

Alberta

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New Horizons School

Design Development Report
New Horizons Charter School - Modernization
February 2016

New
Horizons
School

ONPA architects

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1.0 Introduction

1.1 Executive Summary

The purpose of this document is to provide a basis for review of the Design Development Phase of the project and create a foundation from which the construction documents can proceed. This report outlines the project progress to date, including site parameters, program considerations, layout and adjacencies as well as description of Architectural, Structural, Mechanical and Electrical design concepts and systems.

In November 2015, Alberta Infrastructure and the New Horizons School Board retained ONPA Architects and their consultant team to design and prepare tender documents for the modernization of New Horizons Charter School in Sherwood Park, Alberta.

New Horizons Charter School is a public charter school serving more than 200 academically gifted students from Kindergarten through Grade 9. Established in 1995, New Horizons is Alberta's oldest charter school.

The New Horizons Charter School (the former St. Theresa Catholic School) was constructed in 1975 and has been through a number of upgrades and renovations over the years. The major upgrades that were undertaken over the years include energy conservation (1996), fire alarm upgrade (1998) and HVAC sheet metal (2008). Minor upgrades were recently undertaken (2014-2015) to replace asbestos containing ceiling tiles, upgrade of one set of washrooms to barrier free requirements and recommissioning of the HVAC system.

The project scope of this modernization include the upgrading of the permanent core (former St. Theresa School) plus the addition of six new modular classrooms and a connecting link. The upgrades include building envelope (roof), barrier free upgrades, life safety and regulatory code upgrades, interior upgrades, and electrical & mechanical upgrades. The first goal of the modernization is to bring the facility up to the health and safety standards. The second goal is to modernize the existing school facility to accommodate program requirements. Modernization to the school's administration area is also required to meet the functional requirements. A new entrance feature will be designed to create a more visible, focal and welcoming entrance to the facility.

This project is being carried out in a common design-bid-build format. Construction drawings are expected to be complete for project tendering in April 2016 with construction commencing in early July 2016.

Dependent on the cost report to follow, this report reflects the intent for the scope of work. Based on the cost, a priority list will be developed with the users for the scope of work items.

1.2 Acknowledgements

ONPA acknowledges and commends the assistance and guidance of the project team, specifically the building committee for their enthusiastic effort in the successful development of this project.

1.3 Building Committee

Shaun Boylan	Alberta Infrastructure
Parimal Patel	Alberta Infrastructure
Darren Hutton	Alberta Education
Don Falk	New Horizons Charter School
Ted Zarowny	New Horizons Charter School
Lori Vigfusson	New Horizons Charter School
Kim Fehr	New Horizons Charter School
Lisa Richardson	New Horizons Charter School
Janice Dinel	New Horizons Charter School
Vicky Qualie	New Horizons Charter School
Tina Marie Baldwin	New Horizons Charter School
Randy Broadhead	New Horizons Charter School
Ashley Abraham	New Horizons Charter School
Owen Kwasniewski	New Horizons Charter School



1.4 Consultant Team

Architect (Prime Consultant)

ONPA Architects

Rob Black
Chris Woollard
Asma Javed

Structural Consultant

Read Jones Christoffersen Ltd.

Jeff Rabinovich
Deanna Perrin

Mechanical Consultant

MCW Hemisphere Ltd.

Brad Berteau
Lisa Hunter

Electrical Consultant

MCW Hemisphere Ltd.

Dick Jarvis
Manan Kapoor

Additional Consultants

Cost Consultant

Altus Group

Curtis Cameron



Existing School View



Existing School View

2.0 Architectural Design

2.1 Siting

The site is located in Sherwood Park, in a residential area at Strathcona Drive. An important aspect of the modernization is in reinforcing the sense that the school is a part of the community and that the community is welcome. The main entrance is also being redesigned to create a focal point in an effort to provide clear access for community visitors both during school hours & in the evening and to increase functionality in terms of weather protection, circulation and visibility to the main office.

A geotechnical report is currently underway to understand the soil conditions for the new entrance and screw piles for the modular classrooms.

2.2 Concept & Organization

The project needs to speak to the students and staffs of the New Horizons Charter School. They must transcend the simple objective of being functional and become a space that has identity and fosters community pride. When this is in place, the best performance will be realized.

A number of meetings were held with the representatives of the New Horizons School, Alberta Infrastructure and Alberta Education to have a better understanding of the school's functional and program requirements. The design summarized in this design development document and drawings is the result of those discussions. The included drawings provide the details of the scope and design. The following outlines provides a general overview and summary.

Based on the information provided by Alberta Infrastructure and Alberta Education, the school capacity, with the modernizations, will be 300 students. The modernization will include:

- New Roofing throughout the school
- New Main Entrance Canopy and Vestibule
- Reorganization of Administration Area
- New Jurisdiction Administration Area
- New Counsellor Office
- New Conference Room
- New Ancillary Room
- New Student Gathering Area

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- New Sensory and Therapy room
- New Media Room
- Redesigned Library with possible new skylights
- Updated Music Room
- Redesigned Kitchen
- New Barrier Free and Gender Free Washroom
- Addition of Private Changing Space in Changing Rooms.
- Addition of Six New Modular Classrooms and Link (supply of modular classrooms is under separate contract)

In addition to this the whole school is upgraded to meet the barrier free, life safety and regulatory code requirements. The main organization of the building is as follows:

Entrance:

The existing main entrance is oriented towards the bus drop off zone. Currently it's difficult to distinguish the main entrance from the street. Also there is no visibility from the main office to the main entrance to allow for the supervision of the students or the visitors entering the school.

The new entrance canopy and vestibule will provide a clearly identified entry point which will welcome students, staff and the general public to the school. Also the relocation of the main office administration adjacent to the main entrance will allow for the supervision of the students and visitors entering the school.

After Hours Usage

After hours sports and community gatherings requires use of the gymnasium so ease of access is essential while still maintaining security to the remainder of the school that is not in use. In the development of the modernization new, clear lock-off points are established to isolate the gymnasium and kitchen from the remainder of the school to allow for after school hours access to that area.

Administration

The Administration space will see a complete overhaul including a new reception desk, workroom, infirmary, offices and a barrier free washroom. The placement of the administration space adjacent to the main entrance will create a more visible staff presence thus emphasizing a stronger sense of security.

The waiting area adjacent to the main administration will also be redesigned to suit the new administration layout space. The fire rated double door will be replaced by a rolling fire shutter and the existing storage room will be demolished to allow for a much needed open and welcoming entrance.

The existing jurisdiction offices and conference room adjacent to the kitchen area will be relocated to allow that area to be used as an ancillary space. The current grade 6 classroom will be re-purposed to house four offices; a counsellor office, external services, superintendant office and secretary treasurer office.

Flex Spaces

In order to create a flex space for students, the existing maker room is to be converted into a student gathering area. Students can use the space for group work, studying, or as a lunch room. The space will be set up with multiple power outlets for computers as well as with some millwork for microwaves and seating. An operable partition will allow for maximum flexibility and use of space for different purposes.

In addition to the student gathering area, breakout spaces were requested for students. In order to accommodate that request, breakout spaces are provided in the new modular classrooms zone for individuals or small groups.

Library / Learning Commons

The library is currently centrally located and provides easy access for all students. The location is ideal for the library and reflects its importance as an academic hub for the school.

The main concern with the library is the natural light as currently there is no natural light in the space. Modernization will allow to capture as much natural light as possible by adding potential skylights. The whole area will see a complete overhaul including circulation desk, ceiling, flooring and painting to convert that area into a bright, vibrant and inviting learning space. The library will incorporate a more modern approach to research and learning by creating a center with multiple study zones. Floor outlets for personal laptop and table usage will be incorporated into the space allowing for flexibility of use in an ever evolving technological world.

Kitchen

Based on the program requirement, a commercial kitchen is not required. The existing commercial kitchen will be renovated and reorganized in order to maximize the existing space. The space will be renovated to allow for 4 workstations and a teaching station.

The new ancillary space adjacent to the kitchen will allow that area to be used as an extension of the kitchen and can be used as a teaching space.

Gymnasium and Stage

The gymnasium floor will be refinished and floor lines will be repainted. A lift will be provided to allow barrier free access to the stage. The stage will receive new flooring and walls will be painted black to act as a backdrop for drama productions.

Music Room and Media Room

The music room will be modernized to include millwork, wall coverings and flooring suitable for music & choir, and a new ceiling to better handle the acoustic requirements of the space.

One of the storage rooms near the music room will be converted into a media room. The existing door and window will be infilled and new door will be added to allow access to that room from the corridor.

CTS Labs

There is no specific program requirements for the two CTS spaces. Those spaces will remain as standard classrooms to allow for the curriculum to evolve over time based on student interest and programmatic needs.

Washroom and Changing Room

A barrier free washroom will be added to the administration area and will be accessible to students and visiting public. All existing washrooms will be upgraded with new countertops and new fixtures.

The existing changing rooms will be re-designed to allow for a private changing space. Based on the program requirements the existing shower spaces in changing rooms are not required. Those shower areas and storage spaces will be re-purposed to house the new conference room and sensory room.

Modular Classrooms

The seven existing modular classrooms at the south east corner and seven existing modular classrooms to the south west corner of the school will be demolished.

Six new modular classrooms will be located at the south west corner of the school. The location will not only allow the elementary classes (grade 1 to grade 3) to be near the administration area but also help with the phasing of the project. Sinks will be provided in all units. The modular component at the opening of the school is the full allotment of 2 'A' units and 4 'B' units

Classrooms

Classrooms will receive new flooring and millwork on a case by case basis throughout the school. Currently, the classrooms have no water connection. The modernization will allow for the much needed water connection i.e. sink in each classroom.

Overall upgrades

In addition to above, the overall upgrades for the entire school includes:

- The existing roofing is beyond its life and will be replaced.
- There is not enough natural light in the classrooms. New windows and skylights are planned to be added to bring in the natural light. The inclusion of these items will be based on costing received.
- Barrier free upgrades
- Upgrades that are required to meet the life safety and code requirements.
- Additional lockers and boot racks will be added to meet the program requirements

The plan below illustrates those areas using the existing floor plan. Please refer to Appendix B for more detail on the individual spaces.



2.3 Program Summary

New Horizons Charter School - Modernization Area Comparison Chart - Capacity 300 Students Feb 2016				
	1	2	3	4
	A.I. Guidelines K-9 m2	Modernization Area m2	Area Change m2	Notes
Instructional Area				
Classrooms	7 @ 80 = 560	1 @ 80 = 80 1 @ 86 = 86 6 Portable = 614 Total 80 +86+ 614 =780	220	Music room ECS Modular Classrooms
Science Classroom	1 @ 120 = 120	1 @ 115 = 113	-7	Lab plus Storage
Total	680	893	213	
Large Ancillary Room	1 @ 130 = 130	1 @ 80 = 80	-50	
Small Ancillary Rooms	2 @ 90 = 180	1 @ 67 , 1 @ 68 = 135	-45	
Information Services	1 @ 115 = 115	1 @ 67 = 67	-48	
CTS Labs	1 @ 142 = 142	1 @ 76, 1 @ 75 = 151	9	
Gym	1 @ 430 = 430	1 @ 447 = 447	17	
Gym Storage	1 @ 43 = 43	1 @ 28 = 28	-15	
Library	1 @ 120 = 120	1 @ 192 = 192	72	
Total	1160	1100	-60	
Sub-Total Instructional Spaces	1840	1993	153	

Note: Total Area as per AI for Instructional Space is 1698m² without CTS. 1698m² plus 142m² for CTS = 1840m²

Non-Instructional Area				
Admin / Staff				
Principal	15	14	-1	
Vice Principal	12	12	0	
Admin. Office	10	0	-10	
Counsellor Office	10	18	8	
Counsellor Office	10	0	-10	
General Admin	30	39	9	
Conference Room	20	22	2	
Staff Room	35	75	40	
Staff Work Room	30	26	-4	
W/C Men	4	4	0	
W/C Women	6	4	-2	
Infirmery	30	4	-26	
Kitchen	15	38	23	

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*Additional Rooms				
Sensory Room	0	9	9	
Therapy Room	0	14	14	
Jurisdiction Admin Area	0	14	14	
Superintendent	0	18	18	
Secretary Treasure	0	12	12	
Media Room	0	7	7	
Total	227	330	103	
* Spaces provided based on program requirements but not included in AI standards				
Support				
Wrap Around Services	20	60	40	Breakout Spaces
Student & Public W/Cs	36	90	54	
Accessible W/C	12	8	-4	
Phys Ed	75	56	-19	Changing Rooms
Recycle Room	11	0	-11	
Server Network	40	5	-35	
Total	194	219	25	
Mechanical & Meter	108	108	0	
Circulation	425	508	83	Cor., Vestibule, Link
Wall Area	204	204	0	
Storage	59	75	16	
Total	796	895	99	
Student Flex Space	72	81	9	
Total	72	81	9	
Sub-Total Non-Instructional Spaces	1289	1525	236	

Total Area as per AI standards for 300 Student is 2987m² without CTS. 2987m² plus 142m² for CTS = 3129m²

2.4 Building Exterior

The new entrance will be at an appropriate scale for entry into this type of public building in the community. The new cladding will tie into the original design and materials but will become a more prominent feature on the building. The entrance will feel more inviting and welcoming making it easier for visitors to navigate their way into the school. The entrance will feature glazing to allow for varying levels of natural light to penetrate into the interior foyer space. The entry will be aluminium curtain wall system complete with metal cladding as appropriate.

The building envelope of the link will be of appropriate quality balancing best practices of design, construction budget and available trades' technology to complete the work. Low or no maintenance products have been selected to reduce long-term maintenance costs and provide finishes that will keep their appearance over a long period of time.

2.5 Building Envelope and Walls

The exterior wall assemblies are to be constructed using the Pressure Equalized Rain Screen Insulated Structure Technique (PERSIST). This approach is characterized by the following:

- A fully adhered air sealing component to the exterior of the structural frame and structural infill. The air sealing component in combination with the underlying structural elements forms the Air Barrier System.
- Insulation in direct and firm contact with the Air Barrier System.
- Exterior cladding covering an air space pressure equalized with the exterior.
- Materials used suitable for the environmental conditions and service life consistent with accessibility for maintenance.
- Suitable drainage and venting.
- Penetrations of the Air Barrier plane must be coordinated between structural, mechanical, electrical and architectural disciplines to maintain air seal continuity.

The base wall assemblies will be:

Base Wall Assembly 1

- Interior Finish
- 16mm Abuse-Resist. GB
- 152mm Metal Studs
- 13mm Ext. Grade GB
- Self-Adhering A/V Barrier

Base Wall Assembly 2

- Foundation Walls
- Self-Adhering A/V Barrier

The wall cladding / finish assemblies will be:

Cladding Assembly 1

- 125mm Semi-Rigid Insulation
- 2 Layers 76mm Z-Girts (horiz. & vert.)
- 25mm Air Space
- Metal Cladding

The school exterior currently feature stucco, the new cladding will use metal cladding.

2.6 Exterior Doors & Windows

The 'store front' wall area of the building at the main entrance will be curtain wall sections that are pressure equalized and incorporate rain screen technology.

The smaller 'punched' windows will be conventional aluminum frame exterior glazed window systems. Glazing will be hermetically sealed double-pane units using 6mm tempered outer lites and 6mm clear float inner lites.

Insulated hollow metal doors in insulated pressed steel frames will be used for any new exterior doors. Where appropriate, exterior doors will also contain sealed glazed vision panels.

2.7 Roof

The roof assembly will be:

- 2-ply Reflective SBS Roof Membrane (min. average SRI=66)
- Fibreboard
- Rigid Insulation (sloped as required)
- A/V Barrier
- *13mm Ext. Grade GB
- *Metal Deck and Supporting Structure
- * Existing to remain

2.8 Interior Construction & Finishes

New interior partitions will mostly be of steel studs c/w gypsum wall board. Concrete blocks will be used only to infill the existing concrete block walls.

The interior partition assemblies will be:

Partition Assembly 1

- Finish
- 16mm Abuse-Resist. GB
- 152mm Metal Studs @ 600mm oc
- 90mm Mineral Wool Insulation
- 16mm Abuse-Resist. GB
- Finish
- To Underside Of Roof Deck

Partition Assembly 2

- Finish
- 16mm Abuse-Resist. GB
- 152mm Metal Studs @ 600mm oc
- 90mm Mineral Wool Insulation
- 16mm Abuse-Resist. GB
- Finish
- To 150mm Above Adjacent Ceiling

Partition Assembly 3

- Finish
- 16mm F.R. GB
- 152mm Metal Studs @ 600mm oc
- 90mm Mineral Wool Insulation
- 16mm F.R. GB
- Finish
- To Underside of Roof or Floor Deck

Partition Assembly 4

- Finish
- 190mm Concrete Block
- Finish

2.9 Interior Finishes

There will be a simple combination of materials used throughout the school. Colours and material finishes will be confirmed during the Construction Document phase of the project. Final review and approval will involve Alberta Infrastructure, Alberta Education and New Horizons School Board. Room finishes are as follows:

Flooring

- | | |
|---------------|--|
| - Gymnasium | Refinished Athletic Wood Flooring System |
| - Stage | Wood Flooring System |
| - Kitchen | Resilient sheet flooring c/w patterns |
| - Flex Spaces | Resilient sheet flooring c/w patterns |
| - Library | Carpet |
| - Offices | Carpet |
| - Entry | Ceramic tile |

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- | | |
|---------------|---------------------------------------|
| - Washrooms | Ceramic tile |
| - *Classrooms | Resilient sheet flooring c/w patterns |
| - *Corridor | Resilient sheet flooring c/w patterns |

* New flooring for corridor and classrooms will be provided only in required areas.

Walls

The entire school has been repainted recently. The new painting will be provided only in the areas that will be effected by this renovation.

- Paint concrete block walls and gypsum board in renovated spaces
- Paint gypsum board in new link
- Acoustic wall fabric panelling in student gathering area, stage, music room and library as required for acoustics

Ceilings

The school received new ceiling tiles last year. The new ceiling will be provided only in the spaces that will be effected by the renovation.

- | | |
|---------------------------------|-----------------------|
| - Offices & Administration Area | Acoustic Ceiling Tile |
| - Entry | Acoustic Ceiling Tile |
| - Washrooms | Gypsum Wall Board |

Special acoustic cloud ceilings will be provided in the library and student gathering area.

Millwork and Fittings

Solid core wood doors with vision panels where appropriate and a natural finish in pressed steel frames will be used for most new interior doors. When rated doors are required, hollow metal doors and frames with welded seams will be provided.

Millwork will consist of architectural grade, clear, uniform light birch veneer plywood with patterned plastic laminate countertops and PVC edges to match existing millwork. All millwork will be provided with locking cabinet doors.

2.10 Building Code

Data

The building will be classified under the 2014 Alberta Building Code by Article 3.2.2.25 and falls under the authority/jurisdiction of Strathcona County.

Gross Floor Area	: Tenant Improvement	
	Basement	N/A
	Main Floor (Existing)	2799.8m ²
	Main Floor (New)	721.1m ²
	Mechanical & Mezzanine	179.9m ²
	Total Gross Floor Area	3700.8m ²

Building Area (A.B.C. definition)	: 3700.8m ²
Usage Description	: Modernization to K-9 School
Facing Streets	: 3
Building Height	: 1 Storey

Analysis

Classification	: Group A2 - Assembly Occupancy Based on review of major occupancies
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Occupancy Major	: 3.2.2.25 - Group A, Division 2, up to 3 Storeys
Other Major Occupancies	N/A
Minor Occupancies	N/A
Max Area	2400m ²
	(Note: compartments utilized to break up floor area)

Construction Requirements Based on Major Occupancy

Construction Type	: Combustible and Non-Combustible Floors to be 45min rated fire separations
Sprinklered	: No
Spatial separation / Limiting distance	: N/A
Access Routes	: Required (3.2.5.4)
Stand Pipe Requirements	: N/A (3.2.5.8)
Sprinkler Systems	: N/A (3.2.2.25)
Fire Extinguishers	: Required (3.2.5.16)
Interconnected Floor Space	: 3.2.8
Major Fire Separations	:
	Interconnected Floor Space : 3.2.8
	Crawl Space : N/A (3.2.2.9)
	Floor Assemblies : 45min (3.2.2.25)

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	Roof Assemblies	: 45min (3.2.2.25) (if of combustible cons.)
	Mezzanine	: 45min (3.2.2.25)
	Load Bearing Structure	: 45min (3.2.2.25)
	Stair Shafts (exits)	: 45min (3.4.4.1)
	Exit Corridors	: 45min (3.3.2.6)
	Vertical Service Space	: N/A
	Elevator Machine Room	: N/A
	Elevator Shaft	: N/A
	Mechanical Rooms	: 1 hour (3.6.2.1)
	Janitor rooms	: 45min (3.3.1.21)
	Storage Rooms	: 45min (3.3.1.26)
	Kitchen	: 6.2.2.7 (if commercial equip. will be used)
	Adjacent major occupancies	: N/A
	Adjacent minor occupancies	: N/A
Occupant Load		: Area of Non-Fixed Seating 0.75m ² Classrooms: 1.85m ² Reading and Writing Rooms or Lounges 1.85m ² Actual anticipated occupancy 300 students
Exiting		: General: 2 exits required from each floor area (3.4.2.1) 30meters max. travel distance (3.4.2.5)
Barrier Free Design		: General: Building is required to have barrier free access Requirements: Barrier free washroom for each sex. Exit to confirm to CSA standards for floor/railing design
Sanitary Facilities		: School Occupant Load: 300 total Assume 50/50 MF Split: Required: 3 Male / 6 Female (3.7.2.2) Provided: 3 Male / 10 Female I must be barrier free per sex Provide 2 sinks per grouping of 3 fixtures

2.11 Sustainable Design

The size and scope of the modernization doesn't allow for the LEED silver certification, which is generally required by Alberta Infrastructure for all new construction and major renovations. However, the project will use an alternative sustainable approach by targeting to achieve minimum 15 points. The approach of the project team is to provide added value, creativity and innovation. The guiding principle for this is 'leadership'. As the project develops, the project team will bring added value to the processes, solutions, designs and principles. By promoting 'best practices' in design, the team will try to achieve the target, limiting the ecological footprint of the school.

LEED NC v2009 will be used as a guidelines for sustainable design approach. It is the goal to work within budget and schedule to explore appropriate solutions for a 'green' school.

Please find the preliminary LEED Scorecard for this project on following pages. The design team and owner will discuss and finalized the targeted credit as the project design progresses.



LEED 2009 for New Construction and Major Renovations

Project Checklist

3	Sustainable Sites	Possible Points: 26
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	Y	?	N										
	Y			Prereq 1	Construction Activity Pollution Prevention								
				Credit 1	Site Selection								1
				Credit 2	Development Density and Community Connectivity								5
				Credit 3	Brownfield Redevelopment								1
				Credit 4.1	Alternative Transportation—Public Transportation Access								6
				1	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms							1
					Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles							3
					Credit 4.4	Alternative Transportation—Parking Capacity							2
				1	Credit 5.1	Site Development—Protect or Restore Habitat							1
					Credit 5.2	Site Development—Maximize Open Space							1
					Credit 6.1	Stormwater Design—Quantity Control							1
					Credit 6.2	Stormwater Design—Quality Control							1
					Credit 7.1	Heat Island Effect—Non-roof							1
					Credit 7.2	Heat Island Effect—Roof							1
				1	Credit 8	Light Pollution Reduction							1

3	Water Efficiency	Possible Points: 10
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	Y												
				Prereq 1	Water Use Reduction—20% Reduction								
				Credit 1	Water Efficient Landscaping								2 to 4
				Credit 2	Innovative Wastewater Technologies								2
				3	Credit 3	Water Use Reduction							2 to 4

4	1	Energy and Atmosphere	Possible Points: 35
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	Y												
				Prereq 1	Fundamental Commissioning of Building Energy Systems								
				Prereq 2	Minimum Energy Performance								
				Prereq 3	Fundamental Refrigerant Management								
				2	Credit 1	Optimize Energy Performance							1 to 19
					Credit 2	On-Site Renewable Energy							1 to 7
				2	Credit 3	Enhanced Commissioning							2
				1	Credit 4	Enhanced Refrigerant Management							2
					Credit 5	Measurement and Verification							3
					Credit 6	Green Power							2

2	1	Materials and Resources	Possible Points: 14
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	Y												
				Prereq 1	Storage and Collection of Recyclables								
				Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof								1 to 3
				Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements								1
				1	Credit 2	Construction Waste Management							1 to 2
					Credit 3	Materials Reuse							1 to 2

Materials and Resources, Continued

Y	?	N			
	1		Credit 4	Recycled Content	1 to 2
1			Credit 5	Regional Materials	1 to 2
			Credit 6	Rapidly Renewable Materials	1
			Credit 7	Certified Wood	1

4 5 Indoor Environmental Quality Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
	1		Credit 1	Outdoor Air Delivery Monitoring	1
			Credit 2	Increased Ventilation	1
			Credit 3.1	Construction IAQ Management Plan—During Construction	1
			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
	1		Credit 5	Indoor Chemical and Pollutant Source Control	1
			Credit 6.1	Controllability of Systems—Lighting	1
	1		Credit 6.2	Controllability of Systems—Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
			Credit 8.1	Daylight and Views—Daylight	1
			Credit 8.2	Daylight and Views—Views	1

1 Innovation and Design Process Possible Points: 6

1			Credit 1.1	Innovation in Design:Low Mercury Content	1
			Credit 1.2	Innovation in Design: Specific Title	1
			Credit 1.3	Innovation in Design: Specific Title	1
			Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
			Credit 2	LEED Accredited Professional	1

1 Regional Priority Credits Possible Points: 4

1			Credit 1.1	Regional Priority: Specific Credit	1
			Credit 1.2	Regional Priority: Specific Credit	1
			Credit 1.3	Regional Priority: Specific Credit	1
			Credit 1.4	Regional Priority: Specific Credit	1

15 10 Total Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

3.0 Structural Design

3.1 General

The New Horizons Charter School Modernization project involves structural renovations and alterations to the existing facility originally constructed in 1975. Throughout the design process, the goal will be to develop economical structural solutions, fully integrated with other building design disciplines.

This Design Development report will provide structural design strategies that have developed since the schematic design stage. All design strategies, whether unchanged since schematic design, will be outlined within this report.

3.2 Design Assumptions

The structural components of the New Horizons Charter School Modernization project will be designed in accordance with the requirements of the Alberta Building Code 2014 and all referenced documents. The structural systems will be capable of sustaining the minimum loading requirements of the Building Code. In addition, the general principles outlined in the Building Structure requirements of the Standards and Guidelines for School Facilities will be followed.

Where the roof structure of the existing school is being altered, roof loads will consider the dead load of the selected roofing system and superimposed live loads due to snow and rain as prescribed by the Alberta Building Code 2014.

Where new higher roof structures or skylights are proposed, the impact of snow drifting on adjacent lower roof structures will be considered. Structural upgrade of existing adjacent roof structures may be required.

As required by the Building Code, lateral support for wind loads shall be incorporated into the structural design of all building alterations.

Given the age of the original building structure, seismic design provisions would not have been incorporated into the original structural design. Based on the limited structural scope of the proposed modernization, an upgrade of the existing building structure to meet current Building Code seismic design requirements is not required.

Climatic design parameters for the New Horizons Charter School Modernization, as prescribed by the Alberta Building Code 2014 are as follows:

Snow Loads

$$\begin{aligned} S_s &= 1.8 \text{ kPa} && + \text{ snow accumulation} \\ S_r &= 0.1 \text{ kPa} \end{aligned}$$

One Day Rain

$$1/50 = 90 \text{ mm}$$

Wind

$$\begin{aligned} q_{1/10} &= 0.35 \text{ kPa} \\ q_{1/50} &= 0.45 \text{ kPa} \end{aligned}$$

3.3 Importance Category

As required by the Alberta Building Code 2014, all buildings shall be assigned an Importance Category. As prescribed by the Building Code, structural building alterations to New Horizons Charter School will be assigned a High importance category. Appropriate load modification factors will be applied to the superimposed live loadings used throughout the structural design.

It's important to note that while the design of new structural components will comply with the requirements of the Alberta Building Code 2014, existing building framing not affected by the proposed modernization will not be reviewed nor upgraded to meet current building code requirements.

3.4 Foundations

A site specific geotechnical investigation report is presently being prepared for the New Horizons Charter School Modernization project. At the time of writing of this report we understand that field testing has not yet been completed. The foundation design of all building additions, or alterations within the existing building, will be based upon the recommendations of the geotechnical investigation. To mitigate potential issues with differential settlement of new building foundations, the performance of new foundations to be constructed within, or adjacent to, the existing building will need to be consistent with the performance of the existing adjacent foundations.

Where a structural review of existing building foundations is required due to renovations of the existing building structure, the capacity of existing building foundations will be assessed based on the information contained on the original structural drawings (if available) and the recommendations of the current geotechnical investigation.

New modular classroom and link structure additions will likely be supported on steel helical micropiles, unless otherwise directed by the geotechnical report. Foundation design for the modular classrooms will need to circumvent conflict between the new steel micropiles and the existing cast-in-place concrete friction piles that are currently supporting the existing modular classrooms to be demolished.

3.5 Superstructure

The new entry vestibule and canopy addition to the existing New Horizons Charter School will utilize conventional steel roof framing supported by structural steel columns.

The new link structure between the existing school building and the new modular classroom additions will also consist of conventional steel roof framing supported by structural steel columns.

New modular classrooms will be pre-engineered by the manufacturer.

3.6 Building Renovations

Various levels of structural design involvement will be required within areas of building renovations of the existing New Horizons Charter School. Where existing building equipment and mechanical and electrical services are proposed to be modernized, extensive areas of the existing building Main Floor concrete slab on grade may be required to be removed and replaced to accommodate new building equipment and services.

Structural involvement will also be necessary to facilitate the proposed modernization of the existing Administration area within New Horizons Charter School. To allow the reprogramming of certain areas and improve connectivity of adjoining spaces, portions of several load bearing masonry block walls are proposed to be removed or infilled. Local sub-framing of the existing roof structure, including new block lintels and jambs, will be required.

Existing masonry block walls to be removed within the new Student Gathering Area and Ancillary Room are not load-bearing, and therefore can be removed without Structural involvement. New infill masonry block walls at the east and west sides of the new Student Gathering area will require localized demolition and thickening of the supporting concrete slab-on-grade, as well as framing details for the lateral support of the walls at the underside of the existing roof structure.

Lastly, the existing roof structure will need to be locally reinforced and laterally stabilized around proposed skylight openings over the Library space. If the projection of the new skylights above the existing roof elevation is enough to collect snowdrift accumulation, localized upgrades to the existing roof structure surrounding the new skylight openings will likely be required.

4.0 Mechanical Design

4.1 Mechanical Systems

4.1.1 Summary

This report is intended to review the configuration of the existing facility, understand the existing building infrastructure and services, and provide recommendations for mechanical upgrades for the modernization of the school. Existing information was compiled through a visual walkthrough of the school on January 20, 2015, existing drawings, and a review of the RECAPP document.

4.2 Site Services

4.2.1 Storm System

4.2.1.1 Configuration

There is one storm main serving the facility. The 300mm storm service leaves the building on the south-east corner and travels east and picks up a 200mm service serving a catch basin in the east parking lot. The storm main then increases in size to 380mm and continues south to the city service connection. A storm building cleanout is located in the Corridor C-104 east of Classroom 150.

4.2.1.2 Recommendations

There are no plans to modify the storm service connections to the facility. For the purposes of due diligence to determine as-built routing and general sloping and continuity of the service connections it is recommended that the camera survey team video the storm service piping from the building exit to the city service connection to identify any drainage issues that need to be addressed in the modernization.

There may be merit for the project team to consult a civil engineer to review the need for a second new storm service to incorporate the addition of the six new modular units. This may help alleviate the current site ponding near the modulares. Site ponding at the west parking may also be alleviated with the addition of grading and a new catch basin.

4.2.2 Sanitary System

4.2.2.1 Configuration

There is one sanitary main serving the facility. The 150mm sanitary service leaves the building on the north east corner and travels north where it connects into the city service. A sanitary building cleanout is located in the Meter Room 120.

4.2.2.2 Recommendations

There are no plans to modify the sanitary service connections to the facility. For the purposes of due diligence to determine as-built routing and general sloping and continuity of the service connections it is recommended that the camera survey team video the sanitary service piping from the building exit to the city service connection to identify any drainage issues that need to be addressed in the re-development.

4.2.3 Domestic Water System

4.2.3.1 Configuration

The facility is serviced by a 50mm water main originating from the north east corner of the building. The water service is parallel with the sanitary service. The building water meter is located in Meter Room 120. The water service is not equipped with back flow prevention. There is currently no fire service for this facility.

4.2.3.2 Recommendations

We do not anticipate any modifications to the existing domestic water services for the project. This is based on the assumption that a new fire protection sprinkler system is not required. Recommend providing cross-contamination control device with a floor drain to evacuate contaminated water during pressure relief from the device.

4.2.4 Natural Gas

4.2.4.1 Configuration

The facility currently is serviced by a medium pressure natural gas main originating from the north east corner of the building. The gas service is parallel with the sanitary and water service. The service is 183 kW. One gas meter serves the building and is located in Meter Room 120. Natural gas lines are routed in the corridor ceiling space and on the roof.

4.2.4.2 Recommendations

We do not anticipate any modifications to the existing natural gas services for the project. We do recommend that the gas piping on the roof be reviewed to determine condition and either replaced and/or repainted to prevent further rusting. Depending on choice options listed below in Section 4.1.2, the natural gas piping network will either remain or be modified to suit the design option.

4.3 Plumbing System

4.3.1 Sanitary and Storm System

4.3.1.1 Configuration

The facility is served by sanitary and storm mains located beneath the perimeter corridors. The sanitary system collects drainage from the washrooms/changerooms, Science 152/Science Prep 152, Kitchen 107, ECS 104 and Office Workroom 162. The above grade storm system connects into underground storm mains in Kitchen Storage 106, Science Prep 153, Storage 133 and Janitor 142. A cosmetic renovation was recently completed for the Boys 102 and Girls 103 washrooms on the west side of the building. New floors were installed and new faucets and lavatories. The water closets were reused. ADA doors were installed with push button opening ability.

4.3.1.2 Recommendations

The main sanitary drainage system routing will be maintained. Changes to the sanitary system within the building itself will be restricted to branch lines. It is recommended that branch piping be replaced as needed to accommodate new fixtures. Branch piping added to accommodate new sinks in classrooms will require trenching work. Note that there are no floor drains in any of the boys washrooms and changerroom and it is recommended that these be added.

It is recommended that the 100mm sanitary main under the east corridor be extended south to provide drainage to the six new modulars. The 100mm sanitary main is adequately sized for the addition of the in the modulars. An investigation will need to be undertaken to ensure that this extended sanitary service will meet the existing invert. Pending this investigation, options for alternate drainage of the modulars will need to be employed, such as a pumped sanitary main that would then tie into the existing facility sanitary system.

Only minor changes to the storm system within the building itself are anticipated for this project. The main storm drainage system routing will be maintained. Storm drainage for the modulars has two options. Option 1 is to splash the roof storm water to grade and pond the

water in the school yard. Option 2 is to collect the roof storm water with a system of roof drains and rain water leaders to an underground piping system that will connect into the city service. Option 2 is recommended, however consultation with the modular manufacture will need to be undertaken to verify if this option is feasible. It was noticed during the site walkthrough that some roof drain strainers are missing. This can be addressed during the roof replacement phase.

4.3.2 Domestic Water System

4.3.2.1 Configuration

The facility is served by with domestic cold, hot and recirculated hot water mains located in the perimeter corridor ceiling spaces. A newer 324 MBH, 265 litre gas fired water heater with recirculation is located in Mezzanine 115 that serves the entire facility.

4.3.2.2 Recommendations

It is recommended that the domestic water system be reused as much as possible. To bring the plumbing piping to code, all plumbing fixtures should be provided with fixture isolation with ball and globe valves. The existing domestic water heating capacity will be reviewed against the new modernization layout to ensure appropriate capacity. Additional gas fired hot water tanks will be added if necessary. It is recommended to provide two new in-line domestic hot water recirculation pumps. The new six modulars will be provided with water service connections from the main facility system.

All plumbing fixtures and accessories will be replaced and will meet the requirements of LEED. The showers in the change rooms will be removed and the rooms repurposed. The commercial kitchen will be repurposed into a teaching space and have the commercial dishwasher and pot sink removed and replaced with kitchen sinks.

4.4 Heating System

4.4.1 Boiler Plant

4.4.1.1 Configuration

There is no existing boiler system in the facility.

4.4.1.2 Recommendations

Two options are presented for consideration. We recommend Option 2 to fully modernize the

school. However, this option should be considered in conjunction with the finalized mechanical budget.

Option 1:

No boilers provided. Heating for the air system will be provided by existing natural gas.

Option 2:

A complete boiler system will be provided. Two new boilers will be appropriate for the heating system. Preliminary sizing suggests using 2 boilers with a total combined heating output of 360 kW. The final location of the new boilers will depend on the final construction phasing scheme. This scheme is currently in development. A glycol heating system will be provided for preheat coils and unit heaters in the penthouses. Heating coils will be in each new air handling unit.

4.4.2 Distribution

4.4.2.1 Configuration

There is no existing heating water distribution system in the facility. All heating of the school is accomplished by the air system.

4.4.2.2 Recommendation

Two options are presented for consideration. We recommend Option 2 to fully modernize the school. However, this option should be considered in conjunction with the finalized mechanical budget.

Option 1:

No heating water distribution system provided.

Option 2:

A complete new hot water heating distribution system will be provided. It is anticipated that a three-pipe reverse return distribution system will be located in the corridor ceiling space. Lateral branch piping from the corridor mains will run within the corridor and perimeter classroom/perimeter room ceiling spaces to feed either heating coils in VAV boxes or hydronic terminal units such as radiant panel, unit heaters, or finned radiation.

4.5 Ventilation System

4.5.1 Main Facility

4.5.1.1 Configuration

The ventilation, heating and cooling of the facility is provided by four multi-zone Climate Master units with remote condensing units which are at the end of their life. Unit A is located in Penthouse 144, Unit B in Penthouse 154, Unit C in Mezzanine 115 and Unit D in Mezzanine 112. Each mechanical space has a gas fired Flame Master unit heater. Access to Mezzanine 115 and 112 are from ships ladders located on the gymnasium stage. Access to Penthouse 144 and 154 is from the roof only from the mezzanines. Units A, B and C serve the main facility. Unit D serves the gym and stage. Each of the four units have natural gas heating and AC cooling with their own Climate Master condenser on the roof outside of their respective penthouse. Each unit's exhaust and outdoor air louvers are on the walls of the penthouses and flues for the Climate Master unit and unit heater penetrate each penthouse roof.

The main facility is supplied from Units A, B and C. Air is supplied through a supply duct network in the ceiling space. From each unit the air enters a plenum and branches from the plenum to zones where air is supplied through round ceiling diffusers. Air is returned to the unit through egg crate ceiling grilles and migrates through the corridor ceiling space back to the unit's return air duct openings.

The exhaust air system is separated into six fans that serve the washrooms, showers, janitor rooms and kitchen. There is an exhaust fan serving the fume hood in Science Prep 153. Music Room 124 also has an exhaust fan that is decommissioned as this room served as a mechanical maintenance shop before being converted to the music room.

There are no vestibules at the school entrances. Heat is provided over the door by the air system.

A standalone RTU was added in a later renovation to serve Classroom 148 cooling needs of a computer lab. The original supply ductwork was removed during this renovation.

There is an AC unit in the ceiling space in Corridor C-103 cooling the servers in Storage 134.

The existing modular units each have a standalone RTU to provide heating and cooling.

4.5.1.2 Recommendations

As the existing three Climate Master units serving the main facility are beyond their usable service life and refrigerant is not longer available for refill and replacement parts are also not available, we are proposing that they be demolished in the modernization.

Two options are presented for consideration. We recommend Option 2 to fully modernize the school. However, this option should be considered in conjunction with the finalized mechanical budget.

Option 1:

Four new gas fired multi-zone units will be provided to replace the four existing. These units will have mechanical cooling to achieve the indoor air temperature of 22oC. These units will likely be "Knock-down, Built-in-Place" air handling units to allow installation. All existing distribution ductwork will be cleaned and reused as much as possible. All existing grilles and diffusers will be replaced with new. Existing gas fired unit heaters in mechanical rooms will be replaced with new gas fired unit heaters.

All existing plastic ductwork will be replaced with either sheet metal duct or DuctSox Fabric duct as plastic duct does not meet the current Code requirement.

Return air would be pulled out of each room at the ceiling level near the rear (exterior wall) of each room and migrate back to the air handler through the corridor ceiling space. We request feed back from the prime consultant that an asbestos abatement has been completed and there is no asbestos in the ceiling space.

The exhaust fans will be replaced with new. Existing exhaust ductwork will be cleaned and reused as much as possible. An additional exhaust fan will be provided for the copy room.

Option 2:

Four new hydronic heated central air handlers capable of 100% outdoor air and exhaust heat recovery will be provided in the existing, expanded mechanical penthouses/mezzanines. The central air handlers will have mechanical cooling to achieve the indoor air temperature of 22oC. These units will likely be "Knock-down, Built-in-Place" air handling units to allow installation. All existing distribution ductwork and diffusers will be demolished. A new duct distribution network will be included. The fresh air would be supplied to the spaces using conventional ventilation ceiling.

Air flow control would be provided with VAV boxes located in the corridor ceiling spaces, one per classroom. VAV Boxes will be equipped with hydronic re-heat coils. Existing unit heaters in mechanical rooms will be replaced with new hydronic units.

All existing ductwork will be replaced with new.

Return air would be pulled out of each room at the ceiling level near the rear (exterior wall) of each room and migrate back to the air handler through the corridor ceiling space. We request feed back from the prime consultant that an asbestos abatement has been completed and there is no asbestos in the ceiling space.

The existing exhaust air ducting would also be removed along with the existing exhaust fans. The exhaust from the washrooms, janitor rooms, storage rooms, copy rooms will be pulled into the air handling units where that exhaust heat will be re-captured as appropriate.

Note that a conventional VAV ventilation system has been deemed suitable for this modernization over a displacement ventilation system due to the block wall construction of all walls in the school. Displacement ventilation will require a stud wall to be constructed in front of the existing block wall to accommodate ducting in the wall to serve displacement wall diffusers located at the floor level. Ceiling displacement diffusers will not be considered for the design. However, if the modernization will accommodate this construction requirement then wall displacement ventilation can be considered in lieu of conventional ventilation ceiling diffusers.

4.5.2 Gymnasium and Stage

4.5.2.1 Configuration

As previously mentioned, the gymnasium and stage are ventilated by Unit D located in Mezzanine 112. The gym and stage are supplied from Unit D through ceiling ductwork with round diffusers and air is returned through wall grilles directly to the mechanical mezzanine.

4.5.2.2 Recommendations

As the existing three Climate Master unit serving the gymnasium and stage is beyond its usable service life and refrigerant is not longer available for refill and replacement parts are also not available, we are proposing that it be demolished in the modernization. Options below expand on Unit D and correspond to the options presented above in Section 5.1.2.

Two options are presented for consideration. We recommend Option 2 to fully modernize the school. However, this option should be considered in conjunction with the finalized mechanical budget.

Option 1:

One new gas fired multi-zone unit will be provided to replace the existing. This unit will have mechanical cooling to achieve the indoor air temperature of 22°C. All existing distribution ductwork will be cleaned and reused as much as possible. All existing plastic ductwork will be replaced with either sheet metal duct or DuctSox Fabric duct as plastic duct does not meet the current Code requirement. Existing return grilles in the gym wall will be replaced with new. Diffusers in Gym Storage 117 and Janitor Off/Storage 118 will be replaced with new.

Option 2:

A new hydronic heated air handler unit capable of 100% outdoor air and exhaust heat recovery will be provided in Mezzanine 112. This unit will likely be "Knock-down, Built-in-Place" air handling units to allow installation. All existing distribution ductwork and diffusers will be demolished. Ducting will be replaced with DuctSox. Existing return grilles in the gym wall will be replaced with new.

The exhaust from the locker rooms will be pulled into the gymnasium air handling unit where that exhaust heat will be re-captured as appropriate.

4.6 Fire Protection Systems

4.6.1.1 Recommendations

The school is unsprinklered and has fire extinguishers in recessed cabinets, loose in rooms and wall hung in mechanical rooms. It is recommended that a review of the fire extinguisher coverage be undertaken and that the extinguishers that are sitting on floors and millwork be properly hung on walls. The existing fire extinguishers are 5 lbs ABC.

If it is deemed that the facility is to have a sprinkler system installed then a sprinkler design will be embarked on. This will require a network of sprinkler piping in the ceiling space or corridors and rooms with sprinkler heads from the ceiling, a fire department connection at the main entrance and fire pumps.

There is a fire suppression system for the commercial range hood that will be demolished along with the hood.

4.7 Specialty Ventilation & Cooling Systems

4.7.1.1 Recommendations

Mechanical cooling of the ventilation air will be provided to achieve the indoor air temperature of 22oC. Mechanical cooling will be provided for the server room and any computer labs in the building by a split ac unit. The evaporator will be mounted on the wall and the condenser located on the roof.

The existing science fume hood in the Science Prep 153 will be demolished. New exhaust fans

and ductwork will be provided for new science room fume hoods.

The kitchen currently has a commercial range hood that will be demolished. The kitchen teaching space will have residential style hoods for each range and be exhausted to the outdoors. Air will be made up from supply air and transferred air. There is a cooler and freezer in the kitchen storage room and both condensers blow into the room. If a new cooler and freezer are included in the modernization it is recommended that the condenser be located on the roof.

4.8 Control Systems

4.8.1.1 Recommendations

A DDC control system was installed in 1998 to assist the delivery of air more efficiently and to supervise features as the group flushing of the urinals. It is recommended that a complete new digital control system will be provided to control all mechanical systems in the building. Consideration will be given to interface occupancy sensors that control lights with the building management system to operate occupied/unoccupied configurations in the various rooms within the building.

5.0 Electrical Design

5.1 Summary

This report is intended to address the condition of the existing facility, review visible code violations, evaluate existing building infrastructure and services, and then to provide recommendations for the modernization of the school for a complete and functioning facility.

Existing information was compiled through a visual walkthrough of the school as well as a limited database of existing drawings.

5.2 Overview

New Horizons Charter School (originally known as St. Theresa School) was originally constructed in 1975, with additions of portables occurring in 1976 and 1982. The existing school is approximately 4055 square meters, primarily containing generic classrooms, science classrooms, computer labs/library, administration facilities, gymnasium, portables and support areas. The school is planned to undergo a complete modernization. The building exterior shell and many interior walls are planned to remain, with minor modifications made for a complete modernization. The school will be designed using current standards, codes and sustainable engineering design practices as outlined in this report.

The following codes and standards will govern the electrical design.

- Canadian Electrical Code Part 1, 2015 Edition.
- Alberta Building Code, 2014 Edition.
- Illuminating Engineering Society of North America.
- EIA/TIA Electronics and Telecommunications Standards
- Tenant (Alberta Infrastructure) design guidelines and standards

5.3 Main Power Service

5.3.1 Description

Electrical service is supplied to the building from a utility padmount transformer located at the

northeast entrance. The transformer feeds an 800A, 120/208V, 3 phase, 4 wire main distribution board located in the main electrical room, situated in the northeast of the school.

5.3.2 Condition and Recommendations

The main power distribution board is original to the building and was installed in 1975. Although the main board is fully functioning, it is at its end of life cycle of 40 years and replacement parts are difficult to source, therefore it is recommended that the board be replaced with new. As the school is not growing in size or changing in its use, and the peak demand is below the current electrical capacity, it is intended that the utility service feeders and padmount transformer are reused for the modernization.

5.4 Telephone and Data Service

5.4.1 Description

The building is provided with telephone, cable TV and fibre services. The incoming telephone and TV services terminate at the main termination board within the main electrical room in the north east of the facility. Supernet fibre services terminate within the main server closet located in the east side of the facility.

5.4.2 Condition and Recommendations

The existing telephone, cable TV and fibre services are currently functioning well and deemed to be adequate for the use of the facility. These services are intended to be reused for the modernization.

5.5 Site Lighting and Power

5.5.1 Description

Site lighting consists of wall mounted HID flood fixtures located on various locations on the exterior of the building.

Existing car park receptacles are installed in individual pedestals located in the rear south parking lot.

5.5.2 Condition and Recommendations

All existing exterior lighting will be removed. New design will account for a mixture of wall

mounted and pole mounted LED light fixtures to suit the new proposed layout. All new site lighting will be energy efficient, dark sky friendly with full cutoff and high colour rendering index. Additional LED downlight fixtures will be installed at canopies to highlight entrances and for increased security. Exterior lighting controls will be accomplished through a new central astronomical timeclock contactor system.

Existing car park receptacles are in poor condition and will be completely removed and replaced with new. Existing pedestals and devices will be replaced on a one for one basis, conduit will be reused but all new wiring will be specified. Receptacles will be controlled with a temperature and/or a flip flop contactor.

5.6 Power Distribution

5.6.1 Description

The existing power distribution consists of the large 120/208V main distribution panel located in the main electrical room, which feeds numerous branch circuit panelboards mounted in various locations throughout the facility. The MDP also feeds a small number of splitters in order to supply power to mechanical equipment within the building.

There currently is a lack of convenience receptacles throughout the school. Majority of classrooms only contain a few receptacles and typically share the same circuit.

5.6.2 Condition and Recommendations

The existing 120/208V branch circuit panelboards have been replaced, added to and modified in various stages of the facility. Due to the poor condition, age and lack of replacement parts available, the panelboards will be completely removed and replaced with new.

Placement of these panelboards will largely be in the same location as existing. Where code does not permit panelboard locations, these will be moved to suit the new layout. Where power distribution equipment is being replaced, all associated feeders will be removed and replaced as they are original to the building and well beyond their recommended useful life. Mechanical equipment will be serviced with VFDs and loose motor starters as required by the proposed design.

Duplex receptacles will be provided throughout all areas of the school for convenience and operation of the facility. Additional duplex and special purpose receptacles will be provided in areas such as Science Rooms, Arts Rooms, Music Rooms and computer labs. Locations and quantities of receptacles will be determined and finalized with user groups.

5.7 Interior Lighting

5.7.1 Description

The existing lighting in the building is generally broken down as follows:

- Classrooms – Surface mounted 1x4 row fixtures, retrofitted with fluorescent T8 lamps and ballasts.
- Corridors and washrooms – Surface mounted 1x4 fixtures, retrofitted with fluorescent T8 lamps and ballasts.
- Gymnasiums – Pendant mounted large HID fixtures, supplemented with 4 surface mounted fluorescent strip fixtures.
- Administration areas – Surface or pendant mounted 1x4 fixtures, retrofitted with fluorescent T8 lamps and ballasts.
- Support and service areas – Surface mounted strip fixtures, retrofitted with fluorescent T8 lamps and ballasts.

Classroom lighting is switched by local low voltage switches from low voltage relay cabinets original to the building. Corridor lighting is controlled by switchbanks located in the electrical room. Fixtures in all other areas are controlled by various locations of local line voltage switches.

5.7.2 Condition and Recommendations

The lighting overall is considered to range from poor to fair condition. The fixtures utilized in the building are outdated and inefficient, as such they should be replaced with new, current and efficient technology.

All lighting will be provided using owner guidelines and standards along with the Illuminating Engineering Society of North America as a basis of design for lighting levels. Lamp sources will be LED producing 4000K colour temperature and using 120V supply voltage. Light fixture types will be provided to suit the proposed floor plan as follows:

- General administration and office areas with t-bar ceilings will be supplied with 2x4 light fixtures with an architectural design and high efficiency rating.
- General administration and office areas with gypsum board ceilings will be supplied with aircraft cable suspended direct/indirect type fixtures with a minimum 50% direct component, supplemented with recessed LED type downlights.

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- Classrooms will be supplied with 2x4 light fixtures with an architectural design and high efficiency rating.
- Washrooms will be supplied with recessed LED type downlights and wall mounted linear LED fixtures.
- Gymnasium change rooms and storage areas will be supplied with surface mount LED type fixtures with vandal resistant lenses.
- Gymnasium will be supplied with chain suspended LED fixtures with wire guards or impact lenses suited for a gymnasium application.
- Building service rooms and storage rooms will be supplied with LED general purpose strip lighting with lenses.

Lighting controls in the school will primarily be accomplished through new low voltage switching and automatic sensor controls. Controls will be provided to suit the proposed floor plan as follows:

- All open administration and office area will be controlled with local low voltage switching, while smaller private offices will be controlled with wall mounted occupancy sensor switches(manual on/auto off).
- Classrooms will be switched using local low voltage controls, with multi level switching capabilities to suit different room uses. Vacancy sensors will be provided to automatically turn off lighting during periods of inactivity.
- Circulation spaces and corridors will be low voltage switched from the master low voltage switchbank.
- Gymnasium lighting will be switched using local low voltage controls, with multi level switching capabilities to suit different room uses.
- Washrooms and change rooms will be switched using dual technology occupancy sensors.
- Building services rooms and storage closets will be controlled using local line voltage occupancy sensors.
- A master low voltage switchbank will be located in an area which will be defined by the user groups. The master switchbank will be able to zone sweep off all light fixtures in the building, including a keyed switch for night lights.
- The low voltage switching controls are to be tied in the building management system.

5.8 Emergency and Lighting

5.8.1 Description

A basic layout of self powered exit signs and DC battery packs currently exists. All existing emergency and exit lighting employs incandescent technology.

5.8.2 Condition and Recommendations

The current installation of exit and emergency lighting is in poor working condition and is beyond its recommended useful life. All existing fixtures will be removed and replaced with new. Battery powered 120V/12VDC emergency lighting battery packs and LED heads with self-test auto diagnostics will be provided throughout to provide complete emergency lighting coverage in the proposed floor plan. LED type, green pictogram, self powered exit signs which are NRCAN-C860 registered will be provided throughout to maintain a consistent exiting strategy in the proposed floor plan and to be compliant with local codes.

5.9 Communication Systems

5.9.1 Description

Recently an extensive existing data system was installed in the school, mostly utilizing Cat-5 cabling or better. Systems are distributed using a combination of free-air runs and j-hooks from termination jacks to the server rack. The main server room is located in the east wing of the school off the corridor area.

There is a rudimentary cable TV system installed within the facility, with the main incoming service terminating in the basement custodial storage/office.

5.9.2 Condition and Recommendations

Due to the large scope of the modernization and other electrical upgrades, it is recommended that all new CAT-6 cabling be installed throughout the facility. The entire communications distributions system outside of the server room, from conduit and cables to individual terminations, will be completely removed and replaced with new in order to suit the new proposed layout. End user termination ports for data communications will be provided throughout using CAT-6 cabling installed in conduit which will be stubbed into accessible corridor ceiling space for distribution via a new cable tray system. Locations and quantities of data termination ports will be determined and outlined with user groups. Provisions for wireless data transmitters will be made in each classroom in order to provide complete coverage. All new installations of communications distribution will be fully EIA/TIA compliant, certified and provided with a standard warranty.

Cable TV is not planned to be distributed to the majority of the building as it is not regularly used. Specialized areas which require cable TV outlets will be outlined by user groups and provided as such. Delivery of the system to users will consist of RG6 cabling installed in conduit which will be stubbed into accessible corridor ceiling space for distribution via cable tray.

5.10 Voice and Sound Intercommunication Systems

5.10.1 Description

An existing telephone system is installed in the facility which is being distributed to end users using traditional copper lines which originate from BIX blocks in the main electrical room, and distributed through a Panasonic digital phone switch. A recent upgrade of all telephone equipment was completed to install digital handsets.

A rack mounted Bogen Multicom paging system exists in the school, although non-operational due to it being bypassed. Speakers are located throughout the building in corridors, storage rooms, classrooms, offices etc. Paging is currently accomplished through the phone system using a small, standalone Bogen amp.

5.10.2 Condition and Recommendations

The existing phone system and its components are relatively new, and therefore will be retained as part of the modernization. However, all new wiring will be installed throughout, as changes to the floor plan and layout occur. End user communication handsets will be connected using CAT-6 cabling installed in conduit which will be stubbed into accessible corridor ceiling space for distribution via cable tray. Handsets will be located in each classroom, offices and administration areas. The system will interface with paging and intercommunications systems.

The existing Bogen Multicom system will be reinstated and re-commissioned in order to fully function properly. A hardware upgrade will be performed in the form of a Bogen Quantum card installation. Although a manufacturer's investigation will be completed to examine the integrity, age and features of the system as well as the availability of replacements parts. All new speakers will be provided throughout the building as well as outdoors. All indoor areas such as washrooms, corridors, instructional areas such as classrooms and libraries will have ceiling recessed speakers while areas with open structure such as service rooms will have ceiling surface speakers. Exterior speaker horns will be provided around the building perimeter to allow for parking lot and playground paging. The system will be zone controlled to allow for independent paging of predefined zones. The sound and public address system speakers will also control other features such as classroom change signals.

5.11 Fire Alarm

5.11.1 Description

The existing fire alarm system was installed in 2014 and is a hard wired Edwards FireShield Plus system, which replaced an old Edwards system from 1998. The system consists of the main control panel located in the north east entrance corridor, an annunciator panel in the south west entrance. Initiating devices include manual pullstations, smoke detectors and heat detectors. Signal devices include combination bell/strobes as well as combination horn/strobes. A combination of old devices and new devices are installed throughout the building.

5.11.2 Condition and Recommendations

The existing Edwards FireShield Plus panel was installed in order to maintain safety and security in the facility until such time a complete modernization was performed. Due to the technology employed being a traditional hard-wired system, as well as a mixture of signal circuits being installed, it is recommended that a complete replacement of the system take place.

A single stage, fully addressable fire alarm system will be provided in order to fully comply with the Alberta Building Code. The fire alarm control panel should be located in a secure, but accessible area along with a multi zone fire alarm annunciator panel located at the main entrance vestibule. A passive fire alarm graphic will be installed alongside the fire alarm annunciator panel as dictated by the local fire authority. Manual fire alarm initiating devices will be provided near all building exits and any fire separation crossings. Automatic fire alarm initiating devices such as smoke and heat detectors will be provided in storage rooms, service spaces, kitchens and stair shafts. The fire alarm system will be tied into the HVAC system with duct detectors to provide shut down upon fire alarm condition, where required. Audible and visual signaling devices will be installed throughout the building to maintain consistent coverage and fully comply with the Alberta Building Code.

5.12 Clock System

5.12.1 Description

The existing digital clock system was mostly decommissioned and is non-operational.

5.12.2 Condition and Recommendations

A new Primex wireless clock system will be specified, along with new clocks and head end equipment. Head end equipment will consist of either a new GPS transmitter, or WiFi amps to tie the clock system into the school IT system. All clocks will be wirelessly controlled with

built in transmitter/receiver antennas and be battery powered. Clocks located in areas such as classrooms, circulation and gathering spaces, offices and administration areas will be 12" in diameter. Clocks located in the gymnasium will be 15" in diameter and mechanically protected with a wire guard.

5.13 Intrusion Detection and Card Access System

5.13.1 Description

A basic intrusion system was installed in 1998 which consists of exterior door contacts and motion sensors in various locations. There is currently no card access control within the facility. In addition, in 2002 a rudimentary CCTV system is installed in the building to provide basic coverage of select zones.

5.13.2 Condition and Recommendations

The existing intrusion alarm system does not adequately provide security for the facility and should be supplemented and modified to suit the new proposed layout. Intrusion detection will consist of a main keypad at a location defined with the security team and user group as well as a series of motion sensors to maintain consistent coverage in circulation spaces such as vestibules and corridors. Connection to an outside monitoring facility will be provided using an auto dialer. All exterior doors will be provided with new contacts with specific doors outlined being fitted with card swipe access (two locations).

The CCTV system should be maintained but expanded to provide complete coverage of circulation spaces and areas of security concern such as interior corridors and exterior parking lot and building entrances.

A lockdown system will be incorporated whereby the schools exterior doors shall be locked during an emergency situation. The system will be initiated by the Principal or designated staff member activating a push button which will be in a strategic location identified by the user group.

5.14 Energy Savings

In order to provide an energy efficient electrical building system and a sustainable design, the following items and features will be incorporated into the school:

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- High efficiency fixtures (lumens per watt).
- Multi level lighting controls as specified.
- Automatic controls of exterior car park receptacles and exterior lighting.
- Automatic occupancy sensor controls in room types as specified.
- Low overall lighting power density (watts per square meter).

6.0 Project Schedule

Combined Schematic and Design Development Report Submission	Feb. 05, 2016
50% Contract Documents Submission with Cost Plan	Feb. 26, 2016
90% Construction Documents Submission with Cost Plan	April 01, 2016
Pre Tender Report	April 01, 2016
Finalize Comments and Revisions	April 15, 2016
Anticipated Approval for Tender	April 15, 2016
Issued for Tender by Alberta Infrastructure	April 19, 2016
Close Tenders	May 10, 2016
Award Contract	May 19, 2016
Construction Commencement	June 01, 2016
Occupancy	August 2017

7.0 Costing

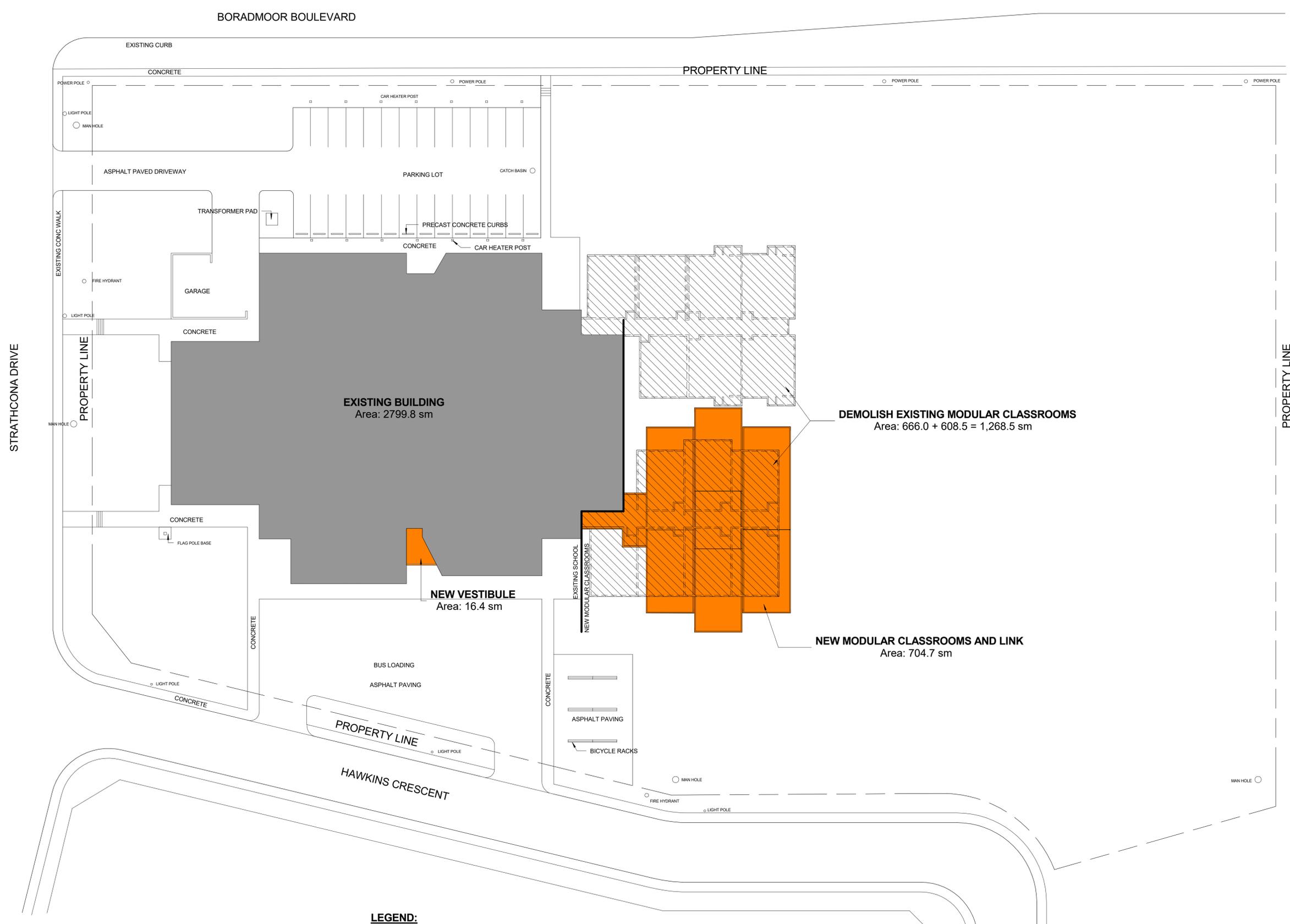
The design development drawings and technical requirements have been reviewed to date by the Owner's Cost Consultant, Altus Group. The project assumptions and areas have been discussed and Altus Group's opinion of probable cost at this time will be submitted under separate cover by Altus Group.

8.0 Appendix A - Site Drawings

8.1 Site Aerial Photo



9.0 Appendix B - Design Development Drawings



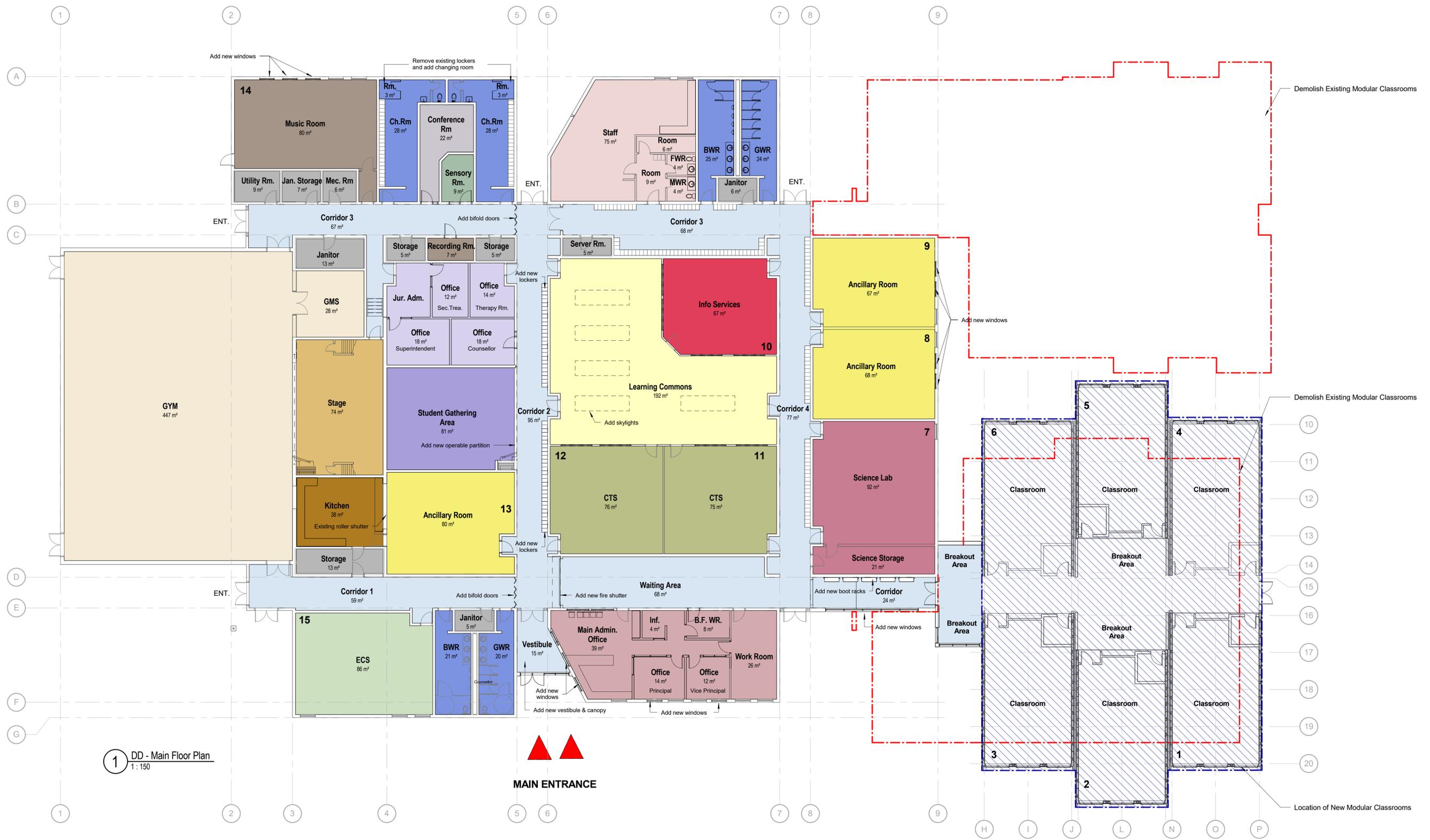
LEGAL DESCRIPTION
Plan 3743 TR Block 100 Lot 31

MUNICIPAL ADDRESS
Hawkins Crescent and Strathcona Drive,
Sherwood Park, AB

- LEGEND:**
- EXISTING BUILDING
 - EXISTING MODULAR CLASSROOM TO BE DEMOLISHED
 - NEW MODULAR CLASSROOMS AND LINK

1 DD Site Plan Overall
1:300





1 DD - Main Floor Plan
1:150

SPACE LEGEND

	Main Administration		ECS		Music Room
	Staff Area		Ancillary Rooms		Library
	Jurisdiction Administration		Science Lab		Student Gathering Area
	Circulation		CTS		Sensory Room
	Washroom / Changing Room		Kitchen		Collaboration Space
	Storage Spaces		Gym / Gym Storage		Info Services

Classroom Required:

- 1 - ECS (2 Classes of Half a day Each)
 - 2 - Grade 1
 - 2 - Grade 2
 - 2 - Grade 3
 - 1 - Grade 4
 - 1 - Grade 5
 - 1 - Grade 6
 - 1 - Grade 7
 - 1 - Grade 8
 - 1 - Grade 9
 - 2 - Classroom (For Future Use)
- Total Classroom Required 15**