and 2029 relative to the Model National Energy Code, and as measured by an energy modelling specialist; and
f. All new construction and major renovations are carbon neutral by 2030.

3. At the outset of the IDP for capital projects, consider the goal of achieving third-party verified, green building certification for all new construction and major renovations. Target LEED Gold (or equivalent), and achieve a minimum of LEED Silver (or equivalent), including registration and certification for new construction and renovations over $500m^2$ with the majority of floor space devoted to tenant use and occupation.
4. Require that a green building specialist (e.g. LEED Accredited Professional) is involved in all capital construction projects.
5. Use the life-cycle costing approach in budgetary planning for major capital projects.
6. Use the IDP to generate educational materials to encourage learning and awareness of green building practices for staff within the RDN and for people in the wider community.
7. Review and adapt the IDP as the foundation for the Green Building Policy for RDN buildings after five years, or upon recommendation from staff and/ or the RDN Board of Directors.