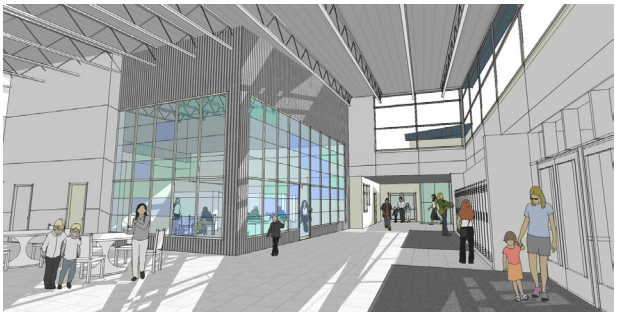
Standard Core Elementary Schools - 600 Capacity

Design Development Short Report

October 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION



October 2007
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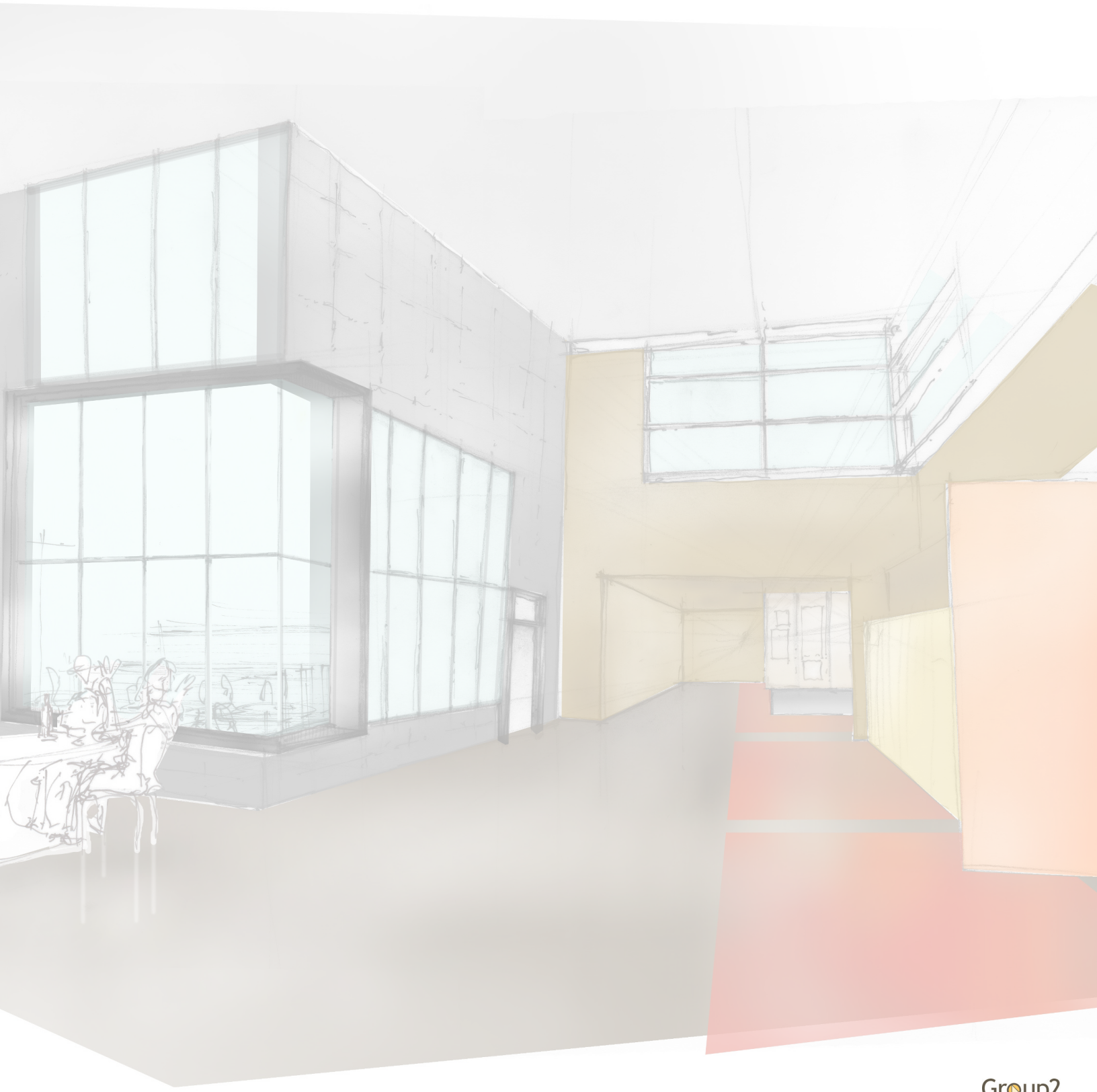
Group2
architecture
engineering



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Project Team

Prime Consultants	Group2 Architecture Engineering Ltd.
Architectural	Group2 Architecture Engineering Ltd.
Structural Engineering	Group2 Architecture Engineering Ltd.
Mechanical Engineering	Hemisphere Engineering Inc.
Electrical Engineering	Hemisphere Engineering Inc.
Energy Modeler	Hemisphere Engineering Inc.
Cost Consultant	Hanscomb Limited

1.0 Context and Framework for Facility Development

The design of a prototype school includes many challenges related to variations that can not been known prior to planning of each individual use of this design. To mitigate as many challenges and attempt to anticipate many variations and opportunities, we have planned the project with variable components. These components are site configuration, passive solar opportunities and other variations that may be required.

- Assumptions have been made to design to a generic site.
- Project goals and objectives have been described and have guided the facility development.
- Program area and permanent core space has been adjusted to accommodate realistic scenarios.
- Design target ratios have been pursued and attained with the current design.
- Learning space accommodation area has been maximized.
- The building footprint has been rationalized in a simple block arrangement.
- LEED® strategies have been identified and analyzed.
- Building core has dictated an in depth analysis of Building Code related size and classification.
- School Building Design has followed:
    - The School Infrastructure Manual (SIM)
    - Design and Construction Standards and Guidelines for school facilities (Green Book)

2.0 Project Goals and Objectives

The overall planning goals for the Standardized Elementary Core (600 Capacity) School design focused on five primary key areas:

- Flexible use of space
- Enhance learning
- Best value for money
- Safe and accessible
- Reflect responsible stewardship
- Site Adaptability

3.0 Concept Design

The site concept design as shown on Figure 2.

3.1 Program and Area Summary

Total Target 600 capacity Core School Area:

Initial Area

Space allocation for standard 600 capacity core elementary	2918m^2
Modular classrooms (full build out) 17 @ 100m^2	1700m^2
Total Build Out Gross Area	**4618m^2**

3.2 Building Design Intent

Several innovative and unique design features have been incorporated into the schematic design of this facility that will ensure a contemporary statement of educational services.

The design of this project originated with an evaluation of the program requirements and the education needs of an elementary school.

- Classrooms with sinks to respond to curriculum delivery
- Access to a project center to allow educational flexibility: providing for unique project work, specialty classes, music, art, gym, etc.
- Access to small instructional spaces such as break-out rooms for individualized instruction, testing, small group work, etc.

From this point, the number of permanent classrooms was derived and the development of the key components of the overall plan including the classroom neighbourhood configuration was undertaken. The plan is developed to establish key points for modular classrooms attachment to the school. The plan identifies the core school permanent construction and the modular configuration.

3.2.1 Floor Plan Rationale

The configuration of the floor plan is developed from a centralized core area of gymnasium, library and student gathering space surrounded by two identical classroom neighbourhoods, separated by a centralized street facing administration suite. This centralized administration allows for a safe and secure control point into the school and the ability to monitor a relatively short corridor circulation system.

Classroom Neighbourhood

Developed out of the educational strategy, themes for the delivery of educational services have prompted the incorporation of open and focused learning areas in all aspects of the design. The classrooms have been organized to include open areas (flexible space) as well as focused learning opportunities in the break out rooms within the classroom neighbourhood.

This innovative combination of open learning spaces and focused learning areas allows for increased flexibility of use. Larger groups working on multiple projects and collaborative team teaching initiatives can also be accommodated in this arrangement. The pods are also planned around a project centre to allow for a variety of activities. The project enters could provide additional sinks for wet work needs

Site Concept Design - Figure 2

such as art and science. This area can be opened to the pod or to the corridor to allow incorporation into the classroom neighbourhood for work or student gathering and adds to the community of each pod.

The neighbourhood component also includes accommodation of curriculum storage, project center storage, breakout rooms and washrooms. All of these components will be available for use by the students in the modular classrooms added to the facility. The design of the plan provides these elements in close proximity to the modular classrooms which are an extension of the learning neighbourhood with equal access to the teaching resources of the pod area.

Flexibility

Flexibility in the design is essential to allow individual School Boards and schools to adapt the prototype to respond to their unique teaching and learning requirements. The classroom neighbourhood responds to this providing an array of additional teaching / learning tools on resources such as breakout rooms, project centers, etc. This allows the design to meet a variety of circumstances such as special education requirements, small class sizes, seminar based instruction, individualized instruction, and collaborative learning. An enhanced level of flexibility is developed in the plan by creating 3 strategic areas of the design that can support a variety of teaching methodologies. The 3 areas are:

1. Team Teaching Classroom Area
2. Project Centre / Neighbourhood Core
3. Transitional Classroom Area

By varying these strategic areas over 200 different plan configurations are possible as well as the ability to provide customized configurations not anticipated by these designs. The design of these areas has been developed to allow a high degree of flexibility and adaptability both initially and over the life of the facility. This adaptability is achieved with minimal impacts on building structure, envelope, or mechanical systems. This allows flexibility without modifying the base design elements. This is more cost effective and avoids negative impacts of inflation associated with delays in meeting the anticipated rapid delivery.

Each of the three strategic areas have several configurations which can be considered. These can be combined togehter dependant on educational direction and work together to support differeing means of delivery.

1. Team Teaching Classroom Area

Flexibility of the design allows for three (3) configurations of team teaching classroom providing 1 or 2 sets of team teaching areas per classroom neighbourhood. Team teaching classrooms can be provided through the inclusion of operable walls or the walls can be constructed as standard walls if this form of flexible instructional space is not desired by the School Board.

2. Project Centre / Neighbourhood Core

The design of the neighbourhood core can adapt with numerous different configurations providing a high degree of customization to meet the needs of educators and students. This flexibility allows the design to meet a variety of needs. These include:

- Providing increased area for Physical Education
- Increased Project Centre size
- Increased number of Break-out rooms

- Increased amount of Flex space or Active Learning space (this can be developed as a single larger space or two smaller spaces to enhance adjacencies to other classrooms)
- Providing the ability to access multiple Seminar Rooms of varying sizes
- Provide for Curriculum storage

3. Transitional Classroom Area

The classrooms directly adjacent to the school core from both classroom neighbourhoods have been designed to accommodate several modifications that allow these classrooms to function in three (3) ways:

1. Supports to the Learning Neighbourhood
2. As supports to the main school core
3. As transitional space that can link both areas

The designs can respond to various factors such as:

- Providing increased Break–out space
- Enhancing the Flexible space/Active Learning area
- Providing Instructional area and Seminar rooms available to the school core
- Providing larger Instructional areas
- Opening to the school core allowing gathering space to be expanded or to act as a performance area stage for the gathering space

The classroom neighbourhoods, composed of conventional classrooms with open and focused learning spaces are clustered around the central services and administration suite. These classroom neighbourhoods, in turn, identify an area for the modular classrooms to be attached to the school.

Gathering and Library

Similarly, the library design will incorporate this combination of open and focused learning areas. A sliding glass partition between the focused learning area of the library and the adjacent gathering space will allow for additional flexibility of use.

The gathering space is located at the core of the school for student use, community gatherings of the school and other opportunities. This space will be designed to allow for technology, collaborative group use and, potentially facilitate seating for a stage production in the gathering area.

This added flexibility of the gathering space will provide a higher utilization of this area.

Administration Suite

The administration suite has been situated adjacent to two possible entrances. The location of this element allows two immediate options for administration placement to meet site specific variations on the site that may be present. At this location, the site can be viewed from the suite and provides a clear location for visitors to attend. A security grille installed in the opening to reception, permits the entire suite to be secured for after hours access.

Within the suite, the reception area is located facing the gathering area and allows for a secondary door from the main entrance directly into the administration area. This anticipates the need for schools to lock their doors during school hours for the safety of the students and provides the administration the opportunity to screen any potential visitors to the school.

The offices, infirmary, breakout room, storage and work carrels are all located within one area of the suite. Adjacent to this area, separated by a door, is the staff lounge, workroom and staff washrooms. These last areas can be accessed off of the corridor without passing through the reception area to minimize interruptions.

Gymnasium, Gym Services, and Mechanical Electrical Room

Designed as an additional component to the floor plan, this includes the Gym, change rooms, chair storage, gym storage, and stairs to the mechanical room above the change room areas. The change rooms will be developed to include benches for changing, a single washroom and shower for each room. Additional Showers may be added to assist obtaining a LEED® credit for alternative transportation. The mechanical room has bee situated over the change rooms to take advantage of the height of the gym and access for distribution for services.

4.0 LEED® Overview

At the onset of the project it was established by Alberta Infrastructure and Transportation that the Standard Core Elementary Schools be designed to target sufficient LEED® points so that once a project site is identified LEED® Silver under LEED® Canada new construction v. 1.0 is attainable.

Current Project Standing

The LEED® Scorecard currently indicated a LEED® Silver standing at 38. This assessment reflects only the content incorporated into the Design Development Report and the credits that appear well within reach assuming current initiatives are completed. Items discussed as potentially viable for this project but which cannot be confirmed from information in the Design Development Report are itemized under the “MAYBE or ?” column. There are currently 6 credits in the column.

5.0 Structural System

All structural elements will be designed to meet the requirements of Part 4 of the Alberta Building Code (1997), ABC (1997).

Although the noted geotechnical evaluation suggests a strip and spread footing foundation, due to an anticipated three levels of underground parking (as part of the proposed office building project for which the geotechnical report was prepared), Group2 is recommending the foundation construction should consist of bored cast-in-place concrete end-bearing piles (founded in the clay till at a minimum of 5.5m below existing grade), supporting cast-in-place concrete grade beam around the perimeter of the building. Bored cast-in-place concrete end-bearing piles (founded in the clay till at a minimum of 5.5m below existing grade), and cast-in-place concrete pile caps supporting the structural steel columns will be used on the interior of the building. It could be anticipated that allowable bearing capacities listed in the report could be used.

Main Floor

The main floor slab throughout the building will be a 125mm thick cast in place concrete slab on grade reinforced with 10M @ 400o.c. E.W. supported on a minimum of 150mm granular fill compacted to a minimum 98% maximum density. Depending on the floor finishes specified; an under-slab vapor barrier may be required.

Superstructure

The building superstructure will consist of structural steel post and beam construction with some areas of load bearing concrete block walls. Open web steel joists will be used to support roof or floor deck, which will in turn be supported by structural steel beams and columns. The structural steel beams supporting roofs will be designed as cantilever (Gerber) girders, where possible, to optimize steel capacities and sizes. Structural steel beams supporting open web steel joists that will support cast in place concrete toppings on metal deck, will be designed as simple span members. Building lateral stability will be achieved through the transfer of roof deck diaphragm loads to structural steel bracing or masonry shear walls. Some modulars may require upgraded structure due to snow loading.

6.0 Mechanical

Overview

The scope of mechanical work for the core space includes heating, cooling, ventilation, plumbing, fire protection and control systems sufficient for effective and reliable facility operations.

System design will reflect a prudent blend of life cycle cost considerations including capital costs, utility consumption costs and simple straightforward systems that can be understood and operated in an effective manner. Consideration will be given to providing accessibility for maintenance. Canadian products will be specified wherever possible to facilitate easy replacement of parts.

Site Service Utilities

New storm and sanitary services are to be provided based on the generic site plan. Lines will be connected to Municipal utilities. The site will be subject to local Guideline requirements. Storm water ponding may be required in new green space adjacent to the new facility for storm water retention where local Municipal requirements mandate this need.

A new gas service will be provided as required to suit the building loads as well as loads for future modular portable classrooms.

Anticipated service requirements are as follows:

- 150mm domestic cold water service
- 150mm sanitary service
- 300mm storm service
- 647 kW gas service with line sizes appropriate to the available site connection.

Plumbing Systems

.1 All new plumbing systems are to be of the latest design and of the highest degree of water consumption efficiency. The washroom layout and fixture count to be reviewed for code compliance. New lavatories, trim and sinks are proposed along with water conserving faucet sets with the intent of achieving the highest potential LEED® W.E. credit.

.2 Domestic water piping, sanitary water piping, storm and plumbing vents will be networked throughout the building back to the service connections, to and mechanical plant. Site work is required in terms of service connections, depending upon location and depth of new site service connections.

.3 Domestic hot water for the facility is to be provided by individual high efficiency water heaters installed in the mechanical room. A small domestic hot water recirculation pump will be provided to ensure availability of hot water throughout the facility.

.4 All domestic hot, cold and recirculation piping will be thermally insulated for energy conservation. Domestic hot, cold and recirculation piping will be extended to all fixtures. Domestic hot water will be generated for distribution at 54°C.

.5 Reduced pressure backflow preventor assemblies will be provided consistent with the National Plumbing Code Requirements.

.6 A system of sanitary drains and venting will collect sanitary waste and will transfer effluent to the Municipal sewer system. The primary connection point will be a sanitary manhole in the adjacent site prior to termination in the municipal service.

Heating Systems

.1 Heating system for the building will be a combination of perimeter baseboard heating, and/or passive radiant heating panels suspended from the structure. These perimeter elements will be of a 2-pipe configuration. The perimeter panels will be controlled in concert with air system functions for the building.

.2 The orientation of the heating system will be as follows:

- Two hot water high efficiency heating boilers will be situated in the mechanical room. Two exchangers are provided for the heating system. One of hot water in the radiant panel/perimeter heating loop; and one for the air system glycol heating loop.
- For the respective heating loops, hydronic circulating pumps, expansion tanks and accessories will be installed locally in the mechanical room.
- Network of insulated reversed return hot water supply and return lines running to heating risers and mains will distribute heating water to the facility.
- Radiant panels are zoned on an exposure basis (approx. 30 zones) each zone is controlled by thermostats and valves with individual room control where appropriate.
- Entrance unit heaters are ceiling or wall mounted in vestibules and entryways to allow for offsetting of infiltration at door entrances.

Cooling Systems

.1 Mechanical cooling for the entire school will not be provided. Where needed, cooling for the project will be by way of DX split systems or dedicated cooling only AC units.

Ventilation Systems

.1 The main building ventilation systems consist of an indoor air systems situated in the mechanical room. This system will be designed with the premise of providing displacement ventilation at reduced air change rates, and with higher proportions of outdoor air such that fan energy consumption and duct sizes can be reduced. This system tempers the outdoor air to supply the occupied spaces though duct risers and low level supply grilles. The system is equipped with supply and exhaust fans, isolation dampers, filter bank, glycol heating coil supplied from the heat exchangers. All components will be selected for a life expectancy 30 years based on ASHRAE standards. The system will further utilize a heat recovery assembly to optimize on every efficiency.

.2 This distribution system would supply air around the perimeter of each floor to afford the minimum ventilation supplied to the spaces.

.3 The air systems will be utilizing heat recovery systems on the facility exhaust air streams to improve operating efficiency and will serve to preheat the outdoor air for the building.

.4 Air systems will be equipped with space temperature feedback to reset the discharge air temperature. Air delivery to classrooms and offices will be constant volume during occupancy, and reduced volume during non occupancy as scheduled. Air systems are designed to use 100% outdoor air and will provide free cooling when outdoor conditions permit.

.5 Gymnasium unit will be a conventional indoor air system with a mixing section and variable speed supply blower and heat recovery wheel; sized for the minimum air change requirements of the space.

.6 Air system filtration on all units shall be two stage and meet MERV 13 for LEED compliance and air quality control.

Exhaust Systems

.1 Exhaust system for washrooms in the building consist of a network of exhaust ductwork connected to the primary exhaust systems. The exhaust requirement be in compliance with Alberta Building Code. Exhaust systems will also be provided for photocopier areas as well as lunch/kitchenette areas and specific classrooms as dictated by program needs.

Insulation

.1 General

Piping, equipment and sheet metal work with surface temperatures greater or less than surrounding air temperature will be insulated to control heat transfer and condensation. Insulation shall meet minimum M.N.E.B.C. requirements.

.2 Piping

Insulation on piping systems will include:

- Heating water
- Glycol systems
- Domestic hot, cold and recirculation
- Roof drains and a portion of pipe near roof
- Plumbing vents near roof

.3 Ductwork

Insulation on duct systems will include:

- Outside air ducts/plenums
- Supply ducts carrying conditioned air
- Exhaust/relief ducts near louvres
- Acoustic treatment where required

Humidification Systems

.1 Humidity control will be provided for the core building only. The minimum amount of humidity control to be provided using a gas fired steam injection humidifier in the air systems to maintain a minimum of 15% humidity in the building during the winter months.

Controls

.1 The proposed system of room temperature control is simplistic and affords a reasonable level of temperature control. It is recommended that this system be DDC based, and flexible to function and expandability.

Energy Conservation Measures in Mechanical Systems

Due to the volume of ventilation air that will be exhausted from classrooms, heat recovery will be incorporated into the air system operation.

Minimum 85% efficient boilers will be used.

High efficiency fan and pump motors will be specified. Heating piping and domestic water piping will be insulated. DDC control system will have capacity to allow for future connection of mechanical systems and future building additions.

DDC control of systems will enable exhaust fans and ventilation air units to shut down during unoccupied periods. An unoccupied space temperature setback system will be incorporated to lower room temperatures. On night cycle, the fan systems will be off and room temperatures will be maintained at night setting by the hot water heating system. Controls in the ventilation supply system will allow reset of the mixed air temperature to minimize the amount of air tempering.

Executive Summary

The proposed development of the facility is driven by optimal balance of comfort and efficiency. The intent is to provide a sustainable and environmentally conscious system design for the facility, the following highlights are considered:

.1 Improvements to plumbing facilities and fixtures to improve water use efficiency and functionality.
.2 Improvements to heating systems for control and heat distribution management to ensure blanket coverage or exterior zones.
.3 Addition of mechanical cooling systems in the form of unitary systems where supplemental cooling is required.
.4 Addition of heat recovery systems to reduce outdoor air heating loads.
.5 Ventilation systems improvements to ensure low level displacement ventilation air is accurately and unobtrusively delivered to occupied spaces which can be further enhanced by use of openable windows.
.6 Installation of life safety systems to meet minimum Code requirements.
.7 Addition on minimal humidification control for the building of occupant comfort.

8.0 Electrical

Introduction

The electrical design for the Core School shall comply with the current edition of the Alberta Building Code, Canadian Electrical Code and all Provincial and Municipal Codes.

The electrical design shall embody features to minimize and control energy consumption consistent with LEED® performance criteria.

Services

.1 1 – 100 mm raceway from property line to pad mounted transformer location for electrical power.

.2 1 – 100 mm raceway for each of the following systems; cable television, telephone and supernet from the property line to the Electrical/Telecom room.

.3 Pre-cast concrete pad/vault complete with grounding and guardrails to meet the requirements of the Utility Company.

Electrical Distribution

.1 The main electrical service shall be rated at 800 amperes, 208Y./120 volts, 3 phase, 4 wire from pad mounted transformer to main distribution centre.

.2 Main distribution centre shall contain a 800 ampere main breaker, utility current transformer section, digital power meter and moulded case thermal magnetic breakers for control of branch circuit panelboards.

.3 Branch circuit panel boards located throughout the school to facilitate receptacle and lighting loads.

.4 A motor control centre located in the Mechanical/Electrical Room to control mechanical motors.

Telephone / Data System

.1 Telephone/data cabling shall be Cat. 6 FT4, suspended in free air on J-hooks. Telephone data ports will be provided in all Instructional and Administration areas from the main Communication Room.

Sound & Intercommunication System

.1 The system shall consist of microprocessor technology to provide paging and intercommunication throughout the school.

.2 Administration areas will be equipped with handsets to control outside calls and programming functions.

.3 Instructional areas will have wall or desk mounted sets as well as ceiling speakers.

.4 Paging speakers (12" diameter) will be provided in all areas.

.5 Telephone head-end equipment will be integrated into the Sound and Intercom system.

.6 A separate amplifier complete with speakers will be provided in the Gymnasium.

.7 Interior and exterior time signals will emanate through the speakers and exterior horns.

Clock Sytem

.1 The clock system will consist of a main receiver/transmitter that is synchronized with the internet or GPS. Secondary clocks will be wireless with built-in transmitter/receiver antennas; 12" diameter in Instructional and Administration wings; 15" diameter with wire guard in Gymnasium wing.

Convenience Receptacles

.1 Duplex receptacles will be provided in all areas of the school to facilitate the needs of the staff/students and maintenance.

Lighting

.1 Lighting will be of the fluorescent type with luminaries equipped with energy efficient ballasts and lamps.

.2 Classrooms, Corridors, Administration and Project Centres/Gathering Area; luminaires will be of the direct/indirect louvre type with a 70/30 distribution, cable suspended.

.3 Gymnasium Luminaires - Pendant mounted totally enclosed/wire guard complete with 6 – 54 watt T5 high output fluorescent lamps; 2 level switched.

.4 Storage/Mechanical/Electrical Rooms; luminaires will be surface pendant mounted strip type complete with wire guards.

.5 Change/Washroom luminaires will be recessed, 300 x 1220mm lensed type.

.6 All luminaires will be controlled by occupancy sensors. Daylight sensors will be incorporated to reduce illumination levels in high ceiling areas, corridors and classrooms taking into account the natural light content.

.7 Night lighting will be provided in corridors on operation of the security system keypad.

.8 The lighting design will be such as to achieve a "lighting power density" of less than 10 watts per square meter.

Exterior Lighting

.1 Site lighting shall be designed to the illumination levels as set forth by the Illuminating Engineering Society of North America.

.2 Site lighting luminaires shall be dark sky compliant to limit "sky glow" and shall be situated to prevent "light trespass" to the surrounding area.

.3 Exterior luminaires shall be controlled by photocells/time clock and the Building Management (DDC) system if applicable.

Emergency & Exit Lighting

.1 Emergency and exit lighting shall be located to conform to the requirements of the Alberta Building Code.

Fire Alarm & Smoke Detection

.1 The fire alarm and smoke detection system will be of the addressable type utilizing the latest technologies. Fire alarm devices shall be located to conform to the requirements of the Alberta Building Code.

Security System

.1 An intrusion detection system will be provided within the school. A numerical key pad will be located at the main and staff entrances to the school.

.2 Motion sensors of the passive infrared type will be installed in all corridors, instructional space containing computers and in the administration area.

.3 The system shall be equipped with provisions for connection to an outside monitoring facility.

Cable Television System

.1 A television distribution system comprised of RG6-FT4 cable will be routed on J-hooks through the ceiling to wall jacks located in classrooms, project centres, breakout rooms, conference rooms, staff lounge and gymnasium.

Car Parking Receptacles

.1 Car parking receptacles will be provided in pre-manufactured posts, two cars per circuit to accommodate staff vehicles.

.2 Parking receptacles will be controlled by thermostat and time clock, as well as the DDC system.

Modular Classrooms

.1 Provisions will be made to connect power, fire alarm, security, television, sound and intercommunication to each proposed modular from the school proper.

Conclusion

The design of the electrical system will target a LEED® Silver certified facility.

LEED(R) Canada-NC Version 1.0 Scorecard

Prototype 600 core Elementary School June 19, 2007

38	6	23	**Total Project Score**

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platin

Y	?	N			
7	**0**	**7**	**Sustainable Sites**	Possible Points	**14**
Y			Prereq 1		0
1			Credit 1	**Site Selection**	1
		1	Credit 2	**Development Density**	1
		1	Credit 3	**Redevelopment of Contaminated Sites**	1
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
		1	Credit 4.3	**Alternative Transportation**, Hybrid & Alternative Fuel Vehicles	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
		1	Credit 5.1	**Reduced Site Disturbance**, Protect or Restore Open Space	1
1			Credit 5.2	**Reduced Site Disturbance**, Development Footprint	1
1			Credit 6.1	**Stormwater Management**, Rate and Quantity	1
		1	Credit 6.2	**Stormwater Management**, Treatment	1
		1	Credit 7.1	**Heat Island Effect**, Non-Roof	1
		1	Credit 7.2	**Heat Island Effect**, Roof	1
1			Credit 8	**Light Pollution Reduction**	1

Y	?	N			
3	**1**	**1**	**Water Efficiency**	Possible Points	**5**
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
	1		Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Y	?	N			
5	**2**	**7**	**Energy & Atmosphere**	Possible Points	**17**
Y			Prereq 1	**Fundamental Building Systems Commissioning**	0
Y			Prereq 2	**Minimum Energy Performance**	0
Y			Prereq 3	**CFC Reduc. in HVAC&R Equipm't & Elimin Halons**	0
2			Credit 1.1	**Optimize Energy Performance**, 29% MNECB, 20% ASH 90.1	2
1	1		Credit 1.2	**Optimize Energy Performance**, 38% MNECB, 30% ASH 90.1	2
		1	Credit 1.3	**Optimize Energy Performance**, 47% MNECB, 40% ASH 90.1	2
		1	Credit 1.4	**Optimize Energy Performance**, 55% MNECB, 50% ASH 90.1	2
		1	Credit 1.5	**Optimize Energy Performance**, 64$ MNECB, 60% ASH 90.1	2
		1	Credit 2.1	**Renewable Energy**, 5%	1
		1	Credit 2.2	**Renewable Energy**, 10%	1
		1	Credit 2.3	**Renewable Energy**, 20%	1
1			Credit 3	**Best Practices Commissioning**	1
1			Credit 4	**Ozone Protection**	1
		1	Credit 5	**Measurement & Verification**	1
	1		Credit 6	**Green Power**	1

[redacted]

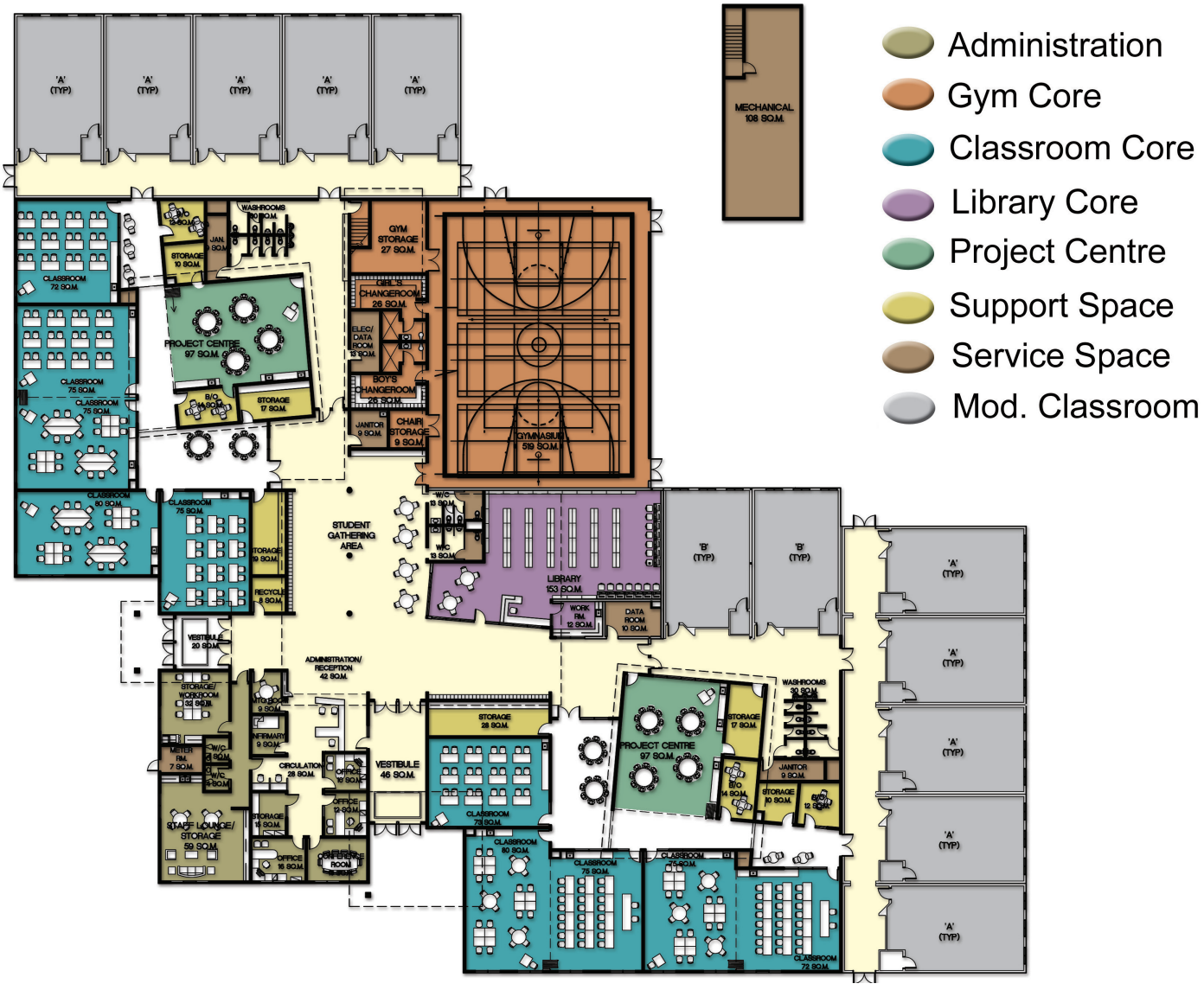
Possible Points **70**

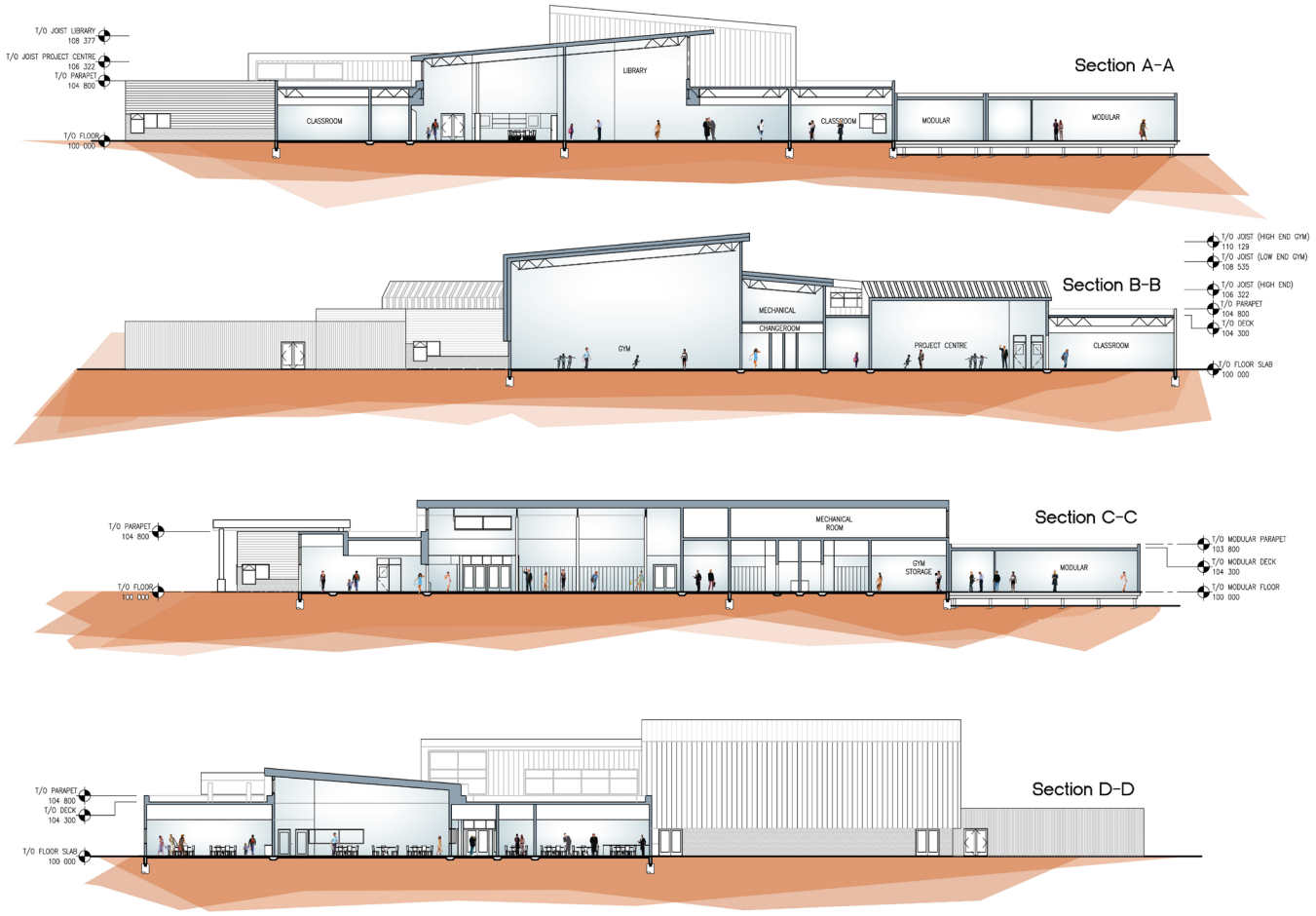
um 52 or more points

Y	?	N		Materials & Resources — Possible Points 14	
Y			Prereq 1	**Storage & Collection of Recyclables**	0
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors, Roof	1
		1	Credit 1.2	**Building Reuse**, Maintain 95% of Existing Walls, Floors, Roof	1
		1	Credit 1.3	**Building Reuse**, 50% Interior Non-Structural Items	1
1			Credit 2.1	**Construction Waste Management**, Divert 50%	1
1			Credit 2.2	**Construction Waste Management**, Divert 75%	1
	1		Credit 3.1	**Resource Reuse**, Specify 5%	1
		1	Credit 3.2	**Resource Reuse**, Specify 10%	1
1			Credit 4.1	**Recycled Content**, Specify 7.5% (Post Cons. + 1/2 Post Indus)	1
		1	Credit 4.2	**Recycled Content**, Specify 15% (Post Cons. + 1/2 Post Indus)	1
1			Credit 5.1	**Regional Materials**, 10% Extracted & Manufactured Locally	1
1			Credit 5.2	**Regional Materials**, 20% Extracted & Manufactured Locally	1
		1	Credit 6	**Rapidly Renewable Materials**	1
		1	Credit 7	**Certified Wood**	1
1			Credit 8	**Durable Building**	1

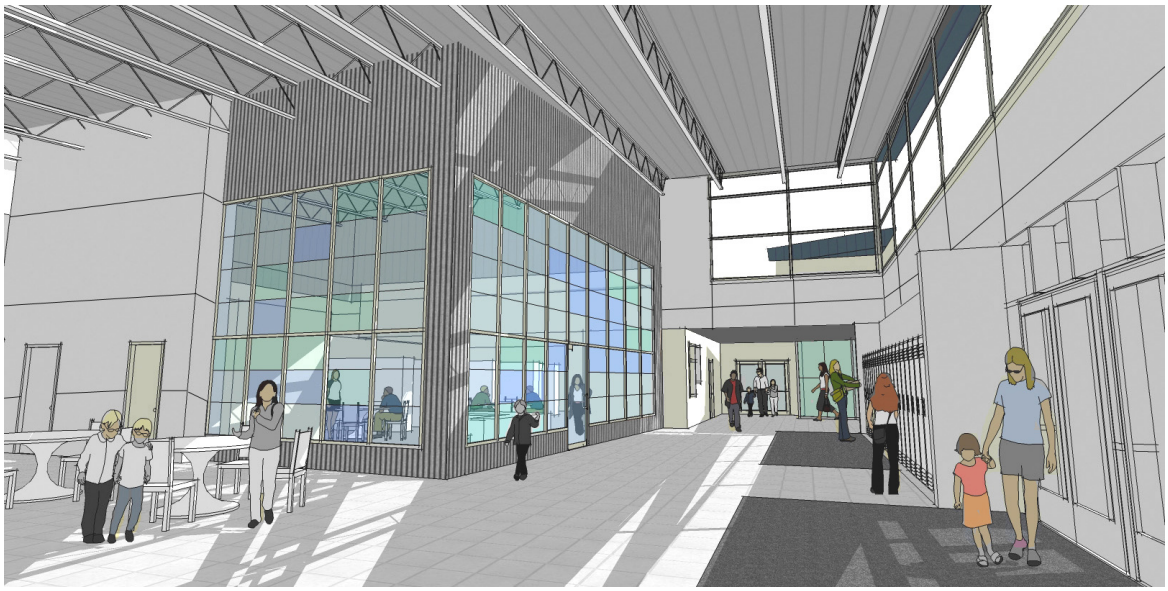
Y	?	N		Indoor Environmental Quality — Possible Points 15	
Y			Prereq 1	**Minimum IAQ Performance**	0
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	0
1			Credit 1	**Carbon Dioxide** (CO_2) **Monitoring**	1
1			Credit 2	**Ventilation Effectiveness**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet	1
	1		Credit 4.4	**Low-Emitting Materials**, Composite Wood & Laminate Adhes.	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
	1		Credit 6.1	**Controllability of Systems**, Perimeter	1
1			Credit 6.2	**Controllability of Systems**, Non-Perimeter	1
1			Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
1			Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
1			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
		1	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Y	?	N		Innovation & Design Process — Possible Points 5	
1			Credit 1.1	**Innovation in Design**:	1
1			Credit 1.2	**Innovation in Design**:	1
1			Credit 1.3	**Innovation in Design**:	1
1			Credit 1.4	**Innovation in Design**:	1
1			Credit 2	**LEED(R) Accredited Professional**	1


Administration
Gym Core
Classroom Core
Library Core
Project Centre
Support Space
Service Space
Mod. Classroom
MECHANICAL 108 SQ.M.
'A' (TYP)
'B' (TYP)
GYM STORAGE 27 SQ.M.
CHANGEROOM 26 SQ.M.
GYMNASIUM 519 SQ.M.
PROJECT CENTRE 97 SQ.M.
LIBRARY 153 SQ.M.
STUDENT GATHERING AREA
ADMINISTRATION/ RECEPTION 42 SQ.M.
VESTIBULE 46 SQ.M.
CLASSROOM 75 SQ.M.
CLASSROOM 72 SQ.M.
CLASSROOM 80 SQ.M.
STAFF LOUNGE/ STORAGE 59 SQ.M.



VIEW A - VIEW FROM STUDENT GATHERING (LIBRARY AT RIGHT)



VIEW B - VIEW TOWARDS CLASSROOM POD (LIBRARY ON LEFT)

Project Information

Project Identification

Project Name: Standard Core Elementary School
600 Capacity
Location: Base Case - Edmonton
School Board: N/A
Architect: Group2 Architecture Engineering Ltd.

Building Type: School
Project Start Date: N/A
Completion Date: N/A
Market Condition: April 2007 Constant $
Geographic Location Factor: Edmonton Base Rate

Description of Building

1 storey with suspended concrete slab, drilled concrete piles, greade beams, 125, 500, structural steel, loadbearing block at gym, exterior wall cladding 4.8m masonry. Facing, upper walls at gym/mechanical room metal siding, aluminum frame operable windows, clearstory at student gathering and neighbourhood project centres, modified SBS on flat roof with metal standing seam roof to pitched areas. Interior partitions concreat block to most areas with GB/SS in admin, project centres and between classrooms. Stained concrete to most areas, carpet to library and admin. Acoustic tile/GB to classrooms with exposed acoustic metal deck to sloped raised areas. Walls paint, ceramic tile washrooms, millwork. Mech - heat perimeter radiant heating panels complete with high efficiency hot water heating boilers. Low volume displacement ventilation system complete with heat recovery coils, DDC controls, elec 800 amps@120/208V.

Building Area and Volume

	Core	Built-out
Gross Floor Area:	3,427 m^2	4,736 m^2
Net Floor Area:	3,418 m^2	4,618 m^2
Volume:	19,065 m^3	23,736 m^3
Exterior Cladding:	1,773 m^2	1,937 m^2
Roof Area:	3,493 m^2	4,808 m^2
No. of Stories above grade:	-	-
Modular Classrooms Built Out:	N/A	12

Outline Specification

A10 Foundation:
Cast inplace concrete grade beams and pile caps supported on bored cast in place concrete end-bearing piles founded in clay till a minimum 5.5m below existing grade

Ratios

	Core	Built-out
Net Floor Area / GFA:	0.932:1	0.743:1
Exterior Cladding Area / GFA:	0.517:1	0.4089:1
Window Area / GFA:	0.077:1	0.0682:1
Roof Area / GFA:	1.049:1	1.0158:1

B10 Superstructure:
Structural steel post and beam with some areas of load-bearing masonry. Steel roof deck supported by OWSJ or composite steel floor deck with concrete topping for second floor areas, supported by OWSJ. Masonry shear walls and steel bracing to resist lateral loads from roof deck diaphragm

B20 Exterior Enclosure
Wall clamping is 4.8m of masonry facing, upper walls at gym, mechanical room and raised roof areas have metal siding finish. Aluminum framed punch windows on lounge and clearstory at project centre. Curtain wall system at student gathering.

B30 Roofing
Modified SBS on flat roof and metal standing seam on pitched roofing system over gym, library and raised projecte centres and entry projections.

Capacities

Percentage exterior wall glazed:	14.3%
Soil characteristics:	N/A
Density plumbing fixtures:	
Heating capacities:	
Cooling capacities:	
Ventilation capacities:	
Lighting intensity:	

C10 Interior Construction:
Concrete block partitions most areas, drywall partitions in admin, project centres with BO rooms and between classrooms.

C30 Interior Finishes:
Stained concrete floors to most areas, carpet flooring to administration and library, wood floor in gym. Ceilings are a combination of painted drywall and acoustic tile, sloped high level ceiling in gym, student gathering and project centres is prefinishing acoustic exposed metal deck. Wall finish is paint with ceramic wall tiles at showers, urinals and mop sinks.

D20 Plumbing:
Conditional storm, sanitary & domestic services with high water efficiency plumbing fixtures & instantaneous hot water heaters

Floor Area (by Type)

No.	Type	Core	Built-out
	Ancillary Classrooms/CTS	175 m^2	175 m^2
	Permanent Core Classrooms	1,031 m^2	1,031 m^2
	Gymnasium	523 m^2	523 m^2
	Library	175 m^2	175 m^2
	Administration/Staff	255 m^2	255 m^2
	Storage	110 m^2	110 m^2
	Mech/Elect/Maintenance	156 m^2	156 m^2
	Circulation	582 m^2	582 m^2
	Other	316 m^2	316 m^2
	Modular Classrooms Built-out	----N/A---	1,293 m^2
	Gross Floor Area	3,323 m^2	4,616 m^2

D30 HVAC:
Displacment ventilation with heat recovery, indoor units, consolidated exhaust air streams

D40 Fire Protection:
Portable extinguishers and firewall separations

D50 Electrical:
Main service size of 1200 amps at 120/206 volts, data, voice and TV systems included using conduit and cable trays, security system included, extensive public address system included, connections to allow for future portables.

Capital Cost of Permanent Core per m² (See Hanscomb Cost Report)

Group2 architecture engineering

Core School Plus Built-Out Floor Plan

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

Core School Plus Built-Out Floor Plan

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engineering

File: 07031