Learning Facilities

Minister's Symposium on Schools Implementation Plan

Recommendation Subcommittee Reports

Alberta INFRASTRUCTURE

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Minister's Symposium on Schools Implementation Plan

Sustainable School Buildings Subcommittee Report

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Sustainable School Buildings

SUBCOMMITTEE STAKEHOLDER REPRESENTATION

- Alberta Association of Architects
- Alberta Construction Association
- Alberta School Board Association
- Association of Professional Engineers, Geologists, Geophysicists of Alberta
- Association of School Business Officials of Alberta
- College of Alberta School Superintendents
- Consulting Engineers of Alberta
- Council of Education Facility Planners International
- Keen Engineering
- Royal Architect's Institute of Canada
- School Plant Officials Society of Alberta

Subcommittee Chair: John Gibson, Alberta Infrastructure

External Consultant: Martyn Phillips, Team Focus Group

Learning Facilities Branch, Alberta Infrastructure

Project Director: Doug Ramsey, Alberta Infrastructure

Sustainable School Buildings

EXECUTIVE SUMMARY

The mandate of the subcommittee is to support the establishment of a performance framework for the development of sustainable school buildings. This includes addressing the following issues:

- Determine desired outcomes, such as sustainability, multi-functionality, flexibility and what incentives could be used to obtain them.
- Consider how life-cycle considerations can be incorporated by utilizing both capital and operational/maintenance funding.
- Test and develop these approaches by incorporating them into a pilot project.

The subcommittee membership was comprised of representatives from the Alberta Association of Architects, the Alberta Construction Association, the Alberta School Board Association, the Association of School Business Officials of Alberta, the Association of Professional Engineers, Geologists, Geophysicists of Alberta, the College of Alberta School Superintendents, the Consulting Engineers of Alberta, the Council of Education Facility Planners International, the Royal Architect's Institute of Canada, the School Plant Officials Society of Alberta, selected consulting companies, and Alberta Infrastructure.

The subcommittee discussions are based on considerations of the parallel aspects of the "triple bottom line", namely: economics, environment and social. The focus of this sub-committee is on design and construction rather than strategy and planning,

The following vision for school buildings has been identified: **"Alberta's school buildings will efficiently and economically meet the life-long learning needs of the community, for both the present day and the longer term".**

Subcommittee recommendations are as listed below:

1. Establish a Performance Framework for the Development of Sustainable School Buildings.

2. Establish a Systematic Process for Ensuring Appropriate Value of School Buildings Projects.

3. Develop a Strategy for Education and Promotion of Sustainable Design.

EXECUTIVE SUMMARY (Cont'd)

4. Introduce Rating Systems For Sustainable Schools Buildings Development.

5. Develop Guidelines To Maximize Recycling And Re-Use Of Materials/Elements.

6. Introduce Incentives To Meet Sustainable Goals.

7. Introduce a Benchmarking System for Sustainable Building Projects.

8. Incorporate Multi-functionality and Flexibility for Community Needs.

INTRODUCTION

Background

The Minister's Symposium held in December 2001 provided the following direction:

- Designs should be sustainable.
- An environmental assessment system should be used to set goals.
- Design fees should provide incentive for meeting goals.
- Alberta Infrastructure should educate and promote sustainable design and set benchmarking standards.

This subcommittee was established to address the following issues:

- Determine desired outcomes, such as sustainability, multi-functionality, flexibility and what incentives could be used to obtain them.
- Consider how life cycle considerations can be incorporated by utilizing both capital and operational/maintenance funding.
- Test and develop these approaches by incorporating them into a pilot project.

Mandate of Subcommittee

To support the establishment of a **performance framework** for the development of sustainable school buildings.

Scope of Subcommittee

- Review "green" construction concepts.
- Review rating systems for sustainable buildings.
- Consider guidelines for construction and demolition of buildings that maximize recycling and re-use of material.
- Consider incentives in design fees that meet sustainable goals.
- Review design and construction value improving practices.

General Position

Several handouts and presentations were received and discussed:

Ref.	Topic	Submitted/ Presented By	Organization Represented
1.	Introduction and Overview	John Gibson	Alberta Infrastructure
2.	Evaluating and Achieving Sustainable Buildings	Stephen Carpenter	Intermodal Engineering
3.	How Green is Green? The Role of Building Environmental Assessment Methods	Professor Raymond Cole	School of Architecture
4.	Going Green	Mike Kennedy	AS&U Magazine

INTRODUCTION (Cont'd)

5.	Review of School Construction and Operating Costs Committee – Interim Report and Preliminary Findings	Jon Lord, MLA	School Construction and Operating Costs Committee
6.	Review of the Draft Report of the School Construction and Operating Costs Committee	Len Rodrigues	Alberta Association of Architects
7.	School Building Deconstruction – Reuse in Alberta: Red Deer, A Case Study	Craig Webber	Group 2 Architecture
8.	Green Buildings and the LEED (Leadership in Energy and Environmental Design) System	Vivian Manasc Tony Grice	Manasc Isaac Architects
9.	Value Improving Practices and Life Cycle Considerations	Martyn Phillips	Team Focus Group
Presentation/Discussion considered by deferred:			
10.	Benefits and Incorporation of Design Fee Incentives	Subcommittee Report Recommendations will require a subcommittee to review.	AAA-APEGGA Joint Board of Practice

Focus

The subcommittee discussions are based on considerations of the parallel aspects of the "triple bottom line", namely:

- Economics
- Environment
- Social

School boards are now expected to accommodate other programs within their facilities to support life-long learning of all community members. A new way of providing educational services is thought to be essential for school boards and communities to address changing curricula, declining enrolments and community needs. Increasingly, schools are becoming multi-use facilities. Accordingly, new school facilities and preservation of existing facilities need to take into account the trend toward integrated multi-agency facilities.

The focus of this subcommittee is on design and construction. Other subcommittees are dealing with strategy and planning, which are earlier in the project development sequence. However, aspects of design and construction have to be considered during the early planning stage. In this regard, the strategic recommendations of other subcommittees should include direct reference to sustainable school buildings.

INTRODUCTION (Cont'd)

Sustainable principles for planning and design incorporate the philosophy of multi-purpose buildings as opposed to single purpose buildings. This philosophy is being reviewed by other subcommittees, primarily Recommendations #4 Subcommittee, Functionality and Utilization (School in the Community). Other subcommittees affected are Recommendation #1, Alternate Procurement (P3), Recommendation #3, Planning and Design Process and Recommendation #5, Use of School Reserves.

PRINCIPLES

The Minister's Symposium on Schools recommended that the principles/philosophy of sustainable design/construction be applied to all school projects (preservation and new construction).

- The sustainability process is to look at accepted solutions and their viability, i.e. are core schools appropriate.
- Principles of sustainability be applied to all projects including Building Quality Restoration Program, Plant Operation and Maintenance, e.g. roofing, painting, what you are using to clean the school.
- The philosophies of sustainability are being applied to both private and public projects.
- Sustainable projects takes into account of all stakeholders and partners.

VISION

The following vision for school buildings has been identified:

"Alberta's school buildings will efficiently and economically meet the life-long learning needs of the community, for both the present day and the longer term".

LIFE-LONG LEARING

Life-long learning is the process by which people acquire and apply knowledge and skills throughout life to help them reach employment goals, enjoy a high quality of life, and be active and responsible citizens. Life-long learning begins in early childhood and continues into senior years. Life-long learning enables Albertans to participate and contribute in an ever-changing economy and society. (Definition based on the draft definition of Life-long Learning provided by Alberta Learning.)

SUBCOMMITTEE OBSERVATIONS

Sustainability:

Sustainable school buildings should meet the needs of the present without compromising the ability of future generations to meet their needs.

Sustainability is measured in three areas:

- Financial – the project must provide appropriate value to the community. Environmental – must be an "environmentally friendly" building. *Social – must meet the needs and future requirements of the whole community.

*Green Construction Concept:

Symposium delegates indicated "Green Building" design and construction concepts should be applied to schools. These concepts lead to buildings that offer superior performance in a variety of areas that will decrease life cycle costs without necessarily increasing capital costs demands on the Province. The Canada Green Building Council has been formed to accelerate the design and construction of Green Buildings across Canada. The U.S. Green Building Council promotes buildings that are environmentally responsible, profitable and healthy places to live and work. Members of the U.S. Green Building Council representing all segments of the building industry developed the LEED (Leadership in Energy and Environmental Design) Green Building Rating System™. LEED is a voluntary, consensus-based U.S. national standard for developing high-performance, sustainable buildings.

LEED recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources. It is intended that LEED Canada standards will soon be available. LEED rating considerations include:

- Functionality (the highest order function is that the facility assists in achieving the required learning outcomes).
- Energy consumption and related air emissions.
- Water consumption.
- Quality of the indoor environment (air quality, thermal comfort, lighting).
- Hazardous, solid and liquid waste management.
- Site disturbance/enhancement and storm water management.
- Longevity (durability, adaptability to retrofit systems changing building user needs).

SUBCOMMITTEE OBSERVATIONS (Cont'd)

- Multifunctional and adaptable to other uses over time. The building addresses the needs of life-long learning and the community.
- Materials, methods and resources.

Different standards of LEED apply to different situations. It has been asserted that the LEED Silver standard is no more expensive than a comparable non-sustainable design. It has yet to be substantiated if this statement applies to first costs or total life cycle costs.

It should be noted that, while gaining acceptance and popularity, the LEED system is still under development and has to be adapted to Alberta's special circumstances.

One of the Symposium recommendations was that Infrastructure take the lead in promoting sustainable design in school buildings. There should be a position at Alberta Infrastructure to promotes sustainable buildings and would have access to other resources in the government. The school exercise could be used as a model and expanded into other government building projects. This is a full-time position, works with the Canadian Green Building Council, Climate Change Central, Federal Government initiatives and other corporations. One person with a budget to use other government resources and consultants is required.

SUBCOMMITTEE RECOMMENDATIONS

Recommendation #1

Establish a Performance Framework for the Development of Sustainable School Buildings

The performance framework will require industry acceptance of the definition of sustainability as it applies to school buildings. It will also require the setting of attainable performance standards and means of performance measurement. Considerations will range from land use, through consumption/depletion of materials and fuels to emissions of harmful gases, carbon dioxide and disposal of construction waste.

Recommendation #2

Establish a Systematic Process for Ensuring Appropriate Value of School Buildings Projects

Building is viewed as a holistic process that identifies current issues, programs' future issues and uses. The subcommittee recommends Alberta Infrastructure and school boards use the value management process on projects. This may range from:

- strategic value management for program focus – to determine options for clear, unambiguous and workable business strategies prior to commitment to develop projects
- value analysis for the project concept – to ensure optimum functionality and cost effectiveness and to confirm/modify the project budget requirements
- value engineering at the project development stage – to "tighten" project proposals and ensure maximum cost efficiency within the allocated budget
- value improvement – to analyze and optimize an in-service program of a facility.

Capital budget allocations need a connection back to life cycle process - the pressure of sustainability is that the capital up front costs may be higher but there will be predicted savings in life cycle costs. The value management process balances initial and life cycle costs.

Recommendation #3

Develop a Strategy for Education and Promotion of Sustainable Design

There is strong need to promote widely the concept of sustainable design and construction, along with ensuring appropriate training within the industry and client personnel.

- Alberta Infrastructure can lead by implementing the recommendations put forward by the subcommittee. There must be investment by government into the project.

SUBCOMMITTEE RECOMMENDATIONS (Cont'd)

- Need to educate on Sustainable Buildings Philosophies/Process and LEED Measurement System.
- Alberta Infrastructure would work with other agencies, government departments' corporations and other stakeholders to promote sustainable buildings. Promote sustainable building practices that an individual building achieves.
- The student community should understand sustainable philosophy and technologies as part of the curriculum.

Recommendation #4

Introduce Rating Systems For Sustainable School Buildings Development

Consideration should be given to the use of the LEED system for school projects.

- Use the LEED rating system as a guideline for the sustainable building process. People need to have the right tools to achieve the sustainable building goal.
- The LEED system is becoming the industry standard across North America and the subcommittee recommends that the LEED system be adopted.
- Minimum "LEED Certified" and "LEED Silver" as the Provincial Goal.

A matrix should be developed to illustrate the LEED process, levels and related benefit-cost implications.

Recommendation #5

Develop Guidelines To Maximize Recycling And Reuse Of Materials / Elements

The subcommittee recommends that philosophy of recycling and reuse of materials/elements be used in all projects including modernization and new construction.

- By adopting the LEED system the above issues are built into the process.
- There needs to be an inventory system of materials that could be recycled and reused across the province.
- Reuse of materials will affect procurement policy, as it could be sole source.
- Recommend specifications be reviewed and revised to allow for reuse and recycling of materials (part of a review of all Alberta Infrastructure specifications to allow for the philosophies and concepts of sustainability).

SUBCOMMITTEE RECOMMENDATIONS (Cont'd)

- Timing of project funding could allow school jurisdictions to design the project to allow time to go through value engineering sessions. Funding rollout is split, funding for design and value engineering then approval of total budget.
- Requirements within the Planning and Design process and the Capital Manual for project planning require value management planning. Sustainable philosophy should be integrated into the learning plans and facility plans. There is a lack of expertise with the school boards.
- A subcommittee should be formed to review and revise the Alberta Infrastructure Specifications.

Recommendation #6
Introduce Incentives To Meet Sustainable Goals.

- Redistribution of the fee and time allocation across the project design and development process is necessary. A subcommittee should be established to review U.S. models and develop an incentive framework in Alberta to attain sustainability goals.

Recommendation #7
Introduce a Benchmarking System for Sustainable Building Projects

This specifically supports Recommendation #1.

The government should fund four pilot LEED Silver projects at no additional capital cost to the province. There would a rural and urban new school projects, and rural and urban preservation projects.

For the purpose of the pilot projects, experienced LEED certified consultants should be used. The process should be documented for use by Alberta Infrastructure for other projects

A base case(s) should be selected from recent projects. The results of the pilot projects would be compared against the base case(s) to compare the following (example) metrics:

- Capital cost per square meter
- Annual operating costs
- Cyclical renewal liabilities
- Simplicity of operations and maintenance

SUBCOMMITTEE RECOMMENDATIONS (Cont'd)

- Reliability
- Functionality
- Subjective criteria such as appearance and user satisfaction.

Such information categories should be included in AI's formal asset management database.

Recommendation #8

Incorporate Multi-functionality and Flexibility for Community Needs

Bonus points could be put in place in the capital approval process to promote multi-functionality and flexibility for community needs.

This refers to the framework being developed by Recommendation #4 Subcommittee. This is part of the planning that a board does prior to the capital applications put forward by the school boards. P3 projects Public/Public – Private/Public criteria and framework will also address multi-functionality and use.