



SCHEDULE 3

DESIGN AND CONSTRUCTION SPECIFICATIONS

Project #2: Six Joint-use Schools located in the Cities of Saskatoon, Martensville and Warman, Saskatchewan.

Proposal Extracts to be included:

Technical Submission Appendix C – Daylighting Study

Section 10 - Sustainability as a Learning Tool of Scored Elements Package

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SCHEDULE 3**DESIGN AND CONSTRUCTION SPECIFICATIONS****PART 1. INTERPRETATION****1.1 Definitions**

Refer to Schedule 1 [Definitions and Interpretation] of this Agreement.

1.2 Interpretation

- 1.2.1 This Schedule is written as an output specification and defines what Project Co must achieve in the Design and Construction. Except as expressly stated otherwise, Project Co shall carry out the Design and Construction as required and contemplated by each provision of this Schedule and its Appendices whether or not the provision is written as an obligation of Project Co or is stated in the imperative form.
- 1.2.2 Where “cost effective”, “appropriate”, “sufficient”, “minimize” and related and similar terms are used in the Design and Construction Specifications, they are to be construed and interpreted in terms whether they are cost effective, appropriate, sufficient, minimize, etc. from the perspective of a prudent public owner of a School who balances capital costs against maintenance, operations, educational pedagogy and other non-capital costs over the life of the School.
- 1.2.3 The word “provide” is to be construed as including all necessary Design and Construction except to the extent the context or the express provision otherwise requires.
- 1.2.4 Unless expressly stated otherwise, each reference to a standard in this document shall be deemed to mean the latest version of that standard as of the Financial Submission Date.
- 1.2.5 Words and abbreviations which are not defined in the Performance Requirements or the DBFM Agreement and which have well known technical or trade meanings and which are used in the Performance Requirements are used in accordance with such recognized meanings.
- 1.2.6 Standard units of measurement may be abbreviated in the Performance Requirements.
- 1.2.7 Unless otherwise provided, references in this Schedule to Part or Section numbers are references to Parts or Sections in this Schedule.
- 1.2.8 Unless otherwise provided, any reference in this Schedule to an Appendix is a reference to an Appendix to this Schedule.

1.3 Standards

- 1.3.1 Project Co shall undertake the Design and Construction:
- 1.3.1.1 in accordance with the standards set out in this Schedule;
 - 1.3.1.2 in accordance with the current version of the National Building Code of Canada 2010 including the Saskatchewan Amendments to the National Building Code of Canada 2010, the requirements corresponding to a 'High' importance category and all applicable Laws;
 - 1.3.1.3 having regard for the concerns, needs and interests of:
 - 1.3.1.3(1) all persons who shall be Facility Users;
 - 1.3.1.3(2) all Governmental Authorities; and
 - 1.3.1.3(3) the community;
 - 1.3.1.4 in accordance with Good Industry Practice;
 - 1.3.1.5 in accordance with the municipal standards, which shall be applied to the entire Sites; and
 - 1.3.1.6 to the same standards that an experienced, prudent, and knowledgeable long term owner of a first class School in North America, whether to be operated publicly or privately, would employ.
- 1.3.2 If more than one of the above standards is applicable then the highest of such standard shall apply.
- 1.3.3 Design requirements and design loads shall be evaluated relative to the expected function of the specific structural element(s). Design requirements and loads shall be increased, where required, to suit any specialized conditions.
- 1.3.4 If Project Co wishes to make reference to a code or standard from a jurisdiction outside of Canada, then Project Co shall demonstrate to the Authority's satisfaction that such code or standard meets or exceeds the requirements of this Schedule.

- 1.3.5 Guidelines listed in Appendix 3C [Reference Standards] shall be interpreted as standards and Project Co shall comply with them as such.
- 1.3.6 The most recent version of any standard and guideline listed in Appendix 3C [Reference Standards] or elsewhere in this document, that is in effect as of the Financial Submission Date, shall govern.
- 1.3.7 Project Co shall undertake the Design and Construction in compliance with all applicable standards and practices whether listed in Appendix 3C [Reference Standards] or not, which is not intended to be an exhaustive list.
- 1.3.8 Project Co shall ensure the Standards and Guidelines of the local authorities are current.
- 1.3.8.1 Wherever guidelines are not provided Project Co shall conform to The City of Saskatoon guidelines.
- 1.3.8.2 Project Co shall follow the approved existing staged storm water drainage plan (Saskatoon), stormwater reports (Martensville and Warman) for each respective Site. Refer to Data Room

1.4 Acronym List:

- 1.4.1 AFUE - Annual Fuel Utilization Efficiency
- 1.4.2 ANSI - American National Standards Institute
- 1.4.3 ASHRAE - American Society of Heating, Refrigerating and Air-conditioning Engineers
- 1.4.4 ASME - American Society of Mechanical Engineers
- 1.4.5 ASPE - American Society of Plumbing Engineers
- 1.4.6 ASTM - American Society for Testing and Materials
- 1.4.7 BMS - Building Management System
- 1.4.8 CaGBC - Canada Green Building Council
- 1.4.9 CEC – Canadian Electrical Code
- 1.4.10 CISC – Canadian Institute of Steel Construction
- 1.4.11 CNLA – Canadian Nursery Landscape Association
- 1.4.12 CPTED - Crime Prevention Through Environmental Design
- 1.4.13 CPU – Central Processing Unit

- 1.4.14 CRTC – Canadian Radio-television and Telecommunications Commission
- 1.4.15 CSA - Canadian Standards Association
- 1.4.16 DDC - Direct Digital Controls
- 1.4.17 DISS - Diameter Index Safety System
- 1.4.18 DVC – Fire Alarm Control and Digital Voice Command Panel
- 1.4.19 HPDE - High Density Polyethylene
- 1.4.20 HVAC - Heating, Ventilating and Air-Conditioning
- 1.4.21 IEEE - Institute of Electrical and Electronic Engineers
- 1.4.22 IP – Internet Protocol
- 1.4.23 IPLCs – Intelligent Parking Lot Control Receptacles
- 1.4.24 IT – Information Technology
- 1.4.25 ITC - Information And Communication Technology
- 1.4.26 IT/Tel – Information Technology / Telecommunication
- 1.4.27 LCD - Liquid-crystal-display
- 1.4.28 LPC – Local Proponent Controller
- 1.4.29 LPDE - Low Density Polyethylene
- 1.4.30 MPI – Master Painters Institute
- 1.4.31 NBC – National Building Code of Canada 2010
- 1.4.32 MNECB – Model National Energy Code for Buildings 1997
- 1.4.33 NBC – National Building Code of Canada 2010
- 1.4.34 NFPA - National Fire Protection Association
- 1.4.35 PABX - Private Automated Branch Exchange
- 1.4.36 PC – Personal Computer
- 1.4.37 PoE – Power Over Ethernet
- 1.4.38 PVC – Polyvinyl Chloride

- 1.4.39 RSIC – Reinforcing Steel Institute of Canada
- 1.4.40 SD – Standard Duty
- 1.4.41 SMACNA – Sheet Metal and Air Conditioning Contractors National Association
- 1.4.42 STC – Sound Transmission Coefficient
- 1.4.43 TIAC – Thermal Insulation Association of Canada
- 1.4.44 TTMAC – Terrazzo and Tile Manufacturers Association of Canada
- 1.4.45 TVOC – Total Volatile Organic Compounds
- 1.4.46 ULC - Underwriters' Laboratories of Canada
- 1.4.47 UPS – Uninterruptible Power Supply
- 1.4.48 VFD - Variable Frequency Drive
- 1.4.49 VLAN – Virtual Local Area Network
- 1.4.50 VOC – Volatile Organic Compounds
- 1.4.51 VoIP – Voice Over Internet Protocol

PART 2. GENERAL

2.1 Project Overview

2.1.1 The Ministry of Education (the “Authority”) is working collaboratively with SaskBuilds as well as the participating School Boards including, Saskatoon School Division No. 13 (SPS), Greater Saskatoon Catholic Schools (GSCS) and the Prairie Spirit School Division No. 206 (PSSD), to enter into a contract with a qualified entity to design, build, partially finance and maintain six joint-use schools as part of Project #2, located in the cities of Saskatoon, Martensville and Warman, Saskatchewan.

2.1.2 The Project shall be procured using a partnership approach using a Design Build Finance and Maintain (“DBFM”) model.

2.1.3 Project #2 includes the design and construction of six joint-use Schools (the “Facilities”) and supporting building infrastructure:

City	Location	Public School Division	Stable Enrolment	Catholic School Division	Stable Enrolment
Saskatoon	Evergreen	Saskatoon School Division No 13	550	Greater Saskatoon Catholic Schools	450
Saskatoon	Hampton Village	Saskatoon School Division No 13	500	Greater Saskatoon Catholic Schools	400
Saskatoon	Rosewood	Saskatoon School Division No 13	500	Greater Saskatoon Catholic Schools	400
Saskatoon	Stonebridge	Saskatoon School Division No 13	625	Greater Saskatoon Catholic Schools	450
Martensville	Lake Vista	Prairie Spirit School Division NO 206	600	Greater Saskatoon Catholic Schools	400
Warman	Traditions	Prairie Spirit School Division NO 206	600	Greater Saskatoon Catholic Schools	400

2.1.4 The planning process has been customized to utilize direct input from front-line educators, curriculum experts, School representatives and students, to name a few. A Lean 3P (Production Preparation Process) process was used to develop the Indicative Designs. The potential for collaborative and supportive uses which enhance opportunities for learners and the community has been a major consideration of this Student First Project.

- 2.1.5 The Indicative Designs were developed from the outcomes of the Lean 3P process including the models and full scale mock-ups. These outcomes and the subsequent 30 and 60 Day Reviews are summarized in the Lean 3P Quality Metrics. The Indicative Design utilizes the concept in which there is a fixed and permanent Core School Design which incorporates key functional areas such as the gymnasium, Resource Centre, Child Care Centre, administration area, certain classrooms, gathering areas and project areas together with the provision of additional teaching areas through the use of Relocatable Classrooms to easily and economically allow for changing demographics.
- 2.1.6 The Indicative Designs were translated in consultation with the respective School Boards, to address specific enrolments, educational pedagogy and Site constraints. The Indicative Designs were also determined in consultation with the applicable School Board and the relevant municipality.
- 2.1.7 Each Site shall accommodate one joint use School which includes one public school and one Catholic school and one central shared space that includes the multi-purpose room, Community Resource Centre and Child Care Centre, to form a single, cohesive joint use School. The Project shall offer educational programming for students ranging from Pre-Kindergarten (Pre-K) to grade 8. The key attributes of the program and environment include:
- 2.1.7.1 Flexible learning environments for varied instructional use and class size;
 - 2.1.7.2 Interdisciplinary, project based and inquiry based teaching and learning;
 - 2.1.7.3 A technology-rich environment that anticipates changes in educational delivery;
 - 2.1.7.4 Teacher collaboration and support spaces integrated into learning communities; and
 - 2.1.7.5 School commons space that allows students of all ages to gather and connect.
- 2.1.8 In addition, each joint-use School shall feature a core space for shared joint and public use, integrating School facilities with community programming for maximum use. The primary areas allocated for public use are the 90 seat Child Care Centre facility, Community Resource Centre, and Multipurpose Room.
- 2.1.9 Refer to Appendix 3A [Functional Program] (the “**Functional Program**”) for a description of the program requirements for each of these School elements.

2.2 Functional Program

- 2.2.1 Attached as Appendix 3A [Functional Program] is the functional program and space considerations for the School.

- 2.2.2 Project Co shall design and construct the School:
- 2.2.2.1 so that it accommodates all of the spaces, activities, functions, design features and adjacencies described in the Functional Program; and
 - 2.2.2.2 in accordance with the requirements of the Functional Program and Appendix 3B [Functional Program Room Data Sheets], subject to any adjustments or refinements made in accordance with Appendix 2B [User Consultation and Design Review].
- 2.2.3 Project Co shall, for each room in the School, provide all equipment and features indicated on the applicable Room Data Sheet except for any Equipment that the Authority is responsible for providing under the terms of Appendix 2D [Equipment and Furniture].
- 2.2.4 Unless otherwise noted below, the net square metre area for all rooms must not be less than the required area listed in the Appendix 3A [Functional Program], Attachment 1 [Schedule of Accommodations]. Project Co must provide a rationale for each variation and demonstrate to the Authority's satisfaction that affected rooms retain their functionality and performance. If, in the Authority's opinion, the room does not meet the required functionality or performance, the full net square metres must be provided as stated in the Schedule of Accommodations.
- 2.2.4.1 The net square meter area for rooms listed in Schedule of Accommodations does not include circulation, the net square meter area is that required for educational functions. Therefore the design of these spaces must include circulation space in addition to the required net square meter area.

2.3 Additional Rooms and Spaces

- 2.3.1 Notwithstanding anything in the Appendix 3A [Functional Program] and Attachment 1 [Schedule of Accommodations], Project Co shall design and construct the School to include all rooms and spaces as required to comply with the terms of this Agreement, including sufficient rooms and spaces as necessary for the operation and maintenance of the School and for Project Co to perform the Services in accordance with this Agreement. Spaces provided for operations, maintenance and other FM requirements shall not impact educational function or public and staff access to the building.

2.4 Indicative Design

- 2.4.1 The Authority's consultants undertook an Indicative Design for the Schools (the "**Indicative Design**"). The Indicative Design is provided for information in the Data Room.

- 2.4.2 The Indicative Designs were developed from the outcomes of the Lean 3P process including the models and full scale mock-ups. The output of the Lean 3P work is an internal building layout that informed the Functional Program, Indicative Design and Schedule 3 [Design and Construction Specifications]. The Indicative Design serves several purposes, including testing the functional program to ensure that it fits within the available space, providing input to a quantity survey estimate to confirm affordability and supporting the refinement of key adjacencies and work flows.
- 2.4.3 The Indicative Designs are not intended to restrict Project Co in their design of the Schools; it shows one possible form of a design solution and is not to be interpreted as the ideal design for the current educational needs. The Authority is particularly interested in, and encourages, innovative design solutions that meet the Performance Specifications and offer benefits to the Authority and relevant School Boards.
- 2.4.4 The Authority makes no representation as to the accuracy or completeness of any aspect of the Indicative Design and it may not reflect all of the requirements of this Schedule 3 [Design and Construction Specifications];
- 2.4.5 Project Co shall be completely responsible for all aspects of the Design and Construction whether or not it uses all or any part of the Indicative Design, and Project Co shall be responsible to independently verify the accuracy of any information contained in or inferred from the Indicative Design if Project Co uses any of such information in its design.
- 2.4.6 Project Co shall be responsible for meeting all municipal by-laws and codes as required by Statute.

2.5 School Sites

- 2.5.1 The Project shall be carried out within the boundaries of the Sites for each public school and Catholic school, at the locations identified in Schedule 2 [Design and Construction Protocols] Appendix 2G Site Plans. Certain of the Exterior Improvements shall be constructed on the municipal lands within the Sites, and shall be maintained by Project Co throughout the Project Agreement Term.
- 2.5.1 Project Co shall design the Schools:
- 2.5.1.1 so that it is an integrated part of the surrounding neighbourhood and contributes to the liveability and sociability of the community; and
- 2.5.1.2 to have a strong urban presence and a distinctive educational character, reflecting the Authority's values and role as the major centre in the community.

2.6 School Site Investigations

- 2.6.1 The Authority undertook Site investigations work to provide additional information to Project Co relating to the legal and topographic survey, Transportation Impact Assessments (TIA), and Environmental Site Assessments for each School Site (the “**School Site Investigations Reports**”). The School Site Investigation Reports are provided for information in the Data Room.
- 2.6.2 The School Site Investigation Reports are provided to Project Co as information only. The School Site Investigation Reports shall not be construed as importing any duty of care to Project Co on the part of the Authority or the relevant School Board in relation to the accuracy of such School Site Investigation Reports or the studies or other information contained therein, it being mutually understood and agreed that Project Co shall perform its own research, investigation and due diligence as it requires at each School Site.
- 2.6.3 Project Co is solely responsible for all geotechnical testing and analysis, Site conditions, environmental conditions and requirements, historical assessments and other matters relating to the Sites as may be required for the necessary Authorizations from Governmental Authorities in connection with the Project, or as may otherwise be required by Applicable Laws.

PART 3. DESIGN PRINCIPLES AND OBJECTIVES**3.1 Guiding Principles**

- 3.1.1 This Section 3 sets out the general design criteria for the Core School Design applicable to all the Schools.
- 3.1.2 The Authority has defined guiding principles that guide the process and inform the School development work. Guiding principles for the Project include:
 - 3.1.2.1 Student First;
 - 3.1.2.2 Collaboration;
 - 3.1.2.3 Celebration;
 - 3.1.2.4 Respect Diversity;
 - 3.1.2.5 Integrity and Trust;
 - 3.1.2.6 Innovative; and
 - 3.1.2.7 Open Communication.

3.2 Design Philosophy

- 3.2.1 The goal of the Project is to provide safe, comfortable, sustainable and creative spaces for students and early learners to achieve success, with a focus on the needs of students to ensure successful educational outcomes. Fundamental to the model is student focused education.
- 3.2.2 The design philosophies that the Indicative Designs were based upon and which Project Co shall include while carrying out its' obligations under the Project Agreement include the following:
 - 3.2.2.1 meet all programmatic and educational requirements;
 - 3.2.2.2 provide a flexible design that allows the School to be easily modified to respond to different teaching methods such as project based learning, collaborative learning, team teaching, seminar-style instruction and individual instruction;
 - 3.2.2.3 develop flexible learning and interactive spaces for students, teachers and the community that are adaptable to change in program or personnel and promote student and staff safety;

- 3.2.2.4 recognize and enhance the environmental systems and promote sustainability by the incorporation of sustainable design system into the building concept including without limitation the maximization of natural lighting and views for all occupied areas;
- 3.2.2.5 use of materials and components that ensure minimum inconvenience and disruption from breakdowns, repairs and maintenance activities;
- 3.2.2.6 within the full design capability of the equipment that has met the Performance Requirements, and in accordance with Good Industry Practice, use of lighting, thermal and visual designs, acoustics and air quality to ensure maximum student comfort and learning;
- 3.2.2.7 design of workspaces that are ergonomic and conducive to workflow, processes and are youth-friendly;
- 3.2.2.8 as determined in the Lean 3P process, individual school orientation on site shall be as follows:

City	Location	Public School Division	Catholic School Division
Saskatoon	Evergreen	North	South
Saskatoon	Hampton Village	West	East
Saskatoon	Rosewood	West	East
Saskatoon	Stonebridge	West	East
Martensville	Lake Vista	East	West
Warman	Traditions	East	West

3.3 Project Design Objectives

- 3.3.1 Project Co shall apply the following overall objectives as further described in Sections 3.4 to 3.12 (collectively the “**Project Design Objectives**”) in undertaking the Design:
 - 3.3.1.1 Evidence Based Design;
 - 3.3.1.2 Sustainable design;
 - 3.3.1.3 acoustical design;
 - 3.3.1.4 indoor air quality design;
 - 3.3.1.5 thermal comfort design;
 - 3.3.1.6 visual comfort design
 - 3.3.1.7 wayfinding and signage
 - 3.3.1.8 optimized outcomes; and

3.3.1.9 adaptability, flexibility and expandability.

3.3.2 The Project Design Objectives are integrated objectives and Project Co shall apply them on an integrated basis throughout the Design and Construction.

3.3.3 In addition to the descriptions of these objectives in this Section 3, specific requirements related to these objectives are included in Parts 4 – 13 of this Schedule 3 [Design and Construction Specifications] and guiding design principles are set out in Appendix 3A [Functional Program] and Appendix 3B [Functional Program Room Data Sheets].

3.4 Evidence Based Design

3.4.1 The design of the Schools shall include an interior design that aligns with the Project Design Objectives as outlined in Section 3.3 and gives priority consideration to student and community centred design, and safety for students and staff.

3.4.2 In undertaking the design of the School, Project Co shall apply Evidence Based Design methodologies to achieve the Project Design Objectives. “**Evidence Based Design**” means that decisions about the design of the Schools shall be based on credible research, information derived from comparable projects, and information about Authority operations, in order to achieve the best possible outcomes. The goal of Evidence Based Design is to deliver measurable improvements, for example in the Authority’s student and staff workflow outcomes and productivity.

3.5 LEED® Certification

3.5.1 Project Co shall:

3.5.1.1 design and construct the Schools using design methods, building materials, operational practices, energy and life cycle considerations that promote environmental quality and economic vitality throughout the Construction and Operating Periods, including by minimizing the Authority’s operating costs (for example in relation to utilities and carbon taxes);

3.5.1.2 achieve LEED® Silver Certification requirements as outlined in Schedule 2 [Design and Construction Protocols].

3.5.1.3 give priority to efficient use of resources, protection of health and indoor environmental quality;

3.5.1.4 consider efficiencies and innovations that may be possible through integration of systems to minimize operational costs for the Authority and the relevant School Board;

3.5.1.5 apply a total systems approach to minimize energy consumption and incorporate energy consumption management techniques that are targeted to stabilize and optimize energy flows;

- 3.5.1.6 where possible prioritize the use of rapidly renewable products to reduce the depletion of finite resources; and.
 - 3.5.1.7 include benign characteristics such as energy neutral, water balanced, toxin free, with minimal and well-managed waste.
 - 3.5.1.8 LEED® Certification Plan shall include for each School the LEED® site boundary plan(s), energy model report(s), daylight simulation(s), documentation of the Commissioning process, and documentation of all design and construction drawings and specifications including but not limited to; erosion and sedimentation control, construction waste management, indoor air quality during construction and before occupancy, LEED® material requirements, and LEED® general requirements.
- 3.5.2 Project Co may design the Schools to include the use of alternate energy sources such as passive solar, on Site power generation, such as alternate heating and cooling sources, such as ground source heat pumps.
- 3.5.3 Going above and beyond LEED Silver sustainable design and construction practices, Project Co has incorporated many features that enable the Schools to act as learning tools for students to provide a greater understanding of, numerous education tools will be provided and maintained by Project Co to provide high visibility and easy access to staff, students and visitors. Each of these can be incorporated into class curriculums and in some cases already have teaching aids that are pre-packaged and delivered within the tools. Refer to Section 10 - Sustainability as a Learning Tool of Scored Elements Package as included in Proposal Extracts.

3.6 Sustainable Design

- 3.6.1 The Design Life requirement is a 50 year building starting at the date of Service Commencement. Table 3.6.1 indicates The Design Life, in years, of major building components and systems.

Table 3.6.1 – Design Life			
CATEGORY – Major Components/Systems	Design Life Years	CATEGORY – Major Components/Systems	Design Life Years
Site:		Vertical Movement:	
Hardscaping	15+	Elevator	25+
Parking	10+	Elevator Finishes	15+
Landscaping	15+		
Site Lighting	20+	Structure:	
Exterior CCTV/Security	15+	Building Structure	50+
Exterior Signage	10+		
Exterior Building:		Mechanical:	
Building Façade Finish	50+	Heating Systems	25+

Canopies/Sun Shades	15+	Cooling Systems	25+
Glazing Systems	25+	Plumbing	25+
Roof Finish	25+	Plumbing Fixtures	15+
Eaves, Soffits, Fascia	25+	Major Equipment	25+
Exterior Doors and Hardware	15+	Air Handling Units & Associated Equipment	20+
Building Envelope	25+		
Interior Finishes:		Electrical:	
Floor Finishes	10+	Low Voltage Distribution	50+
Ceiling Finishes	15+	Alarm System	15+
Wall Finishes	7+	Data System	10+
Interior Doors and Hardware	10+	Communication Systems	15+
Furnishings	5+	Light Fixtures	15+
Signage (Interior)	10+	Interior CCTV/Security	15+
Casework / Counters	15+	Major Equipment	25+

3.7 Acoustical Design Criteria

- 3.7.1 Project Co's design shall incorporate a high standard of acoustic design. The guidelines set out in this section are minimum guidelines.
- 3.7.2 Project Co shall design the Schools' instructional areas with minimal noise interference from adjacent classrooms, hallways, mechanical equipment and outside noises.
- 3.7.3 Project Co shall consider such elements as reverberation, sound isolation and background mechanical noise so as to ensure that in all instructional areas a high level of clear intelligible speech is achieved.
- 3.7.4 Key design criteria to be implemented by Project Co are as indicated below to ensure that all instructional areas have the following minimum acoustic characteristics:
 - 3.7.4.1 quiet background noise levels due to the operation of heating and ventilation systems and air conditioning ("HVAC") and plumbing systems. Project Co shall use ASHRAE Noise Criteria method for assessing HVAC and related indoor noise as well as the guidelines outlined in Schedule 3 [Design and Construction Specifications];
 - 3.7.4.2 low reverberation;
 - 3.7.4.3 adequate noise isolation between classrooms, learning areas and adjacent classrooms, washrooms, corridors, music rooms, gymnasium, auxiliary gymnasiums and mechanical rooms;
 - 3.7.4.4 adequate noise isolation from outdoor noise sources such as vehicular traffic or aircraft; and

- 3.7.4.5 adequate structural isolation between music rooms, gymnasium, mechanical rooms and adjacent spaces.
- 3.7.5 Project Co's mechanical design shall address concerns related to background noise from the HVAC system.
 - 3.7.5.1 Project Co shall design Instructional Areas so that in all locations where a student or teacher's desk could potentially be located, the background HVAC noise shall not exceed the limits indicated in Table 3.7.9.
 - 3.7.5.2 The HVAC system shall be designed so the background HVAC noise shall have a neutral spectrum devoid of tones, low frequency rumbling noises and other distracting sounds.
 - 3.7.5.3 Project Co shall include without limitation vibration isolation for all appropriate mechanical equipment to prevent transmission of discernible vibration into the classrooms.
 - 3.7.5.4 Design all mechanical systems to prevent sound and vibration transmission between spaces and from mechanical equipment to the spaces, and to maintain sound to levels as per design standards. Design mechanical systems located at or near a building exterior to minimize sound transmission to the neighbouring residential community.
 - 3.7.5.5 All hung equipment shall utilize spring isolators designed for the weight and vibration characteristics of the equipment.
 - 3.7.5.6 Provide flexible connectors on all pump, duct and wiring connections to isolated equipment.
 - 3.7.5.7 Utilize fibre-free internal insulation on supply and return air ductwork. Products shall have achieved Greenguard for Children and Schools Certification.
- 3.7.6 Reverberation time shall be designed to meet the following:
 - 3.7.6.1 Reverberation in unoccupied classrooms shall not exceed the limits indicated in Table 3.7.9, averaged over the frequency of 500 Hz – 2000 Hz.
 - 3.7.6.2 Reverberation in unoccupied music/band rooms shall be between RT 0.70 – 0.80 seconds, averaged over the frequency of 500 Hz – 2000 Hz.
 - 3.7.6.2(1) Music Room ceiling height shall be between 3.6 m – 4.6 m.

- 3.7.6.2(2) Portions of the ceiling shall be reflective to promote sound diffusion. Recommend use of pyramidal or convex ceiling diffuser panels covering approximately 10% - 20% of the ceiling.
 - 3.7.6.2(3) Provide non-parallel sidewalls or provide sound diffusing elements on sidewalls such as open instrument storage.
 - 3.7.6.3 Reverberation in unoccupied gymnasium shall not exceed RT 2.0 seconds, averaged over the frequency of 500 Hz – 2000 Hz. Acceptable reverberation time can typically be achieved with ceiling treatments with a minimum NRC 0.70, such as acoustic roof deck, impact resistant acoustic ceiling tiles or suspended baffles. Wall treatment shall be distributed over at least two adjacent walls, with a minimum NRC 0.50.
 - 3.7.6.4 Student gathering areas shall have acoustic ceiling treatment such as acoustic suspended ceilings, baffles, acoustic deck or spray-on materials.
 - 3.7.6.4(1) If ceiling absorption area is limited, provide acoustic wall panels with a minimum NRC 0.70.
- 3.7.7 Project Co shall design the School with sound isolation requirements throughout the building. The minimum Noise Isolation Class (“NIC”) for classrooms is NIC 45 and for music rooms is NIC 55.
- 3.7.8 In addition, Project Co shall design the acoustics for the Instructional Areas so as to:
 - 3.7.8.1 provide acoustic treatment where sound attenuation, soundproofing or other sound control measures are necessary to create a learning environment for students and a safe and comfortable environment for staff and where confidentiality is paramount.
 - 3.7.8.2 minimize sound flanking or structural bridging so the maximum potential noise isolation capability is reached. Wall, floor and ceiling assemblies around classrooms shall require a STC rating that is 5 points higher than the required NIC rating;
 - 3.7.8.3 isolate noise between classrooms and mechanical rooms in order to meet the HVAC background noise level requirements. A mechanical room envelope with a rating of NIC 50 shall accommodate most mechanical systems but may not be adequate in all circumstances;

- 3.7.8.4 provide noise isolation between classrooms and adjoining spaces to prevent impact noises from creating a distraction in Instructional Areas. Typical activities such as walking in corridors, locker doors closing, etc. shall not exceed a maximum noise level of 40 dBA inside a classroom or other learning area;
- 3.7.8.5 take into consideration that a building envelope with STC 40 and operable windows, if applicable, which may be acceptable for a suburban location
- 3.7.8.6 provide acoustic treatment to both ceiling and walls of the gymnasium, auxiliary gymnasium and Multipurpose Rooms and Da Vinci Studios, if applicable, to control noise and reverberation;
- 3.7.8.7 provide acoustic treatment to control noise and sound transmission in music rooms identified in Appendix B (Functional Program Room Data Sheets);
- 3.7.8.8 balance the openness required for student learning with privacy considerations, confidentiality of student information and the security needs of staff at all hours of the day.
- 3.7.8.9 Project Co. shall retained an Acoustic Consultant to review the construction assemblies and provide the proper isolation and separation around required spaces.

3.7.9 Interior wall and ceiling acoustic criteria shall be as follows:

Table 3.7.9 – Acoustic Criteria					
Space	STC	NRC	RT	RC	Note:
Classrooms	49	0.55	0.6	30	
Offices / Administration	45	0.55	0.6	30	
Music/Band Rooms	60	0.80	0.7 - 0.8	30	1
Multi-Purpose Rooms	55	0.70	0.6	30	
Washrooms	55	0.70	0.6	40	
Libraries/Resource Centre	49	0.70	0.6	30	
Gymnasium/Auxiliary Gymnasium	60	0.50	2.0	40	1
Student Gathering Areas	55	0.70	0.7	40	1
Corridors	49	0.55	0.6	40	
Movable Walls	49				

Note 1: Minimum NRC rating for both ceiling and wall treatment

- 3.7.10 For walls with a rating of STC 45 or greater, extend walls full height or if not possible, extend wall 150 mm above suspended ceiling and provide acoustic ceiling system with CAC 40 rating.
- 3.7.11 Where penetrations are necessary, minimize placing penetrations back-to-back or next to each other. Use mineral fibre insulation to seal joints around all cut-outs such as electrical, TV and telephone outlets, plumbing escutcheons, and recessed cabinets.
- 3.7.12 Minimize constructions, such as ducts, rigid conduits, or corridors that act as speaking tubes to transmit sound from one area to another. Common supply and return ducts shall have sound attenuation liners at the diffuser and/or grill to maintain assemblies' STC. Seal conduits.
- 3.7.13 To isolate structure-borne vibrations and sound, install resilient mountings on vibrating equipment to minimize sound transfer to structural materials. Provide ducts pipes, and conduits with resilient, non-rigid boots or flexible couplings where they leave vibrating equipment and isolate them from the structure with resilient gaskets and sealant where they pass through walls, floors, or other building surfaces.
- 3.7.14 Use acoustic screens, vibration isolators and carefully selected exterior equipment to prevent exterior noise that neighbors may find offensive. All building systems must be designed so that they do not produce more than 50 dBA at night and 60 dBA during the day when measured at the property line of the project.
- 3.7.15 Classroom walls without windows or openings shall be designed to achieve a STC rating of 49. Where classroom walls include windows, overhead doors or sliding doors, adequate noise reduction is to be considered in relation to the classroom programs for that area, including provision of sound seals to all window and large door perimeter connections to the adjacent walls and floors; walls shall be constructed in the same manner as if there were no openings with an STC rating of 49.
- 3.7.16 The STC rating for washrooms shall apply to all walls surrounding the washroom including the washroom stalls.

3.8 Indoor Air Quality Design Criteria

- 3.8.1 Project Co's design for the ventilation system for Instructional Areas shall be designed for an average of 30 students per classroom.
- 3.8.2 For HVAC systems employing outside air economizers, Project Co shall ensure that the minimum outside air flow rate to every occupied space in the School shall meet the requirements of the most current ASHRAE Standard 62.
- 3.8.3 The elimination of materials that may off-gas or contain potential environmental pollutants is preferred. If the use of materials that may off-gas or contain potential environmental pollutants is required then the use of such materials shall be minimized.

3.9 Thermal Comfort Design Criteria

- 3.9.1 Project Co shall, in the design for thermal comfort, focus on implementing strategies that enhance student attention spans, productivity and energy conservation.
- 3.9.2 Project Co's HVAC design shall respond to the loads imposed by building envelope, internal loads and ventilation loads in an integrated fashion to achieve good thermal comfort, superior indoor air quality and to avoid excessive energy use.
- 3.9.3 The heating and cooling systems shall be designed to maintain the following conditions in the space, based on the worst case winter design conditions for each municipality:
- 3.9.3.1 Heating:
- 3.9.3.1(1) occupied hours: 22°C; and
- 3.9.3.1(2) unoccupied hours: 18°C during heating modes;
- 3.9.3.2 Cooling:
- 3.9.3.2(1) All air handling systems shall include without limitation an economizer section to enable 100% outdoor air free cooling when outdoor temperatures permit.
- 3.9.3.2(2) Supply air temperatures on air handling units serving the School Structure in cooling mode can exceed the stipulated 18°C if interior space meets the requirements of ASHRAE 55;
- 3.9.3.2(3) Design criteria occupied hours: 22°C
- 3.9.4 Project Co shall, in the design for thermal comfort, ensure that the following design condition temperatures are not exceeded:
- 3.9.4.1 the temperature fluctuation shall not exceed $\pm 1^\circ\text{C}$ from set point during the heating mode.
- 3.9.4.2 temperature fluctuations in air conditioned areas shall not exceed $\pm 1^\circ\text{C}$ from set point.
- 3.9.4.3 the horizontal temperature gradient between 300 mm and 3000 mm from the exterior wall, at desk height shall not exceed 2°C. This is not applicable within 1000 mm of a supply diffuser or other fixed heating, ventilating or air conditioning equipment;
- 3.9.4.4 the vertical temperature gradient between 200 mm and 1700 mm above the floor at any point more than 300 mm from the exterior wall shall not exceed

3°C. This is not applicable within 1000 mm of a supply diffuser or other fixed heating, ventilating or air conditioning equipment;

- 3.9.5 Project Co should take into consideration the use of operable windows that can be opened at the occupants discretion within the Schools, in their selection of cooling and/or heating systems.

3.10 Visual Comfort Design Criteria

- 3.10.1 Project Co shall design the School Structure to ensure that an enjoyable visual environment is provided through the use of materials, textures, colours, and natural and artificial lighting.
- 3.10.2 Project Co's design of the School shall include articulation of the exterior of the School to create an architecturally interesting and refined structure. Consider emphasizing the modular requirements of the program in the massing and materials to achieve articulation, visual interest, and human scale.
- 3.10.3 Project Co shall incorporate the following general strategies for achieving visual comfort:
- 3.10.3.1 integrating natural and electric lighting with appropriate design and controls for user management and daylight harvesting;
 - 3.10.3.2 balancing quantity and quality of light by avoiding excessively high light levels and by designing appropriate illumination levels for individual rooms or room use areas;
 - 3.10.3.3 controlling or eliminating glare; and
 - 3.10.3.4 incorporating direct and indirect lighting in specific areas to allow more versatility of the space.
- 3.10.4 Project Co shall take advantage of incorporating natural daylight in the Core Structure. Daylighting is the controlled admission of natural light into a space.
- 3.10.5 Project Co shall design for diffuse, uniform daylight throughout the Instructional Areas and corridors where possible.
- 3.10.6 Design natural light sources with controls and filtering mechanisms such as interior shades, louvers, or blinds and exterior overhangs and/or light shelves, to avoid direct beams of sunlight and glare.
- 3.10.7 For window daylight filtering mechanisms that are not accessible from the floor level, Project Co shall provide motorized interior shades to control light transmittance and reduce glare.

3.10.8 Project Co shall consider bringing in light from overhead through the use of vertical clerestory glazing.

3.10.9 Provide Direct Natural Light, Borrowed Natural Light, and Exterior Views in accordance with the following Chart:

Daylight Standards and Views				
	Location	Daylight Standards Required		Exterior Views Required
		Direct Natural Light	Borrowed Natural Light	
Schools	Classrooms (G1.1, G1.2, G2.10, G2.11, G2.12, G2.21, G2.22, G4.0, P2.1, P2.3, P2.8, P3.1, D1.2, D2.12)	Yes	No	Yes
	Band Room (P2.10), Music Room (P2.4), Multi-Purpose Flex Drama (P2.7)	Yes	No	Desirable ¹
	Break Out Rooms (G2.2)	Desirable ¹	Desirable ¹	Desirable ¹
	Tutorial (G2.5), Resource-Cultural Room (G2.3), Library Seminar (R1.4), Resource Room (R1.6), Seminar (G2.4)	No	Desirable ¹	No
	Student Commons (G2.24)	Yes ²	Yes ²	Yes
	Learning Commons (G2.6)	Yes ²	Yes ²	Yes
	Library (R1.1, R2.1)	Yes ²	Yes ²	Yes
	Gymnasium (P1.1)	Yes ²	Yes ²	Limited
	Multi-Purpose Physical Activity (P2.11)	Desirable ¹	Desirable ¹	Limited
	Staff Room (D1.5)	No	Desirable ¹	No
	Staff Room (A4.1)	Desirable ¹	Desirable ¹	Desirable ¹
	Teacher Collaboration (A4.2)	No	Desirable ¹	Desirable ¹
	Workroom (A4.3)	No	No	No
	Reception (A1.0)	Desirable ¹	Desirable ¹	Desirable ¹
	Principal's Office (A3.1)	Desirable ¹	Desirable ¹	Desirable ¹
	Vice Principal's Office (A3.2)	No	Yes	No
	Office (A2.1, A3.3, A3.5, A3.7, D1.6, D3.3, G2.7, G2.13, R1.2)	No	Desirable ¹	No
	Meeting Rooms (A3.4, D3.2)	Desirable ¹	Desirable ¹	Desirable ¹
	Work Stations (A3.6)	Desirable ¹	Desirable ¹	Desirable ¹
	Community Resource Centre (D3.1)	Yes	No	Yes
Infant Sleep (D1.4)	No	No	No	
Corridors (C1), Bootrooms (C3)	Desirable ¹	Desirable ¹	Desirable ¹	

Note 1: "Desirable" means if a room is located on an exterior wall, then windows and exterior views shall be provided. If a room is located internally, then borrowed light shall be provided wherever possible.

Note 2 : For spaces noted as requiring both Direct Natural Light and Borrowed Natural Light, if an applicable room or area meets or exceeds the Direct Natural Light requirements for such spaces on an individual room or area basis, it may be exempted and excluded from Borrowed

Light requirement. If an applicable room or area does not meet Direct Natural Light requirement on an individual room or area basis, then it must meet the Borrowed Light requirement as an individual room or area space, and must also be accounted for in the aggregate location requirement for Direct Natural Light.

Note 3: In the event of conflict, daylighting and view requirements to rooms identified in the table above shall govern over Room Data Sheet requirements.

- 3.10.9.1 Except as specified below, locations which require Direct Natural Light shall achieve a minimum illuminance of 100 lux for at least 60% of each independent location type, room or area.
- 3.10.9.1(1) For areas evaluated and summarized by Project Co to achieve daylighting beyond the minimum requirements of this section, achieve the minimum daylight level and area as proposed and summarized in Project 2,, Package 3, Appendix C Daylight Analysis Summary Tables. Refer to Proposal Extracts.
 - 3.10.9.1(2) For Student Commons and Learning Commons areas located on a main floor which require Direct Natural Light, achieve a minimum illuminance of 50 lux for at least 25% of each independent location type room or area, or demonstrate 50 lux for 25% of the aggregated area for all rooms and areas of the specified location type.
 - 3.10.9.1(3) For Student Commons and Learning Commons location areas located on upper floors which require Direct Natural Light, achieve a minimum illuminance of 100 lux for at least 50% of each independent location type room or area, or demonstrate 100 lux for 50% of the aggregated area for all rooms and areas of the specified location type.
 - 3.10.9.1(4) Criteria to be demonstrated for a clear sky condition on March 21 or September 21 at 9:00 am, 12:00 pm, or 3:00 pm through computer simulations, calculations, measurements or a combination of the three options. Simulations may assume an internal surface reflectance of 50%.
- 3.10.9.2 For locations which require Borrowed Natural Light, provide natural light as indicated in Appendix 3D [Light Measurement Methodology].
- 3.10.9.3 Except as specified below, locations which require Borrowed Natural Light, but do not meet the criteria indicated in Appendix 3D [Light Measurement Methodology] provide overhead type daylighting to achieve a minimum 50 lux for at least 50% of the individual location, room or area.

- 3.10.9.3(1) For Student Commons and Learning Commons located on the upper floors which require Borrowed Natural Light, but do not meet the criteria indicated in Appendix 3D [Light Measurement Methodology] provide overhead type daylighting to achieve a minimum 100 lux for at least 50% of the location area.
- 3.10.9.3(2) Applicable criteria to be demonstrated for a clear sky condition on March 21 or September 21 at 9:00 am, 12:00 pm, or 3:00 pm through computer simulations, calculations, measurements or a combination of the three options. Simulations may assume an internal surface reflectance of 50%.
- 3.10.9.4 For all locations a maximum illuminance of 5000 Lux (500 foot candles) in a clear sky condition on March 21 or September 21 at 9:00 am, 12:00 pm, or 3:00 pm,
- 3.10.9.5 Except as specified below locations which require Exterior Views, for measurement purposes provide direct line of sight to the outdoor environment for building occupants via vision glazing between 0.76 metres and 2.3 metres above the finished floor for at least 90% of the location area.
 - 3.10.9.5(1) For Student Commons and Learning Commons areas which require Exterior Views, provide direct line of sight to the outdoor environment for building occupants via vision glazing for at least 25% of the location area.
 - 3.10.9.5(2) At least one Student Commons or Learning Commons area for each of the public school and the Catholic school shall be located on an exterior location with direct Exterior Views.
- 3.10.9.6 For regularly occupied areas directly connected to perimeter, excluding gymnasias, windows must have a glazing-to-floor area ratio of at least 0.07.
- 3.10.9.7 Provide sunlight redirection and/or glare control devices to each window to ensure daylight effectiveness.
- 3.10.9.8 Overhead type daylighting includes clerestorey glazing and solar tubes. Skylights are not permitted.
- 3.10.10 Provide opportunities for student empowerment through control of lighting, sound, and daylight.
- 3.10.11 Create visual interest within the Building by varying colours, textures and lighting.

- 3.10.12 Avoid 'blank' hallways with solid-coloured end walls wherever possible; provide views and/or direct or borrowed natural light at ends of hallways.
- 3.10.13 Design workplaces so that they are flexible and adaptable to change in program or personnel and promote student and staff safety.
- 3.10.14 Design of workspaces shall be ergonomic and conducive to workflow and processes.

3.11 Wayfinding and Signage

- 3.11.1 Overriding Principles
 - 3.11.1.1 Provide a simple configuration of the School circulation systems and functions so that way finding is inherently easy.
 - 3.11.1.2 Locate major destinations along primary circulation paths for easy access, make waiting areas as open as possible to build confidence in way finding and design waiting areas to be distinct from circulation.
 - 3.11.1.3 Provide significant recognizable, easily named and identified elements in key and easily found locations that can become 'meeting points' for students and visitors.
 - 3.11.1.4 Provide all signage required for building operations, including without limitation regulatory signs, fire evacuation plans and informational or policy signage as determined by the Authority.
 - 3.11.1.5 Design interior signage such that the materials, colours, letter fonts, sizes and other aesthetic and functional considerations, such as braille, conform to the overall wayfinding design system, including without limitation the following:
 - 3.11.1.5(1) a system that is flexible and adaptable to room name and/or language changes, incorporating the name of the room and room number separately, in title case,
 - 3.11.1.5(2) permanent signage text shall be reverse engraved or reverse painted on 3 mm thick plastic;
 - 3.11.1.5(3) uses lettering on the signage that is clearly legible from a minimum distance of 3 m.
 - 3.11.1.5(4) is user adaptable with paper inserts,
 - 3.11.1.5(5) is resistant to graffiti and physical damage and shall not allow the lettering be removed from the exposed surface,

- 3.11.1.5(6) uses international graphic symbols and barrier-free symbols, where applicable, for all washroom and change / locker room signage, and
- 3.11.1.5(7) incorporates tamperproof screws as part of the installation.
- 3.11.1.6 Orient all building plan directories to reflect the direction from which they are viewed.
- 3.11.1.7 Provide signage that directs visitors to all student destinations and all other rooms within. Prioritize student destinations over non-student destinations.
- 3.11.1.8 Interior signage system shall differentiate the Schools from each other and the Community Resource Centre and Child Care Centre spaces.
- 3.11.1.9 Provide signage that is clearly visible day or night.
- 3.11.1.10 Avoid multi-layered naming hierarchies and complex numbering systems.
- 3.11.2 Design the internal directional signs to include:
 - 3.11.2.1 a main directory, installed at the main public entrance to the public school and Catholic school, that indicates the relation of each public and Catholic school to the overall Site and the location of every entrance that is accessible to the public;
 - 3.11.2.2 a continuous 'trail' of wayfinding signage from the main entrances to each of the classrooms or activity rooms listed on the directories;
 - 3.11.2.3 installation of signage at each point at which a directional decision is required;
 - 3.11.2.4 overhead directional signage for key rooms that shall be typically accessed by the general public. These key rooms shall include without limitation areas such as the gymnasium, Community Resource Centre, administration area, Multipurpose Rooms;
 - 3.11.2.5 consistent terminology;
 - 3.11.2.6 washroom signs shall incorporate both international symbols and names for girls, boys, staff male and female washrooms and gender neutral barrier free washrooms;
 - 3.11.2.7 service room signage shall include mechanical, electrical, communications, storage and housekeeping;

- 3.11.2.8 shared spaces like stairwells and the elevator shall have the same number on both floors except for the first digit indicating the floor number. Similarly for most corridors and classrooms which are equally repeated in design on each floor.
- 3.11.2.9 informational signage included without limitation: signage for scent free, signage for 'Visitors to report to the front office' and fire evacuation signage as determined by the relevant School Board;
- 3.11.2.10 door signage:
- 3.11.2.10(1) to indicate restrictions on entry and warn of hazards;
 - 3.11.2.10(2) to identify every space (e.g. rooms, alcoves, corridors) in the School;
 - 3.11.2.10(3) that is located in a consistent location for every room in the Facility; and
 - 3.11.2.10(4) for each door frame with a lamacoid number plate approximately 25 mm high by 50 mm long, attached to the head of the door frame on the hinge side.
- 3.11.2.11 Project Co shall review the door numbering system with the Authority and the relevant School Board and number rooms in accordance with the relevant School Board signage policy and the following:
- 3.11.2.11(1) determine room numbers early in design and maintain numbering following occupancy. Follow the same numbering system on Design and Construction documentation for all disciplines (architectural, mechanical, electrical, etc.).
 - 3.11.2.11(2) provide door signage that is consistent with the following room numbering protocol:
 - 3.11.2.11(2)(a) each room has a unique identifier number, for use on the door frame lamacoid number plates;
 - 3.11.2.11(2)(b) rooms are numbered in a manner that reflects normal movement through the applicable building;
 - 3.11.2.11(2)(c) labelling anticipates a person attempting to follow numbering along corridors in sequence;

- 3.11.2.11(2)(d) blocks of numbers are periodically skipped to allow for future expansion of the numbering system if rooms are added through renovations; and
- 3.11.3 Exterior Signage shall include street address(es). It is expected that Project Co shall differentiate the three components of the School to ensure that mail and deliveries go to the proper location and that Project Co shall explore the options with Canada Post and express the Authorities need for multiple addresses.
- 3.11.3.1 Project Co shall be well illuminated, reflective or high contrast and easily visible, vandal resistant, cast aluminum/brass lettering for the exterior of each respective Schools' main entries and the entrance to the Community Resource Centre and Child Care Centre.
- 3.11.3.2 Project Co shall design and provide lettering for the name of each Public and Catholic school and each School Board. Names shall be provided by the Authority.
- 3.11.3.2(1) Font type shall be chosen for its clarity and readability.
- 3.11.3.3 Project Co shall design the lettering to highlight the entrance. Lettering shall be visible from the front municipal roadway.
- 3.11.3.4 All lettering shall be located above the top of windows or doors to reduce the likelihood of vandalism to the letters.
- 3.11.3.5 The Schools' municipal address(es) shall be set out in vinyl lettering located on the glazing panel above each of the three main entrances. Lettering shall be a minimum height of 200 mm or to meet minimum municipal fire department requirements, whichever is greater. Font style for vinyl lettering shall be complementary to each public and Catholic school's main entry signage and have a highly contrasting colour to ensure visibility from roadway.
- 3.11.3.6 Project Co shall provide for future community-installed pylon signs, one (1) per School to be located adjacent to main entry walk of each respective School at locations agreed upon in consultation with the Authority and the respective School Board.
- 3.11.3.7 Accommodation for the pylon signs shall include providing two (2) empty conduits for power and data (25 mm and 50 mm diameter) per sign, suitable for burial and as required by Code from electrical panel in each respective School to the pylon sign locations.

3.11.3.8 Project Co shall provide appropriate parking lot and traffic signs as required by municipal regulations and include international graphic symbol on the signage at all barrier-free parking stall locations and shall indicate:

3.11.3.8(1) Staff only parking lot

3.11.3.8(2) Child Care Centre staff parking

3.11.3.8(3) Visitor parking

3.11.3.8(4) Car Pooling parking

3.11.3.8(5) Drop off

3.11.3.8(6) Loading

3.11.3.8(7) Community Resource Centre staff parking

3.11.3.8(8) Accessible parking

3.11.3.8(9) No parking signs in front of garbage enclosures, and

3.11.3.8(10) Traffic control signage

3.11.3.9 All parking lot signage shall conform to the latest edition of the Manual for Uniform Traffic Control Devices for Canada (MUTCDC) or as required by the relevant municipality, whichever is greater.

3.11.4 Project Co shall coordinate with the Greater Saskatoon Catholic Schools on the design of building façade to accommodate a “cross”. Design of the cross shall be reviewed during the collaborative sessions. Cross shall be provided by the Greater Saskatoon Catholic Schools, unless incorporated into the design of the exterior facade; Project Co shall install cross if free-standing or surface applied.

3.12 Optimized Outcomes

3.12.1 Project Co shall design Instructional Areas to support innovative and collaborative methods of teaching, help incorporate Authority’s technologies, respond to diverse teaching styles (such as open classrooms) and optimize flexibility and space utilization. A key element to the development of an integrated instructional area is the provision of physical environments that support multi-disciplinary teams. Accordingly, Project Co shall design workplaces to:

3.12.1.1 include generic, adaptable rooms and spaces, where appropriate;

3.12.1.2 provide floor lay-outs that accommodate teams as well as individuals, and that support students who require flexibility and use portable technology;

3.12.1.3 provide space saving strategies, and lay-outs and furniture that facilitate change; and

3.12.1.4 provide flexibility to incorporate technology.

3.13 Adaptability, Flexibility and Expansion

3.13.1 Project Co shall design and construct the Schools to accommodate future changes as follows:

3.13.1.1 to accommodate the rapid cycle of innovation and change to support development and implementation of new work processes and technology change;

3.13.1.2 to accommodate program, service, work and equipment change with minimized utility infrastructure and School impact, including down time;

3.13.1.3 to support future expansion of components, and capacity as a whole, including loose fit design to optimize functionality within a given floor area, and multi-use adaptable space;

3.13.1.4 with an infrastructure that incorporates excess systems capacity and includes systems and components that support future expansion with minimized disruption and allows for upgrades in Authority technology or technological progression;

3.13.1.5 to rigorously control and record placement of in-floor items such as radiant heating, etc., to optimize the potential for and ease of future floor penetrations.

3.13.1.6 Flexible Learning Spaces, Learning Commons and Break Out Rooms will facilitate a wide range of activities in each Learning Community. Learning Spaces open onto each other and onto the Learning Commons and Break Out Rooms with large sliding barn doors. In most Grade 2 to Grade 8 Learning Communities the Learning Commons and Break Out Rooms are open to the corridor and located across from one another so that they can be combined for larger group projects.

3.13.1.7 The relationships of these spaces allows for programmatic expansion into each other and enables students and staff to create the optimal levels of privacy, acoustical separation, openness and/or collaboration to support the type of work required by varying models of educational delivery.

3.13.1.8 Relocatables connect to the end of each Learning Space wing, allowing for connection to and future expansion of the Learning Community.

3.13.2 Relocatable Classrooms

3.13.2.1 The Relocatable Classrooms shall be designed to meet, at a minimum, the requirements of Part 12 [Relocatable Classrooms], and any other applicable requirements in Schedule 3 [Design and Construction Specifications].

3.13.2.2 Initial, Additional and Maximum Relocatable Classrooms

3.13.2.2(1) On or before the School Service Commencement Date for each School, as a condition of School Service Commencement for the applicable School, Project Co shall design, supply, deliver, install, commission and make available the type and quantity of Relocatable Classrooms listed in the "Open 2017" column in Table 3.13.2.2. Project Co shall also provide the Services with respect to such Relocatable Classrooms. The Authority shall pay Project Co for such Relocatable Classrooms in accordance with Appendix 8D [Relocatable Classroom Payments] and Appendix 8E [Relocatable Classroom Payment Schedule].

3.13.2.2(2) Project Co shall design, supply, deliver, install, commission and make available the type and quantity of Relocatable Classrooms listed in the "August 1, 2018", "August 1, 2019", "August 1, 2020" and "August 1, 2021" columns of Table 3.13.2.2 on or before the date shown in the respective column heading. Project Co shall also provide the Services with respect to such Relocatable Classrooms. The Authority shall pay Project Co for such Relocatable Classrooms in accordance with Appendix 8D [Relocatable Classroom Payments] and Appendix 8E [Relocatable Classroom Payment Schedule].

3.13.2.2(3) Project Co has included the option to reduce the requirement for opening 2017 Relocatable Classrooms by four, through the provision of four permanent construction Classrooms for the Saskatoon Public School at the Stonebridge Site only. Refer to Appendix 3A – Attachment 1, Schedule of Accommodations.

3.13.2.2(4) Relocatable classrooms shall carry the matching colour of the school.

Table 3.13.2.2 - Initial & Additional Relocatable Classrooms - Years 1-4								
School	Division	Open 2017	August 1 2018	August 1 2019	August 1 2020	August 1 2021	Total Relocatables On Site Years 1-4	Expected Maximum Site Capacity for Relocatables
Evergreen	SPS						0	8
	GSCS						0	8
Hampton	SPS	2			2	2	6	10
		A1/B1			A1/B1	A1/B1		
	GSCS	2			2	2	6	10
		A1/B1			A1/B1	A1/B1		
Rosewood	SPS					2	2	12
						A1/B1		
GSCS						0	12	
Stonebridge	SPS	12					12	12
		3-A1/3-B1 3-A2/3-B2,						
	GSCS			2	2	2	6	8
				A1/B1	A2/B2	A1/B1		
Martensville	PSSD					2	2	8
						A1/B1		
GSCS						0	6	
Warman	PSSD		2		2		4	8
			A1/B1		A1/B1			
GSCS						0	6	
Total Relocatable Classrooms Add		16	2	2	8	10	38	108
Total Relocatable Classrooms Move						0		
Cumulative		16	18	20	28	38		

Note: Refer to Schedule 3, Section 12.3 for Classroom Types

3.13.2.3 Addition and Removal of Relocatable Classrooms

3.13.2.3(1) Project Co shall design the Schools to allow for the addition and removal of Relocatable Classrooms to easily and economically allow for changing demographics. Project Co shall design the Schools to accommodate Relocatable Classrooms to the expected maximum number of Relocatable Classrooms shown in the “Expected Maximum Site Capacity for Relocatables” column of Table 3.13.2.2.

- 3.13.2.3(2) Where a school is expected to receive more than 2 stacked Relocatable Classrooms (4 Relocatable Classrooms) to a Learning Community, then additional Relocatable Classrooms may be ganged together to a maximum of 2 deep per Learning Community.
- 3.13.2.3(3) The Authority may, from time to time and at any time, require the addition and/or removal of Relocatable Classrooms by Project Co through Changes under Schedule 6 [Changes, Minor Works and Innovation Proposals]. Such addition and/or removal may include, in the Authority's discretion, any one or more of design, supply, delivery, installation, commissioning, making available and providing the Services (for an addition) and the converse (for a removal).
- 3.13.2.3(4) The Authority may elect to supply a Relocatable Classroom other than through Project Co. Where the Authority elects to supply a Relocatable Classroom other than through Project Co, Project Co's cost (if any) of repairing or altering such Relocatable Classroom to meet the requirements of this Schedule 3 (except to the extent waived in writing by the Authority in each specific instance) shall be included in the determination of the Net Change Value of a Change. Where the Authority supplies a newly manufactured Relocatable Classroom from the same manufacturer and the same design as any previously installed by Project Co, the presumption shall be that the cost of repairing or altering such Relocatable Classroom is nil. In respect of a Relocatable Classroom that is supplied other than through Project Co, the Authority may, through Changes under Schedule 6 [Changes, Minor Works and Innovation Proposals], require Project Co to perform any one or more of delivery, installation, commissioning, making available and providing the Services in respect of such Relocatable Classroom.

PART 4. DESIGN CRITERIA – STRUCTURAL SYSTEMS**4.1 General**

- 4.1.1 Every building, or portion thereof, shall be designed and constructed to have sufficient structural capacity and integrity to safely and effectively sustain all loads and influences that may reasonably be expected during the service life of the building.
- 4.1.2 Every building, or portion thereof, shall be designed and constructed for serviceability, including but not limited to deflection, vibration, and fatigue, based on the use, occupancy, and materials used and that may reasonably be expected during the service life of the building.

4.2 Durability

- 4.2.1 The School shall meet or exceed the requirements of CSA S478, Guideline on Durability in Buildings for a 'Long Life' Category Design Service Life (50 to 99 years). This includes without limitation all primary structure and all secondary structure supporting cladding systems.
- 4.2.2 Design of the building structure and structural components shall minimize effects of corrosion and deterioration due to reasonably expected use and environmental conditions.
- 4.2.3 To minimize the effects of corrosion and deterioration of the building structure and structural components due to use and environment, the following details are required:
 - 4.2.3.1 Concrete elements are to be adequately reinforced to control cracking caused by shrinkage and deflection. Provide adequately sized and spaced crack control joints. Visible cracks exposed to view shall be routed and repaired and exposed control joints shall be filled with material (epoxy, caulk, etc.) suited to the location.
 - 4.2.3.2 Structural member design and detailing shall provide reasonable protection against damage due to use. Such measures may include chamfer of corners on concrete elements, steel protection angles on concrete edges prone to spalling due to impact, increased wall thickness of HSS column section to prevent dents, and the like.
 - 4.2.3.3 Provide building expansion joints adequately spaced and located so as to mitigate cracking, excessive deflection, distortion, and drift, and prevent a concentration of stress within the structure due to the effects of temperature, shrinkage, wind and seismic forces, and the like. Unless reasonable engineering judgment can justify otherwise, building expansion joints shall not be located further than 50 meters apart.

- 4.2.3.4 Concrete mixes shall be adequately proportioned to the applicable standards and meet the durability requirements based on the appropriate exposure class. Unless reasonable engineering judgment can justify otherwise, the exposure class of concrete used in specific elements of the building shall be as follows:

Concrete Element	Exposure Class
Exterior Concrete Flatwork (apron slabs, etc.)	C-1
Concrete in contact with Site soils or groundwater	S-2

- 4.2.3.5 A protective coating, such as epoxy paint or galvanizing shall be used on all structural steel exposed to the environment. This includes all steel that is installed outside the building envelope including brick support angles, canopies, and the like.

4.3 Flexibility for Future Change

- 4.3.1 Design the structure to readily accommodate renovations for changes in use and occupancy, changing technology and teaching philosophy, equipment repair and replacement, and building services updates.
- 4.3.2 Use the minimum live loads required for the School location except where the specific use and occupancy of a space requires a higher live load.
- 4.3.3 Design the superstructure using a framing system that results in minimum total thickness of floor or roof structure for the particular column/wall gird and provides adequate ceiling space flexibility for the placement of mechanical and electrical services. [Project Co will use best efforts to ensure structural solution that allows for flexibility of all student spaces by not obstructing the areas with structural columns..](#)
- 4.3.4 Place the lateral-load resisting elements in areas which are least likely to interfere with future program changes, such as corridor and stairwell walls.
- 4.3.5 Accommodate the need for future access, transportation, installation, and removal of equipment, including but not limited to mechanical equipment, gymnasium equipment or bleachers, electronic teaching aids, and the like.

4.4 Structural Building Materials

- 4.4.1 Structural building materials shall be non-combustible in nature, unless expressly stated otherwise.
- 4.4.2 The following structural building materials are acceptable for use, in part or whole, in the School(s):
- 4.4.2.1 reinforced cast-in-place concrete;

- 4.4.2.1(1) Reinforcement of cast-in-place concrete elements shall be proportioned to meet or exceed strength design requirements, durability, serviceability, and the minimum steel area requirements based on the element type.
- 4.4.2.2 reinforced and/or pre-tensioned, precast concrete;
- 4.4.2.2(1) Reinforcement and pre-stressing of pre-cast concrete elements shall be proportioned to meet or exceed strength design requirements, durability, serviceability, and the minimum steel area requirements based on the element type.
- 4.4.2.2(2) reinforcement, pre-stressing shall be of Canadian manufacture with certified mill test reports for reinforcing steel showing physical and chemical analysis provided. For reinforcement, pre-stressing from other than Canadian manufacture, provide test data from a Canadian Testing Laboratory proving that each size and grade of reinforcement meets the standards set out in Schedule 3 [Design and Construction Specifications]. The acceptability and use of non-Canadian manufacture reinforcement, pre-stressing is at the sole discretion of the Authority.
- 4.4.2.3 rolled structural steel;
- 4.4.2.3(1) Erection tolerances for steel construction shall be in accordance with CSA S16-09 Clause 29.7 except the maximum out-of-plumbness of exterior columns shall be +/- 20 mm over the full height of the building.
- 4.4.2.3(2) structural steel shall be of new material from North American mills with certified mill test reports for each steel grade showing physical and chemical analysis provided. For steel from other than North American mills, provide test data from a Canadian Testing Laboratory proving that each grade of steel meets the standards set out in Schedule 3 [Design and Construction Specifications]. The acceptability and use of non-North American manufacture structural steel is at the sole discretion of the Authority.

- 4.4.2.4 reinforced concrete masonry units.
 - 4.4.2.4(1) Reinforcement of concrete masonry elements shall be proportioned to meet or exceed strength design requirements, durability, serviceability, and the minimum steel area requirements based on the element type.
- 4.4.2.5 heavy timber or glued-laminated construction;
 - 4.4.2.5(1) Design, fabricate, and erect heavy timber and glued-laminated construction of appropriate properties for the intended use in accordance with the requirements of all applicable codes and specifications.
- 4.4.2.6 lightweight, cold-formed, steel;
 - 4.4.2.6(1) Design, fabricate, and erect lightweight, cold-formed steel of appropriate properties for the intended use in accordance with the requirements of all applicable codes and specifications.
- 4.4.3 The following structural building materials are not acceptable for use, in part or whole, in the Schools:
 - 4.4.3.1 plain (unreinforced) concrete;
 - 4.4.3.2 post-tensioned concrete;
 - 4.4.3.3 dimensional lumber (stick framing);
 - 4.4.3.4 unreinforced concrete masonry units.
- 4.4.4 Structural building materials not listed above are to be submitted to the Authority for review and acceptance.

4.5 Substructure Requirements

- 4.5.1 All substructure components, including but not limited to foundations, below grade walls and beams, and slab-on-grade, shall be designed and constructed in accordance with Site specific geotechnical information and recommendations provided by a qualified geotechnical engineer registered in the Province of Saskatchewan.
- 4.5.2 All permanent structures shall be founded on frost protected foundations. Frost protection achieved through founding of the substructure below the frost depth (as dictated by the geotechnical engineer) is strongly preferred.
 - 4.5.2.1 The use of insulation to provide frost protection shall only be used in unique situations where founding of the substructure below frost depth is

unfeasible. Design of such protection shall be undertaken by a qualified geotechnical engineer registered in the Province of Saskatchewan.

- 4.5.3 The substructure shall be designed to support vertical and horizontal loads imposed by the superstructure above, to conform to Site specific geotechnical recommendations provided by a qualified geotechnical engineer registered in the Province of Saskatchewan, and to meet the serviceability and strength requirements specified in Schedule 3 [Design and Construction Specifications].
- 4.5.4 All substructure, including foundations and on-grade structure, shall be designed to limit the total movement (including settlement or heave) of the structure and the differential movement between components of the structure to within acceptable structural design limitations based on the geotechnical report recommendations, the specified use and occupancy, and the requirements of building materials and finishes, but shall not exceed the following values:
- 4.5.4.1 a maximum total foundation movement of 25 mm;
- 4.5.4.2 a maximum differential movement of 15 mm.
- 4.5.5 The following foundation systems are acceptable for use, in part or whole, to support the building(s):
- 4.5.5.1 Reinforced concrete strip and spread footings;
- 4.5.5.1(1) Concrete and reinforcement shall meet the requirements of section 4.4.2.1 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.2 Bored cast-in-place concrete piles (straight shaft and under-reamed);
- 4.5.5.2(1) Concrete and reinforcement shall meet the requirements of section 4.4.2.1 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.3 Driven pre-cast concrete piles;
- 4.5.5.3(1) Concrete and reinforcement shall meet the requirements of section 4.4.2.2 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.4 Driven structural steel piles;
- 4.5.5.4(1) Structural steel shall meet the requirements of section 4.4.2.3 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.5 Driven timber piles;

- 4.5.5.5(1) Timber piles shall be preservative treated and meet the requirements of section 4.4.2.5 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.5(2) The use of helmets and bands/collars are required during installation to prevent splitting and brooming.
- 4.5.5.5(3) Reinforced concrete pile caps are required for all timber piles and shall meet the requirements of section 4.4.2.1 of Schedule 3 [Design and Construction Specifications].
- 4.5.5.6 Steel helical piles;
 - 4.5.5.6(1) Steel helical piles shall be designed using industry accepted design methodology. Site specific pile load tests shall be conducted to verify and correlate predicted pile capacities.
 - 4.5.5.6(2) Structural steel shall meet the requirements of section 4.4.2.3 of Schedule 3 [Design and Construction Specifications].
- 4.5.6 The following foundation systems are not acceptable for use, in part or whole, in the building(s):
 - 4.5.6.1 plain (unreinforced) concrete footings or piles;
 - 4.5.6.2 dimensional lumber (stick framed) foundation systems;
 - 4.5.6.3 concrete masonry unit foundation systems.
- 4.5.7 Foundation systems not listed above are to be submitted to the Authority for review and acceptance.
- 4.5.8 Water-proof the foundation walls for below-grade occupied spaces to prevent groundwater ingress. Design construction joints with purpose-made water stops.
- 4.5.9 Install a perimeter draining system around the exterior of the building(s) foundation as recommended by the geotechnical engineer.

4.6 Superstructure Requirements

- 4.6.1 The requirement for column free spaces is noted in Appendix 3B [Functional Program Room Data Sheets] and shall also include without limitation the following spaces:
 - 4.6.1.1 Hallways, corridors, and stairs;
 - 4.6.1.2 Classrooms, Da Vinci Studio's, and collaborative meeting rooms;
 - 4.6.1.3 Gymnasiums and Multipurpose Rooms.

4.7 Coordination

- 4.7.1 Coordinate structure with equipment requirements for slab depressions and cast-in hardware. Provide adequate depth of slab depressions to avoid the need for ramps.
- 4.7.2 The structural members shall be coordinated with the architectural finishes to have adequate thickness, cover and reinforcing to satisfy the fire protection and durability requirements.
- 4.7.3 All structural members shall be coordinated with other disciplines to avoid utility interferences and to ensure adequate architectural headroom and clearances.

4.8 Design Loads

- 4.8.1 Design the structure for the actual live loads anticipated, the actual superimposed dead loads and the anticipated concentrated loads from equipment, fixtures, and machinery, whether floor, wall, or ceiling-mounted, including without limitation moveable partitions, basketball nets, gymnasium equipment, and the like.
- 4.8.2 The total superimposed dead load shall include without limitation the minimum superimposed dead load components listed below:
 - 4.8.2.1 All floor areas, with the exception of areas labelled 'Gymnasium' or 'Mechanical/Electrical Room', shall be designed for a minimum specified superimposed dead load allowance for partitions of 1.0 kPa.
 - 4.8.2.2 All suspended floors or roofs shall be designed for a minimum specified uniform allowance for mechanical and electrical services of 0.25 kPa, except for floors or roofs directly above or below mechanical or electrical areas which shall be designed for a minimum load allowance of 0.50 kPa.
- 4.8.3 Design roofs for the minimum snow, rain, and wind loads required for the School location and the local building by-laws. Design for a minimum net uplift wind load of 1.0 kPa.

4.9 Deflection

- 4.9.1 Design the structure to minimize the effects of deflection and long-term creep.
- 4.9.2 The structure shall conform to specific deflection requirements for specialty equipment, as recommended by the supplier or manufacturer.
- 4.9.3 Notwithstanding the specified deflection limits, the deformations of the structure under service loads shall be compatible with the architectural finishes, roof systems and cladding systems.

4.10 Vibration

- 4.10.1 Machinery that could be a source of vibration shall be mounted using vibration isolation techniques.
- 4.10.2 Design the structural system to minimize the effects of floor vibration due to use, occupancy, and equipment. Vibration shall be limited to acceptable levels for the use and occupancy of the floors and occupied roof areas and at a minimum, shall meet the following criteria:
 - 4.10.2.1 Floor system vibration characteristics shall comply with Commentary D of the National Building Code of Canada 2010 or other industry accepted methods.
 - 4.10.2.2 Floor structural systems shall be selected and designed to have a vibration acceleration maximum limit of 0.5%g with a damping ratio of 0.02 when an excitation force of 0.29 kN is applied. A damping ratio of 0.03 may be used only upon verifiable evidence the configuration of the floor system, including partition heights and locations, actual super-imposed dead loads, and the like, meets this design damping coefficient.

PART 5. DESIGN CRITERIA – BUILDING ENVELOPE**5.1 Exterior Enclosure - Exterior Walls**

- 5.1.1 Project Co shall design exterior wall assemblies that separate spaces that require differing environmental conditions by controlling the flow of air, water and energy.
- 5.1.2 Project Co shall design the exterior wall assemblies to have an aesthetic finish which shall enhance the School's appearance to the community which it is located within, while providing a durable surface that withstands the majority of vandalism and high wear and tear.
- 5.1.3 Project Co shall purposefully design the building to minimize unnecessary undulations, providing seamless building envelope and contiguous roofing systems, predictable drainage patterns, mitigates undesirable snow accumulations and other exposures to the elements. The solution also provides simplified access to all points of the building exterior elements, maximizing serviceability long term. By adhering to CPTED principals, the design solution has purposefully sought to avoid enhanced risks of vandalism and graffiti, as well as has factored for the clean-ability of exterior building materials.
- 5.1.4 The design of the exterior walls shall be based upon the "Pressure Equalized Rain Screen Insulated Structure Technique", or "PERSIST". This approach is characterized by the following:
- 5.1.4.1 exterior cladding covering an air space that shall be pressure equalized with the exterior;
- 5.1.4.2 insulation shall be:
- 5.1.4.2(1) mainly located to the exterior of structural components;
- 5.1.4.2(2) in direct contact with an air/vapour barrier system; and
- 5.1.4.2(3) exterior of an air/vapour barrier system.
- 5.1.4.2(4) the use of spray-foam insulation within the wall system is not acceptable.
- 5.1.4.3 waterproof membranes in exterior walls as part of the building envelope and integral with rain screen or cavity wall assemblies.
- 5.1.4.4 provide a continuous vapour retarder membrane to prevent water vapour transmission and condensation in wall assemblies, roofing assemblies, and under concrete slabs-on-grade within the building perimeter.

- 5.1.4.5 air barrier assemblies shall prevent air leakage caused by air pressure across the parapet and roof upturn assembly, including interruptions to the integrity of wall and roof systems such as junctions with dissimilar constructions.
- 5.1.5 Exterior walls shall be designed only with a combination of masonry veneer designed to resist impact and pre-finished metal cladding 3000 mm above grade. Contrasting but complementary colours have been selected to create a visually coherent overall appearance to the buildings, while still providing distinct identities to each school, as well as the central community core. Alternate colour schemes for each site may be explored during user engagement, so that each site/community has its own distinct identity..
- 5.1.6 Foundation wall surfaces shall have damp proofing coverage that is sufficient to repel and prevent moisture ingress where no hydrostatic pressure is present.
- 5.1.7 Design wall and roof construction assemblies to prevent the ingress of moisture or water vapour from the exterior through the building envelope and the passage of air through the building envelope from the interior spaces to the exterior and vice versa.
- 5.1.8 Project Co shall design the exterior walls to ensure that water, snow and ice sheds safely from exterior surfaces and is not trapped in the assembly to cause deterioration, staining or mould.
- 5.1.9 Load bearing and non-load bearing steel studs may be considered as a component of the exterior wall systems to support exterior wall finishes and form an integral part of the perimeter envelope rain screen systems, including tested air barrier assemblies.
- 5.1.10 Masonry construction shall be considered for both independent exterior walls and in exterior wall systems as a structural backing to other finish materials or systems and walls systems where permanence of finishes, both visually and functionally, and ease of maintenance are primary considerations in the exterior fabric of the School.
- 5.1.10.1 Face work must be laid plumb and true with all joints consistent in both width and colour.
- 5.1.10.2 Provide anti-graffiti masonry sealers to all exterior masonry, full height.
- 5.1.11 Exterior wall systems comprising unit masonry as a finish veneer to concrete, concrete masonry, insulated sandwich panels or metal stud framing shall be a rain screen or cavity wall system.
- 5.1.11.1 Unit masonry below grade for exterior applications is not permitted.
- 5.1.12 Project Co shall ensure that building surfaces are designed not to encourage or invite climbing.

5.1.13 Project Co shall avoid the use of ledges, horizontal siding and low roofs.

5.2 Roofing Assembly

5.2.1 Materials and workmanship for roofing shall conform to the Saskatchewan Roofing Contractors Association (SRCA) latest standards and ten (10) year Guarantee, as published in the Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual. Perform roofing quality inspections as required by the SRCA to obtain the SRCA warranty.

5.2.2 Project Co shall design roof assemblies to dispense precipitation into drains within the exterior wall plane only. Exterior drains and scuppers are not acceptable as a primary means of roof drainage. Emergency overflow scuppers are permitted to accommodate 1 in 100 year storm events or similar occurrences.

5.2.3 Provide a complete horizontal barrier to weather and climate using one of the following construction systems as applicable to the installation required:

5.2.3.1 built-up bituminous or protected roofing systems are not acceptable;

5.2.3.2 2 ply modified bituminous or non-bituminous exposed roofing systems, or standing seam sheet metal roofing systems are acceptable;

5.2.3.3 if roof design allows for storm water retention ponding, provide upgraded roof membrane suitable for water retention;

5.2.3.4 roofing specialties and accessories required for completion;

5.2.3.5 protection from pedestrian traffic;

5.2.3.6 interior access systems to roof areas; and

5.2.3.7 roof drainage, including roof drains and internal gutters.

- 5.2.4 Metal roofing systems, if used, shall provide clear internal paths of drainage to allow any trapped moisture to drain to the exterior and avoid the staining of architectural finishes, forming of puddles, forming of icicles and dripping on pedestrians. School design and roof systems shall ensure that entrance ways are protected from sliding snow and ice and shall ensure that there are no accumulations of snow or ice in roof valleys.
- 5.2.5 Design sheet metal flashings to divert water away from membrane flashing termination and protect the membrane from deterioration due to the elements and mechanical damage. The roofing membrane shall be continuous under the metal. Ensure that sheet metal components comply with wind uplift requirements established for roofing system.
- 5.2.6 Ponding of water on roof is permitted provided the structure is appropriately designed for the load and the roof membrane system is upgraded to a system designed for fluid retention. Ponding is not permitted on the outdoor roof learning spaces.
- 5.2.7 Occupied roof areas scheduled to be used for educational purposes shall be constructed with durable hard surfaces with integral drainage and railing systems, suitable for the intended classroom educational purpose.

5.3 Exterior Windows

- 5.3.1 Size, configure and adequately construct windows to suit rooms that require daylight, views and/or natural ventilation. The designs have been developed using daylight simulation models to analyze the actual effectiveness of the designs. Both the layouts of the floor plans, and the size and location of exterior windows have been analyzed to optimize the daylighting of interior spaces in the schools. Refer to Appendix C Daylighting Study in proposal extracts.
- 5.3.2 Classrooms shall have aluminum or fibreglass thermally broken type exterior windows that meet the following requirements:
- 5.3.2.1 provide minimum of two operable windows that open to a maximum of 150 mm, have two manual type locking mechanisms and operate as follows:
- 5.3.2.1(1) Saskatoon: Open in, hopper style, with insect screens.
- 5.3.2.1(2) Warman / Martensville: Open out, awning style, with insect screens
- 5.3.2.2 locate top of window sills no higher than 760 mm above the finished floor, unless otherwise noted;
- 5.3.2.3 locate top of window sills in Child Care classrooms, Pre-kindergarten and Kindergarten classrooms, no higher than 420 mm above the finished floor;

- 5.3.2.4 window sills in Learning Commons, Student Commons, Library, and Gymnasium may extend down to floor level;
- 5.3.2.5 ensure operable windows are ergonomically feasible to open in each situation;
- 5.3.2.6 provide insect screens on operable windows that may be left open.
- 5.3.2.7 The main mass of window frames so they shall not project beyond the exterior plane of the air barrier.
- 5.3.2.8 Bridge the cavity of the wall by means of flashings (not the frame or cover cap).
- 5.3.2.9 Caulking cover caps to flashings is not acceptable and caulking the cover cap in place is not acceptable.
- 5.3.2.10 Window operating hardware shall be lockable.
- 5.3.3 Windows in proximity to first floor/ground floor windows not street facing and facing the tarmac play areas shall be:
 - 5.3.3.1 Saskatoon: Insulated glass units with low-e coating as noted above, with exterior metal screens, provided for breakage protection. Security screens shall be hinged and lockage, beige in colour, as manufactured by Rusco 4200 series or Kane Manufacturing A-Pro-z series or Authority approved equivalent.
 - 5.3.3.2 Warman / Martensville: No requirements for breakage protection.
- 5.3.4 Exterior windows to washrooms shall use obscured glass as required by Code.
- 5.3.5 Provide 'borrowed light' deep into the School, either through clerestory windows, interior windows to occupied rooms that do not have exterior windows or through other means. The intent is to bring light to areas that do not have direct access to windows and consequently create a more comfortable and less a closed-in atmosphere which shall benefit staff and students alike. Solar tubes are permitted. Skylights are not permitted.
 - 5.3.5.1 Aluminum finish for exposed aluminum surfaces shall be applied in the manufacturing process and be permanent and resistant to corrosion caused by weather exposure and climate.
- 5.3.6 Provide vertical glazed aluminum curtain wall systems and aluminum window systems including standard and high performance thermally broken tubular aluminum sections with self-supporting framing, shop fabricated, factory prefinished, vision glass, glass spandrel infill, related flashings, anchorage and attachment devices.

- 5.3.6.1 Curtain wall framing and aluminum windows shall incorporate a thermally broken system that is drained and vented with a complete air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allow air into the pressuring chamber.
- 5.3.6.2 Exterior windows will be a high performance aluminum frame, such as Kawneer 5525 Isoweb or equivalent. They will have a clear anodized finish. The frames will be thermally- broken with either PVC or polymerized thermal spacers. Operable lites will be lockable, outward opening awnings, with insect screens.
- 5.3.6.3 In locations where more extensive glazing is desired, such as in the libraries, an aluminum curtain wall system will be used. This will consist of a high performance, thermally- broken system, such as Kawneer 1600 UT System 1 or equivalent.
- 5.3.6.4 Sealed units will be double- glazed units, with low- e coatings and glass selected to optimize the energy performance of the building envelope
- 5.3.6.5 The school designs do not include skylights. Light pipes and vertical clerestory glazing will be used to bring daylight to spaces that are not located on exterior walls, where required.
- 5.3.7 Aluminum entrances and storefront framing and doors may form part of the exterior envelope of the Schools three main entrances only. Provide automatic swing doors for interior and exterior locations as set out in Appendix 3B [Functional Program Room Data Sheets].
 - 5.3.7.1 Door equipment shall accommodate medium to heavy pedestrian traffic and the appropriate weight of doors.
 - 5.3.7.2 Directional motion sensor control device, if used, shall be unaffected by ambient light or ultrasonic frequencies.
- 5.3.8 Project Co shall design exterior sills with a minimum 6% drainage slope to exterior.
- 5.3.9 Project Co may provide exterior and/or interior glass and glazing as integral components of the exterior building envelope, interior partitions and screens, exterior and interior doors, handrail balustrades, skylights and decorative and ornamental glazing.

- 5.3.9.1 Project Co shall, as a minimum, include without limitation hermetically sealed glazed windows in the design of the exterior windows, doors and sidelites.
- 5.3.9.2 Low emissivity (Low E) coating in sealed glazing units shall be used in Project Co's Designs.

5.4 Exterior Doors

- 5.4.1 Project Co shall design the exterior doors to withstand the exterior environmental elements and allow some vision through the doors while providing a strong enough finish to withstand the usual vandalism that occurs on School property. Refer to Schedule 4 [Services Protocols and Specifications] for additional information.
- 5.4.2 The doors shall be designed to be able to endure abusive contact with minimal visual dents and damage.
- 5.4.3 Doors for the gymnasium, auxiliary gymnasium or Multipurpose Room shall not require exterior hardware or glazing if provided with a door viewer.
- 5.4.4 Project Co shall design the exterior doors to meet the requirements of Schedule 3, Section 6.2 [Doors and Windows], Section 9.1 [Security Access and Surveillance] and Section 3.6 [Acoustic Design Criteria].
- 5.4.5 All other exterior entrance doors and frames shall be designed to use insulated hollow metal. Provide doors constructed of sheet steel, with seamless construction with no visible seams or joints on faces at vertical edges. Exterior wood doors are not permitted.
- 5.4.6 Project Co shall include without limitation ½ vision lite glazing for the upper and lower half of all exterior doors which are directly accessed by the main corridors and smaller vision panels for all exterior doors exiting from the main stairwells. Float glass is unacceptable.
- 5.4.7 Project Co shall design all corridor exterior doors and exit doors to swing outward.
- 5.4.8 Project Co shall design the exterior doors to include without limitation fixed mullions for the double doors unless noted otherwise.
- 5.4.9 Project Co shall include without limitation removable mullions to main designated delivery area, the gymnasium and all interior corridors to allow the ability to move large items through more easily.

- 5.4.10 Hardware shall be integrated with the security requirements and coordinated with electrical wiring and power requirements as suitable for the purpose specified or indicated.
- 5.4.11 Exit devices on exterior doors shall be electrically equipped to automatically lock, using one of the following features, when the exterior doors are locked down from a central point in the administration area.
 - 5.4.11.1 fail-secure exterior trim or
 - 5.4.11.2 automatic latch retraction
- 5.4.12 Double exterior doors designed to receive pull hardware shall have one pull only on the active leaf, continuous piano hinges and removable mullions.

PART 6. DESIGN CRITERIA – INTERIOR FIT-UP AND FINISHES**6.1 Building Interior – Interior Walls**

- 6.1.1 The interior walls and partition systems shall:
- 6.1.1.1 provide acoustic separations as required for the specific functions to be carried out in the spaces affected in accordance with the acoustic requirements set out in Schedule 3, Section 3.6 [Acoustic Design Criteria] and
 - 6.1.1.2 provide separations required for fire safety and protection and be located to minimize impact on educational adjacencies and flows.
- 6.1.2 Design and select interior walls and partitions, partition systems and interior finishes to comply with the following criteria as may be relevant for the particular or specific functions enclosed:
- 6.1.2.1 suitable for cleaning, maintenance, permanence and durability, including impact resistance;
 - 6.1.2.2 aesthetic and design qualities shall provide a learning environment for the benefit of students and staff;
 - 6.1.2.3 flexibility to permit adaptability of the internal spaces, if required to suit future process revisions;
 - 6.1.2.4 provide fittings, attachments and internal bracing/backing as required to accommodate and support wall or ceiling mounted equipment in classrooms and teaching spaces;
 - 6.1.2.4(1) components include, but not limited to: architectural woodworking components, door frames and hardware, windows, displays, lockers, handrails, mirrors, white boards and tack boards, washroom partitions and accessories, boot racks, curtains, interior signage, window treatments, manufactured specialties, mechanical and electrical devices requiring support.
 - 6.1.2.4(2) provide backing in two walls for mounting of flat screen monitors for each of the following room types: Offices, Intinerant, Counselling/first aid, Counselling, Meeting , Breakout, Teacher collaboration, Seminar, staff rooms.

- 6.1.2.4(3) Janitor, Recycling, Laundry and Storage rooms will require blocking in all walls so that shelving can be anchored to the walls.
- 6.1.3 Masonry construction shall be considered for interior applications as an integrally finished material, as a base for applied finish or as a structural backing to other finish systems and wall systems when priorities include permanence and maintenance, sound transmission control, fire resistance, separation requirements and security. Bullnose corner blocks to be used on exposed corners.
- 6.1.3.1 Unpainted concrete unit masonry shall not be considered an acceptable exposed finish in educational or public areas. Architectural block is acceptable.
- 6.1.3.2 Brick masonry in interior applications shall have integral finish and construction compatible to the maintenance requirements of the Authority.
- 6.1.4 The exposed corridor walls shall receive the most abuse, accordingly, Project Co shall design the walls to be abuse resistant with durable finishes.
- 6.1.4.1 Authority preference for exposed corridor walls is painted concrete block.
- 6.1.5 Project Co shall design gymnasium walls with concrete block to a minimum 3000 mm height, with abuse resistance material above to underside of roof deck.
- 6.1.6 Project Co shall design shower walls with concrete block to ceiling height.
- 6.1.7 Toilet cubicles shall be full height, fully enclosed concrete block with a solid core wood door and pressed steel door frame, unless otherwise indicated in Appendix 3B [Functional Program Room Data Sheets].
- 6.1.8 Where wet areas are foreseeable, such as janitor rooms and drinking fountain areas, Project Co shall design these walls with a water resistant substrate and a water resistant finish to prevent mould, deterioration and staining.
- 6.1.9 Depending on the School Board program requirements as defined in the Functional Program, a number of partitions are to be designed by Project Co to ensure flexible use of the space. This may be accommodated in a number of ways such as moveable partitions or removable walls. Refer to Appendix 3A [Functional Program] for specifics.

- 6.1.10 Integrate fire-stopping and smoke seal systems into vertical and horizontal space separations to protect against the spread of fire and smoke, and apply protection to exposed building elements (structural and non-structural) susceptible to fire and subsequent damage.
- 6.1.11 Interior Wall Framing Performance Criteria
- 6.1.11.1 Prefabricated steel studs for interior partitions and furring shall be non-load bearing, with no axial load other than its own weight, the weight of attached finishes, and lateral loads of interior pressure differences and seismic loads.
 - 6.1.11.2 Steel stud framing construction shall accommodate electrical, plumbing and other services in the partition cavity, and support fixtures, wall cabinets and other such wall-mounted items with reinforcement and backing.
 - 6.1.11.3 Design shall consider the differences in air pressure that may result on opposite sides of the wall or partition due to factors such as wind and other lateral pressures, stack effects, or mechanically-induced air pressurization.
 - 6.1.11.4 Design assembly to accommodate construction tolerances, deflection of building structural members, and clearances of intended opening.
 - 6.1.11.5 Where gypsum board systems are required to provide fire resistance ratings, design wall assemblies tested by fire testing laboratories
 - 6.1.11.6 Standard gypsum board and type X ULC fire rated, non-combustible core gypsum board shall be used behind all plumbing fixtures in student washrooms of non-masonry construction.
 - 6.1.11.7 Use abuse-resistant gypsum board where required for increased resistance to abrasion, indentation, and penetration of interior walls and ceilings.
 - 6.1.11.8 Provide airborne sound insulation for gypsum board/steel stud assembly to close off air leaks and flanking paths by which noise can go around the assembly. Make assemblies airtight. Seal conduit/duct/piping penetrations with tape and fill at the plenum barrier.
 - 6.1.11.9 Recessed wall fixtures such as cabinets or electrical, telephone and television outlets, which perforate the gypsum board surface, shall not be located back-to-back. Carefully cut any opening for fixtures to the proper size and seal piping penetrations appropriately.
 - 6.1.11.10 The entire perimeter of a sound insulating assembly shall be made airtight to prevent sound flanking. Use an acoustic caulking compound or acoustical sealant to seal between the assembly and all dissimilar surfaces (including at window mullions) in accordance with the specified STC requirements.

6.2 Doors and Windows

- 6.2.1 Doors and door frames shall have the capability to withstand the varying and high levels of impact that occur typically within an educational School and maintain their inherent aesthetic and functional capacities.
- 6.2.2 Size, fabricate and install doors to suit the intended function of spaces or rooms requiring acoustic or visual privacy, security, movement of equipment, special HVAC requirements, fire-resistance rated separations or other closures.
- 6.2.2.1 Refer to Section 9.1 [Security Access and Surveillance] and Section 3.6 [Acoustic Design Criteria] for additional requirements.
- 6.2.2.2 All doors for Instructional Areas are to be designed by Project Co to swing into the classroom unless required by Code to swing out in the direction of exiting. Project Co may design School support rooms and rooms within a “suite” allowing those doors to swing into the room.
- 6.2.2.3 Project Co shall use fixed mullions in most double door locations. However, Project Co shall design removable mullions for double doors to designated delivery areas and storage areas to allow for improved access for large items.
- 6.2.2.4 Project Co shall design all door frame throats to match wall thickness and to be tied into walls rather than mechanically surface fastened.
- 6.2.2.5 Use of wood frames, thermally broken metal frames or knock down metal frames by Project Co is not acceptable.
- 6.2.3 Metal doors shall be installed in all non-wood door locations and metal frames are to be used in all man door locations. Insulation shall be determined based on interior or exterior door location. Fire rating shall be determined based on door location.
- 6.2.4 Hollow Metal Doors and Frames:
- 6.2.4.1 Exterior doors shall be a minimum of 1.2 mm (18 gauge) face sheet steel, flush faced construction, insulated, internally steel stiffened with continuous vertical steel stiffeners continuously welded to both face sheets.
- 6.2.4.2 Interior doors shall be a minimum 1.2 mm (18 gauge) face sheet steel, flush faced construction, honeycomb core material.
- 6.2.4.3 Exterior and interior door and window frames for openings:
- 6.2.4.3(1) less than 1200mm wide shall be a minimum of 1.6 mm (16 gauge) thick steel, welded type construction; and

- 6.2.4.3(2) greater than or equal to 1200 mm wide shall be a minimum 2.0 mm thick steel, welded type construction.
 - 6.2.4.3(3) fully welded construction;
 - 6.2.4.3(4) full wrap frame;
 - 6.2.4.3(5) anchors to each jamb to suit wall type and receive the frame; and
 - 6.2.4.3(6) reinforcement for automatic door operators to prevent sagging of the header.
- 6.2.5 Project Co shall include without limitation, hollow metal doors in pressed steel frames for interior corridor doors and interior stairwell doors. Provide ½ vision lite glazing panels top and bottom as defined in Appendix 3B [Functional Program Room Data Sheets].
- 6.2.6 Double interior corridor doors and double stairwell access doors shall be designed by Project Co with no mullions and to remain open with overhead/wall mounted hold open devices, automatically closing when the fire alarm is activated, as indicated in the Appendix 3B [Functional Program Room Data Sheets].
- 6.2.7 Project Co shall design corridor doors to have the flexibility to allow sections of the School to be securely locked off as desired by the users.
- 6.2.8 Project Co shall design the doors for mechanical rooms and School support services as hollow metal doors in pressed steel frames. Vision lites for these types of doors may be provided to encourage learning opportunities.
- 6.2.9 The extent of glazing in a door, or the size and quantity of sidelights, shall be consistent and balanced between the nature of observation required and the privacy requirements of the occupants of the room. Where possible and appropriate, the preference is to provide glazing in an adjacent sidelight rather than within the door itself. Refer to Schedule 3, Appendix 3B [Functional Program Room Data Sheets] for additional requirements.
- 6.2.9.1 Glazing in doors and sidelights shall allow observation and operational safety of the spaces they serve. Provide blinds or window films suitable and appropriate for the level of privacy intended and required. Blinds shall be installed on the interior side of the window or side lite.
 - 6.2.9.2 Corridor glazing into all learning spaces shall be maximized and coordinated with the location and configuration of doors, sidelights, lockers and classroom furniture and fittings.

- 6.2.9.3 Sidelights or door glazing to Offices shall have frosted film with a pattern that obscures direct view but allows occupancy observation.
- 6.2.9.4 Vision lites in doors can be deleted in locations where a full height sidelite is provided. Provide vision lite glazing panels in both top and bottom portion of doors as defined in Appendix 3B [Functional Program Room Data Sheets].
- 6.2.9.5 Interior windows, sidelites and glazed doors shall be designed to have wired glass at rated closures and tempered glass at others.
- 6.2.9.6 Exterior door glazing shall be sealed double glazed units in hollow metal frames.
- 6.2.9.7 Provide for blackout blinds on room side for all glazed doors and sidelites off of the main corridors, for use during “lock down” times. Refer to Appendix 2D [Equipment and Furniture].
- 6.2.10 Solid core wood doors in pressed steel frames, designed to meet this Section 6.2 [Doors and Windows] are required for all interior administration and classrooms and other learning areas to suit the intended function and aesthetics of the School and its programs. Provide ½ vision lite glazing panels top and bottom as defined in Appendix 3B [Functional Program Room Data Sheets]. Round or oval shape vision lites are not permitted.
 - 6.2.10.1 Solid core wood doors shall be flush type, Custom Grade quality, solid wood core, medium density particle core cores or structural composite lumber core (SCLC). Door Thickness: minimum 45 mm.
- 6.2.11 Project Co shall design all doors with grade 1 institutional hardware.
 - 6.2.11.1 Install finish hardware securely to resist loosening over time. Fasten finish hardware to solid wood backing, except where hardware is designed to be through-bolted.
- 6.2.12 Interior doors to large openings between instructional spaces may be sliding aluminum storefront systems, sliding barn style doors with glazing, transparent overhead doors, operable partitions or other appropriate systems as reviewed and approved by the Authority and the relevant School Board. Minimum clear width of opening to be 2400 wide.
 - 6.2.12.1 Serveries shall be provided with overhead rolling grilles, interlocking flat profile slats, manual push up operation, locking.
 - 6.2.12.2 Office administration areas shall be provided with overhead rolling or side folding grilles, visually transparent with polycarbonate panel inserts, manual operation, locking.

- 6.2.12.3 Interior sectional overhead doors shall be triple wall clear polycarbonate insert panels set into aluminum frame, with acoustic seals to all perimeter edges, with standard or high lift hardware to suit application, chain hoist operated, locking.
- 6.2.12.4 Sliding/folding aluminum and glass door system, including aluminum frame, threshold, panels, sliding/folding and locking hardware, glass and glazing; designed to provide an opening glass wall to suit application.
- 6.2.12.5 Provide glazed interior partitions as appropriate to comply with the functions of the spaces as defined by the Functional Program.
- 6.2.12.6 Operable folding partitions shall be acoustically designed, mechanical manually operated, top supported, centre stacked, single stack panels.
- 6.2.13 Coordinate glazing heights with adjacent wall protection, handrails and other accessories to achieve functional and aesthetic cohesiveness.
- 6.2.14 Finish door hardware shall include without limitation hinges, lock/latch sets, panic devices, stops, holders, door closers, deadbolts, cylinders, flush bolts, kick plates, weatherstrip and thresholds. Project Co shall coordinate the hardware requirements with the Authority and the relevant School Boards, including hardware manufacturer preferences, door functions and keying requirements.
 - 6.2.14.1 Provide cylinders that are master key system that may change from time to time and construction master keyed.
 - 6.2.14.2 Determine detailed requirements for master keying system upon consultation with the Authority and the School Boards during the User Consultation Process as defined in Schedule 2 [Design and Construction Protocols], prior to finalizing keying schedule. Provide key schedule to the Authority and relevant School Boards.
 - 6.2.14.3 Project Co shall provide new key fittings to the Authority for control by the Authority. Turn over keys from the factory to the Authority.

6.3 Interior Stairs and Landings

- 6.3.1 The interior exit stair design shall be closed riser steel pan construction with resilient rubber flooring material or ceramic tile to all treads, risers and landings.
- 6.3.2 Provide tactile warning strips and one piece stair treads with smooth surface, integral risers and visually impaired nosings, to assist the visually impaired.
- 6.3.3 Project Co shall incorporate handrails on both sides of all stairwells and ramps.
 - 6.3.3.1 Project Co shall design for round steel handrails, with tamperproof fasteners.

6.3.3.2 Wood handrail on metal guardrails is acceptable.

6.3.4 The 'Presentation Stair' fulfills multiple roles for the Schools such as circulation between floors, bleacher style bench seating for group learning presentations and informal study/reading space. Seating capacity shall accommodate 100 students. As the presentation stair is intended to be a large element, the space under the stair is to be utilized as formal (enclosed) space of informal (open) study space.

6.3.4.1 Project Co shall provide "Presentation Stairs" as indicated in the Functional Program complete with flooring material to all surfaces that is durable in nature and complimentary to the surrounding spaces.

6.3.4.2 The following image is provided as a concept idea for clearer understanding of the design intent of the presentation stair.



6.4 Interior Finishes - General

6.4.1 Project Co shall design all wall assemblies and finishes to be durable, impact resistant, easily replaceable in sections if damage does occur and to require minimal maintenance.

6.4.2 Acoustic characteristics of finish materials shall be a priority consideration.

6.4.3 For wet areas (e.g., washrooms, showers, housekeeping closets), Project Co shall design wall finishes with a water-resistant and impact resistant and scrubbable finish such as ceramic or porcelain tile complete with an integral base. Project Co shall incorporate a waterproof substrate in change / locker rooms and shower areas.

- 6.4.4 Project Co shall design the overall appearance of finishes and colours to create and promote a natural home-like, non-institutional learning environment, prevent glare and minimize artificial lighting requirements, with a colour scheme of light colours for added reflectance and brightness, to the approval of the School Boards.
- 6.4.5 Refer to Schedule 3, Appendix 3B [Functional Program Room Data Sheets] for locations and types of finish materials. In the event of conflict between Schedule 3 [Design and Construction Specifications] and Appendix 3B [Functional Program Room Data Sheets], Appendix 3B shall govern for material type & location. Schedule 3 shall govern for material quality and performance.

6.5 Interior Finishes

- 6.5.1 Consider providing wall coverings on interior walls to satisfy aesthetic considerations beyond the application of paint and create a learning environment in student areas, a comfortable working environment in staff work areas, and a safe and inviting environment in public areas.
- 6.5.2 Provide a visually harmonious and aesthetically coordinated appearance across all areas of the School.
- 6.5.3 Exterior and interior finish materials shall have surface finishes either as manufactured and integral to the finish material or as applied to the surface of the finish material by paint or special coating.
- 6.5.4 Interior paint materials shall be of a quality to withstand regular or repeated cleaning as the function of the area dictates.
- 6.5.5 Paint Gloss Finish:
- 6.5.5.1 Use semi-gloss for all walls and doors
 - 6.5.5.2 Use semi-gloss for all door frames and metal doors
 - 6.5.5.3 Use semi-gloss for all paint grade doors
 - 6.5.5.4 Use eggshell paint for all ceilings
 - 6.5.5.5 Use a 2-component (base component A, curing agent B). Use a primer if part of coating system.
- 6.5.6 Treat exterior masonry materials such as brick and concrete block with water-based and chemical-free graffiti resistant coatings, to protect surfaces against graffiti markings, ultraviolet radiation, sulfur dioxide, smoke, ozone, dirt, wind, sea mist and spray, and other common urban pollutants. Reapply coating during maintenance period as per manufacturer's recommendations.

- 6.5.7 Seamless epoxy wall coatings, if used, shall be a two component, high solids, zero or low VOC, solvent free, epoxy glaze wall coating which shall be seamless, abrasion and chemical resistant, and UV resistant.
- 6.5.8 Ceramic and porcelain floor and wall tiles shall be installed in areas with wet surfaces as scheduled in Appendix 3B [Functional Program Room Data Sheets].
- 6.5.8.1 Provide a waterproof membrane under ceramic floor tile in showers and other wet areas. The membrane may be trowel-applied, built-up, liquid-applied or sheet-applied.
- 6.5.9 Provide protection of walls and exposed wall corners in student areas, corridors and other areas as required to prevent damage due to impact. Materials such as wood chair rails are acceptable. Secure wall and corner guards to reinforcing and backing in the walls. Provide wall and corner guards sufficient to withstand expected impact loads.

6.6 Interior Finishes - Floor Finishes

- 6.6.1 Project Co shall design the main central core and corridors to have a durable, slip resistant and low maintenance flooring installed where minimal maintenance other than cleaning is required.
- 6.6.2 Project Co shall design the floor finish for Instructional Areas and the Multipurpose Rooms with a durable cleanable finish. In selecting flooring materials, consider cleaning and maintenance, pedestrian and rolling traffic, acoustics, and aesthetics. Refer to Appendix 3B [Functional Program Room Data Sheets] for additional details and locations.
- 6.6.3 Flooring shall not be finished with sealer and/or wax, but must be finished with high speed buffing as per manufacturers specifications.
- 6.6.4 Flooring in public, staff, and student washrooms shall be impervious to water and have a slip-resistant finish.
- 6.6.5 Resilient tile products shall be considered for flooring in service corridors and service areas.
- 6.6.6 Project Co shall design all washrooms and wet areas with slip resistant and waterproof surfaces with integral covered base. Refer to Appendix 3B [Functional Program Room Data Sheets] for additional details.
- 6.6.7 Project Co shall include without limitation rubber base to all walls throughout the School, except as noted in wet areas such as washrooms.
- 6.6.8 Flooring shall not be finished with sealer and/or wax, but must be finished with high speed buffing as per manufacturers specification.

- 6.6.9 General purpose flooring types acceptable to the Authority include:
- 6.6.9.1 Sheet Linoleum with homogenous core of primarily natural materials, consisting of linseed oil, wood flour, and resin binders mixed and calendared onto a natural jute backing, with welded seams. Wet areas surfaced in sheet flooring shall have integral cove bases.
 - 6.6.9.1(1) Forbo Marmoleum with Topshield 2 or Authority approved equivalent.
 - 6.6.9.2 Homogeneous single layered vinyl sheet flooring
 - 6.6.9.2(1) Polyflor PUR, Armstrong PUR, Tarkett PUR or Authority approved equivalent.
 - 6.6.9.3 Rubber sheet without backing, 100 percent virgin elastomers, reinforcing agents, soil-resisting agents, and migrating waxes compounded to create durability, excellent cleaning characteristics and exceptional slip resistance, colour and pattern through total thickness. All joints shall be hot welded seams with matching colour rods.
 - 6.6.9.3(1) Noraplan Environcare or Authority approved equivalent.
 - 6.6.9.4 Rubber flooring tile with stud designs shall have chamfered edges with a sharply-defined edge at the top for higher slip resistance, easier cleaning, superior maintenance and low vibration design to minimize vibration and noise, are acceptable for use on stairs and landings. Areas surfaced with resilient tile flooring shall have rubber bases.
 - 6.6.9.5 The use of vinyl composite tile flooring is not acceptable.
- 6.6.10 Special purpose flooring types acceptable to the Authority include:
- 6.6.10.1 Homogeneous slip resistant vinyl resilient sheet flooring with silicon carbide, coloured quartz, natural recycled aggregates and aluminium oxide granules. Slip-resistant sheet vinyl shall have a static coefficient of friction of 0.6 on level surfaces and 0.8 on ramps.
 - 6.6.10.1(1) Mannington Assurance or Authority approved equivalent.
 - 6.6.10.2 Athletic rubber flooring, calendered and vulcanized with a base of natural and synthetic rubber, stabilizing agents and pigmentation; 6.0 mm thick (for Gymnasiums, Multi-Purpose Room and Child Care Centre Classrooms. Manufactured in two layers, which are vulcanized together. The shore hardness of the top layer shall be greater than that of the bottom layer. Materials to be available in sheet configuration.

- 6.6.10.2(1) Taraflex cushion floor, Gerflor PVC sport floor or Authority approved equivalent
- 6.6.11 There may be floor surfaces that require specialized application such as poured epoxy, painted concrete or special vinyl. Review these applications on a per application basis.
- 6.6.11.1 If used, provide seamless epoxy flooring with 100% solids, zero VOC, solvent-free comprised of a two component epoxy primer, a two-component epoxy resin and curing agent, coloured quartz aggregate broadcast into both primer and undercoat, and a high performance, UV-resistant two-component, clear epoxy sealer. Provide integral cove bases.
- 6.6.11.2 Where epoxy flooring is used in wet areas, use water and slip-resistant grade and prevent water or moisture transmission to the substrate. Terminate flooring at the walls in the form of 150 mm high flash coves. Above 150 mm high flash cove, taper flooring material to allow smooth transition of the wall protection over the flooring.
- 6.6.12 Carpet tile is permitted only as set out in Appendix 3B [Functional Program Room Data Sheets].
- 6.6.12.1 Carpet tile shall meet the following requirements: minimum 100% nylon, level loop, 100% solution dyed, modular size of 610 mm x 610 mm.
- 6.6.12.2 Provide underlayment bond coat that is compatible with releasable pressure sensitive tile to substrate.
- 6.6.13 Provide a durable concrete floor finish, including the use of sealers and hardeners as required to meet the anticipated use and occupancy.

6.7 Interior Finishes - Ceiling Finishes

- 6.7.1 The ceiling system shall be part of the definition of interior spaces and may be accessible or inaccessible in total or in part.
- 6.7.2 Project Co shall design the gymnasium, Multipurpose Rooms, student gathering areas, Resource Centre and project centres as high volume spaces with exposed structure or as indicated in Appendix 3B [Functional Program Room Data Sheets].
- 6.7.3 Project Co shall design the ceiling finishes in the central core area and central corridors to reflect light while absorbing sound.
- 6.7.4 Project Co shall design a cleanable, durable gypsum board ceiling finish for all washrooms, and change / locker room areas.

- 6.7.5 If in-floor hydronic heating is used, the use of power activated fasteners to underside of concrete structure and metal decking tabs or clips to underside of metal deck structure for anchoring of ceiling system support system is not permitted.
- 6.7.6 Acoustic Panel Ceilings Performance Criteria
- 6.7.6.1 The design shall control interior sound levels to facilitate a comfortable and learning environment for students and a safe working environment for School staff.
- 6.7.6.2 Install acoustic ceiling tiles in a suspension system to provide levels of sound attenuation to suit the intended function of the room.
- 6.7.6.3 For ceiling tiles in a suspension system, provide accessibility to the ceiling spaces where access is required to mechanical, electrical or other service systems.
- 6.7.6.4 Project Co may install special surface-treated ceiling tiles, such as wood, mylar or metal-faced tiles, where maintenance and ease of cleaning are priorities as well as the accessibility and acoustic requirements.
- 6.7.6.5 Design standard acoustical panels and tiles for installation within the normal occupancy condition range of 15°C - 29°C and maximum 70% relative humidity. When the service use temperature and RH are expected to exceed these ranges, use of acoustical units specifically designed for such applications shall be considered.
- 6.7.6.6 In any area where lay-in ceiling panels frequently need to be removed for plenum access, provide tiles with scratch-resistant surfaces.
- 6.7.6.7 Ceilings installed in food preparation areas shall be capable of being cleaned without undue wear on the tile.

6.8 Architectural Woodwork

- 6.8.1 Basic requirements
- 6.8.1.1 Wood and plastic products and procedures required in the construction process and as integral components of the building fabric, including fabrication, assemblies, surfaces and finishes, shall conform to requirements outlined in Schedule 3 [Design and Construction Specifications] and to those set out in this section.

- 6.8.1.2 Provide rough carpentry, wood backing materials, backing boards for mechanical rooms and electrical/communication rooms (minimum 2440 mm above finished floor), roof sheathing, copings, cant strips, finish carpentry and architectural woodwork, including but not limited to exterior fascia's, cabinets, casework, paneling, trim, installation of doors and hardware, and other wood-related products and applications as required:
- 6.8.1.2(1) to support functionality as defined in the Functional Program or as required for operation of the School; and
 - 6.8.1.2(2) as required for wood products exposed to view in finished interior and exterior installations.
- 6.8.1.3 Products containing urea formaldehyde shall not be used.
- 6.8.1.4 Provide finish carpentry and architectural woodwork, including cabinets, casework, frames, paneling, trim, installation of doors and hardware, and other wood-related products and applications. as required for wood products exposed to view in finished interior and exterior installations.
- 6.8.1.5 Provide plastic laminate surfacing and/or solid polymer fabricated surfacing as required to create surfaces that require antiseptic or clean characteristics, special or regular maintenance, and resistance to caustic action of chemicals or agents used by the Authority.
- 6.8.1.6 Provide acrylic plastic, stainless steel or epoxy products as required for wall cladding, wall protection, corner protection, casework finishing, trims, ornamental elements, and other applications to achieve a quality of interior finish suitable for use by students and staff.
- 6.8.1.7 Kitchen millwork and casework may not be substituted for pre-manufactured furniture and modular furniture assemblies. Other millwork and casework may be substituted for pre-manufactured furniture and modular furniture assemblies if they meet the performance criteria set out in Schedule 3 [Design and Construction Specifications], Appendix 3B [Functional Program Room Data Sheets] and as indicated in Appendix 2D [Equipment and Furniture].
- 6.8.2 Performance Criteria
- 6.8.2.1 Finish carpentry and architectural woodwork
- 6.8.2.1(1) Design, fabrication, materials, installation, and workmanship of finish carpentry and architectural woodwork shall conform to quality standards outlined in the Architectural Woodwork Manufacturer's Association of Canada (AWMAC) Quality

- Standards Manual for minimum "Premium Grade," and Door and Hardware Institute (DHI) standards.
- 6.8.2.1(2) All bottoms of sink cabinet boxes and areas that may come into contact with water must have a marine-grade plywood substrate. Do not use fibreboard or particleboard.
- 6.8.2.1(3) The maximum door size is 813 mm x 1220 mm without stiffeners.
- 6.8.2.2 Countertops shall meet the following requirements:
- 6.8.2.2(1) High pressure plastic laminate, general purpose grade, standard duty, minimum 1.06 mm thick complete with 38 mm thick hardwood edging, Birch or Maple with clear finish and bevelled edges.
- 6.8.2.2(2) Core (for countertops with sinks): western softwood plywood, good one side, solid two sides, for use as plastic laminate cores, minimum 19 mm thick. Liner grade backer sheet to underside of all countertops.
- 6.8.2.2(3) Core (for countertops without sinks): particle board, for use as plastic laminate cores, minimum 19 mm thick. Liner grade backer sheet to underside of all countertops.
- 6.8.2.2(4) Solid surface countertops: Solid surface material (SSM) shall consist of reacted monomers and resins, mineral fillers and pigments manufactured in sheets of 13 mm nominal thickness. SSM shall be solid, non-porous, homogeneous, hygienic, renewable, and, when applicable, may feature inconspicuous hygienic seams. SSM shall be free from conspicuous internal strengthening fibers.
- 6.8.2.3 Casework shall be plastic laminate finish to exposed and semi-exposed parts, with PVC or solid wood edge banding to School Board standards.
- 6.8.2.4 Hardware (Institutional grade):
- 6.8.2.4(1) Hinges: minimum 125 degree opening; concealed hinge; swing free; self-closing; nickel plated steel hinge arm and hinge cup. Doors under 813 mm high require two hinges, doors over 813 mm require three hinges.
- 6.8.2.4(2) Drawer Slides: minimum 45 kg. load capacity; steel track; full extension, steel ball bearings.

6.8.2.4(3) Door Locks/Catches: Provide locks to all units, disk tumbler cam type. Each room to be keyed alike. Vandal resistant elbow catch for each pair of lockable doors.

6.8.2.4(4) Grommets: minimum size to be 60 mm diameter, 22 mm depth. Provide at reception desks and countertop areas where electrical, telephone and data outlets are located below.

6.8.3 Typical Millwork

6.8.3.1 Refer to Appendix 3B [Functional Program Room Data Sheets] for description and location of required millwork elements. In addition to those requirements the following descriptions are provided to further the understanding of design intent:

6.8.3.1(1) Cubbies: Fixed non movable cubby – dimensions per individual cubby – 1220 high x 300 wide x 300 deep (upper section) / 450 deep (lower section), 3 hooks per cubby. Fabricated in banks of 2 in order to facilitate future reconfiguration. Upper section to have a flat top in order to allow storage on top.

6.8.3.1(1)(a) Saskatoon (SPS): Provide cubbies for Pre-K, Kindergarten and Grade 1.

6.8.3.1(1)(b) Saskatoon (GSCS): Provide cubbies for all main floor classroom.

6.8.3.1(1)(c) Warman/Martensville (PSSD): Provide cubbies for Pre-K, Kindergarten and Grade 1.

6.8.3.1(1)(d) Warman/Martensville (GSCS): Provide cubbies for Pre-K, Kindergarten, Grade 1, Grade 2, Grade 3, Grade 4.



6.9 Interior Fittings

- 6.9.1 Interior fittings include without limitation: lockers, cubbies, toilet partitions, interior signage, boot racks, washroom accessories, visual display surfaces, projection screens, window coverings, entry mats.
- 6.9.2 Project Co shall provide solid backing in partitions for all fittings.
- 6.9.3 Project Co shall provide metal lockers and wood cubbies of sizes, numbers, and groupings as determined in consultation with the Authority and where indicated in Appendix 3B [Functional Program Room Data Sheets].
- 6.9.3.1 The student corridor metal lockers shall be designed as a single tier 305 mm wide x 381 mm deep x 1524 mm high or two tier configuration, 305 mm wide x 381 mm deep x 1830 mm high.
- 6.9.3.1(1) Saskatoon (SPS): double tier for Grades 2 to 7, single tier for two Grade 8 classrooms.
- 6.9.3.1(2)
- 6.9.3.1(3) Saskatoon (GSCS): double tier for 2nd level classrooms except single tier for two Grade 8 classrooms. Warman/Martensville (PSSD): double tier for Grades 2 to 8,

- 6.9.3.1(4) Warman/Martensville (GSCS): double tier for Learning Community Grade 5 to Grade 8,, except single tier for one Grade 8 classroom.
- 6.9.3.2 Provide metal lockers for student use as indicated, complete with provision for wall coat hooks, double ceiling hooks, metal vented top trim, closures and filling panels, finished end panels, sloped tops, number plates and padlock hasps.
- 6.9.3.3 Project Co shall design lockers to be fully recessed with the face of the lockers flush with the adjacent wall or with sloped tops and finished end panels if not recessed.
- 6.9.3.4 Project Co shall design bases as required (pressure treated for wet areas).
- 6.9.3.5 Project Co shall select up to four colours per School for the locker doors, which colours shall be reviewed and approved by the School Boards prior to Project Co utilizing the selected colours.
- 6.9.4 Project Co shall design toilet partitions to resist vandalism with the following characteristics:
 - 6.9.4.1 phenolic panels with pebble finish, floor mounted and overhead braced, colours shall be reviewed and approved by the Authority prior to Project Co utilizing the selected colours;
 - 6.9.4.2 hardware design shall be heavy duty, brushed stainless steel, institutional grade with tamperproof screws.
 - 6.9.4.3 height of partitions shall be confirmed with the Authority as this might vary based on the function (example: lower partition walls in Child Care Centre washrooms to allow supervision while maintain child's privacy from other children).
- 6.9.5 Project Co shall install 1220 mm (48") wide prefinished steel boot racks with four upward folding surfaces, welded construction, wall mounted, with removable shelves, to all entry vestibules and boot rooms as scheduled.
- 6.9.6 Provide accessories for washroom functions in public, student and staff washrooms as required. Determine type, size, and number of accessories based on the numbers and categories of users. Refer to Schedule 2 [Design and Construction Protocols], Appendix 2D [Equipment and Furniture] for Equipment category types; if category is not listed, the item shall be provided by Project Co and Appendix 3B [Functional Program Room Data Sheets].
 - 6.9.6.1 Project Co shall install the following surface mounted washroom accessories in the washrooms and similar areas:

- 6.9.6.1(1) paper towel dispensers, toilet paper dispensers, sanitary napkin disposal and soap dispensers, that are supplied by School Board vendors as listed in Appendix 2D [Equipment and Furniture].
- 6.9.6.1(2) These vendor supplied items could change from time to time, Project Co shall allow for surface mounted sacrificial panels behind paper towel dispensers or wall repairs and power connections for hands-free paper towel dispensers.
- 6.9.6.2 Provide mop/broom bracket with a minimum of 5 mops holder in each housekeeping room. Final location and height shall be determined through the User Consultation process.
- 6.9.6.3 Student services washrooms shall be provided with mobile electronically height adjustable change table and ceiling lift and track system with a minimum 550 lbs patient lift capacity.
- 6.9.6.4 [Project Co design allows for garbage included in each private bathroom.](#)
- 6.9.7 Whiteboards and tackboards shall be installed in classrooms, meeting rooms, staffrooms, and other areas within the School where collaborative shared learning shall take place. Whiteboards shall have a metal j-trim with concealed fastener complete with a grey colour vinyl insert.
 - 6.9.7.1 Provide tackboard surfaces of a type and quality to allow pin penetration of the surface materials and have reasonable resistance to deterioration.
 - 6.9.7.2 Provide whiteboard surfaces of a porcelain ceramic type to allow use of felt-type writing instruments and allow erasing and cleaning with minimal effort, magnetic; scratch and abrasion-resistant; and maximum contrast, glare control, and reflectivity.
 - 6.9.7.3 Provide tackboards and whiteboards complete with manufactured frames and accessory trays. If there is only one whiteboard in the room it is to have a marker rail at the bottom of the board and map rail complete with map hooks (one hook per meter of board).
- 6.9.8 Provide each classroom with one manually operated retractable projection screen, 1525 mm x 2030 mm nominal size, wall mounted on ball bearing rigid steel spring roller with controlled screen return mechanism, include pull cord. Refer to Schedule 2 [Design and Construction Protocols], Appendix 2D [Equipment and Furniture].
- 6.9.9 Provide a 3600 mm wide projection screen in gym and all School Commons complete with keyed switch. Refer to Schedule 2 [Design and Construction Protocols], Appendix 2D [Equipment and Furniture].

- 6.9.10 Interior window coverings shall be supplied and installed by the Authority for security lockdown purposes. Refer to Schedule 2 [Design and Construction Protocols], Appendix 2D [Equipment and Furniture]. Project Co shall provide access to the Authority for installation of window coverings.
- 6.9.11 All exterior window coverings shall be supplied and installed by Project Co to all exterior windows. Roller shades with a sheer weave and a blackout roller blind are preferred but other products may be used if they provide equivalent room darkening, privacy, sun and heat control, are smooth surface, easy to clean, wipe-able, non-pleated, rot-proof, flame-resistant, fungal and bacteria resistant, colourfast to light, glare-reducing, and able to provide external visibility;
- 6.9.11.1 Roller shades systems shall operate with a spring wrap mechanism, adjustment free continuous chain and pulley clutch operating system with breakaway chain and wall anchor.
- 6.9.11.2 Provide for infinite positioning of window shade system, mounted between walls and to face of window frames.
- 6.9.11.3 Where window blind controls are difficult to reach, motorized blinds shall be provided.
- 6.9.11.3(1) Shade motor shall be an asynchronous unit, start and run, single phase type motor. Shade motor shall be equipped with a disconnect plug at motor lead.
- 6.9.11.3(2) Schools consisting of more than one zone and various groups, shall be controlled by a building master switch, one master switch per zone, one switch per group.
- 6.9.11.3(3) Switch shall be rocker type, recessed mount complete with momentary key switch.
- 6.9.12 Project Co shall design the all building entries with a system to prevent and/or remove the bulk of the wet and dirt products from entering the School such as integrated recessed walk off mats.
- 6.9.12.1 Project Co shall design the entrances and exits to the exterior play areas to allow for removable surface mounted entry mats of aluminium scraper bars, and rubber/fibre composite wiper strips complete with metal perimeter transition trims.

6.10 Gymnasium Fittings

- 6.10.1 Basketball Backstops – Wall Mounted Sidefold, Main Court
 - 6.10.1.1 Provide 2 – main court wall mounted, side folding mechanism, prefinished steel frame, height adjustment of minimum 610 mm required, including adjustable stabilizing bars, complete with keyed electric winch and safety cables. No cable braces permitted.
- 6.10.2 Basketball Backstops – Wall Mounted Sidefold, Cross Courts
 - 6.10.2.1 Provide 4 – backstops with sidefolding mechanism, prefinished steel frame, height adjustment of minimum 610 mm required, including adjustable stabilizing bars and operating pole. No cable braces permitted.
- 6.10.3 Backboards and Goals
 - 6.10.3.1 Main courts: fibreglass backboard complete, spring loaded, removable nylon net, safety edge cushion. Backboard to have baked enamel border and target area.
 - 6.10.3.2 Cross courts: aluminum backboard complete with factory painted border and target area. Standard bolted mount, steel goal with removable nylon net.
- 6.10.4 Volleyball/Badminton End and Intermediate Posts
 - 6.10.4.1 Volleyball/Badminton end and intermediate posts of prefinished aluminum round tubing, complete with nets fabricated from high quality nylon chord square mesh. Bottom brace with rubber padding for floor protection.
 - 6.10.4.2 End post accessories:
 - 6.10.4.2(1) Adjustable fittings for net height adjustment.
 - 6.10.4.2(2) Manual crank winch and polypropylene leaders to receive nets.
 - 6.10.4.3 Transporter: provide minimum two (2) transporters, each supplied with two castors for the movement of the poles to and from storage.
- 6.10.5 Floor Sockets
 - 6.10.5.1 Floor post sockets: steel tube with base plate, of quality required to suit game layouts. Location of posts must meet current standards in relation to the games lines.
 - 6.10.5.2 Flush socket floor covers. bronze post socket covers to sit over post sockets flush with floor. Provide finger grip opening for removal.

- 6.10.5.3 Storage Room Sockets: steel tube with base plate, of quantity to suit the number of posts provided.
- 6.10.6 Gymnasium Divider Curtain
 - 6.10.6.1 Provide a combination of flame retardant vinyl fabric and mesh, with sufficient weight and design to withstand the typical School gymnasium activities.
 - 6.10.6.2 Suspension system to be of aircraft cable and all associated clews, fasteners and pulleys required for suspension and movement to manufacturers standards for loading.
 - 6.10.6.3 Bottom of curtain shall be hemmed with a padded pipe in hem, connected to each hoisting cable.
 - 6.10.6.4 Electric winch motor shall be of a size and voltage appropriate to suit application, complete with key switch.
- 6.10.7 Stage Curtains
 - 6.10.7.1 Provide the main stage in gymnasium with curtains and a valance the full width and height of the stage.
 - 6.10.7.2 Proscenium curtains shall be 100% Trevira polyester fabric, flame resistant, continuously weighted bottom hem, manually operated by looped pulley and cord on drapery track system.
 - 6.10.7.3 Curtain tracks shall be suspended from structure, blocking or deck, not fastened to suspended ceilings or drywall.
- 6.10.1 Telescopic Bleachers
 - 6.10.1.1 Telescopic bleacher seat system shall be "closed deck", multiple tiered seating rows, comprised of seat and deck components, risers, and supportive under structure, stacking vertically in minimal floor area where not in use.
 - 6.10.1.2 The first moving row shall be secured with both friction and mechanical locks. All other rows shall be mechanically locked, operable only upon unlocking and cycling of first row. Electrical assist operative system is preferred.
 - 6.10.1.3 The operative system shall incorporate a lock system permitting the discretionary securement of one, several, or all rows in use or stacked position.

- 6.10.1.4 The dimensional and physical characteristics of the bleachers and the seating plan, shall be in accordance with all applicable codes and designed to accommodate 100 students with hard style seats without backs. Seats shall be numbered.

6.11 Specialty Fittings

- 6.11.1 Project Co shall include specialty fittings as scheduled in Schedule 3, Appendix 3B [Functional Program Room Data Sheets].
- 6.11.2 Dust Collector System
 - 6.11.2.1 The dust collection system shall be an exterior mounted recirculation type consisting of a dust separator, fabric filter media, ductwork, filter reconditioning mechanism and exhaust fan with an explosion-proof motor.
 - 6.11.2.1(1) Construct the dust separator with built-in inlet baffles adequately separating coarse particles from fine ones and directing heavier particles down into a hopper.
 - 6.11.2.1(2) Dust collector with integral storage and tight fitting slide gate for emptying.
 - 6.11.2.1(3) Dust collector shall be complete with an automatic filter shaker. The shaking mechanism shall be operated automatically on a programmed timing cycle whenever fan is shut down. A time delay interlock shall be provided to allow the fan to stop and the shaking cycle to operate for a definite time period before the fan can be re-started. This shaking time period shall be adjustable between one and three minutes.
 - 6.11.2.1(4) The dust collector fan/motor package shall be of the materials-handling type and shall be installed between the dust collection and return outlet.
 - 6.11.2.2 Filtration: Collector and filtering media capable of effectively collecting and filtering dust and chips produced by various woodworking equipment, without plugging the collector or hanging up on the filtering media. Filtering media shall have a minimum dimension of 160 mm between wall or tubes or sides of envelopes on the dirty side, to prevent bridging and short circuiting of filter area.
 - 6.11.2.3 Noise level: The dust control system shall include a silencer to maintain a noise level of NC 75 or less.

- 6.11.2.4 Exhaust airflows from woodworking equipment shall be in accordance with recommendations found in American Conference of Governmental Industrial Hygienists (ACGIH) Industrial Ventilation Handbook, latest edition.
- 6.11.2.5 Dust Collection system shall be designed in accordance with National Fire Protection Association (NFPA) 664, Standard for the Prevention of Fires and Explosions in Wood Processing, and Woodworking Facilities.
- 6.11.3 Project Co shall design storage shelving to have adjustable shelves.
 - 6.11.3.1 All rooms and/or areas where the Room Data Sheets identifies 'Shelving System' final quantities and locations shall be determined through the User Consultation process. Provide all required backing. Refer to Appendix 3B [Functional Program Room Data Sheets] for design intent.
 - 6.11.3.2 Provide storage systems for materials in designated storage areas.
 - 6.11.3.3 Adjustable shelving systems may be specifically manufactured for storage purposes, such as plywood or steel-slotted angle industrial shelving for bulk materials, of plastic laminate-faced plywood for clean storage.
 - 6.11.3.4 Project Co shall design the storage unit and shelves to inhibit tipping.
 - 6.11.3.5 The maximum length of shelves shall be 800 mm.
- 6.11.4 Project Co shall design a fall protection and anchor system with a safety tie-back and life line anchors and horizontal life line system and associated equipment for safe building maintenance operations including window-washing.
 - 6.11.4.1 Fall protection system shall be designed and engineered to protect workers from free falling a vertical distance greater than 1200 mm.
 - 6.11.4.2 Fall protection system shall include all hardware and lanyards attached to the horizontal lifeline system complete with body harness.

6.12 Building Systems- Elevators

- 6.12.1 Project Co shall include without limitation an elevator for each multi-storey Public and Catholic school.
- 6.12.2 Project Co shall design such elevators to be primarily for passengers including persons with special mobility needs, emergency stretchers in the prone position and also for vertical transportation of heavy and bulky materials and equipment such as floor scrubbers
- 6.12.3 Basic Requirements

- 6.12.3.1 Design elevator systems to ensure there is sufficient capacity to accommodate the wide range of user and functionality requirements, in a manner which satisfies expectations for safety, reliability, responsiveness, accessibility and operational efficiency of the Schools.
- 6.12.3.2 Provide durable elevator cab finishes (including stainless steel fronts, hand and bumper rails, and indirect lighting) to suit the School.
- 6.12.3.3 Provide entrances consisting of car doors, frames, jambs, headers, sills, sight guards, door hangers, tracks, interlocks, door closers, electrical contacts and all other equipment required for a complete installation. Provide entrance doors and frames finished in brushed stainless steel.
- 6.12.3.4 Cab and Hall Equipment
- 6.12.3.4(1) Provide an infra-red multiple beam door protective device that protects the full width of the elevator entry.
- 6.12.3.4(2) Provide battery operated emergency cab lighting.
- 6.12.3.4(3) Provide a two speed exhaust fan mounted in the cab top.
- 6.12.3.4(4) Provide one set of cab protective pads that cover all walls and the cab front return panel along with pad hooks. Provide pad hooks in each elevator.
- 6.12.3.4(5) Provide a hands-free two-way voice intercommunication / telephone system with a lobby rescue station and remote handset.
- 6.12.3.4(6) Where required, provide hoistway access switches located in the entrance frame or in the hall door sight guard.
- 6.12.3.4(7) Provide hoistway door unlocking devices (by lunar key) on the hall doors at all floors.
- 6.12.3.4(8) Provide one riser hall station illuminating up or down push buttons.
- 6.12.3.4(9) Provide hall lanterns with electronic tones at each entrance.
- 6.12.3.4(10) Project Co shall design the elevator to include a key switch that shall enable or disable the call station at each level of service.
- 6.12.3.4(11) Provide elevator equipment that shall not restrict the Authorities ability to engage a competent elevator

maintenance contractor, other than the original manufacturer / installer, for the provision of maintenance services. Where microprocessor based control systems are supplied, provide "on board" diagnostic tools and associated manuals containing all set-up parameters, code references and troubleshooting instructions required for routine maintenance and adjusting procedures.

PART 7. DESIGN CRITERIA – MECHANICAL**7.1 Mechanical Engineering**

- 7.1.1 Project Co shall provide the School in accordance with the general mechanical design principals set out below:
- 7.1.1.1 HVAC, plumbing, and fire protection systems shall be designed to provide a comfortable and productive environment for the Facility Users.
 - 7.1.1.2 Design the HVAC, plumbing and fire protection systems to minimize disruption to the operation of the School during maintenance or repairs.
 - 7.1.1.3 The HVAC, plumbing, and fire protection systems shall:
 - 7.1.1.3(1) minimize impact on the physical environment, through energy efficiency, optimization of resource use, and simplification of the systems; and
 - 7.1.1.3(2) be developed to provide reliability of continual operation, and adequate standby capacity.
 - 7.1.1.4 Provide water, sanitary, storm and gas utilities as required and sized to suit the consumption and discharge needs of the School.
 - 7.1.1.5 All pipes, ducts and fittings shall be insulated to conserve energy, prevent condensation, attenuate noise and prevent accidental burns.
 - 7.1.1.6 Provide natural gas, fire protection and drainage connection points suitable for future Relocatable Classrooms.
 - 7.1.1.7 Water, glycol and other fluids used within mechanical systems shall be treated to prevent corrosion, algae growth, build-up of deposits, disease, bacteria and to prolong the equipment life.
 - 7.1.1.8 All mechanical, HVAC, plumbing, fire protection and specialty systems shall be vibration isolated to minimize noise and vibration through the structure or other components of the School.
 - 7.1.1.9 Provide a single point emergency shut-off for natural gas in case of an emergency situation. There shall be a single mechanism where outside air dampers on all air handling units shall be closed. There shall be a single point of shut down for all 100% outside air units. These shut off locations shall be accessible to school maintenance staff at all times.

7.2 Fire Suppression

7.2.1 Basic Requirements:

- 7.2.1.1 Project Co shall complete the School and the Relocatable Classrooms (including without limitation corridors) to be fully sprinklered. Design the sprinkler system and equipment to suit the occupancy classification that it protects.
- 7.2.1.2 Ensure that inspector's test point is piped to the exterior or to drain. Locate siamese connections where required and as directed by the Government Authority having jurisdiction.
- 7.2.1.3 If a fire pump is required, provide an emergency power supply and a transfer switch which is part of the fire pump controller. Mount the package in a separate mechanically attached enclosure to form one assembly, specifically approved for the purpose as a complete unit.
- 7.2.1.4 Sprinklers subject to freezing temperatures shall be supplied by a dry system. Provide emergency backup power for the compressor on the dry system.
- 7.2.1.5 Project Co shall provide semi-recessed sprinkler heads in ceiling areas to minimize vandalism.
- 7.2.1.6 All sprinkler heads in areas subject to damage, such as in the gymnasiums, and maintenance rooms shall have wire guards and shall be vandal proof.
- 7.2.1.7 Project Co shall provide fire extinguishers in recessed cabinets in all School corridors and public areas. Fire extinguishers cabinets shall be surface mounted in other areas to meet the minimum applicable laws and the Standards and Guidelines.

7.2.2 Performance Criteria:

- 7.2.2.1 Provide a fire protection system hydraulically designed to NFPA standards.
- 7.2.2.2 Locate zone shut-off valves so they are visible and accessible from the floor. Do not conceal shut-off valves from view or locate in janitor rooms, storage rooms or stairwells. Monitor all valves controlling water flow.
- 7.2.2.3 Install fire department connections at a location approved by the applicable Governmental Authority

7.3 Plumbing Services:

- 7.3.1 Provide individual water, fire protection, gas, sanitary and storm services as required and sized to suit the usage needs of the School. Provide a separate incoming domestic water line for redundancy. Refer to description in Schedule 3, Part 10 [Design Criteria – Civil].
- 7.3.2 Basic Requirements:
- 7.3.2.1 Project Co shall provide utility meters for natural gas and domestic water as required by each municipality for the size of service required for the School. Provide backflow protection as required by each municipality and Authority having jurisdiction.
 - 7.3.2.2 Project Co shall design for secondary water meters for the domestic cold water supply to each public school, Catholic school, and Child Care Centre.
 - 7.3.2.3 All isolation, maintenance, balancing and other service valves located in the corridor ceiling spaces or the adjacent mechanical rooms shall be accessible from standing or when using a maximum 2.4 m tall ladder.
 - 7.3.2.4 Clearly label all systems. Labelling shall include painting and labelling of all pipes, ceiling identification dots, valve tagging, directional arrows and color coding bands.
 - 7.3.2.5 Design and install all fixtures and equipment to manufacturer's specifications and standards.
 - 7.3.2.6 Provide all fixtures and equipment from manufacturers with supply and/or service forces located in close proximity (e.g. Alberta, Saskatchewan). Replacement and maintenance parts must be stocked locally or readily available.
 - 7.3.2.7 Ensure delivery of water supplies at the required pressures to all water outlets.
 - 7.3.2.8 Provide durable materials to allow for 24 hour a day operation with minimal downtime.
 - 7.3.2.9 Consideration should be given to easy access and serviceability and avoiding interference with other services.
 - 7.3.2.10 Provide floor drains with automatic trap primers in kitchens, washrooms, meter rooms, showers and other rooms as required by code or Good Industry Practice. Floors shall slope to all drains. Floor drains in mechanical rooms are not required to have automatic trap primers.

- 7.3.2.11 Provide backflow preventers on the incoming water service as well as at equipment source connections where required by code.
 - 7.3.2.12 Provide interceptors to all Da Vinci Studio / Art rooms and Kitchens as required by the applicable Governmental Authority guidelines to intercept oil, grease, dirt and solids.
 - 7.3.2.13 Provide a domestic water strainer at the incoming service to the building, for Warman and Martensville Schools only.
 - 7.3.2.14 If a water booster pump is required, ensure it is designed with standby to provide uninterrupted water service and pressure in the event of malfunction or maintenance.
 - 7.3.2.15 Provide water supply for irrigation system as defined in Schedule 3, Section 11.7 [Landscape Irrigation].
 - 7.3.2.16 Water supply shall be provided from the domestic cold water system and meter that is supplying the common Central Core areas and Child Care Centre.
 - 7.3.2.17 The water supply for landscaping irrigation will be provided from the domestic cold water system and come off the meter supplying the common Central Core areas and Child Care Centre.
- 7.3.3 Performance Criteria:
- 7.3.3.1 Design all drainage systems such that the system connects to the Site services. Designs shall utilize gravity drainage where possible.
 - 7.3.3.2 In the case where structural slabs or non-grade supported foundations are used, support all under-slab piping hung from the concrete slab above. Provide hangers and rods of sufficient strength and installed at intervals sufficient to carry the pipe and load, at the required slope. Hangers and rods shall be corrosion resistant. Install light-weight fill, sand or pea-gravel above all piping that is supported (hung) from the concrete slab above.
 - 7.3.3.3 If a pumping system is required for subsurface, storm, or sanitary drainage, the system shall not flood the mechanical space in which it is housed. The sump shall have twin compartments, a settling and a pumping compartment, and shall be sized to prevent short cycling of the pump. Provide alarm points for high water and pump failure.
 - 7.3.3.4 Storm and sanitary piping below grade shall be cast iron or PVC to SDR standards acceptable to the authority having jurisdiction. ABS piping is not acceptable.

- 7.3.3.5 Storm and sanitary piping above grade shall be as per smoke and fire ratings of the National Building Code of Canada 2010. ABS piping is not acceptable.
- 7.3.3.6 Insulate storm drainage, domestic water piping, and exposed p-traps on barrier free fixtures throughout as per TIAC quality standards. Where piping and / or piping components are subject to freezing, provide insulation and heat tracing. Provide monitoring and an alarm to detect heat trace system malfunction or service disruption.
- 7.3.3.7 Design all plumbing drainage to limit or remove blockage from the piping system.
- 7.3.3.8 Provide flushing and disinfection of domestic water systems. Provide independent testing of piping systems once flushing and cleaning has been completed.
- 7.3.3.9 Provide automatic trap primers in all floor drains.

7.4 Domestic Hot and Cold Water Systems:

- 7.4.1 Basic Requirements:
 - 7.4.1.1 All domestic water piping shall be copper pipe, Type L with wrought or cast couplings and fittings conforming to ASTM B88-03. Joints are made with silver solder. All domestic hot water recirculating pipe shall be copper pipe, Type K. Joints are to be made with 95-5 tin-antimony or tin-silver solder.
 - 7.4.1.2 Project Co shall provide isolation valves to isolate fixtures or groups of fixtures from the main and sub-main distribution piping. Butterfly valves are not permitted.
 - 7.4.1.3 Acceptable valves shall be rated for 860 kPa WSP or 1380 kPa non-shock WOG with bronze body.
 - 7.4.1.4 Acceptable drain valves and blow off valves shall be rated for 4,137 kPa WG 19mm ball valves with bronze body.
 - 7.4.1.5 Acceptable hose-bibbs shall be rated for 1,380 kPa non-freeze bronze body and 19 mm garden hose thread.
 - 7.4.1.6 Domestic hot and cold water demand shall be calculated in accordance with ASPE Plumbing Engineering Design Handbook. Supply sufficient hot and cold water to serve the needs of each space with isolation valves for each building located in a reasonably accessible location.

- 7.4.1.7 Project Co's design for branch piping from a fixture to a recirculation main shall not exceed 8.0 m.
 - 7.4.1.8 Project Co shall design all water lines to be insulated to maintain water temperature, minimize heat loss and to prevent condensation on the piping.
 - 7.4.1.9 Project Co shall design for providing a connection for the irrigation system where required to irrigate planting and landscape as indicated in the Schedule 3, Part 11 [Design Criteria – Site Development and Landscaping].
 - 7.4.1.10 Provide a central domestic hot water system for the public school, the Catholic school and the Child Care Centre within the mechanical room of sufficient size to supply the hot water demand for the designated space.
 - 7.4.1.11 Domestic hot water shall be of adequate temperature to serve the needs of the School at not less than 60°C. Provide mixing valves where temperatures are required to be less than 60°C at point of use.
 - 7.4.1.12 Design domestic hot water systems with sufficient capacity and recovery rate.
 - 7.4.1.13 Design domestic water systems to prevent growth and spread of legionella bacteria within the tanks, piping, fixtures, or any other component. Acceptable design methods include eliminating dead-leg piping and minimizing uncirculated piping by connecting the circulation system as close as possible to fixtures.
- 7.4.2 Performance Criteria:
- 7.4.2.1 Provide separate distribution systems for the public school, the Catholic school and for the Child Care Centre.
 - 7.4.2.2 Recirculate domestic hot water from the distribution system(s) back to the generating equipment.
 - 7.4.2.3 Monitor hot water supply temperatures via the BMS system and provide alarm outputs when the temperature exceeds the design setpoint.
 - 7.4.2.4 Project Co shall design key-operated non-freeze hose bibs installed at 30 m intervals along School exterior.

7.5 Plumbing Fixtures:

- 7.5.1 Basic Requirements:
 - 7.5.1.1 Project Co shall design the plumbing fixtures for barrier-free use where applicable.

- 7.5.1.2 Project Co shall include without limitation floor mounted dual flow toilets (4.2 lpf / 6.0 lpf) with standard bowls, in student and staff washrooms with hard wired infrared activated flush valves. In Prekindergarten and kindergarten washrooms toilets shall be flush tank type, maximum of 280 mm high. Personal care washrooms shall have manual flush valves. Barrier free water closets shall have a time delay on the flush valve. Refer to Schedule 3, Part 13 [School Board Design Variances] for additional information.
- 7.5.1.3 Urinals shall be wall hung ultra-low flow urinal (0.5 lpf) with hard wired infrared activated flush valve.
- 7.5.1.4 Lavatories in washrooms shall be stainless steel with hard wired infrared activated brass. . Lavatories in rooms up to grade 3 shall be at a lower height for ease of access. Refer to Schedule 3, Part 13 [School Board Design Variances] for additional information.
- 7.5.1.5 Project Co shall provide all required fixtures in the Child Care Centre as per the Government of Saskatchewan, Ministry of Education document “Daycare Centre Construction and Design Requirements and Considerations”, dated January 2014.
- 7.5.1.6 Project Co shall design drinking fountains as refrigerated with bottle filler at or near the gymnasium. All other locations shall be non-refrigerated type with bottle fillers. All drinking fountains shall be dual height.
- 7.5.1.7 Project Co shall include without limitation handicap fixtures and brass on all water closets, urinals and lavatories designated as handicap and meet the National Building Code.
- 7.5.1.8 Project Co’s sink outlet designs shall include without limitation laminar flow outlets.
- 7.5.1.9 All sinks in learning common spaces, music rooms, classrooms, servery and kitchens shall be stainless steel (single or double). Classrooms and common spaces shall have single lever gooseneck, mixing valve and bottle fillers. Servery and kitchen sinks shall have dual handles, with extra long faucet. Sinks for music rooms shall have gooseneck, single lever with pull out faucet. Sinks for specialty areas such as music rooms shall be sized to accommodate musical instruments. Refer to Appendix 3B [Functional Program Room Data Sheets] for additional information.
- 7.5.1.10 Project Co shall provide pre-cast floor mounted janitor sinks with 4 hook mop hanger, pail hook, wall mounted faucet and stainless steel wall protection around the sink. Refer to Appendix 3B [Functional Program Room Data Sheets] for additional information.

- 7.5.1.11 Pressure assisted low flow toilets (3.8 lpf) may be used in staff area washrooms only.
- 7.5.1.12 Showers shall be suitable for handicap use. Each shower shall have pressure and temperature sensing mixing valves. Showers head shall be sized for 5.7 L/min (1.5 gpm) flow.
- 7.5.1.13 Plumbing fixtures shall be products that shall prevent undue harm or damage to the building and/or occupants.
- 7.5.2 Performance Criteria:
 - 7.5.2.1 Provide isolation valves for all individual rooms for all plumbing services. Clearly identify all valves.
 - 7.5.2.2 Provide accessible clean-outs for all sinks and lavatories (and future sinks and lavatories) above the flood-level rim of the sink.
 - 7.5.2.3 Select toilets with special attention to reducing spread of infection. Size flush tanks suitably for the water consumption of the bowl. Toilet bowls shall not splash or spray water onto the toilet rim or anywhere outside of the toilet bowl and shall be designed to minimize the aerosolization of the toilet contents.
 - 7.5.2.4 Hardwire all electronic sensor-activated fixtures.
 - 7.5.2.5 Provide pressure reducing valves in accessible locations if system pressure exceeds acceptable delivery pressure.

7.6 Heating, Ventilating and Air Conditioning

- 7.6.1 Heating Basic Requirements
 - 7.6.1.1 Provide a central heating plant located in the mechanical room to service the entire School. Project Co shall design the heating system so that when one boiler is out of service the remaining boiler or boilers shall be of sufficient capacity to offset building heat loss excluding heat for ventilation. Size equipment such that the requirement for a fifth class chief engineer is not needed for the operation of the boiler plant.
 - 7.6.1.2 Supply sufficient space heating capacity to meet the required indoor design temperatures while using the January 1% outside design temperature outlined in the National Building Code of Canada 2010.
 - 7.6.1.3 Size the heating equipment to meet the maximum simultaneous demand for all systems served by the heating plant. Heating equipment must be capable of controlling and responding to periods of low usage.

- 7.6.1.4 Preference shall be given to the design of the heating media distribution system with a two-pipe reverse return system. Provide for duty/standby pumping for all pumps within the heating system.
- 7.6.1.5 Heating shall be designed to provide independent piping loops to each of the public school, the Catholic school and the Child Care Centre. Each loop shall have enthalpy meters installed in order to derive an energy use breakdown of utility consumption data in accordance with Appendix 2C. Each loop shall be complete with duty/standby variable speed pumps. Community Resource/Child Care Centre Area systems shall be separate from the public and Catholic school systems.
- 7.6.2 Heating Performance Criteria
- 7.6.2.1 Project Co shall design the hot water heating plant using boilers with stainless steel heat exchangers and of the highest efficiency.
- 7.6.2.2 The system shall provide high temperature glycol to the air handling unit coils if the ventilation system is using hydronic heating
- 7.6.2.3 All areas, with the exception of the mechanical rooms, electrical rooms, janitor rooms, gymnasium and entrances, shall utilize in-slab heating loops. These areas shall utilize heating terminal units that have high tolerance to damage and abuse. Perimeter radiation shall be mounted at high level.
- 7.6.2.4 Locate zone manifolds for in-slab heating in locations that are not accessible to students or staff and in locked cabinets. Zone manifolds shall not be located within the ceiling space.
- 7.6.2.5 Each Classroom shall have an individual control zone for heating and cooling with thermostat. Exterior office spaces of similar size and exposure may be combined into one control zone but shall be separate from interior offices. Interior offices and spaces of similar size and use may be combined into one control zone.
- 7.6.2.6 Ensure that thermostats are located such that they shall provide the best control for the area they are serving.
- 7.6.2.7 Project Co shall design the boilers with standalone controls and BMS interface for boiler reset, alarms and status.
- 7.6.2.8 Project Co shall include without limitation provide heating piping distribution materials that are Schedule 40 black iron or Type L copper.
- 7.6.2.9 Provide valves using Good Industry Practice.

- 7.6.2.10 Project Co shall include without limitation a drain valve with cap and chain on all system low points.
- 7.6.2.11 Include without limitation ball valves for isolation and globe valves for balancing.
- 7.6.2.12 Project Co shall provide terminal heat transfer units on the basis of the maintainability, controllability and life cycle costs .
- 7.6.2.13 Each terminal heat transfer unit shall be thermostat controlled to provide individual room control.
- 7.6.2.14 Project Co shall provide glycol heat exchanger with related piping and circulation pumps for, as a minimum, air system preheat and/or reheat coils.
- 7.6.2.15 Provide adequate expansion compensation for heating piping throughout the system. Location of anchors and guides, design of expansion compensation loops and selection of expansion compensation devices shall be based upon a thorough review of piping layout and piping stress analysis.
- 7.6.2.16 Equip all high points in piping with air removal devices such as air collection chambers and air vents.
- 7.6.2.17 Install equipment and piping with adequate service space, access panels and the ability to remove equipment from the building for servicing or replacement.
- 7.6.2.18 Provide isolation valves, unions and bypass piping to allow for equipment isolation and removal without unduly affecting the system operation or major drain down.
- 7.6.2.19 Provide balancing valves, flow-measuring devices, temperature and pressure sensors throughout the system to facilitate system balancing.
- 7.6.2.20 Select pumps to operate at the system fluid temperature without vapour binding and cavitation, be non-overloading in parallel or individual operation, and operate within 25% of the mid-point of published maximum efficiency curve.
- 7.6.2.21 Grooved mechanical joints as manufactured by Victaulic are permitted for heating piping that are over 65 mm in diameter and located anywhere in the School.
- 7.6.2.22 Valves shall be cast iron for 65 mm and larger and bronze for 50 mm and smaller.

- 7.6.2.23 Pump construction and installation shall permit complete pump servicing without breaking piping or motor connections.
- 7.6.2.24 Locate services that require regular maintenance access above non-critical spaces such that there is minimal to no disruption to the students or services.
- 7.6.2.25 Insulate all heating water piping, equipment and accessories.
- 7.6.3 Air Conditioning Design Principles:
 - 7.6.3.1 Cooling loads shall be based on School occupancy 365 days per year.
 - 7.6.3.2 Evaporative cooling shall not be used.
 - 7.6.3.3 Essential cooling systems are to be provided in high heat areas such as the data server rooms. The maximum space temperature for server rooms shall be 24°C.
 - 7.6.3.4 Supply cooling temperatures indicated while using the July 2.5% outside design temperature outlined in the National Building Code of Canada 2010.
- 7.6.4 Air Conditioning Performance Criteria
 - 7.6.4.1 Chilled water cooling is preferred for all systems over 100 KW of refrigeration.
 - 7.6.4.2 Ensure no air within the air conditioning system, outside of the central air handling equipment, drops below its dew point temperature.
 - 7.6.4.3 Ensure that all equipment that uses chilled water is maintained at or above room air dew point to prevent condensation.
 - 7.6.4.3(1) If chilled beams are proposed, Project Co shall demonstrate to the authority similar applications where chilled beams have been installed. Similar applications shall have operable windows that may be opened at the occupants discretion.
 - 7.6.4.3(2) Project Co shall also demonstrate that the chilled beams will handle high perimeter heat loads and that the spacing shall be adequate to avoid jet collisions of opposing airstreams.
 - 7.6.4.3(3) Project Co shall also demonstrate that the ventilation air requirements can be met when chilled beams are utilizing CO2 sensors to control outside air flow.

- 7.6.4.4 If a chiller is used then there shall be one loop for each of the public school, the Catholic school and the Child Care Centre. Each loop shall have duty/standby pumps and enthalpy meters in order to derive an energy use breakdown of utility consumption data in accordance with Appendix 2C.
- 7.6.4.5 If air cooled condensers are used in lieu of a chiller, then a separate condensing unit shall be used in place of each chilled water loop. Condensing units shall use multiple compressors for staging. Variable speed air cooled condensing units may be used as an option.
- 7.6.4.6 CFC and HCFC based refrigerants shall not be used in the refrigeration equipment.
- 7.6.4.7 Locate chillers and/or condensing units to ensure minimum disturbance to students for visual and/or sound.
- 7.6.4.8 Install chilled water and /or refrigeration piping in an orderly manner. Insulate piping all cooling piping and refrigeration piping.
- 7.6.4.9 Install equipment and piping with adequate service space, access panels and the ability to remove equipment from the building for servicing or replacement.
- 7.6.5 Ventilation Design Principles:
 - 7.6.5.1 Zone air systems in accordance with space function and occupied hours. Provide an independent air handling unit/system for each gymnasium. Provide independent air handling unit/system for each of the public school , the Catholic school and the Child Care Centre.
 - 7.6.5.2 Air handling units shall consist of but not be limited to a supply fan, return fan, heat recovery device, preheat coil, reheat coil, cooling coil, MERV 8 summer/winter pre-filters on the supply air tunnel, MERV 13 final filters on the supply air tunnel, MERV 8 filters on the exhaust tunnel, variable frequency drives on the supply and return motors and motorized fresh, return and exhaust dampers. Gas fired heat exchangers may be used in lieu of reheat coil.
 - 7.6.5.3 Room terminal units shall supply recirculated air to the space while mixing with the outside air being supplied from the main air handling units. CO2 sensors shall control the amount of outside air being supplied to each terminal unit. Room terminal units shall be controlled in conjunction with the in-slab heating through the room thermostat.
 - 7.6.5.4 Each gymnasium air handling unit shall consist of supply fan, return fan, variable speed drives, heating coils, cooling coils, pre-filter MERV 8, final

- filter MERV 13, mixing/economizers sections. Each unit shall have demand controlled ventilation and the use of CO2 override for high occupancy situations to adjust airflow as required
- 7.6.5.5 If required, total air change rates may be increased in order to meet the temperature requirements for the air conditioning system.
- 7.6.5.6 Provide factory fabricated air handling equipment to ensure the highest construction standard. No Site built-up units shall be allowed. Units shall be of the highest quality with double wall construction, minimum 18 gauge galvanized steel and structural steel base frames. Units shall have hinged access doors for fans, filters, coils, dampers and electrical components. All units shall be factory painted.
- 7.6.5.7 Project Co's air system design shall consist of fresh air and exhaust air roof/wall outlets, ductwork and air outlet distribution.
- 7.6.5.8 Exhaust air shall be provided from areas of high humidity and where required by the National Building Code of Canada 2010 and Authority having jurisdiction.
- 7.6.5.9 Project Co shall allow for range hood exhaust and a separate make-up unit for servery areas in the Schools and the Child Care Centre.
- 7.6.6 Ventilation Performance Criteria
- 7.6.6.1 The School design shall incorporate a strategy to install and remove major Building Equipment such as fans, etc.
- 7.6.6.2 Air handling units shall be located inside the Schools, within designated mechanical rooms. Project Co shall not use mechanical rooms as air plenums.
- 7.6.6.3 Provisions shall be made to provide reduced outdoor air volumes for normal usage versus peak occupant usage utilizing variable frequency drives and CO2 sensors.
- 7.6.6.4 Roof mounted air handling units are permitted provided they are equipped with heated vestibules. The heated vestibules must meet the following criteria:
- 7.6.6.4(1) be high enough for a service person to stand in,
- 7.6.6.4(2) the width of the corridor must be as wide as the air handling unit, or as recommended by the equipment manufacturer to allow for full unit servicing,

- 7.6.6.4(3) be wide enough for the heating coils to be removed,
 - 7.6.6.4(4) be accessed directly from inside the building via stairs from the Second Floor,
 - 7.6.6.4(5) must meet all applicable code, standard and safety regulations including Good Industry Practice, and
 - 7.6.6.4(6) the roof mounted air handling units will be screened using the same cladding profile and colour as the rest of the building to minimize their appearance.
- 7.6.6.5 Locate fresh air intakes so that intakes do not entrain contaminants from outdoor sources. Locate all intakes in areas not accessible by the public.
- 7.6.6.6 All supply, return, and exhaust air shall be fully ducted to the space being served. Ductwork for return air may not be required in ceiling spaces of classroom types G1.1 and G1.2 .
- 7.6.6.7 Ductwork internal to the building within conditioned spaces shall have 25 mm thick rigid glass fibre duct insulation with vapour barrier. All outside air and mixed air ductwork shall be insulated with minimum 25 mm thick rigid glass fibre duct insulation. All exhaust and relief air ductwork shall be insulated, including plenums or casings, from 1500 mm upstream of shut-off dampers to connection to the exterior wall or roof.
- 7.6.6.8 Reduced outdoor air volumes shall only be applied once the economizer is not required for space temperature control.
- 7.6.6.9 Project Co shall design and zone air systems in accordance with function, occupied hours and air quality requirements.
- 7.6.6.10 Project Co shall ensure that that good air distribution and occupant comfort are achieved through appropriate air outlet application, selection and location.
- 7.6.6.11 Project Co shall ensure provision of a return air fan when re-circulating air to the air system. Usage of a supply fan only is not acceptable.
- 7.6.7 Testing, Adjusting, Balancing (TAB) and 3rd Party Commissioning:
- 7.6.7.1 Without limiting Project Co's obligations under Schedule 2 [Design and Construction Protocols], Project Co shall:
 - 7.6.7.1(1) demonstrate to the Authority and the relevant School Board that the mechanical and electrical systems are substantially

operational by testing, adjusting, balancing and commissioning the systems; and

- 7.6.7.1(2) retain complete records of all TAB and commissioning data and provide the Authority with a copy of the final documents for review.

7.7 Building Management System

- 7.7.1 Provide a Building Management System (BMS) that shall perform the following functions:
- 7.7.1.1 automatically operate, monitor and manage the building mechanical systems to provide a high level of occupant comfort and maintain a healthy and productive environment without disruption to the students and staff;
 - 7.7.1.2 display building related alarms at the management control centre;
 - 7.7.1.3 provide a form of external monitoring including all associated hardware and software;
 - 7.7.1.4 meter and trend data related to flow of electrical power, natural gas and domestic water to the School as outlined in Schedule 2 [Design and Construction Protocols], to monitor energy performance;
 - 7.7.1.5 controlling primary energy consuming equipment;
 - 7.7.1.6 develop optimum start and stop time for equipment and systems that shall not operate 24 hours a day;
 - 7.7.1.7 resetting air and heating water supply temperatures using feedback from occupied space demand;
 - 7.7.1.8 using air system to preheat, precool or purge to achieve the objective space temperature at the start of occupancy;
 - 7.7.1.9 control of zone temperature utilizing user adjustable DDC thermostats in each room; and
 - 7.7.1.10 interface with the building electrical and communication systems including fire alarm, lighting, car plugs and exterior lighting for monitoring and alarming.
- 7.7.2 The BMS system shall:
- 7.7.2.1 be non-proprietary and designed with open protocol;

- 7.7.2.2 optimize the system performance under all operating conditions to minimize the School energy usage;
 - 7.7.2.3 configuration shall accommodate future technological changes;
 - 7.7.2.4 architecture shall permit expansion;
 - 7.7.2.5 controls system are designed to allow monitoring and operation of the entire building from a single location or remote Internet connection;
 - 7.7.2.6 is completely integrated (front-end and back-end) with Native BacNET DDC system;
 - 7.7.2.7 is an independent system separate from the building fire alarm and other control systems;
 - 7.7.2.8 is capable of expanding in scope and size with future School renovations; and
 - 7.7.2.9 is comprised of complete package from one manufacturer, not a composite system from several manufacturers.
- 7.7.3 Performance Criteria
- 7.7.3.1 Zoning for HVAC systems shall be based on occupancy, room location within the building, room orientation and thermostatic room loads. Provide for individually zoned heating and proportionally modulated temperature control for each classroom and offices.
 - 7.7.3.2 Hardwire fail-safe components to provide reliable operation in all circumstances.
 - 7.7.3.3 The BMS shall meter and trend all data related to the flow of services into and out of the Buildings including domestic water, natural gas and electricity.
 - 7.7.3.4 The BMS shall monitor, control, indicate alarms and provide trending where applicable for all connected sensors and control points.
 - 7.7.3.5 The BMS shall provide an alarm signal to Project Co's help desk.
 - 7.7.3.6 The BMS shall monitor critical alarms for essential building and life safety systems. These alarms shall notify the Authority and the relevant School Board as well as the School's master control centre. These critical alarms include:
 - 7.7.3.6(1) fire alarm system for alarm, supervisory and trouble;
 - 7.7.3.6(2) all temperature alarms resulting from set point deviations; and

- 7.7.3.6(3) all alarms relating to the fire protection system.
- 7.7.3.6(4) high water alarm on main rain water leader
- 7.7.3.7 The BMS system shall control all public area lighting such as parking lots, walkways, exterior signage, and corridor and lobby lights located in areas not occupied 24 hours per day. Exterior lighting shall include an input for photocell over-ride.
- 7.7.3.8 The BMS documentation shall include a detailed narrative description of the sequence of operation of each system.
- 7.7.3.9 User interface shall be graphical in nature with animated graphics to indicate equipment operation. Graphics shall be grouped in systems and in departments.

PART 8. DESIGN CRITERIA – ELECTRICAL**8.1 Electrical - General**

- 8.1.1 Provide all electrical systems and equipment required for the function of each identified system and configure the respective system and equipment with due regard for the details of each of the systems. Coordinate all electrical and systems interfaces with all other divisions that shall provide devices identified in this Schedule.
- 8.1.2 Design the installation to occupy available space economically, leaving space for future additions, and to facilitate easy access to other systems and equipment, including without limitation mechanical equipment, Building Systems access ways and architectural building components which may require periodic inspection or maintenance.
- 8.1.3 Design and construct the protection, grounding and/or isolation, insulation and control of all circuits and systems to address the functional requirements of the locations in which they are installed.
- 8.1.4 All systems components including without limitation hardware, cabling, devices, software and installation requirements shall match the specific requirements listed by the respective public school and Catholic school described in Appendix 3E [Specific IT Equipment Requirements]. Where specific component model numbers are superseded, Project Co shall provide the most current product that meets or exceeds the performance criteria of the equipment listed.

8.2 Wiring Methods and Materials

- 8.2.1 Basic Requirements
 - 8.2.1.1 Wiring methods and materials shall result in safe reliable and flexible electrical power, control, communication, data and life safety systems in the School.
 - 8.2.1.2 All wiring and cables shall be neatly run and properly supported in such a way that it is protected from damage and is not in conflict with mechanical or architectural components of the School.
 - 8.2.1.3 Apply common industry wiring methods for installation in the construction techniques used where inaccessible drywall ceilings and partitions are provided.
 - 8.2.1.4 Conceal wiring and wiring support systems from public view.
 - 8.2.1.5 Protect all wiring from mechanical damage throughout each wiring system. Prevent entry or accumulation of moisture into any wire, cable or wire way.

8.2.2 Performance Criteria

- 8.2.2.1 Identify all pull boxes, junction boxes and conduits with purpose-manufactured durable and clearly legible marking to identify the function and voltage of the system.
- 8.2.2.2 Feeders for electrical equipment shall be run in EMT. Teck90 armoured cable may be run only where building construction does not allow access for installation of junction boxes and pull boxes.
- 8.2.2.3 All goods and materials for the School shall be new and carry a CSA approval seal. Equipment and materials shall be CSA certified. Where there is no alternative to supplying equipment that is not CSA certified, obtain special approval from the Authority and the SaskPower Electrical Inspections Department.
- 8.2.2.4 Prevent interference between wiring of power supply systems and wiring of data and communication systems by maintaining adequate separation and shielding throughout.
- 8.2.2.5 Consider ease of maintenance and continuous service to the operations such that maintenance and repair of the wiring systems do not cause or require major service disruptions in the School.
- 8.2.2.6 Clearly label all conductors and cables at both ends.
- 8.2.2.7 All wiring/raceways in finished areas shall be concealed, above finished ceilings, under floors, in walls and partitions. Conduits or raceways that are required to be exposed shall be neat and run parallel or perpendicular to the building lines, accurate in line and level. Conduits run within concrete or concealed below concrete poured floors are not acceptable unless there is no crawlspace or basement beneath.
- 8.2.2.8 Surface mounted raceways on the exterior of the building will not be acceptable.
- 8.2.2.9 All wiring run below grade shall not be installed beneath buildings, structures, and trees and shall have suitable clearances from other underground services.

8.3 Grounding and Bonding

- 8.3.1 Provide a suitable grounding system.
- 8.3.2 The grounding system shall have sufficiently low impedances to limit the voltage potential above ground and to assist in the proper operation of the overcurrent devices.
- 8.3.3 All conductors and all conducting components of electrical equipment which form part of the grounding and bonding systems in the School shall be of non-alloyed copper.
- 8.3.4 Bond all metallic raceways continuously with a bonding conductor installed within the raceway. Raceways shall not be used as a bond.

8.4 Raceways

- 8.4.1 Basic Requirements
 - 8.4.1.1 Provide raceways for wiring and cabling to support, protect and organize wiring and cabling systems throughout the School.
 - 8.4.1.2 Design and install raceways to provide ease of access and capacity for expansion and change that is consistent with the requirements of the equipment and systems that they serve.
 - 8.4.1.3 Plan raceways to facilitate easy access to other systems and equipment including without limitation mechanical equipment, Building Systems access ways and architectural building components which may require periodic inspection or maintenance.
- 8.4.2 Performance Criteria
 - 8.4.2.1 Design and install raceways without sharp edges or sharp bends so that cables can be pulled in or laid in and removed without damage to the cables. Observe manufacturer's maximum bend radii.
 - 8.4.2.2 Cable trays shall have space for installation of additional cables to accommodate future growth and expansion.
 - 8.4.2.3 Provide separate raceways for cables and conductors of different voltages or system types.
 - 8.4.2.4 Provide required tray size necessary to accommodate cables and spacing requirements.

8.5 Electrical System and Distribution

8.5.1 Basic Requirements

- 8.5.1.1 Provide electrical power of the voltage, current and phase(s) required, from the main sources of supply, to each load requiring supply of power and to convenience and special purpose outlets designed to meet all requirements for operation of the School.
- 8.5.1.2 Design the transmission and distribution equipment and system to be robust, reliable, easily operated and maintained and with extra capacity to accommodate load growth and equipment additions.
- 8.5.1.3 Provide distribution equipment of “specification grade” and “industrial” quality, not of a “light duty”, “commercial” or “residential” quality.
- 8.5.1.4 Group major electrical equipment, including without limitation, transformers, main distribution centres, motor control centres, together in a configuration that allows for addition or expansion of each type of equipment and is a logical arrangement in terms of the interconnection, operation and maintenance of the equipment.
- 8.5.1.5 The main service switch shall be complete with adjustable electronic trip unit for accommodating the requirements of the over-current coordination and arc flash study.
- 8.5.1.6 Locate major electrical equipment with the intention of minimizing run length of feeders and branch circuits, and so as to provide a clean, dry, safe, accessible installation protected from unauthorized access.
- 8.5.1.7 Locate electrical distribution, motor control equipment and panel boards in secure, lockable service rooms. Lockable, flush mounted branch circuit panels shall be permitted in corridors.
- 8.5.1.8 Select, configure, locate and install all components of transmission and distribution systems so as to minimize the transmission of noise, vibration or unwanted heat into other parts of the School.
- 8.5.1.9 For components of the transmission and distribution systems, including without limitation light switches, receptacles, wire ways, equipment grounding points, and status displays.
- 8.5.1.10 Provide components with both long life expectancy without perceptible deterioration and good in appearance; and
- 8.5.1.11 Select, design and install components so as to permit easy and complete cleaning.

- 8.5.1.12 The intent for the main service distribution is that there is a designated distribution to serve each of the public school, the Catholic school, and the Child Care Centre/Community Resource Centre space. The main services to the Catholic school and the public school and the Child Care Centre/Community Resource Centre shall be designed such that in the future if so desired, that each distribution could be modified such that each receives a separate meter from the power utility. As such, the main distributions for these will require the appropriate utility metering provisions, including separate means of disconnect.
- 8.5.1.13 The distribution serving Child Care Centre/Community Resource Centre spaces is to incorporate metering such that the Child Care Centre power use can be distinguishable from the common area power use.
- 8.5.2 Performance Criteria
- 8.5.2.1 Design and install protection and coordination of protection equipment so that the initial electrical installation and future additions and modifications to the installation shall be properly protected and fully coordinated, such that in the event of a fault or overload, protective devices shall act to isolate only the faulty portion of the system and areas downstream, leaving all other portions of the system fully operational. Protection equipment shall adequately protect against injury to persons and damage to property.
- 8.5.2.2 Where required by system characteristics or operational requirements, provide special shielding, isolation, grounding, bonding, harmonic filtration or other treatment to prevent interference between systems or degradation of performance of an individual system.
- 8.5.2.3 Provide required electrical connections for a fire pump including a separate Utility service.
- 8.5.2.4 Locate distribution centres with extra space within the distribution centres to accommodate future growth and expansion.
- 8.5.2.5 The main distribution and sub-distribution panelboards shall address arc-fault levels present within the system.
- 8.5.2.6 Over-current coordination, arc flash and fault level studies shall be provided and included within the Operations Manuals.
- 8.5.2.7 For components of the transmission and distribution systems to be located in in any public, administrative or staff area, including light switches, receptacles, wire ways, equipment grounding points, and status displays:

- 8.5.2.7(1) provide components that shall provide both long life expectancy without perceptible deterioration and good in appearance; and
- 8.5.2.7(2) select, design and install components so as to permit easy and complete cleaning.
- 8.5.2.8 Transformer losses shall not exceed CSA Standard C80232.-00 Maximum Losses for Distribution, Power and Dry-Type Transformers.
- 8.5.2.9 Transformers shall have an insulation class and low temperature rise to safely operate continuously at rated voltage and full current without causing damage to the transformer.
- 8.5.2.10 Transformers shall have enclosures suitable for the location in which they are installed. All enclosures shall be complete with removable metal side panels complete with adequate ventilation openings covered with expanded metal grill and wall mounting brackets where required.
- 8.5.2.11 Transformers shall be K rated to withstand and minimize the harmful effects of non-linear loads.
- 8.5.2.12 All transformers shall be provided with taps on the H.V. windings. Tap changes shall be accomplished without disturbing H.V. feeder conductor terminations.
- 8.5.2.13 Autotransformer or two coil 'T' connected transformers are not acceptable.
- 8.5.2.14 Install transformers in level upright position with adequate clearance around transformer for ventilation.
- 8.5.2.15 Transformers shall have vibration dampening spring isolators to minimize noise and vibration transmission.

8.6 Electrical Utilities

- 8.6.1 Basic Requirements
 - 8.6.1.1 Design and install the supply of electrical energy from the power utility to the School.
 - 8.6.1.2 The metering system shall provide easily read locally displayed information for all distribution centres.

8.6.2 Performance Criteria

- 8.6.2.1 Provide an underground service from the utility's pad mount transformer to the School's main distribution. Coordinate with SaskPower for an outdoor pad-mount transformer, located on the Site and located far enough away from the School to prevent access to the roof from the Transformer.
- 8.6.2.2 The location of the SaskPower pad-mount transformer and the routing of the incoming services to the School shall not interfere with any known future expansion of the School.
- 8.6.2.3 The minimum ampacity of the service and service conductors shall be sized to not limit any future growth or expansion.
- 8.6.2.4 The incoming service voltage shall be of a standard voltage provided by the utility.

8.7 Metering

8.7.1 Basic Requirements

- 8.7.1.1 Provide the utility meter socket and instrument transformer compartment for installation of the utility's meter and instrument transformer.

8.7.2 Performance Criteria

- 8.7.2.1 Supply digital pulse metering to provide detailed information about power quality and power consumption at key points at the main distribution and the distribution centres. The metering shall be networked to the BMS for access by the School.
- 8.7.2.2 Loads associated with School operations and the end users shall be easily distinguishable for the purposes of energy management. Such loads as lighting, mechanical loads, user plug loads are required to be separately monitored and loggable within the user software.
- 8.7.2.3 Store historical data from the metering system network. Ensure the metering system is capable of generating user configurable electronic and printed reports on demand.
- 8.7.2.4 The metering system shall not be dependent on power from the metered circuit for its operation and shall be supported by a backup power source or sources, which ensure operation when the metered circuit is de-energized.
- 8.7.2.5 The metering system shall, at a minimum, provide the following information about each metered circuit: Phase-to-Phase Voltage (all phases), Line-to-

Neutral Voltage (all phases), Phase Current (all phases and neutral), KW, KVA, Power Factor, KWH, VAR hours.

8.7.2.6 The meters shall be power quality type able to monitor harmonics, sags, swells, spikes, etc.

8.7.2.7 Circuit distribution to the breaker panels and distribution centres shall be arranged to segregate or “group” the lighting, mechanical, and user plug loads such that they are isolated to specific panels and distribution centres.

8.8 Power Quality

8.8.1 Basic Requirements

8.8.1.1 Provide an overall power quality which assures suitable conditions for operation of all electrical and electronic equipment throughout the School.

8.8.1.2 Provide suitable Surge protection for the entire electrical distribution system. Surge protective devices shall be component recognized in accordance with Good Industry Practice.

8.8.1.3 Provide equipment that addresses power quality issues such as harmonics created on site, power factor, etc and reasonably limits their negative impact using Good Industry Practice.

8.8.2 Performance Criteria

8.8.2.1 Provide equipment that is capable of operating in an environment where there is the potential for adverse power quality issues to exist. Critical equipment associated with systems such as but not limited to fire alarm, security, communications, data, and building controls, etc shall be protected from all adverse incoming utility power quality issues and shall continue to operate in the event that short term incoming utility power quality issues exist.

8.8.2.2 Provide equipment and systems capable of demonstrating to the School at any time that there are no potentially harmful power conditions present and that equipment intended to guard against such conditions is in proper working order.

8.8.2.3 Provide equipment and systems which ensure that the variety of electrical equipment and systems in use in the School shall not be harmed or impaired either by external events or conditions, including without limitation, lightning or disturbances to the Utility service, or by internal events or conditions generated within the School.

- 8.8.2.4 Use methods and provide equipment consistent with industry standards by installing a built-in power quality meter at the incoming service.
- 8.8.2.5 Breaker panels are not to be installed where they limit the ability of an educator to mount and display material associated with their students or educational matters. Breaker panels are not to be mounted behind doors.

8.9 Mechanical Equipment Connections

8.9.1 Basic Requirements

- 8.9.1.1 Provide electrical power control and monitoring connections to all mechanical equipment as required for proper operation, protection and maintenance of the equipment. Materials and installation methods shall result in safe, reliable and serviceable mechanical equipment and systems in the School.
- 8.9.1.2 Provide all wiring and devices including without limitation branch circuit, controller and motor disconnect switches, variable frequency drives, full voltage motor controllers, overcurrent protection, controllers, and overload and overheating protection resulting in fully operational and serviceable systems. Project Co shall fully coordinate the requirements of all mechanical equipment for all necessary equipment.

8.9.2 Performance Criteria

- 8.9.2.1 Cables, connectors, conduit systems, fittings and hardware used to make connection to mechanical equipment shall be of institutional or industrial quality. Project Co shall select and install such equipment to provide high levels of reliability, durability and ease of maintenance of the equipment.
- 8.9.2.2 Design and install connections to mechanical equipment to easily permit removal and replacement of the equipment and provide for the eventuality that equipment shall be replaced in the future with upgraded and dissimilar equipment types.
- 8.9.2.3 Provide connections to motors and/or motor driven equipment or equipment with noticeable levels of vibration of a type specifically designed to accommodate the vibration.
- 8.9.2.4 Provide a means of disconnecting each motor branch circuit, motor starter or controller and motor.

- 8.9.2.5 Size motor control centres, main feeders to motor control centres and mechanical distribution centres to accommodate the current mechanical equipment plus additional spare capacity to accommodate future expansion and growth.
- 8.9.2.6 Project Co shall provide required GFI connections from appropriately located breaker panels for Rain Water Leader Heat Trace cables.
- 8.9.2.7 Project Co shall provide for all other miscellaneous electrically required power feed and Data connections for mechanical equipment beyond motor control such as heat trace, control panels, fire safety equipment, etc.
- 8.9.2.8 All disconnects and motor controllers shall have voltage, horsepower, and current ratings suitable for the equipment being connected.
- 8.9.2.9 Suitable line and load protection shall be provided for all variable frequency drive installations for protection of loads and for mitigation of harmonics. The required type, technology, and layout shall be designed by Project Co.
- 8.9.2.10 All variable frequency drives shall contain a local display provided by drive manufacturer and associated with that unit.

8.10 Lighting System

8.10.1 Basic Requirements

- 8.10.1.1 Project Co shall design a complete lighting system to meet, the latest Illuminating Engineering Society of North America (“IESNA”) recommended practices for school lighting (See IESNA RP3 – Guide for Educational Facilities Lighting).
- 8.10.1.2 Design lighting to optimize use of daylight by means of a combination of natural light, luminaires and controls.
- 8.10.1.3 Exterior and interior lighting shall create a safe and secure environment for students, visitors and staff.
- 8.10.1.4 School lighting shall use low glare optics.
- 8.10.1.5 Select lighting source types that are LED or low mercury content fluorescent light sources. Incandescent, metal halide, and low pressure sodium lamp sources are not acceptable.
- 8.10.1.6 Selection of luminaires and light sources shall meet the stated energy efficiency and quality and quantity requirements, but shall also meet the

objective of providing adequate lighting for students, staff and visitors so that they can carry out their activities in comfort and safety.

8.10.1.7 Select type of lighting fixtures and their locations based on the activities/tasks of specific areas.

8.10.2 Performance Criteria

8.10.2.1 Ballasts for light fixtures controlled by motion sensors shall be suitably selected to optimize lamp life during frequent switching cycles.

8.10.2.2 Illuminate all information and display boards with suitable wall washing luminaires.

8.10.2.3 Classroom and other instructional spaces shall be capable of dimming down to 1% of the initial light output.

8.10.2.4 Provide lighting levels throughout the School that are appropriate to the purpose and the use of the space and adequate to ensure the safety of students and staff while reflecting an educational environment.

8.10.2.5 Provide proper illumination of whiteboards in classrooms and instructional spaces.

8.11 Interior Lighting and Control

8.11.1 Basic Requirements

8.11.1.1 Provide a low voltage light control system within each of the public School and Catholic school consisting of local control and interface capability with the BMS to provide scheduled or automatic control of the lighting in selected areas within the Schools or where multiple lighting branch circuits are required to be controlled simultaneously.

8.11.2 Performance Criteria

8.11.2.1 Incorporate motion sensing control devices for the operation of light fixtures in all areas throughout the School except mechanical rooms, electrical rooms, water rooms and other service spaces. Motion sensor operation shall be selectable to be manual ON/auto OFF or auto ON/auto OFF.

8.11.2.2 Ultrasonic motion sensors are not acceptable. Sensors shall have selectable time delays and sensitivity settings which shall be adjusted to suite the location or area the devices are installed.

8.11.2.3 Provide motion sensors with a suitable range of detection to provide complete coverage.

- 8.11.2.4 Where a motion sensor is used, manual over-ride switch is required except in washrooms, change rooms, corridors and stairs.
- 8.11.2.5 Incorporate daylight sensors into the lighting control that are suitable for the location and function of the space. Daylight sensors shall provide continuous dimming in instructional and learning spaces.
- 8.11.2.6 Lighting control in instruction and learning spaces shall consist of manual and automatic control of the luminaires to provide control schemes and multiple light levels suitable for the use and activities of the space.
- 8.11.2.7 Manual switches in instruction and learning spaces shall be provided in locations that are suitable for the use and activities of the space and convenient for the teacher or instructor.
- 8.11.2.8 Provide individual manual control of the whiteboard illumination in instruction and learning spaces.
- 8.11.2.9 Lighting in multipurpose performance areas shall be controlled by lighting control systems based on multiple zones to create scene control that shall suit various activities in the spaces. The lighting in these spaces shall be dimmable and controlled by master scene controller. The architectural lighting control system shall incorporate energy saving strategies including occupancy or vacancy sensing, daylight harvesting and personal dimming control.
- 8.11.2.10 LED light fixtures shall be used throughout the instructional areas. These fixtures can be easily controlled to allow students and teachers to adjust the lighting levels for different activities.

8.12 Exit and Emergency Lighting System

8.12.1 Basic Requirements

- 8.12.1.1 Select equipment suitable for the location..
- 8.12.1.2 Exit light fixtures shall be universal green 'Running Man Pictogram'.

8.12.2 Performance Criteria

- 8.12.2.1 Emergency lighting power supplies shall provide uninterrupted power to emergency lighting illuminating the building egress paths. The system shall be capable of maintaining the connected load for a minimum of 30 minutes during a power failure.
- 8.12.2.2 Emergency lighting shall be selected and installed that complement the architectural considerations of the space.

8.12.2.3 Exit light fixtures shall be connected to a suitable backup power system.

8.13 Exterior Lighting System

8.13.1 Basic Requirements

8.13.1.1 Project Co shall design a complete exterior building lighting system including without limitation on-building and pole mounted luminaires. The lighting system shall be designed to meet, the latest Illuminating Engineering Society of North America (“IESNA”) recommended practices for security lighting (See IESNA G-1-03 – Guideline for Security Lighting for People, Property, and Public Spaces).

8.13.1.2 The exterior building lighting system shall be designed to operate by a low voltage light control system via photo-electric cell and clock operation.

8.13.1.3 Lighting fixtures selected shall have sharp cut-off photometrics and shall be “dark sky” complaint.

8.13.1.4 Provide security lighting to illuminate alcoves and concealed areas.

8.13.1.5 Lighting shall be provided at each parking lot including the driveways, each pathway from the respective public school and Catholic school parking lots and each pathway from the bus drop-off or street to the primary entrances of the public school, Catholic school and Child Care Centre.

8.13.2 Performance Criteria

8.13.2.1 Exterior lighting fixtures shall have a minimum starting temperature suitable for their installed environment.

8.13.2.2 Fixture control design shall be via both photocell and time clock scheduling. Low use entrances and adjacent walkways are to be suitably illuminated and incorporate daylight control.

8.13.2.3 Lighting zones shall be adjustable and adjusted when required to suit the needs of the School.

8.13.2.4 Illuminated signage shall be incorporated into a separate lighting zone.

8.13.2.5 All exterior lighting zones shall be adjustable through programming to be controlled by photocell and/or time clock.

8.14 Branch Wiring / Devices

8.14.1 Basic Requirements

- 8.14.1.1 Project Co shall design a complete system of wiring devices in accordance with Appendix 3B [Functional Program Room Data Sheets].
- 8.14.1.2 Project Co shall design receptacles for electronic whiteboards and data workstations with surge protection facilities.
- 8.14.1.3 Project Co shall design a complete branch circuit power distribution system throughout the School.
- 8.14.1.4 Provide dedicated circuits for equipment as required.

8.14.2 Performance Criteria

- 8.14.2.1 Provide required grounding receptacles at each location where electrical equipment requiring a supply of power shall be plug connected.
- 8.14.2.2 Wiring devices (switches and receptacles) throughout the School shall be Decorator style. All device wall plates shall be stainless steel. Grouped devices shall have a single coverplate covering the whole group. All wiring devices shall be at a minimum Specification grade.
- 8.14.2.3 In areas where charging of electrical devices is required, receptacles with integral USB charging outlets shall be provided.
- 8.14.2.4 All receptacle coverplates shall be suitably labeled. Label shall identify the branch circuit designation and circuit number from which the device is connected.
- 8.14.2.5 Provide recessed multi-service floor boxes in all common areas, resource centres, libraries, and gymnasias. Where utilizing floor boxes, Project Co shall use flush mounted, ULC scrub water approved, multi-service units with receptacles, voice/data outlets and A/V inputs required for the activities of the specific areas.
- 8.14.2.6 Receptacles within instructional areas or rooms shall be evenly spaced on the perimeter walls in sufficient quantities to facilitate the use of the receptacles by the students and staff without the need of extension cords.
- 8.14.2.7 Provide exterior wall mounted receptacles on the exterior of the School as well as in close proximity to all outdoor learning areas.

- 8.14.2.8 All receptacles within Child Care Centre, pre-kindergarten, kindergarten and play/parent areas and all adjacent rooms or areas where children may be during normal School / Child Care Centre use shall be tamper resistant.
- 8.14.2.9 Provide receptacles and power outlet boxes within areas including without limitation, serveries, kitchens, staff rooms, and learning areas to facilitate the use of electrical appliances. Provide necessary receptacles at all millwork counters and island millwork counters.
- 8.14.2.10 Provide receptacles throughout the Schools and Child Care Centre that are designated for portable janitorial equipment.
- 8.14.2.11 Provide an overhead electrical distribution system consisting of ceiling mounted receptacles within the DaVinci Studios to facilitate the use of cord reels and other similar ceiling mounted devices provided by the Authority.
- 8.14.2.12 Receptacles within Sensory Rooms shall be provided with the ability to individually energize/de-energize the receptacles with a handheld controller. Receptacles shall be floor, wall, or ceiling mounted to suit the individual requirements of the equipment being installed. Sensory Room equipment shall be provided by the Authority.
- 8.14.2.13 Provide receptacles including without limitation at all teacher workstations, workrooms, meeting rooms, reception areas and office areas.

8.15 Communications

8.15.1 Basic Requirements

- 8.15.1.1 Employ the latest technology and systems available at the start of Construction for use within these systems.
- 8.15.1.2 Provide conduits and cable including without limitation, underground service conduits and cables, termination backboards, interior conduits and cables, and cable distribution trays to accommodate a communications system including without limitation public address/class call system, telephone system, network system and cable / satellite television and to comply with all the requirements for each public school and Catholic school as set out in Schedule 3, Part 13 [School Board Design Variances] and Appendix 3B [Functional Program Room Data Sheets].
- 8.15.1.3 The cabling systems shall use matched components from a single manufacturer certified to deliver system performance over the lifetime of the applications which the cabling system was originally designed to support.

8.15.1.3(1)

- 8.15.1.4 Select communications systems that are cost effective, provide efficiencies for staff and students, perform the necessary tasks, adaptable to change, flexible in implementation, expandable to accommodate growth, and compatible with the existing systems within each School Board.
- 8.15.1.5 The cabling infrastructure shall not differentiate on the type of end-use device that connects to it. The cabling infrastructure shall be universal and allow all currently available forms of end-use devices access to the different system types.
- 8.15.1.6 The cabling infrastructure shall be to the latest TIA / EIA solution.
- 8.15.1.7 Locate IT/Communication rooms on each floor of each public school and Catholic school, such that they shall maximize the area they serve. Provide additional IT rooms as necessary to suit cable length limitations (100 m maximum) and the school layout including the projected maximum Relocatable classrooms. A separate, independent IT/communication room shall be provided for the Child Care Centre. IT/Communication rooms shall be designed for the sole purpose of housing communications equipment.
- 8.15.1.8 Provide a structured cabling component from a single manufacturer that is a recognized industry leader.
- 8.15.1.9 Implement a cable management labeling software and electronic drawing system to track and manage the cable plant.
- 8.15.1.10 All network hardware components including without limitation network switches, routers, wireless access point devices shall be provided by Project Co.
- 8.15.1.11 Locate a main Telco room within the building for the demarcation of the main incoming telephone and fibre optic communications services. All incoming services shall be extended into each of the School's and Child Care Centre's IT/Communications rooms. The centrally located secure main demarcation IT service room may be shared with Child Care Centre/Community Resource Centre area.
- 8.15.1.12 Project Co shall engage SaskTel to provide Community Net services in each of the schools. Project Co shall coordinate with SaskTel and the Authority to achieve Community Net network connectivity at School Service Commencement for each School. Include the coordination of all scheduling required for commissioning and applications for service installation.
- 8.15.1.13 Each IT/Communication room shall be sized to accommodate network cabinets and the cable termination racks. Sufficient additional floor space

shall be provided to allow for the installation of one additional cabinet and one rack within the room to accommodate future growth.

- 8.15.1.14 In the main demarcation room, provide plywood backboard with adequate space to accommodate equipment to be installed by SaskTel that is necessary for the Community Net network installation. Provide space for all equipment including without limitation a fibre interface panel, Community Net router, and multi-tenant network switch.
 - 8.15.1.15 Project Co shall provide a fibre patch panel at the main communications demarcation point to extend the fibre optic cable into the schools' main server rooms.
 - 8.15.1.16 Network cabinets shall be free standing, floor mounted movable cabinets that are secure and suitably ventilated. Cabinets shall be installed with adequate working clearances provided on all sides. Cabinets mounted against walls or other equipment will not be acceptable.
 - 8.15.1.17 Cable termination racks shall be free standing, floor mounted racks. Racks shall be installed with adequate working clearances provided on three sides.
 - 8.15.1.18 All network cabinets and racks shall have integral horizontal and vertical cable management and power bars.
- 8.15.2 Performance Criteria
- 8.15.2.1 Provide communications systems that are:
 - 8.15.2.1(1) proven technology;
 - 8.15.2.1(2) effectively used in existing schools ;
 - 8.15.2.1(3) easy to operate and maintain; and
 - 8.15.2.1(4) will integrate readily, where required, with the other systems in the School and with technology utilized in existing schools within each of the respective School Boards.
 - 8.15.2.2 Where ceilings are inaccessible, all communication cabling shall run in raceways that provide some opportunity for re-pulling or future changes to cabling of the outlets. The raceways shall require the installation to permit future re-pulling, removal or additional cabling in the raceways.
 - 8.15.2.3 Fibre cable shall be run in separate conduit or raceway, including separate conduit or raceway for redundant or 'dark' fibre cable runs.

- 8.15.2.4 Provide spare capacity to all communication rooms in compliance with applicable standards.
- 8.15.2.5 Flame spread rating of cables shall be provided as required to meet the applicable codes and standards. Cable flame spread ratings shall be consistent throughout the entire installation.
- 8.15.2.6 Provide patch cables of sufficient length for all end-use devices in sufficient quantity to make each device operational plus spare for future expansion and growth. Patch cable shall allow complete connection from end to end.
- 8.15.2.7 Label all cables, outlets and jacks/ports at patch panels. Labeling shall be clearly marked at each end of the cable. Identification of cable drops shall comply with the School Boards IT standards for identification.
- 8.15.2.8 Provide communications wiring for all inputs to classroom equipment including without limitation, smart boards, projectors, and monitors. Cables shall be terminated with appropriate connectors and coverplates in a common wall mounted box. At a minimum audio, video and network inputs shall be provided in every classroom including without limitation DaVinci Studios, Multipurpose Rooms, Learning Commons, and Music rooms, as well as each learning commons, gymnasias, resource centre, and teacher collaboration room.
- 8.15.2.9 Provide all necessary devices and equipment as required to suit the School's equipment.
- 8.15.2.10 VOIP phones shall be Cisco phones connected to a centrally managed CUCM and Unity Connection back end infrastructure.
- 8.15.2.11 All data cables shall be blue with blue jacks. Patch cables shall be colour coded to meet the Authority's standards.
- 8.15.2.12 Multiple cable termination racks grouped together would be considered as one rack assembly and the required clearances would apply to the rack assembly and not per individual rack.
- 8.15.2.13 All routers, switches, software, licenses and VOIP phones shall be Cisco. All hardware shall meet or exceed the performance criteria of the equipment listed by the respective public school and Catholic school in Appendix 3E [Specific IT Equipment Requirements].
- 8.15.2.14 Provide data outlets at workstations in all areas including without limitation teacher collaboration rooms, workrooms, meeting rooms, reception areas, open office areas, student support spaces, instructional spaces, and

resource centres, to allow the Authority to connect to the Schools data network.

8.15.2.15 Provide data outlets in all floor boxes.

8.15.2.16 In addition to outlets required for teacher works stations and other miscellaneous equipment, provide data outlets adjacent to each classroom including without limitation DaVinci Studios, Multipurpose Rooms, Learning Commons, and Music rooms, for a VOIP phone.

8.16 Class Call and Public Address Systems

8.16.1 Basic Requirements

8.16.1.1 Project Co shall provide a complete and operational Class Call / Public Address system within each public school and Catholic school with all zones controlled from their respective administration areas. Each system shall include without limitation all speakers, amplifiers, processors, zone controllers, paging stackers, mixers, tuners, timers, and CD players. The Child Care Centre shall also have a separate system with interconnects to the adjacent public and Catholic school systems.

8.16.1.2 Project Co shall ensure that all necessary interconnecting wiring, etc., are provided to result in fully operational systems.

8.16.1.3 The system shall utilize the latest proven technology available at the time of installation.

8.16.1.4 The system shall be capable of providing different bell and ring tones to distinguish tones between the public school and Catholic school.

8.16.1.5 Provide UPS power source(s) complete with network capabilities to support the head end class call system equipment for a minimum period of 3 hours.

8.16.2 Performance Criteria

8.16.2.1 Include a speaker system complete with all of the necessary equipment and wiring to provide clear, intelligible speech and background music. The system shall allow specific zones to be controlled.

8.16.2.2 Paging speakers shall be provided and distributed throughout the school as required to provide 100% coverage.

8.16.2.3 School operating such that the students and staff are able to hear pages, announcements, music, or otherwise during normal conditions. The room data sheets presented areas that were considered priority areas in which it was assumed would require speaker devices.

- 8.16.2.4 Media players, wireless and wired microphones and other input devices shall be included for complete operation of the system.
- 8.16.2.5 The exterior shall incorporate, weather proof audible devices suitable for external use.
- 8.16.2.6 The system shall be tied into and accessible from the VoIP system where a VoIP class call system is required.
- 8.16.2.7 This system shall be interconnected with the Audio System and the Classroom Sound Enhancement System.
- 8.16.2.8 Paging zones shall be typical for each of the public school and the Catholic school. Project Co shall provide sufficient paging zones to meet the requirements of the Authority. At a minimum, separate paging zones shall be provided for the following:
- 8.16.2.8(1) each administration area including without limitation, adjacent workrooms, offices, washrooms, and meeting rooms;
 - 8.16.2.8(2) each learning commons;
 - 8.16.2.8(3) each student commons;
 - 8.16.2.8(4) each resource centre;
 - 8.16.2.8(5) each teacher collaboration room;
 - 8.16.2.8(6) the gymnasium
 - 8.16.2.8(7) corridors, boot rooms, stairs, mechanical rooms, electrical rooms;
 - 8.16.2.8(8) each classroom including without limitation DaVinci Studios, Multipurpose Rooms, Learning Commons, and Music rooms. The sound enhancement systems in these rooms shall be considered a separate zone; and
 - 8.16.2.8(9) exterior audible devices
- 8.16.2.9 Speakers in smaller rooms including without limitation breakout rooms, support spaces, and washrooms that are located adjacent to corridors, student commons, or other similar areas that are considered as a separate paging zone shall be provided as part of the speaker zone for that adjacent area.

- 8.16.2.10 Provide a page or message stacking system for speaker zones within common areas of the School that are shared between the individual school's public address systems. In the event that simultaneous access to a shared speaker zone occurs, the stacking system shall record and temporarily store messages while that zone is in use for immediate playback once the zone is clear.
- 8.16.2.11 Automatic mixing shall be performed for paging and microphones inputs with ambient noise as a consideration.
- 8.16.2.12 System shall have priority override capability for emergencies (i.e/ fire and evacuation)
- 8.16.2.13 Provide for music to be played throughout each Class Call system.
- 8.16.2.14 Provide and label cabling for paging and public address systems. Provide back boxes for speakers and suitable audio cable. Cable shall be suitably protected from physical damage.
- 8.16.2.15 All interconnecting wiring terminations shall be made on numbered screw type terminal strips. Soldered, crimped or twisted connections shall not be accepted.
- 8.16.2.16 No audio cable shall be installed adjacent to power cable or power conduit.
- 8.16.2.17 All audio equipment shall be fixed mounted. This shall include loudspeakers, input and output jacks, switches and interconnecting cable. The exception to rigid mounting shall be for low frequency loudspeakers, which require resilient shock mounting for vibration isolation from structure.
- 8.16.2.18 Provide fixed, stand-alone sound equipment racks to accommodate all necessary equipment.
- 8.16.2.19 Provide cable management and "waterfall" kits for cabling entering racks. Provide Velcro ties for bundled cabling, plastic cable ties are unacceptable.
- 8.16.2.20 All wiring shall be point to point and terminated directly onto the equipment or terminal strips that form part of the equipment.
- 8.16.2.21 Provide sufficient cable slack prior to termination to allow for maintenance and future upgrades.
- 8.16.2.22 Project Co shall coordinate all requirements of the respective systems with the respective IT departments and their required manufacturer and provide a system to suit the requirements. The wiring of the speakers and VoIP phone sets shall be coordinated with the manufacturer and wired to suit the needs of each respective School Board.

- 8.16.2.23 Class Call/Paging System: Media player, tuner, timer, and mixer c/w auxiliary inputs to be located in a fixed location within the administration/reception area and wired back to the fixed sound equipment rack.

8.17 Fire Alarm System

8.17.1 Basic Requirements

- 8.17.1.1 Project Co shall design a complete microprocessor based, addressable, non-coded, **single stage** fire alarm system. The system shall be provided to meet all applicable codes, standards and requirements of Governmental Authorities.
- 8.17.1.2 The system shall utilize the latest proven technology available at the time of installation.

8.17.2 Performance Criteria

- 8.17.2.1 Project Co shall design a fire alarm system that allocates individual fire alarm addresses for each device on each floor area.
- 8.17.2.2 Project Co shall provide fan shutdown facilities and connection between fire alarm control panel and master clock system controller to inhibit period signal tones and exterior horns.
- 8.17.2.3 Project Co shall provide for interface of fire alarm system panel and off-site monitoring function by both Project Co and the School Boards.
- 8.17.2.4 Project Co shall design the fire alarm system to include without limitation visual signal devices that comply with ADA.
- 8.17.2.5 Appropriate signaling shall occur to alert Project Co and the School's operating staff of all alarm and trouble conditions.
- 8.17.2.6 Control all exit ways to suit fire exit requirements.

8.18 Satellite / Cable Television System

8.18.1 Basic Requirements

- 8.18.1.1 Project Co shall provide for a rough-in conduit including without limitation underground service conduit to accommodate cable television service.
- 8.18.1.2 Cable television services shall be extended from the main Telco room to the main IT/Communications rooms for each of the public school and Catholic school and Child Care Centre area.

8.18.1.3 The extension of the cable television services shall include conduit and cabling.

8.18.2 Performance Criteria

8.18.2.1 Project Co shall provide cable from the property line to the splitter/amplifier location in the main Telco room.

8.18.2.2 Project Co shall provide boxes and plates at field outlets with conduit stubs to ceiling spaces at all outlet locations. Provide an outlet in every classroom including without limitation DaVinci Studios, Multipurpose Rooms, Learning Studios, and Music rooms, as well as every staff room, teacher collaboration room and learning commons.

8.18.2.3 Project Co shall provide and install suitably sized raceway for satellite and cable television access within the School to the utility service.

8.18.2.4 If the utility service is not yet installed in the streets or boulevards adjacent to the School Site boundaries the conduit shall be stubbed-off at the School Site boundary.

8.18.2.5 At one (1) location for each of the Catholic school, the public school and the Child Care Centre, provide a suitably braced support location where a future satellite dish can be installed by the respective Catholic school or the public school by Project Co. Suitable empty conduit shall be provided back to the respective IT closets.

8.19 Master and Secondary Clocks System

8.19.1 Basic Requirements

8.19.1.1 Provide a master clock system with main receiver/ transmitter synchronized with a microprocessor based administrative communication system or from an atomic clock via the internet.

8.19.1.2 Project Co shall provide secondary clocks with wireless settings from the master clock throughout the School.

8.19.2 Performance Criteria

8.19.2.1 The system device firmware shall perform diagnostics on battery life, time accuracy, and strength of the wireless connection, and sends this data to the system appliance.

8.19.2.2 Secondary clock locations shall be provided in every learning area and the clocks shall be fully portable, ceiling or wall mountable, and capable of being relocated at any time without distance or signal path limitations.

- 8.19.2.3 Secondary clock locations shall allow an unobstructed view of the clock display from any location within the area served by the clock.
- 8.19.2.4 Secondary clock display shall be conspicuous and easy to read. Digital clock displays are not acceptable.
- 8.19.2.5 Secondary clocks shall maintain internal reference so that failure of the master clock signal shall not cause clocks to fail. Clocks shall continue indicating accurate time until the signal from the master clock is restored. The secondary clocks shall self-correct upon receipt of the master clock signal.
- 8.19.2.6 The system shall store diagnostic information and event logs from the system's devices and forwards this data to assigned personnel by e-mail.
- 8.19.2.7 The system shall enable firmware upgrades, store system device diagnostics and log and perform data backups.

8.20 Voice and Data System, Cable, Conduits and Raceways

- 8.20.1 Basic Requirements
 - 8.20.1.1 Provide a secure network design.
 - 8.20.1.2 Provide open architecture network equipment.
 - 8.20.1.3 Work with the public school and Catholic school in creating an operational plan for the network complete with management strategy and resource requirements for maintenance.
 - 8.20.1.4 Communication rooms shall be provided throughout the public school and Catholic school as required to service voice/video/data requirements of the schools.
 - 8.20.1.5 Conduits and cables shall be provided to accommodate a complete voice and data system that meets the needs of each public school and Catholic school as set out in Appendix 3A [Functional Program] and Appendix 3B [Functional Program Room Data Sheets].
 - 8.20.1.6 Project Co shall design a cable tray, at strategic locations, to run cabling from outlets to respective voice and data head end equipment.
 - 8.20.1.7 Project Co shall provide data and voice cabling for each public school and Catholic school including without limitation installation, termination, labeling and testing of patch panels, jacks and copper and fibre cables.

- 8.20.1.8 The data and voice cable installation shall include all horizontal cabling, backbone cabling, connectors, patch panels, equipment racks, bix blocks, grounding and bonding of communications equipment.
 - 8.20.1.9 Project Co shall provide a cabling system to requirements for Category 6A systems.
 - 8.20.1.10 All cables entering equipment racks and interconnecting equipment racks shall be supported vertically and horizontally in tray throughout the entire length of the run. Cables shall be protected from mechanical damage where they enter/leave the cable tray.
 - 8.20.1.11 In areas with exposed ceilings, exposed cables supported with j-hooks will not be acceptable.
- 8.20.2 Performance Criteria
- 8.20.2.1 Utilize conduits from individual outlet boxes into accessible ceiling space areas.
 - 8.20.2.2 Provide entire Data and Voice cable installation including all horizontal cabling, backbone cabling, connectors, patch panels, equipment racks, bix blocks, grounding and bonding of communications equipment
 - 8.20.2.3 Provide wide area network connections to the entire School.
 - 8.20.2.4 Provide a main information services communications room within the School to host servers supplied by the School and the main core internal backbone network equipment. The School will provide a list of equipment for the purposes of space, power and environmental control planning.
 - 8.20.2.5 Provide require infrastructure to accommodate wireless access points (WAP) throughout the entire School. Facility wide wifi on the interior as well as in exterior learning environments supports 21st century technology to augment the educational curriculum.
 - 8.20.2.6 Provide fibre patch panels with connectors to meet the School's requirements, at each termination point, mounted in floor mounted data rack
 - 8.20.2.7 Provide backbone fibre cabling between the demarcation point and each main server room, and between each main server room and each horizontal distribution equipment IT Closet / Room.
 - 8.20.2.8 Each cable shall be terminated with connectors on each end at the wall jacks and patch panels in the equipment racks.

- 8.20.2.9 Fibre optic cabling shall interconnect communication equipment racks in the IT closets to the main IT Communication Room's equipment racks.
- 8.20.2.10 Utilize a star wired cabling approach to wire all outlet locations back to communication rooms and all communication rooms back to the nearest communications equipment rack.
- 8.20.2.11 Provide UPS power source(s) complete with network capabilities to support the network system for a minimum period of 3 hours.
- 8.20.2.12 The minimum backbone fibre cable to be provided shall be 6 strand OM4 (50/125 µm) Laser Optimized multi-mode.

8.21 Audio System

8.21.1 Basic Requirements

- 8.21.1.1 Provide a fully operational Audio System for each public school and Catholic school. Ensure that all necessary interconnecting wiring, etc., are provided to result in a fully operational system. These requirements shall be read in conjunction with the requirements for the Paging/Class Call System and the Classroom Sound Enhancement System, and the Theatrical Lighting System.
- 8.21.1.2 Sound system shall be provided in conformance with "Gym System (Fixed)" and "Gym System (Rolling Cart)" diagrams in the "GSCS Elementary School Technology Template" in Appendix 3E [Specific IT Equipment Requirements].
- 8.21.1.3 Scope of the work shall include an independent sound system for use in the Gymnasium and Commons area complete with appropriate loudspeakers, audio amplifiers, DSP audio processing, wireless microphones and input wall jacks.
- 8.21.1.4 Distributed speakers shall be designed with a flexible audio system in mind. The system's purpose includes playing loud music during events/classes. The system must also allow clear speech intelligibility when being used by the paging system or audio system is utilizing a microphone plugged into a wall plate.
- 8.21.1.5 Provide a portable equipment cabinet housing wireless microphone receivers, CD player and a multi-input mixer to allow the users to connect to the respective public school and Catholic school fixed equipment via outlets located in the gymnasium and student commons area.

8.21.2 Performance Criteria

- 8.21.2.1 Audio amplifiers, DSP processing and other associated equipment shall be located in a fixed location. This system shall be modular in design to facilitate technical access and maintenance.
- 8.21.2.2 Media players, wireless and wired microphones and other input devices shall be included for complete operation of the system.
- 8.21.2.3 Provide ambient microphones for ambient noise sensing. Automatic mixing shall be performed for paging with ambient noise as a consideration.
- 8.21.2.4 Project Co shall exercise caution, as necessary, to guard against electrostatic hum, and to install the cabling so as to provide maximum safety to non-technical operators.
- 8.21.2.5 The system must be free of all mechanical noise, very low in harmonic distortion and cross-talk, free of low frequency 60 cycle hum, switching noise and/or higher harmonic noise or buzz.
- 8.21.2.6 Provide even distribution of sound reinforcement. Loudspeaker provision and placement shall assure uniform sound pressure levels, side-to-side, front-to-back, with ± 2 dB @ 2,000 Hz octave band. Typical speech reinforcement levels shall be 85 dB SPL, plus 10 dB peaking factor without audible distortion, measured 1.2 meters from floor level.
- 8.21.2.7 Overall system shall provide adequate dynamic range to assure microphone speech clarity with voice levels from 60 dB SPL to 95 dB SPL with presenter at 12" from microphone.
- 8.21.2.8 The system shall provide music reproduction, as well as highly intelligible speech performance. High speech intelligibility is the primary feature.
- 8.21.2.9 The gymnasium audio system shall provide an adequate dynamic range, system gain, and/or sound pressure levels that ensure intelligible speech without feedback. Overall microphones and line inputs shall have gains no less than 12dB overall.
- 8.21.2.10 A DSP shall be employed to maximize speech articulation and provide adequate acoustic gain and be capable of providing but not be limited to, audio level control, equalization (parametric and graphic equalization), delay, ducking, compression, output limiting, matrix routing, low pass filtering, high pass filtering.
- 8.21.2.11 Audio system shall operate in conjunction with the school's paging system. Methods such as ducking or muting must be utilized in order to allow paging to the gymnasium/commons areas while the audio system is in use.

- 8.21.2.12 Power sequencers, UPS power supplies, and associated equipment shall be utilized to allow proper startup and shutdown of the fixed location equipment.
- 8.21.2.13 Provide input jacks in the gymnasiums and student commons areas in suitable locations with the necessary wiring back to fixed equipment to connect the equipment on the portable rack back into the fixed equipment. Provide a minimum of two outlets in each of the public school gymnasium and the Catholic school gymnasium and one in the student commons area.
- 8.21.2.14 All wiring shall be terminated in terminal panels, junction boxes, on suitable terminal strips or blocks, and to be neatly installed, laced and labelled. All connections in sound terminal panels and junction boxes shall be made with solderless connectors to screw clamp type terminal blocks with separate terminal for each cable/conductor.
- 8.21.2.15 All equipment provided shall be manufactured for commercial and professional sound reinforcement applications
- 8.21.2.16 Portable mixer shall have independent base, treble and volume control for each input, priority muting, input routing, a minimum of two outputs, and balanced and unbalanced inputs,
- 8.21.2.17 Loud speakers in the gymnasium and the student commons areas shall each be wired as a separate zone.
- 8.21.2.18 Speakers in areas or rooms such as washrooms and changerooms that have direct access from the gymnasium or commons area shall be provided as part of that adjacent area (gymnasium or commons) speaker zone.
- 8.21.2.19 The overall performance of the sound system shall meet the requirements of the Authority. Project Co shall provide a detailed model of the gymnasiums and student commons using acoustical simulation software to demonstrate the sound system performance.

8.22 Wireless Network

8.22.1 Basic Requirements

- 8.22.1.1 Provide a digital wireless network infrastructure acceptable to the respective School Board, for the Facility that shall allow wireless end-use devices access to the School's network and all its associated applications.

- 8.22.1.2 The wireless network components supplied by Project Co shall comply with the latest industry standards. Ensure the band width of the network shall meet the requirements of the School at the time of installation.
- 8.22.1.3 Access points shall be powered by PoE, compliant with industry standards, and be consistent with the existing systems within each School Board.
- 8.22.2 Performance Criteria
 - 8.22.2.1 Provide a complete wireless network throughout the Facility, with no dead spots, that supports any standard network applications or telephone applications, to locations determined in consultation with the School Boards.
 - 8.22.2.2 The wireless products shall use advanced random data encryption protocol to secure the information.
 - 8.22.2.3 The wireless system shall not adversely affect other systems within the School.
 - 8.22.2.4 All access points and wireless components shall be adequately supported.
 - 8.22.2.5 Project co shall ensure that the performance of the wireless network meet or exceed the current standards of the School. Provide 100% wireless network coverage based on the maximum capacity of each access point. Provide WLAN coverage and data rate heat maps to demonstrate the performance and available signal strengths of the system throughout the School.
 - 8.22.2.6 Wireless network shall utilized Cisco Meraki wireless controllers and Cisco wireless access points. All wireless network components provided shall comply with IEEE 802.11a/g/n/ac latest standards.
 - 8.22.2.7 Project Co shall provide a UPS power source(s) complete with network capabilities to support the wireless network system for a minimum period of 3 hours.
 - 8.22.2.8 Cisco wireless network components shall match the hardware requirements listed by the respective Catholic school or the public school in Appendix 3E [Specific IT Equipment Requirements]. Where quantities are indicated, they are a minimum requirement only. Project Co shall provide additional hardware necessary for a complete system.

8.23 Classroom Sound Enhancement Systems

- 8.23.1 Basic Requirements
 - 8.23.1.1 Project Co shall design a complete sound enhancement system for each respective School's learning spaces including art studios. Ensure that all

necessary interconnecting wiring, etc., are provided to result in a fully operational system. Provide all coordinating testing, schedule, rough-in, etc.

- 8.23.1.2 Exercise caution, as necessary, to guard against electrostatic hum, and to install the cabling so as to provide maximum safety to non-technical operators.
- 8.23.1.3 Provide professional sound products and technical services to assure overall system performance.
- 8.23.1.4 Provide a distributed overhead speaker system within each teaching area to provide 100% coverage. Select speaker type based on the overall room layouts and configurations.
- 8.23.1.5 Sound enhancement shall be provided in each classroom including without limitation DaVinci Studios, Multipurpose Rooms, Learning Commons, and Music rooms.
- 8.23.2 Performance Criteria
 - 8.23.2.1 The system shall be free of all mechanical noise, very low in harmonic distortion and cross-talk, free of low frequency 60 cycle hum, switching noise and/or higher harmonic noise or buzz.
 - 8.23.2.2 Overall system shall provide adequate dynamic range to assure microphone speech clarity.
 - 8.23.2.3 The system shall provide music reproduction, as well as highly intelligible speech performance. High speech intelligibility is the primary feature.
 - 8.23.2.4 Final system tuning and control shall be provided to ensure a minimum effort by the Authority to operate the audio system in a reliable and easy fashion with minimal adjustments.
 - 8.23.2.5 Each teaching area shall include all necessary equipment for a completely operation system. All equipment shall be installed in an wall mounted, decorative, cabinet that compliments the overall aesthetics of the teaching areas.
 - 8.23.2.6 The system shall have an auto-mute input that shall disable the audio in use when a call is made from the main class call system. The class call shall utilize the same speakers as the sound enhancement system for the broadcasting of announcements. Provide an input from the class call system to each of the individual classroom mixers/amplifiers that will automatically override the audio in use when a call is made from the class call system. System shall be capable of assigning the auto mute function to any combination of the various mixer/amplifier inputs.

- 8.23.2.7 Wireless microphones shall have a working range to suit the room layout. Handheld dynamic microphone element shall be complete with internal shock mounting.
- 8.23.2.8 Provide receivers assembly for best operation coverage throughout the teaching areas.
- 8.23.2.9 The wireless microphone system shall allow simultaneous use in adjacent teaching areas without interference or eavesdropping.
- 8.23.2.10 Provide recessed wall jacks near the teacher's primary teaching location for auxiliary inputs for use other peripheral equipment.
- 8.23.2.11 Provide wall mounted jacks for auxiliary VGA, HDMI, audio and network inputs for use with short-throw projectors where needed. Provide network drops at the projector and teacher stations.
- 8.23.2.12 Provide all required cable, wire and connectors for a complete and operational sound system.
- 8.23.2.13 Provide necessary power outlets at the equipment cabinet location.
- 8.23.2.14 Provide hands-free and handheld wireless microphones for each classroom system.
- 8.23.2.15 All chargers for wireless devices shall be provided and located within the equipment cabinet.

8.24 Parking Controls

8.24.1 Basic Requirements

- 8.24.1.1 Project Co shall design a complete parking area control system including without limitation receptacles mounted in pedestals and temperature detection equipment. Electrification shall be provided for all parking stalls designated for public school, Catholic school, Child Care Centre staff, Community Resource Centre and barrier free stalls.
- 8.24.1.2 Provide a complete system which shall include outside air temperature sensing and computer control of contactors for the Intelligent parking lot receptacle control.

8.24.2 Performance Criteria

- 8.24.2.1 Adaptive controls shall be included which shall shift the duty cycle. This shall allow greater on times as the outdoor temperature decreases and the on time shall decrease as the outdoor temperature rises. The adaptive

control feature shall be provided for each load contactor. Programmable off times shall be allowed for each load contactor.

- 8.24.2.2 Time override shall allow the operator to override the system. This shall allow each load circuit to be either manually switched on or manually switched off.
- 8.24.2.3 Control shall be provided to allow each electrified parking stall to be selectively energized or de-energized as required by the public school or Catholic school.
- 8.24.2.4 The parking areas designed for each public school, Catholic school or Child Care Centre shall be electrified from their respective electrical distribution systems.

8.25 Theatrical Stage Lighting

8.25.1 Basic Requirements

- 8.25.1.1 Provide a complete stage lighting system complete with dimmers, light control panels, light controls console, house light control, plug-in channels and theatrical light fixtures.
- 8.25.1.2 The system shall be supplied as an integrated package by a single supplier to ensure a complete and workable system.
- 8.25.1.3 The final mounting of fixtures and programming of the stage control system shall be completed under the supervision of the supplier.
- 8.25.1.4 Theatrical lighting and sound system shall be provided in conformance with Appendix 3E [Specific IT Equipment Requirements].

8.25.2 Performance Criteria

- 8.25.2.1 Project Co shall provide all luminaires including without limitation front of house spot lights, follow spotlights, Fresnel lights and backdrop illumination fixtures.
- 8.25.2.2 The control console shall be a portable table top configuration and capable of housing all control devices.
- 8.25.2.3 Channel mount plug-in strips shall be supplied to provide electrical connection and mounting support for the stage lighting fixtures
- 8.25.2.4 The plug-in strip shall have tracks as an integral part of the extrusion suitable for suspending stage lighting fixtures, however, fixtures shall be supported by a pipe which, in turn, shall be supported by the channel.

8.25.2.5 Cable and conduit necessary to make the system operable shall be provided and installed as instructed by the manufacturer of the system. Project co shall be responsible for overall system co-ordination shall ensure that all of the necessary system components are installed to result in a complete, workable system.

8.25.3 Stage Equipment and Devices

8.25.3.1 Provide suitable amount of applicable receptacles within the stage area served from a local stage breaker panel. The breaker panel shall be used for future stage lighting or other performance related activities.

8.25.3.2 The console shall consist of a single enclosure with fully integrated processor.

8.25.3.3 The console shall support the processing of up to 1024 total DMX512 outputs by use of potentiometers for submasters, playbacks and effects as well as buttons to activate cues.

8.25.3.4 The console shall support up to 250 control channels for the purpose of controlling dimmers.

8.25.3.5 The console shall support up to 30 automated luminaires with a maximum of 40 attributes each. Each intensity channel shall be controlled on a Highest Takes Precedence basis while each attribute channel shall be controlled on a Last Takes Precedence basis.

8.25.3.6 Communication to system devices shall be available over a network, DMX or MIDI.

8.25.3.7 The console shall store up to 999 cues, 24 pages of 24 fades that can be sub-masters, effects or playbacks. Each effect can have up to 99 steps per effect.

8.25.3.8 The lighting control panel shall be fully digital, designed specifically for architectural and entertainment lighting control applications.

8.25.3.9 Panel setup and pre-set data shall, as standard, be fully user programmable on a per panel or system wide basis.

8.25.3.10 Panels shall be available that support individual power feeds from standard circuit breaker panels or panels shall have integral breakers and 3 phase main lug only inputs.

8.25.3.11 The relay panel shall have required Fire Alarm interface.

- 8.25.3.12 Light fixtures shall be variable beam and colour changing complete with channel mounting and safety hardware, and twist-lock male plug.

8.26 Digital Messaging

8.26.1 Basic Requirements

- 8.26.1.1 Project Co shall provide a complete and fully functional digital messaging system for each public school and Catholic school that is capable of creating and broadcasting looped text and photo images and recorded audio and video on display monitors located throughout the School.
- 8.26.1.2 The digital messaging system shall be Harris InfoCaster, with Harris InfoCastor Creator software.
- 8.26.1.3 System shall include without limitation desktop server, software, licenses, cabling infrastructure and display monitors (televisions) required for a complete and operational system. Include all power supplies for necessary equipment and devices.
- 8.26.1.4 Display monitors shall be located near all primary entrances of each public school and Catholic school, the libraries or resource centres, and at the top and bottom of each open stairwell.
- 8.26.1.5 Server shall be located in the staff workroom.

8.26.2 Performance Criteria

- 8.26.2.1 System shall provide a single channel output to all displays via the School data network.
- 8.26.2.2 Provide cable extender adaptors at each device, server, display monitor or otherwise to allow the system output/input signal to be delivered over the data network cabling.
- 8.26.2.3 Provide splitters/amplifiers to split and distribute the display signal to each of the monitors. Splitters/amplifiers shall be installed in the IT rooms near the data termination rack.
- 8.26.2.4 Provide via redundant network data drops from the IT room patch panels terminated at a wall outlet box adjacent to the server location.
- 8.26.2.5 Provide redundant network data drops from the IT room patch panels terminated at a wall outlet box at each monitor location.
- 8.26.2.6 All data cabling provided shall comply with Section 8.20 Voice and Data System, Cable Conduits and Raceways.

- 8.26.2.7 Display monitors shall be 46" or larger plasma, LCD or LED flat panel displays with built in CATV tuner, 1080P resolution, integrated speakers, and audio/video inputs and outputs. Monitors shall have low glare finish and a wide viewing angle.
- 8.26.2.8 Display monitors shall be wall or ceiling mounted with an adjustable, tiltable mounting bracket suitable for the monitor mounting points. Monitors shall be positioned to provide maximum viewing for the area they are installed in.
- 8.26.2.9 Monitors shall be installed with provisions for future input wiring from the satellite or cable television system.
- 8.26.2.10 Install system software on desktop computer provided for the Authority's use by Project Co.

PART 9. DESIGN CRITERIA – SECURITY**9.1 Security Access and Surveillance**

9.1.1 Basic Requirements

9.1.1.1 Project Co shall design the security system such that it shall be capable of future expansion through the addition of security cameras, video monitors, and additional access devices; including without limitations a conduit and outlet box to all exterior camera locations.

9.1.2 Performance Criteria

9.1.2.1 Project Co shall include without limitation coverage for exterior doors, all corridors, administration office areas, classrooms, and service rooms including without limitation electrical room and mechanical room, stairways, Resource Centre and Da Vinci Studios and related storage areas.

9.1.2.2 Provide for boiler room flood water detection and low building temperature detection.

9.1.2.3 Project Co shall make provision for interface of security system panel with lighting control panel.

9.1.2.4 Project Co shall provide for interface of security system panel and off-site notification to both Project Co and the respective School Boards representatives.

9.2 Access Control System

9.2.1 Basic Requirements

9.2.1.1 Project Co shall design a complete Access Control door security system and shall include without limitation, all electrical equipment required to allow for a complete operating system.

9.2.1.2 Provide a complete, programmable and independent Security Management System (SMS) which includes the electronic access control (EAC) and tie-in to the building security systems for the School that uses the latest proven technology at time of Construction. Include the installation of all control equipment, accessories, materials and software to operate the SMS.

- 9.2.1.3 The EAC shall provide control of people through entrances and exits of a controlled area of the public school and Catholic school. As an aspect of security, utilize hardware systems and specialized procedures to control and monitor movements into, out of, or within a controlled area. Design the EAC to provide access to various areas as a function of authorized level or time or a combination of both.
- 9.2.1.4 The SMS shall be supported by a Microsoft Windows™ operating system determined at time of installation that is acceptable to each respective School Board and compatible with the access control system to be installed.
- 9.2.1.5 Each public school and Catholic school shall have a separate, independent access control system with all associated equipment located in a secure space within the respective public and Catholic school.
- 9.2.1.6 Card readers at external doors considered as “Exit Only” are not required.
- 9.2.2 Performance Criteria
- 9.2.2.1 Provide card readers at all entrances to the public school, Catholic school and Child Care Centre/Community and on all IT rooms / closets complete with required electronic door hardware.
- 9.2.2.2 The card access system shall be controlled from a central control point in each public school and Catholic school administration area and shall include the following features.
- 9.2.2.2(1) a single “emergency lock” switch that would cut the power to the electric strikes at the exterior entrances to prevent entry from the exterior. Interior panic hardware and fire alarm release shall remain active.
- 9.2.2.2(2) the ability to program the electric strikes through a door security control panel that would allow the doors to be locked or unlocked at various times of the day either individually or in groups as dictated by the door security program. This program shall be required to be manually activated through a “staff-on-site” manual switch to ensure an authorized public school and Catholic school staff member is always on Site before the door control program is activated.
- 9.2.2.3 Swiping the card readers by an authorized public school or Catholic school staff member shall not allow access into the respective other public school and Catholic school during a “lock down” but shall allow unscheduled access back into the respective public school and Catholic school through

an exterior door when the door is normally locked by the door security program.

- 9.2.2.4 Each of the public school and Catholic school card access system shall be compatible with their existing card access systems used in their other schools.
- 9.2.2.5 All interior rooms (with exception of those identified for card access) shall be equipped with bore in locks. No full mortise locks to be used.
- 9.2.2.6 Each respective School Board has their own "Restricted Key Ways" and the School Board's maintain key control. Each public school and Catholic school shall have the same keys and key ways used for each School Board as identified so as to be compatible with the older schools in their respective School Boards.
- 9.2.2.7 Building card access system shall be tied to the alarm system so that it deactivates when card reader is swiped.
- 9.2.2.8 Door access control system to utilize a centrally managed Millennium Enterprises system.
- 9.2.2.9 Access control system shall provide two-way communication between the main entry vestibule and the respective reception area of each public school and Catholic school. System shall be capable of manually releasing the main entry door from the reception area to allow entry to the School when the School doors are secure.

9.3 Closed Circuit Video Equipment (CCVE)

9.3.1 Basic Requirements

- 9.3.1.1 Provide a complete fully operation closed circuit video surveillance system as indicated in Schedule 3 [Design and Construction Specifications], Appendix 3A [Functional Program], Appendix 3B [Functional program Room Data Sheets] and herein specified.
- 9.3.1.2 Each public school and Catholic school shall have a separate, independent video surveillance system with all associated equipment located in a secure space within the respective public school and Catholic school.
- 9.3.1.3 Cameras shall be located on the exterior of the building to provide complete perimeter coverage. Each of the public school and Catholic school's surveillance systems shall share exterior coverage of the portion of the building forming the central community area from their respective systems. Cameras located near building entrances/exits shall be positioned to capture a facial image.

- 9.3.1.4 Cameras shall be located on the interior of the building to provide coverage of all School entrances and exits including entrances into the public school and Catholic school from the adjacent community spaces. Cameras shall be positioned to capture a facial image.
- 9.3.2 Performance Criteria
- 9.3.2.1 The video surveillance system shall be a network and IP video system that permits live and recordable video viewing, allowing real-time access to secure networks of video on a soft-ware system that is currently used by the respective School Boards.
- 9.3.2.2 The video surveillance system shall be tied to the card access system so picture is taken when card is swiped.
- 9.3.2.3 Project Co shall include all applicable operation licenses for all equipment within the system, if applicable.
- 9.3.2.4 The recording of all video shall be stored on the rack mounted network video recorder for each respective public school and Catholic school. Project Co to verify that the proposed CCTV system does not exceed the data array's bandwidth limits, include spare capacity for future.
- 9.3.2.5 Environment: All exterior equipment shall be capable of operating in the adverse weather conditions where this system is installed. Design video components and systems to operate with all required ambient conditions.
- 9.3.2.6 There shall be no real time monitoring of the systems.
- 9.3.2.7 The system equipment shall be rack mounted.
- 9.3.2.8 The entire system shall contain all required components, programming, etc to accommodate required spare capacity.
- 9.3.2.9 All video surveillance system equipment (excluding cameras) shall be ULC listed products as manufactured by Genetec, Lenel, Schneider Electric Security, or equivalent.
- 9.3.2.10 All video cameras shall be ULC listed products as manufactured by AXIS Communications, Lenel Systems International, PELCO, Panasonic, Bosh or equivalent.
- 9.3.2.11 The Authorities System Software Manager shall provide a user interface and database management of the IP Video Security System. The Authorities System Software Manager shall allow for School Board users to be restricted via software to logical configurable groups of cameras, monitors and system operations.

- 9.3.2.12 The IP Video Security System network shall be arranged so each area shall operate independently and shall communicate via a 1000 baseT (Giga-bit) network at a minimum to the Authorities System Software Manager.
- 9.3.2.13 The Authorities System Software Manager shall manage rights and permissions for all devices, persons, and any system video or other data. The assigned School representatives shall be responsible for the managing and operation of the Authorities System Software Manager.
- 9.3.2.14 Indoor Fixed Cameras shall be IP based and as a minimum be of the latest image compression technology and supportive of an appropriate and acceptable level of resolution and frame rate.
- 9.3.2.15 Outdoor Fixed Cameras shall be as per indoor but shall include weatherproof vandal resistant enclosure c/w environmental heater.
- 9.3.2.16 The network video recorder shall have expandable storage capacity and it shall maximize storage efficiency and offer a time- and priority- based system that identifies data to be removed when storage time expires. The network video recorder shall offer both unsecured and secured modes, using a proprietary key system in the secured mode to prevent unauthorized devices from communicating with any IP Video Security System device. System built-in-storage-time to record all cameras on the system for a minimum thirty (30) day period.
- 9.3.2.17 The network video recorder shall be capable of decimating recorded images by time, without losing all video past the decimated time point. The decimated rate shall be no less than 2 images/second, regardless of the original record rate.
- 9.3.2.18 The network video recorder shall offer plug-and-play configuration and data authentication facilities. The network video recorder shall record video, and data streams for every channel, and shall have storage locking. It shall have full over-the-network remote control and administration.
- 9.3.2.19 The network video recorder shall provide hard drives as needed to meet storage needs.
- 9.3.2.20 Video storage capacity shall be based on continuous recording at 15 frames per second at H.264 format, 10% compression and a key refresh rate of 2 seconds. The minimum storage capacity shall be 0.5TB per camera. Refer to Appendix 3E [Specific IT Equipment Requirements] for individual School Board requirements.

- 9.3.2.21 Provide a means to export and burn video clips to DVD from the video storage devices.
- 9.3.2.22 All video surveillance system equipment including without limitation video recorders, interior cameras and exterior cameras shall be Panasonic. All hardware shall meet or exceed the performance criteria of the equipment listed by the respective school division in Appendix 3E [Specific IT Equipment Requirements].
- 9.3.2.23 The diagnostics shall be systemized with other IP Video Security System products so that problems are reported to the Authorities System Software Manager.
- 9.3.2.24 The network interface provided by Project Co for this system shall allow School Board users with public school and Catholic school to configure devices, set up users, adjust network settings, and create recording schedules.

9.4 Intrusion Detection System

9.4.1 Basic Requirements

- 9.4.1.1 Project Co shall design a complete intrusion security system and shall include without limitation all electrical and electronic equipment required to allow for a complete operating system.

9.4.2 Performance Criteria

- 9.4.2.1 A breach in a secured and monitored door, activation of a motion sensor in a secured area, activation of a duress alarm at a keypad shall immediately be transmitted to the central monitoring agency through the building security monitoring system. The keypads shall indicate the alarm location. The same alarm conditions shall be monitored off-site through secured access by Project Co and the public school and Catholic school's Monitoring agency.
- 9.4.2.2 The building security and auxiliary alarm points shall be acknowledged by each respective public school and Catholic school staff through acknowledge and clearing or resetting the alarm at the main controller station.
- 9.4.2.3 Project Co shall provide an intrusion security system with all sensors being on individual zones.
- 9.4.2.4 The intrusion detection system shall utilize industry proven devices for intrusion detection. Building security field devices shall include but not be limited to the following:

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- 9.4.2.4(1) magnetic door contacts;
 - 9.4.2.4(2) motion sensors;
 - 9.4.2.4(3) glass break detectors;
 - 9.4.2.4(4) auxiliary alarm monitoring points.
- 9.4.2.5 Provide door contacts in areas identified by the public school and Catholic school including:
- 9.4.2.5(1) perimeter doors without card readers;
 - 9.4.2.5(2) controlled doors equipped with card readers;
 - 9.4.2.5(3) exterior exit doors and overhead doors.
- 9.4.2.6 The magnetic proximity switches shall be the normal security type and shall be installed as close as possible to the strike side of the door and frame. If a door is opened without either the system being disarmed or through the use of a key-tag, then the system shall enter a "Door Forced Open Alarm" status.
- 9.4.2.7 A "Door Forced Open Alarm" shall cause the main control panel to automatically dial its preprogrammed telephone numbers and simultaneously activate an alarm siren located within the ceiling space of the main entrance of each respective public school and Catholic school.
- 9.4.2.8 Steel or nylon door contacts shall be flush mounted in new door frames. The door contact housing shall be of a rugged unibody construction with flexible ribbed sides for quick installation, secured without the need for gluing. The magnetic housing isolates the magnet from the surrounding steel for maximum gap distances, both make and break.
- 9.4.2.9 When panic bars or exit switches are used to open an access-controlled door, the associated door contacts shall be de-energized in order to prevent false alarms.

PART 10. DESIGN CRITERIA – CIVIL**10.1 Municipality and Utility Interfacing**

- 10.1.1 Project Co shall coordinate and interface its construction activities with infrastructure owned and operated by the relevant municipality and the applicable utility.
- 10.1.2 In constructing the Exterior Improvements for the Schools on the municipal lands, Project Co shall be responsible for:
 - 10.1.2.1 Any modification, relocation and/or re-connection of all utility services, including without limitation water, sanitary sewer, storm sewer, natural gas, electrical power, telecommunications;
 - 10.1.2.2 Any modifications or relocations of existing street lighting, cable TV lines, bus stops and fire hydrants; and
 - 10.1.2.3 Any repairs or replacement of existing roads, curbs, gutters, sidewalks and portions thereof, that is required to accommodate the new access points to the Schools.
- 10.1.3 Project Co shall be responsible for making good all damage caused to existing roads, curbs, gutters and sideways arising as a result of Project Co carrying out the work at the School.

10.2 Water Main

- 10.2.1 Project Co shall connect the Site to the municipality water main with two (2) water services, separated by a valve, to ensure that a water service is available at all times.
- 10.2.2 The location of any existing water service stubs vary and are Site dependent, refer to the Data Room for additional civil information for each municipality.
- 10.2.3 Looping of the water shall be completed onsite with the dual water service connection.
- 10.2.4 Fire hydrants may be required on the Site and locations shall be Site dependent.
 - 10.2.4.1 The fire flows shall be handled by a system integrated within the School.
- 10.2.5 The dual water service shall enter the School, connecting directly into the water meter / sprinkler room.
- 10.2.6 Individual domestic lines (c/w meters) shall be extended for each user group from the common water meter / sprinkler room.

10.3 Sanitary Sewer

- 10.3.1 Project Co shall connect the Site to the municipality sanitary sewer main with a single sanitary sewer service.
- 10.3.2 The location of any existing sanitary sewer service from the municipality sewer main is Site dependent, refer to the Data Room for additional civil information for each municipality.

10.4 Storm Sewer

- 10.4.1 The location of any existing storm sewer services from the municipal sewer main is Site dependent, refer to the Data Room for additional civil information for each municipality.
- 10.4.2 The roof of the School shall drain into the building storm system.
- 10.4.3 High level alarms are to be installed in the main rainwater leader of the School at 1.5m above grade.
- 10.4.4 The storm service from the School to the public storm utility shall be installed below the frost line or as possible based on the elevation of the public storm utility.
- 10.4.5 The detention areas, as needed to meet local municipality requirements, shall be located in the parking lots and shall be no deeper than 0.4m. Spill routes shall be directed to the adjacent public roadway, or, as permitted by the local municipality, to a public park.
- 10.4.6 Any detention areas, including in soft landscaped areas, shall drain within 2 hours.

10.5 Shallow Utilities (Gas, Electrical, Cable, and Telephone)

- 10.5.1 All shallow utilities building services shall enter the School near the electrical room and is Site dependent.
- 10.5.2 SaskPower, SaskEnergy, and SaskTel shall be contacted to finalize designs.

10.6 Site Grading

- 10.6.1 A comprehensive Site survey has been conducted, refer to the Data Room for additional civil information for each municipality. Project Co shall confirm all existing grades.
- 10.6.2 Project Co is responsible for Site stripping and grading to subgrade as is suitable for each School.

- 10.6.3 Site conditions shall be considered “as is”. Project Co shall be responsible for the disposal of all deleterious material (i.e. topsoil, plants, shrubs, trees, etc.), and the import or export of fill material.
- 10.6.4 The final subgrade and all fill material shall be inorganic, suitable for compaction, considered as the substructure for all the contemplated uses on the Site.
- 10.6.5 Project Co shall provide the soft surface grades such that it shall have 2% to 20% slope away from the School, unless otherwise determined by the geotechnical report.
- 10.6.6 Any grade greater than 20% slope shall require a retaining wall.
- 10.6.7 Any retaining wall greater than 1.2 m in height shall be a designed and stamped by a structural engineer and may require geotechnical consideration.
- 10.6.8 Project Co shall provide the parking lot grades such that it shall have a minimum slope of 1% and a maximum slope of 4%.
- 10.6.9 Project Co shall design the grades to ensure positive drainage away from the School. Continuous positive drainage between School and parking areas and continuous positive drainage between School and soft surface areas.
- 10.6.10 Site grading under the Relocatable Classrooms shall be taken into account and shall drain away from the School.
- 10.6.11 Except as conforming to the development standards of the municipality, Project Co shall provide the grades of the Site to have no localized low spots, without catchbasins.
- 10.6.12 Project Co shall prevent damage to trees, benchmarks, existing curbs, walks and subsurface Utilities to remain within the municipality’s right-of-way.

10.7 Concrete Driveways

- 10.7.1 Project Co shall provide private driveways aprons within the public road right of way in accordance to the specifications of the relevant municipality.
- 10.7.2 Project Co shall provide private driveways entrance locations to the School no closer than 7.5 m from the nearest edge of any public roadway intersections.
- 10.7.3 Project Co shall provide private driveways entrances at public T-intersections to match the opposing roadway centerlines or be offset by at least 25.0 m.

10.8 Public Transit

- 10.8.1 Project Co shall confirm with the relevant municipality that the bus loading and unloading areas do not conflict with the Public Transit Bus Stops.

10.9 Refuse and Drop Off Areas

- 10.9.1 Refuse Areas shall be provided closer to the street and to minimize the on-site vehicle maneuvers. Ensure the refuse vehicles do not back on to the public street.
- 10.9.2 Refuse Areas shall be provided in a visible location when in proximity to pedestrian crossings.
- 10.9.3 All refuse areas shall be enclosed in accordance to the relevant municipal standards and be of sufficient size to accommodate 2 bins for each the public school, the Catholic school and 1 bin for the Child Care Centre.
- 10.9.4 Project Co shall [provide pavement structure details](#). All refuse and drop-off areas which slope to drain in accordance with the respective municipality's requirements. Paved pads shall be of sufficient size to accommodate the bins and the front wheels of the service truck.
- 10.9.5 Project Co shall provide all refuse pick-up areas and drive aisles accessing the refuse pick-up areas to heavy duty asphalt requirements, the remaining areas shall be designed for standard duty asphalt requirements.

10.10 Asphalt Parking Areas

- 10.10.1 Project Co shall design parking area to be paved and shall slope to drain in accordance with the respective municipality's requirements.
- 10.10.2 Project Co shall design each School to include without limitation separate parking areas for each public school and Catholic school.
- 10.10.3 Project Co shall include without limitation the minimum number of parking stalls as indicated in the following Tables 1 and Table 2:

10.10.3 - Table 1: On-Site

	GSCS Staff	SPS/ PSSD Staff	Child Care Centre Staff	Community Resource Centre	Barrier Free	Loading Space	General Drop Off	Total On-Site Parking Stalls
Evergreen*	51	59	10	1	2	2	18	143
Hampton*	51	59	10	1	2	2	18	143
Stonebridge*	51	59	10	1	2	2	18	143
Rosewood*	51	59	10	1	2	2	18	143
Martensville*	36	59	10	1	2	2	7 (c) / 9(p)	126
Warman*	36	59	20	1	2	4	18 (c) / 9 (p)	149

* Denotes sites that require approval by local Municipality regarding proposed on-site versus off-site drop off
 c) Denotes Child Care drop-off
 p) Denotes Passenger drop-off

10.10.3 - Table 2: Off-Site

	Loading Space	Delivery Space	Drop Off	Total Off-Site Stalls	GSCS Bus Drop Off	SPS/ PSSD Bus Drop Off
Evergreen*	-	-	17	17	5	8
Hampton*	-	-	17	17	4	8
Stonebridge*	-	-	17	17	5	8
Rosewood*	-	-	17	17	4	8
Martensville*	-	-	9 (p)	9 (p)	5	7
Warman*	-	-	9 (p)	9 (p)	6	8

Note: The Parking counts noted in Table 1 and Table 2 reflect the minimum project requirements which may or may not exceed the Municipal Bylaw requirements.

- 10.10.4 Project Co shall include without limitation the minimum number of barrier-free stalls as required by the relevant municipality’s land use bylaws, as indicated in the above table but to be confirmed by Project Co.
- 10.10.5 Project Co shall provide standard duty pavement for the asphalt parking areas.
- 10.10.6 Project Co shall ensure that its parking area design include without limitations painted lines, a minimum of 100 mm wide, for demarcating parking stall locations, the loading and drop-off areas and the refuse areas and crosswalks.
- 10.10.7 Project Co shall include without limitation an international graphic sign at all barrier-free parking stall locations in accordance to the relevant municipal standards.
- 10.10.8 Project Co shall provide plug-in post or rail for all staff parking stalls, where the power can be turned on or off.

10.11 Concrete Sidewalks and Curbs

- 10.11.1 Project Co shall minimize the number of pedestrian and vehicle crossings.

- 10.11.2 Project Co shall include standard concrete curbs around the drop-off area, drive aisles, and parking areas without limitation. All asphalt surfaces shall interface with soft landscaped areas with a concrete curb, except at play tarmacs and any asphalt pathways.
- 10.11.3 All concrete curbs shall be barrier curb and/or curb and gutter.
- 10.11.4 All concrete surfacing shall be brush finished.
- 10.11.5 Project Co shall provide the bus loading/unloading areas to include without limitation a curbline sidewalk with a minimum width of 4.0 m or the distance between the curb and sidewalk.
- 10.11.6 Where the drop-off area is on the public street, a minimum width of 2.5 m sidewalk is required or the distance between the curb and the sidewalk.
- 10.11.7 All concrete walkways shall be designed and graded to prevent any water from accumulating on the surfaces of the walkway.
- 10.11.8 Project Co shall include without limitation barrier-free access from the drop off areas, parking areas, and main drive aisles to the doors of the School.
- 10.11.9 Project Co shall be responsible for the adjustment or addition to all sidewalks, curbs, and driveway entrances within the municipal street right of ways to the relevant municipal standards.
- 10.11.10 Project Co shall design all refuse areas to include without limitation concrete aprons for the refuse storage area and these shall be designed to extend to ensure that the front wheels of the dumpster truck shall also be on the concrete apron when dumping occurs.

10.12 Erosion and Sediment Control

- 10.12.1 Project Co shall apply erosion and sediment control measures as required onsite during construction, and as required for maintenance purposes.

PART 11. DESIGN CRITERIA – SITE DEVELOPMENT AND LANDSCAPING**11.1 Exterior Spaces for Students, Staff and Visitors**

- 11.1.1 Project Co shall integrate the School design with the surrounding neighbourhood with respect to the Site context, the School siting, and to plan a seamless integration of the School with the community.
- 11.1.2 Project Co's design of the Site shall not negatively impact adjacent spaces, including but not limited to Municipal Reserves (adjacent parcels of land dedicated to the public use and owned by the City), streetscapes, boulevards, and residential or other lots.
- 11.1.3 Project Co's design of the Site shall coordinate with the existing or proposed Municipal Reserves (adjacent parcels of land dedicated to the public use and owned by the City) spaces including but not limited to, the design of pathways, irrigated and non-irrigated turf, planting, play structures, recreational fields / courts and site furniture.
- 11.1.4 Project Co's design of the Site shall minimize or reduce the negative micro-climatic effects, including snowfall patterns, arising from the location and configuration of parking, walkways and School, including effects of School entrance orientation on student, staff and visitor comfort and safety.
- 11.1.5 Project Co's design of the Site shall integrate the existing Site topography and minimize its impact on Site circulation, School locations and configuration.
- 11.1.6 Project Co. shall use wood stone and other natural materials at community entrances and throughout the sites to reflect local community, heritage, spirituality and First Nations and Metis culture.
- 11.1.7 In accordance with CPTED principles, Project Co's design avoids jogs and indents along the building envelope that create hidden areas that are difficult to supervise, including when the Relocatables are added. In some cases this required adding floor space on the interior of the building however, the need to provide safe spaces for students was seen as a greater priority.
- 11.1.8 Provide exterior public spaces that:
 - 11.1.8.1 welcome and engage visitors, students, and staff;
 - 11.1.8.2 provide protection from sun, wind, rain and polluted air produced by roadways and parking areas;
 - 11.1.8.3 have visual appeal throughout the year;
 - 11.1.8.4 are safe, with adequate lighting for visitors and students;

11.1.8.5 provide paving with a smooth surface, tight joints and a maximum slope of:

11.1.8.5(1) 1:20 where travel is uni-directional; or

11.1.8.5(2) otherwise a maximum slope of 1:50;

11.1.8.6 incorporate principles of CPTED, to enhance safety, community supervision, clear lines of sight and access.

11.1.9 Waiting Areas

11.1.9.1 Project Co shall provide a waiting area for those transitioning from after-hours activities at the School to leaving the School and vice versa. Waiting areas shall be highly visible from street drop-off areas and interior School spaces and shall be located in close proximity to the Community Resource Centre entrance. One (1) waiting area is required for each Site.

11.1.9.2 Waiting areas shall include benches that accommodate a total of 6 children, a trash container, separation from other areas and wind abatement.

11.1.9.3 Paved areas shall be accessible and transitions from School and drop-off areas shall be smooth so as not to cause impediment.

11.2 Circulation and Adjacencies (Pedestrian and Vehicular)

11.2.1 Circulation shall co-ordinate the movements of vehicles and pedestrians. The design shall emphasize safety.

11.2.2 Pedestrian Walkways

11.2.2.1 Integrate pedestrian circulation throughout the Site that minimizes conflict with vehicles zones.

11.2.2.2 Design pathways to provide universal access to all entrances and exits, parking, play areas and city walks.

11.2.2.3 Where pedestrians have to cross vehicular traffic, such as in school parking lots, dedicated cross walks shall be provided, be clearly marked and consist of raised, stamped-asphalt crosswalks, in order to both make them obvious to drivers, but also to the students, to direct the students to the appropriate places to cross traffic.

11.2.2.4 Ensure that pathway lighting levels correspond with the use of a given area.

11.2.2.5 Design pathways and sidewalks to provide natural visual surveillance by School Board staff in the public school and Catholic school.

- 11.2.3 Vehicular access & parking design principles:
- 11.2.3.1 Integrate vehicular circulation with layout of pedestrian zones on the Site to provide visible connections, promote safe travel, and minimize conflict between vehicles and other modes of travel. The driveways shall provide connections between the surrounding roads and major entrances to the School.
 - 11.2.3.2 Provide vehicle parking stalls which include standard stalls and handicapped spaces. Stall dimensions shall adhere to municipal requirements.
 - 11.2.3.3 Design access roadways and drive lanes to support the level of use planned.
- 11.2.4 Bicycle access & storage design principles:
- 11.2.4.1 Provide well-lit secure bicycle locking/parking facilities. These shall be located near main entries and student entries to the public school and Catholic school and Site where they are highly visible from the public school and Catholic school.
- 11.2.5 Site Wayfinding and Exterior Signage design principles:
- 11.2.5.1 Design pedestrian pathways to ease wayfinding and create an amenable environment for pedestrians. Encourage pedestrians to avoid unsafe vehicle drive lanes by providing well-signed alternative pedestrian routes. Utilize paving patterns or markings which can easily be differentiated from vehicular paving by pedestrians where they cross vehicular traffic.
- 11.2.6 Site Access for the Disabled design principles:
- 11.2.6.1 The primary pedestrian system and principal entrances to the School shall be accessible to the physically challenged.
 - 11.2.6.2 Use appropriate signage, markers, or other levels of wayfinding along access routes to indicate to the physically challenged the route terminus points or any required route changes to ensure convenient universal access throughout the Site.
- 11.3 Recreational and Tarmac Play Surfaces**
- 11.3.1 Project Co shall design suitable areas for future CSA and Annex H compliant, play structure(s) (excluding playground equipment).

- 11.3.2 Areas for future playground equipment shall include CSA and Annex H compliant surfacing, subsurface drainage, and appropriate borders, except where variations exist. Refer to Part 13 [School Board Design Variances] for additional information.
- 11.3.2.1 If used, timber borders shall be pressure treated square, minimum dimension of 140 mm x140 mm; lapped joints; rebar driven through pre-drilled holes.
- 11.3.2.2 Subsurface drainage shall include weeping tile wrapped in fabric sock in sufficient quantity and appropriately placed to drain safety surfacing material. Weeping tile shall empty into storm water catch basin or into a sufficiently lowered area to ensure material is kept consistently free of water after rain events.
- 11.3.3 There shall be 110 m² / 100 students based on stable enrolment, of playground equipment area. Project Co shall divide the play areas into areas corresponding to grades: K-3 and 4-6. Play surfaces for future playground equipment shall not be required for Pre-Kindergarten within the Pre-Kindergarten play areas adjacent to the Pre-Kindergarten exterior accesses. Area of required safety surface for future playground equipment shall be divided equally between grades K-3 and 4-6, where Site allows. The Pre-Kindergarten stable enrolment numbers shall not be excluded from the calculation for the total required area for play surfaces.
- 11.3.4 No stormwater storage shall be permitted in future playground equipment areas.
- 11.3.5 Project Co hereby acknowledges and agrees that the initial development of the playground and the initial addition of playground equipment by the Authority shall not be considered a Change as defined in Schedule 6 [Changes, Minor Works and Innovation Proposals].
- 11.3.6 Project Co shall design a hard surface (tarmac) play area for each public school and Catholic school and to the following minimum area requirement: 170 m² per 100 students at stable enrolment projection. This calculation excludes bike parking, complete with suitable spaces for bikes, required basketball court and pathway paving within or separate from hard surface play areas.
- 11.3.7 Hard surface (tarmac) play area shall:
- 11.3.7.1 have a 2%-3% slope away from the School and conform to overall drainage plan;
- 11.3.7.2 No stormwater storage shall be permitted in hard surface (tarmac) play areas or asphalt play areas.
- 11.3.7.3 be designed to light duty requirements or as determined by geotechnical review and include a slurry coat.

11.3.8 Project Co shall design a regulation (15 m wide by 25 m long) asphalt basketball play surface complete with lines for one full size court and two smaller courts that run across the full width.

11.3.8.1 Asphalt basketball play surface shall be sloped to drain at 1%-2% directed away from the School and conform to overall drainage plan.

11.3.8.2 No stormwater storage shall be permitted in hard surface (tarmac) play areas or asphalt basketball play areas.

11.3.9 The Authority shall be responsible for future line painting and periodic maintenance of line painting of basketball play areas and other playground games or graphics, and coordinate these activities with Project Co. Project Co shall coordinate periodic maintenance of tarmac and basketball play areas with the Authority and the relevant Public school and Catholic school.

11.3.10 Project Co shall provide a minimum 3 m by 3 m sandbox integrated into hard surface with positive drainage and an edger in all Pre-K and Child Care play yard.

11.3.11 Granular surfacing (play sand) shall be natural, washed sand of rounded particles, free of fines, clay, silt, stones or other debris 150 mm thick, meeting the following gradation requirement:

Sieve Size	Percent Passing
9.5 mm	100
6.7 mm	100
4.75 mm	99.9
2.36 mm	97-100
1.18 mm	70-90
600 um	25-60
300 um	5-25
150 um	0-3
75 um	0-1

11.3.11.1 Provide non-woven geotextile below sand and above compacted granular base. Geotextile shall not be visible above final play sand level.

11.3.12 Project Co shall provide an asphalt pathway loop with a minimum length of 20 m and a minimum width of 1200 mm in Pre-Kindergarten and Child Care Centre play yard.

11.4 Pedestrian Area Paving

11.4.1 Project Co shall include without limitation barrier-free, concrete walkways from the municipal street to the three main entrances (two School entrances and one Community Resource Centre / Child Care Centre entrance) with a minimum width of 4.0 m.

- 11.4.2 Project Co shall include without limitation, where student entrances are at the rear of the public school and Catholic school, barrier-free, concrete walkways from the bus drop-off areas on the municipal street to the student entrances or edge of asphalt play tarmac adjacent to student entrances with a minimum width of 2.5 m unless noted otherwise.
- 11.4.3 Project Co shall provide a concrete walk of minimum width 4.0 m or entire width of existing boulevard, whichever is greater, adjacent and parallel to bus drop-off areas. Bus drop-off areas shall be designed to accommodate existing or future boulevard tree planting and utilities.
- 11.4.4 Project Co shall provide a concrete walk of minimum width 2.5 m or entire width of existing boulevard, whichever is greater, adjacent and parallel to parent drop-off areas. Parent drop-off areas shall be designed to accommodate existing or future boulevard tree planting and utilities.
- 11.4.5 Project Co shall provide barrier-free, hard surface walkways to sufficient other egress doors to the School to meet minimum barrier-free requirements.
- 11.4.6 Hard surface walkways shall connect to all existing or proposed pathways in adjacent Municipal Reserves (adjacent parcels of land dedicated to the public use and owned by the City), except where variations exist. Refer to Part 13 [School Board Design Variances] for additional information.
- 11.4.6.1 Provide three locations as indicated by Project Co. submission for Saskatoon sites, helping students coming across the MR to get to their entrances.
- 11.4.6.2 Provide three locations as indicated by Project Co. submission for Warman and Martensville sites, helping students coming across the MR to get to their entrances.
- 11.4.6.3 A unit paving path will be provided from the Hampton Village school to the adjacent Municipal Reserve.
- 11.4.6.4 Path width from the Hampton Village school to the adjacent MR shall be 4.5 – 5 m wide.
- 11.4.7 Barrier-free, hard surface walkways shall connect to the future play areas, outdoor learning space, storytelling circles, shared basketball court and bike parking.
- 11.4.8 Concrete and asphalt walkways shall be designed and graded to prevent any water from accumulating on the surfaces of the walkway, and to meet accessibility guidelines for slope, cross slope and jointing.

- 11.4.9 Project Co shall provide concrete furniture pads for trash units, bicycle racks and Child Care Centre storage shed. The Child Care Centre outdoor toy storage shed shall be a 3.0 m by 3.6 m x 2.4 m high standalone shed, with lockable double doors, accessible by children and adults and located within the Child Care Centre yard, shall not be located adjacent to School windows, shall have convenient access from within the yard and shall not be considered part of the yard area calculation. Storage shed shall be finished with durable exterior materials complementary to the exterior of the School.
- 11.4.10 Unit pavers may be used in a limited way as accents in major walkways and in learning spaces and storytelling circles.
- 11.4.10.1 Unit pavers shall be installed over concrete where expansive clay soils are the existing primary soil condition.
- 11.4.10.2 Unit pavers shall be uniform in material and size and from one manufacturer
- 11.4.10.3 Unit pavers shall have minimum 55 MPa compressive strength; maximum 5% water absorption; freeze thaw resistant; integral colour unless approved by Authority.

11.5 Exterior Learning Spaces and Story Telling Circles

- 11.5.1 Project Co shall design each public school and Catholic school to provide outdoor areas that are expected to be used for formal and informal teacher-directed educational activities in locations as follows:
- 11.5.1.1 Learning spaces shall be sized and contiguous such that they can accommodate a class seated at tables, with convenient access from the older ages exit doors and with good surveillance from interior spaces.
- 11.5.1.2 Storytelling circles are expected to be used primarily by the younger grades, the Pre-Kindergarten and Kindergarten classes, with immediate, convenient access from Pre-K and Kindergarten exit doors.
- 11.5.1.3 Project Co. shall provide power outlets on the exterior of the School as well as at the outdoor Learning Spaces. This provides opportunities for furthering the connection of the facility to the community by enabling events to be put on by the schools and/or community groups. Such events will activate the site during non-school hours strengthening the safety and use of the site.
- 11.5.2 Each learning space shall include accessible unit paver hard surfacing of a size and arrangement to accommodate max 30 students at picnic tables and / or benches.
- 11.5.3 Storytelling circles shall include accessible unit paver hard surfacing of a size and arrangement to accommodate 30 students seated directly on the hard surface or on portable seats.

- 11.5.4 Learning spaces shall be screened from adjacent areas using planting, and/or fencing with a maximum height of 1200 mm or berming if appropriate.
- 11.5.5 Minimum sizes for learning spaces and storytelling circles are:
- 11.5.5.1 Learning spaces: minimum 22 m² / 100 students per public school and Catholic school based on stable enrolment. One space per School. One larger contiguous space is allowed provided that sufficient screening and separation is provided to allow 2 classes to use the space simultaneously.
- 11.5.5.2 Storytelling circles: 40 m² per circle, 1 per public school and Catholic school.
- 11.5.6 Edges of learning spaces and storytelling circles shall have approximately 85-90% permanent seating with a “natural” aesthetic such as a solid stone and mortar seating wall.. This cannot be counted toward seating count noted previously.
- 11.5.7 Trees shall be planted to provide shade to storytelling circles.
- 11.5.8 Plant material associated with learning spaces and storytelling circles shall be native to the region or otherwise provide a proven learning objective. Coordinate plant material selections and objectives with the development of the Educational Manual per the LEED® innovation credit.

11.6 Turf and Planting

- 11.6.1 All areas that are not hard surfaced or building shall be landscaped using a combination of trees, shrubs, planting beds and turf. Bare dirt shall not be permitted.
- 11.6.2 Trees shall be used to provide shade and screening for parking lots, shade for play and learning areas, and as street trees adjacent to registered road right-of-ways.
- 11.6.3 Shrub planting shall be used to provide screening, provide visual interest from interior spaces, and as part of the exterior learning spaces.
- 11.6.4 Tree and shrub planting selections shall:
- 11.6.4.1 reflect the character and climatic demands of the region,
- 11.6.4.2 be drought tolerant in areas without a permanent automated irrigation;
- 11.6.4.3 minimize the potential for allergic reactions and excessive maintenance demands such as avoiding those species which produce an excessive amount of pollen, seed “fluff”, or seeds; and
- 11.6.4.4 take into account the mature height and width of the plant material such that sight lines are maintained, and areas are screened over time and mature

- plant size does not interfere with walks, door movement, eaves, downspouts or any other architectural or site feature.
- 11.6.4.5 Tree and shrub nursery shall be located in Canadian hardiness zone 3a or hardier.
- 11.6.4.6 Imported plant material must be accompanied with necessary permits and import licenses. Transportation of elm trees must comply with Provincial DED regulations.
- 11.6.4.7 Roses shall be sourced from areas free of the pathogen *Phytophthora ramorum*.
- 11.6.4.8 Quality and source shall comply with latest edition of the “Canadian Standards for Nursery Stock”, by the Canadian Nursery Landscape Association (CNLA), referring to size and development of plant material and root ball. Project Co. will consult the [Native Plant Society of Saskatchewan](#) for plant material suggestions as it relates to visual representation of First Nations and other relevant cultures.
- 11.6.4.9 Minimum plant sizes shall be as follows:
- 11.6.4.9(1) Deciduous trees – 40 mm caliper for Site trees; 60 mm caliper for perimeter trees.
 - 11.6.4.9(2) Coniferous trees – 1800 mm height.
 - 11.6.4.9(3) Deciduous shrubs – #2 pot size.
 - 11.6.4.9(4) Coniferous shrubs - #2 pot size.
- 11.6.5 Tree species for SPS sites will be a variation [Refer to Part 13 School Board Design Variances].
- 11.6.6 Tree and shrub planting sizes, species and counts shall meet the minimum requirements of the municipality as well as the following counts, whichever is the maximum.
- 11.6.6.1 Perimeter Tree Planting: shall meet or exceed the minimum requirements of the municipality within the Site perimeter or, if allowable and available for planting as determined by the local municipality, within the registered road rights-of-way.
 - 11.6.6.2 Interior Site Tree Planting: Minimum Four trees / 1000 m² of Site excluding perimeter tree planting

- 11.6.6.3 45 m² of shrub planting bed per 1000 m² of Site calculated area, excluding shrub planting to be used for parking lot screening
- 11.6.6.4 In addition to municipal requirements, shrub planting shall be used to screen parking lots adjacent to Municipal Reserves (adjacent parcels of land dedicated to the public use and owned by the City) and to play or tarmac areas.
- 11.6.6.5 With reference to the tree and shrub planting requirements, "Site" is calculated as: the gross Site area minus the School footprint, excluding Relocatables.
- 11.6.7 Mulch shall be provided to planting beds and tree wells to increase moisture retention and reduce weed growth. Mulch shall be untreated wood fibre and shall be provided to a depth to meet above performance criteria without the use of landscape fabric. Clean, rounded washed rock installed over professional grade landscape fabric shall only be used in areas without perennials, shrubs, needle or fruit bearing plants. Mulch shall be tapered to base of plant. Refer to Part 13 [School Board Design Variances] for additional information.
- 11.6.8 Topsoil and planting mix for turf, tree and shrub planting shall be proven suitable for growing the selected species through testing which determines texture, nutrient composition, pH, organic carbon and salinity and which determines recommended fertilizer composition.
- 11.6.8.1 Topsoil shall be black topsoil, a fertile, friable natural loam, neither heavy clay nor very light sand, consisting of not less than 4% organic matter for clay loams and not less than 2% for sandy loams, with an acidity value ranging from pH 6.0 to 8.0.
- 11.6.8.2 Planting mix shall be 60% topsoil, 20% peat moss or well-rotted manure, 20% sharp-grained sand.
- 11.6.9 Topsoil and planting mix shall be spread evenly where required. Eliminate rough and low areas to ensure positive drainage and to assure compliance with site grading plans. Topsoil shall be used in turf areas; planting mix shall be used for planting beds and trees. Depth of topsoil and planting mix for beds must a minimum of 150 mm and 500 mm, respectively.
- 11.6.10 Areas of turf shall be seeded or sodded with grass species that are reflective of the level of use, soil conditions and the expected water regime. Project Co shall consider the use of sod in areas of high traffic.
- 11.6.11 Hydro-mulch shall be used in all seeded areas.

- 11.6.12 Slopes in turf and shrub/perennial planting bed areas shall be a minimum of 2% to promote adequate drainage and conform to the overall drainage plan..
- 11.6.13 Erosion control measures, including but not limited to erosion control blanket and turf reinforcement mats, are to be used where slopes require stabilization.
- 11.6.14 Erosion control blanket shall be agricultural straw or straw / coconut fibre mix stitched between two woven biodegradable nets.
- 11.6.15 Hydro-mulch shall be straw or wood cellulose hydro-mulch with a tackifier of plant derived hydrocolloid polysaccharide (guar), organic psyllium fiber or water dilatable liquid dispersion containing thermoplastic resin. Mix and application rate shall be per manufacturer's instruction.
- 11.6.16 Seeds shall be certified Canada No. 1 Grade to Government of Canada Seeds Regulations and have a minimum germination of 75% and minimum purity of 97%.
- 11.6.17 Fertilizer shall be a complete commercial synthetic slow release fertilizer with maximum 35% water soluble nitrogen, uniform in composition and free-flowing.
- 11.6.18 Kentucky Bluegrass sod may be in areas with permanent irrigation; Fescue-based low-watering sod may be used areas without permanent irrigation.
- 11.6.19 Sod shall be Grade No. 1 cultured turf in accordance with the current edition of the "Metric Guide Specification for Nursery Stock" of the Canadian Nursery Landscape Association (CNLA).

11.7 Irrigation

- 11.7.1 Project Co shall include an automated, high efficiency landscape irrigation system for the front yards. All other turf and planting areas shall be watered manually. Refer to Part 13 [School Board Design Variances] for additional information.
- 11.7.2 The "front yard" shall wholly incorporate the main School entry walks and the bed, turf and yard areas associated with these. In some cases this shall also include the parking lot area. The automated irrigation system shall end at walks, planting beds or some other appropriate barrier so that the maintenance operations are simplified.
- 11.7.3 Irrigation shall also be provided to areas adjacent to irrigated turf in Municipal Reserves (adjacent parcels of land dedicated to the public use and owned by the City), boulevards or park entries where edge of adjacent space is not clearly identified with a walk, continuous planting bed, fence or other continuous landscape element, AND if these areas are less than 10 m wide.

- 11.7.4 The School shall be provided with sufficient numbers of exterior hose bibs to allow for manual watering of turf and planting areas using a maximum 30 meter hose. Location and number of hose bibs shall ensure that watering hoses shall not impede pedestrian or vehicle traffic. Refer to Schedule 3, Part 7 [Design Criteria - Mechanical] for additional information.
- 11.7.5 Irrigation systems shall be designed to minimize water waste including, but not limited to, head spacing and spray pattern, match precipitation rates, watering times and length, head type, low-flow components, moisture sensing equipment, integration of local climate data and re-use of rainwater.
- 11.7.6 Design of irrigation systems shall consider different water requirements of plant or turf type, as well as microclimate.
- 11.7.7 Irrigation system design shall include commercial grade equipment that is suited to the local soil condition, water supply and regional climate with extra capacity for future expansion. PVC distribution pipe is not acceptable.

11.8 Site Furniture, Flag Poles and Fencing

- 11.8.1 Project Co shall provide a select suite of site furniture, however, it is expected that additional site furniture shall be installed at various times throughout Project Co.'s maintenance period through the fundraising efforts of School, parent and / or community groups.
- 11.8.2 Project Co shall provide commercial-grade site furnishings selected on the basis of: durability, easement of maintenance and style in relation to the building architecture and landscape design,
- 11.8.2.1 Metal shall be stainless steel or cast aluminum or steel with powder coat finish.
- 11.8.2.2 Wood furnishings shall be not be permitted unless approved by Authority.
- 11.8.3 Site furniture distributed throughout the Site includes:
- 11.8.3.1 Six basketball standards and baskets shall be installed on basketball court to accommodate half court and full court play. One basketball standard and basket per School shall be installed on their corresponding asphalt (tarmac) play areas.
- 11.8.3.2 One multi-exit hoop per School installed adjacent to their corresponding asphalt (tarmac) play areas
- 11.8.3.3 Seven trash units distributed throughout the Site in locations next to walkways and learning spaces

- 11.8.3.4 Bicycle racks of sufficient quantity to accommodate the bicycles of 15% of the stable student enrolment number. Bicycle racks shall be distributed throughout the Site and be located adjacent to walkways in locations with good surveillance from interior spaces. Location of bicycle racks and secured bicycles shall not impede movement of pedestrians into and out of the building.
- 11.8.4 Project Co acknowledges and agrees that the future installation of site furniture by the respective School Boards, parent and / or community groups shall not be considered a Change as defined in Schedule 6 [Changes, Minor Works and Innovation Proposals]. Coordination of the installation shall be done by the Authority and the respective School Board.
- 11.8.5 Project Co shall include without limitation two aluminum flag poles per School. Flag poles shall have a minimum height of 7620 mm, with an internal halyard, rotating trucking ball and tilt base.
- 11.8.5.1 Flag poles shall be accessible at base for maintenance operations.
- 11.8.5.2 Project Co shall consult with the Authority and the respective School Boards to determine flag pole locations.
- 11.8.5.3 Flags shall be supplied and installed by the School Boards.
- 11.8.6 Project Co shall include without limitation barriers to direct pedestrians to marked cross walks and walkways. Refer to Schedule 3, Part 13 [School Board Design Variances] for additional information.
- 11.8.6.1 Shrub planting used on its own without fencing or parking rail shall not be considered a barrier to direct pedestrians.
- 11.8.7 Project Co shall include without limitation fencing with gates to enclose the Child Care Centre yard.
- 11.8.7.1 The Child Care yards of the Saskatoon, Warman and Martensville Sites shall enclose, at a minimum, 75% of the total exterior space that is required by the Provincial Daycare Regulations.
- 11.8.8 Child Care Centre yard and perimeter fencing shall be visually transparent, metal, installed to minimize movement from freeze-thaw cycles, wind, snow and moisture conditions, and:
- 11.8.8.1 Child Care Centre yard – 910 mm height; perimeter fence – 1200 mm height;
- 11.8.8.2 Gates – 1200 mm wide with locking hardware that shall release with fire alarm;

- 11.8.8.3 bottom of fencing shall not be more than 150mm off the ground surface; and
- 11.8.8.4 shall not be timber, PVC or welded wire.
- 11.8.8.5 if used, design for chain link fencing shall not use wire in place of top rail.
- 11.8.8.6 if used, pickets of metal picket fence shall not protrude above top rail of fence.
- 11.8.9 Pre-K yards shall be fenced in similar manner to Child Care Centre yard where co-located with parking at the front of the School. Pre-K fenced yards shall be a minimum of 112 sq.m., shaped to accommodate sandbox and walkway requirements outlined in Section 11.3.10 and 11.3.12 with remainder of minimum space to be turf or planting, and shall provide direct connection to Pre-K exterior doors.
- 11.8.10 Screen fencing that is used to screen parking lots and trash containers, or to screen other undesirable views, shall meet local municipal requirements and:
 - 11.8.10.1 be designed to suitably screen vehicles and trash containers such that undesirable views to these objects are minimized, including, but not necessarily limited to, height and opacity of material.
 - 11.8.10.2 be designed to withstand the conditions it shall experience (e.g. wind, vehicle impacts);
 - 11.8.10.3 not be PVC or chain-link with privacy insert slats; and
 - 11.8.10.4 not have, if timber, untreated fence boards; and
 - 11.8.10.5 bottom of fencing shall not be more than 150 mm off the ground surface.

PART 12. RELOCATABLE CLASSROOMS**12.1 Design Objectives**

- 12.1.1 Project Co shall, at a minimum, design the Relocatable Classrooms to be high-performance, long-life Relocatable units capable of being moved.
- 12.1.2 The Relocatable Classrooms shall be designed to meet, at a minimum, the requirements of this Part 12, and any other applicable requirements in Schedule 3 [Design and Construction Specifications].
- 12.1.3 The Relocatable Classrooms shall be designed to support the attainment of LEED® Certification for the new Schools to which they shall be attached, as defined in Schedule 2 [Design and Construction Protocols].
- 12.1.4 Project Co is encouraged to identify any innovation design options for the Relocatable Classrooms.
- 12.1.5 Relocatable Classrooms shall be manufactured such that the entire unit is CSA certified.

12.2 Functional Area Requirements – General

- 12.2.1 Project Co's designs shall comply with all modifications to the Relocatable Classroom required by each School Board and as set out in Schedule 3 [Design and Construction Specifications].
- 12.2.2 Project Co shall design the Relocatable Classrooms for a 35-year service life. It is intended that the Relocatable Classrooms can be, if required, moved to any other School in the Project, and accordingly, Project Co shall include without limitation the flexibility in design and construction to configure the Relocatable Classrooms and their adjoining corridors, in three different ways on any given School Site:
 - 12.2.2.1 individually attached to Schools end-on with or without an adjoining corridor;
 - 12.2.2.2 installed side to side in multiples, with exterior side walls having a 2400 mm x 3600 mm framed knock out panel on both sides located 3600 mm in from rear wall of unit concealed with rough bucks. If units are staggered they must provide a 2400 mm x 3600 mm opening to accommodate room to room access.
 - 12.2.2.3 installed end-to-end, with an adjoining corridor separating the units.
- 12.2.3 Project Co shall include without limitation the flexibility in design and construction, to configure the Relocatable Classrooms and their adjoining corridors in any combination of single storey or stacked two storey arrangements, located adjacent to different

Learning Communities, as determined by the School Boards to suit the student demographics.

- 12.2.4 Design modular classrooms to be compatible, for the purpose of connection, with the manufactured modular classrooms that are currently located throughout the Project in length, width and height and can be easily connected together to form larger spaces.

12.3 Classrooms

- 12.3.1 In order to connect the Relocatable Classrooms, Project Co shall design to constrain the maximum external dimensions of Relocatable Classrooms once installed on the School Site to the following dimensions:

12.3.1.1 A1 Unit – Main Floor (includes connecting corridor), A2 Unit – Second Floor (includes connecting corridor)

12.3.1.1(1) Width: 7315 mm (24'0");

12.3.1.1(2) Length: 15245 mm (50'0"); and

12.3.1.1(3) Height from top of subfloor to parapet: 3810 mm (12' 6" nominal),

12.3.1.2 B1 Unit – Main Floor, B2 Unit – Second Floor

12.3.1.2(1) Width: 7315 mm (24'0");

12.3.1.2(2) Length: 12195 mm (40'0"); and

12.3.1.2(3) Height from top of subfloor to parapet: 3810 mm (12' 6" nominal).

- 12.3.2 Project Co shall include without limitation a 45 minute fire-rated wall between classrooms and the corridor and shall include without limitation a one hour fire-rated separation between the mechanical room and a classroom.

- 12.3.3 Project Co shall design locker space in the relocatable classrooms in conjunction with the Authority. Project Co shall include without limitation double egress doors at one end of the corridor (applicable to Unit A1 and A2) where necessary.

- 12.3.4 Project Co shall design the interior partitions in a manner to allow for flexibility of room size and configuration during design. When Relocatable Classrooms are installed in pairs (A1/B1), provide 2 classrooms at 80 m² each and allocate the remaining 40 m² space to a combination of mechanical room, corridor, learning commons and/or break-out rooms to suit an enhanced learning environment that is integral to the core school design.

12.4 Classroom Interior

- 12.4.1 The classrooms within the Relocatable Classrooms shall be designed to meet the requirements of Schedule 3 , Part 6 [Design Criteria – Interior Fit-up and Finishes], Part 7 [Design Criteria – Mechanical] and Part 8 Design Criteria – Electrical], unless otherwise noted in this Part 12.
- 12.4.2 The mechanical room doors within the corridor shall be a rated metal door and frame designed to meet the acoustical requirements set out in Section 3.6 [Acoustic Design Criteria]. Hardware is to match the School design for hardware.

12.5 Other Interior Requirements

- 12.5.1 Project Co shall design the Relocatable Classrooms (including without limitation corridors) shall be fully sprinklered to meet the requirements of National Fire Protection Association (“NFPA”) Standard 13.
- 12.5.2 Project Co shall provide recessed sprinkler heads in ceiling areas to minimize vandalism.
- 12.5.3 Project Co shall provide wire guards in the mechanical rooms.

12.6 Other Constraints

- 12.6.1 Project Co shall allow Relocatable Classrooms to be assembled at the factory from smaller sub-units, provided that:
- 12.6.1.1 the structural and building envelope requirements for connections are met;
 - 12.6.1.2 structurally the Relocatable Classrooms are not disassembled for subsequent moves; and
 - 12.6.1.3 the Relocatable Classrooms are effectively a single unit for all subsequent moves within the Project in order to address concerns about the integrity of the connections.
- 12.6.2 Project Co shall design the Relocatable Classrooms for a minimum of 10 moves over the service life.

12.7 Physical Connection to the School Structure

- 12.7.1 Project Co shall design the Relocatable Classrooms so that physical connection of the Relocatable Classroom at the School Site to the School Structure can be accomplished with a minimum of on-site construction.
- 12.7.2 Designs shall ensure that electrical, communications and control wiring shall be terminated in easily-accessible panels or junction boxes at suitable locations. The

designs shall ensure that mechanical system water and drain lines shall be capped at suitable locations.

12.8 Structural - General Requirements

- 12.8.1 Project Co shall ensure that the structure of the Relocatable Classrooms is sufficiently sound to permit safe occupancy and use of the Relocatable Classrooms.
- 12.8.2 The Relocatable Classrooms are intended to be structures capable of being moved to accommodate changing demands resulting from shifting demographics or other School jurisdiction requirements. The Relocatable Classrooms should be designed to be able to be moved over 10 times during the first 30 years of their life. They must be stackable, two units high.
- 12.8.3 Project Co shall design the Relocatable Classroom unit, constructed by various methods, with a steel under-frame designed to support services loads and dynamic loads during transport without any detrimental effects to their structural integrity.
- 12.8.4 Structural details and building envelope details shall be developed taking into consideration other movements including but not limited to the effects of shrinkage, settling and contraction.
- 12.8.5 Project Co shall structurally design and detail the fastening, support, and backing systems of the Relocatable Classrooms for exterior wall cladding and attachments.
- 12.8.6 Steel connections outside the air barrier shall be galvanized.
- 12.8.7 Project Co shall avoid thermal bridging in its design. Where this is not possible, Project Co shall incorporate measures in its design to minimize the effect of thermal bridging.

12.9 Design Loads

- 12.9.1 Project Co shall design the Relocatable Classrooms for the following design loads:
 - 12.9.1.1 Units must be stackable, two units high;
 - 12.9.1.2 Wind Loads –designed for a 1/50 hourly wind pressure of 1.02 kPa;
 - 12.9.1.3 Snow Loads, Base Model (Standard Duty) – The structure of the Relocatable Classrooms shall be designed for a uniformly distributed snow load of 3.6 kPa;

- 12.9.1.4 High Snow Load Model (Heavy Duty) – Project Co shall include without limitation, in addition, a high snow load design, for Relocatable Classrooms that shall be used in high snow load locations or when placed adjacent to Schools with high walls or other structures that could result in snow drifting onto the roof of the Relocatable Classroom. The units in these cases shall be designed for a uniformly distributed snow load of 10.75 kPa;
- 12.9.1.5 Snow Loads, Identification of Relocatable Classrooms – Project Co shall include without limitation permanent identification of unit type as an SD (Standard Duty) unit or an HD (Heavy Duty) unit, by affixing a metal plate showing this designation, with one way screw heads, to the inside of the mechanical room wall, and, in addition, provide a label showing this designation attached to the door frame. Structural design loads shall be shown on Relocatable Classroom shop drawings; and
- 12.9.1.6 Occupancy Loads – The Relocatable Classrooms shall be designed for a uniformly distributed load of 2.4 kPa, except for assembly areas including without limitation corridors, which shall be designed for a uniformly distributed load of 4.8 kPa. Floor and roof structures shall also be designed for mechanical or equipment loads and other concentrated loads as required by the design.

12.10 Acoustics - General

- 12.10.1 The Relocatable Classrooms shall be designed by Project Co to minimize noise interference from outside the School, hallways, other classrooms, mechanical equipment and from within the classroom itself and to achieve a high level of speech intelligibility within the classroom, in accordance with the acoustic requirements defined in Schedule 3, Section 3.6 [Acoustic Design Criteria].

12.11 Building Envelope - General

- 12.11.1 Project Co shall design the Relocatable Classrooms with a high performance building envelope that enhances and is integrated with the other Building Elements and Building Systems that provide the thermal, visual and acoustic comfort that enable and support the learning environment, without compromising durability or maintenance, in accordance with the requirements defined in Schedule 3, Part 3 [Design Principles and Objectives] and Part 5 [Building Envelope].
- 12.11.2 Project Co shall design the air barrier such that it is continuous at all transitions between different construction assemblies of each Relocatable Classroom unit (floor to wall, roof to wall, window to wall, door to wall, door opening to door opening).
- 12.11.3 Project Co shall incorporate air tightness of the air barrier such that leakage of the overall air barrier system does not exceed the values set out in the National Building Code of Canada 2010, Table A-5.4.1.2, Recommended Maximum Air Leakage Rates,

when the building envelope is subjected to a differential pressure of 75 Pa when pressurized by a blower door, as demonstrated by blower door test conducted in accordance with ANSI/ASTM-779-99.

- 12.11.4 Project Co shall provide a means of maintaining the continuity of the air barrier and minimum insulation R-values to match wall, roof and floor minimums, between adjoining Relocatable Classrooms at door openings or at corridors, between Relocatable Classrooms and other construction (corridor or Core Structure) at the openings. The plane of the air seal shall be accessible.
- 12.11.5 Designs shall ensure that the air sealing component's adhesive and structural capacity is not exceeded due to movement of the structural elements. Movement could be caused by structural or wind loading, hygro-thermal (moisture transfer) movement, and movement due to transportation.
- 12.11.6 Project Co shall prevent condensation from forming on or within the construction assemblies, at transitions between different construction assemblies (floor to wall, roof to wall, window to wall), and at door connections between two adjoining Relocatable Classrooms or a Relocatable Classroom and other construction (corridor or Core Structure).

12.12 Roofs

- 12.12.1 Project Co shall design the roof of the Relocatable Classrooms to have a minimum slope to drain of 1:50 for field of roof. The slope shall be provided in the design of the Relocatable Classrooms towards one end of the structure complete with exterior drainage.
- 12.12.2 Project Co shall design a roofing system with proven performance in Saskatchewan climates.
- 12.12.3 Project Co shall design the roof drainage system to prevent water from draining over the wall cladding system.
- 12.12.4 Project Co shall consider a design which shall minimize damage to roof due to freezing of standing water or from vandalism.
- 12.12.5 Project Co shall include without limitation an engineer designed and approved personnel fall restraint system at the roof level.
- 12.12.6 Project Co shall design the minimum thermal resistance for the roof assembly, including without limitation thermal bridging, to RSI 4.4 m²*C/W.

12.13 Walls

- 12.13.1 Project Co shall design the cladding system to resist impact loads and to reduce the effects of vandalism.

- 12.13.2 Project Co shall design the cladding system to be easily painted to allow matching of colours to other sections of the School Structure at the School Site.
- 12.13.3 Project Co shall design the cladding support system to accommodate, at a minimum, both a cement board cladding application and a metal siding application.
- 12.13.4 Project Co shall design minimum overall thermal resistance of the walls, including without limitation thermal bridging, to RSI 2.6 m²*°C/W or better

12.14 Floor Structure

- 12.14.1 Project Co shall design the minimum thermal resistance for the floor assembly, including without limitation thermal bridging, to RSI 2.6 m²*°C/W or better.

12.15 Windows

- 12.15.1 Project Co shall provide a total of two operable windows per classroom in accordance with Schedule 3 [Design and Construction Specifications]. Project Co shall design window or window-wall assemblies to accept security screens or sacrificial glass as identified in Section 5.3.3.
- 12.15.2 Skylights or other forms of sloped glazing are not allowed, but alternate combinations of end-wall windows and overhead glazing such as light pipes or vertically-glazed clerestories shall be considered.

12.16 Doors

- 12.16.1 Project Co shall design the doors of hollow metal with ½ vision lite top and bottom to match Schools and to ensure barrier-free access. Door frames are to be welded steel frame.
- 12.16.2 Project Co shall design the mechanical room door and frame to meet the acoustical requirements of Section 3.6 [Acoustic Design Criteria].

12.17 Indoor Air Quality

- 12.17.1 Ventilation Air
 - 12.17.1.1 Project Co shall design the ventilation system for an average of 30 students per classroom.
 - 12.17.1.2 Regardless of the proposed heating and ventilation system, Project Co shall include without limitation equipment to allow full outside air economizer cycle for “free cooling” when outside air temperatures permit.
 - 12.17.1.3 Project Co shall design to provide heat recovery on exhaust air.

12.18 Power / Communication Conduit or Wall Channel Space

- 12.18.1 Project Co shall design the required and appropriate raceway for power and communications cabling systems to meet the needs of the Relocatable Classroom and to interface appropriately into the Core Structure.

12.19 Power Service

- 12.19.1 Project Co shall design a distribution panel for each classroom with sufficient capacity to handle all lighting, convenience power and mechanical loads, with ten percent (10%) spare capacity.
- 12.19.2 The panel shall be located in the Relocatable Classroom mechanical room, with appropriate service conductors to the Relocatable Classroom connection point in the corridor ceiling chase area.
- 12.19.3 Project Co shall provide a transient voltage surge suppressor in its own enclosure connected to a breaker in the panel.
- 12.19.4 The panel shall be of the same quality and design as those used within the Core Structure.
- 12.19.5 Provide a suitable grounding system. Bond all metallic raceways continuously with a bonding conductor installed within the raceway. Raceways shall not be used as a bond.
- 12.19.6 Provide digital pulse metering to provide detailed information about power quality and power consumption within each Relocatable Classroom. The metering shall be networked to the BMS for access by the School.

12.20 Convenience Power

- 12.20.1 Single circuit receptacles are to be provided at the TV and video projection locations;
- 12.20.2 Provide at least twelve (12) duplex receptacles, on six (6) circuits, for computer workstations, maximum two (2) workstations per circuit; and
- 12.20.3 Provide at least twelve (12) duplex general convenience receptacles, minimum of two (2) on each wall, maximum two (2) circuits.

12.21 Electric Lighting - Lighting Controls

- 12.21.1 Relocatable Classrooms lighting shall be separately controlled in a minimum of two segments, one near the whiteboard and one for the remainder of the room to facilitate overhead presentations and to adjust for daylight. Dimmable switching shall be as per the School's classroom light switching scheme and system with manual override for occupancy and daylight control.
- 12.21.2 Incorporate motion sensing control devices for the operation of light fixtures in all Relocatable Classrooms. Motion sensor operation shall be selectable to be manual ON/auto OFF or auto ON/auto OFF.
- 12.21.3 Classroom lighting controls shall employ low voltage relays controlled by the Core Structure's low voltage lighting control system, where applicable, or controlled by the Relocatable Classrooms motion sensor.

12.22 Communications

- 12.22.1 Project Co shall design a combination voice (1) and data outlet (4) on the wall near the door, intended for use at the teacher's desk.
- 12.22.2 Project Co shall ensure that the required provision of data outlets are made to each computer workstation.
- 12.22.3 Project Co shall provide infrastructure and speakers for a fully operational Class Call / Public Address system incorporated into the School's main system in each Relocatable Classroom with it being a separate zone controlled from their respective School administration area. This system shall be interconnected with the Classroom Sound Enhancement System.
- 12.22.4 Project Co shall ensure that the wireless network connections cover the Relocatable classrooms..
- 12.22.5 Project Co shall ensure that the systems provided for the Relocatable classrooms such as but not limited to the wireless clocks, sound enhancement system, etc interface to and match the systems provided within the Core Structure.
- 12.22.6 Project Co shall provide appropriate data outlet(s) at the teacher's desk and at the video/data projector interconnected by appropriate conduit raceway system.
- 12.22.7 Project Co shall design a junction box to connect the communication outlets in the classroom and corridors with an empty conduit for connection to the School Structure.
- 12.22.8 Project Co shall design so as to ensure that all of the above elements described in this Section shall be supplied with conduit in the wall stubbed to ceiling space. Refer to Schedule 3, Part 8 [Design Criteria - Electrical] for cabling requirements.

12.23 Fire Alarm

- 12.23.1 Project Co shall design fire alarm devices compatible with the School Structure fire alarm system.
- 12.23.2 Conduit/cabling shall be provided to the modular connection point to enable the devices in the classroom and corridor to be connected to the School system.
- 12.23.3 Project Co shall design fire alarm devices that allow for both audible and visual signals as per applicable Codes.

12.24 HVAC / Mechanical / Controls

- 12.24.1 Project Co shall ensure that the HVAC design responds to the loads imposed by the Relocatable Classroom's building envelope, internal loads and ventilation loads in an integrated fashion to achieve good thermal comfort, superior indoor air quality and to avoid excessive energy use.
- 12.24.2 While specific design criteria is detailed in Schedule 3, Part 7, Project Co shall incorporate the following general strategies for achieving high-performance HVAC:
 - 12.24.2.1 using high efficiency equipment, particularly equipment with high efficiency at part load;
 - 12.24.2.2 appropriate sizing, avoiding oversizing; and
 - 12.24.2.3 controls that respond to load and condition changes and that are compatible with the Core School Design BMS system.
- 12.24.3 Project Co shall provide a carbon monoxide detector in each Relocatable Classroom.

12.25 Heating, Cooling and Ventilation Air

- 12.25.1 For each Relocatable Classroom, Project Co shall design a dedicated HVAC unit that shall be located indoors, factory assembled and packaged as a complete unit and be accessible for ease of maintenance.
- 12.25.2 For the furnace that is supplied, Project Co shall design controls to include without limitation all hardwired safeties, bonnet temperature activated fan switch and heating/cooling fan speed interlocks.
- 12.25.3 Project Co shall ensure the HVAC unit meets the following minimum performance and design criteria:
 - 12.25.3.1 90% efficient natural gas furnace;
 - 12.25.3.2 exhaust air heat recovery shall operate continuously during occupied times with minimum outdoor air and exhaust air capacities of 210 L/s (450 cfm);

- 12.25.3.3 multi-speed supply air fan with high efficiency motor;
 - 12.25.3.4 a DX cooling coil and line sets consisting of two semi-flexible insulated copper lines that are designed to connect the coil to an outdoor condenser;
 - 12.25.3.5 an outdoor condenser sized to match the evaporator coil within the furnace. Minimum SEER rating of 13.
 - 12.25.3.6 supply air filter with an efficiency rating of MERV 13 (30% dust spot) for air systems with a capacity greater than 283 L/s (600 cfm);
 - 12.25.3.7 two stage gas valve or fully modulating gas valve with a 3:1 turndown ratio;
 - 12.25.3.8 supply air temperatures less than 12°C (55°F) shall not be permitted;
 - 12.25.3.9 modulating economizer to allow the use of 100% outside air for space cooling; and
 - 12.25.3.10 noise levels to meet specified acoustic requirements.
- 12.25.4 Project Co shall ensure the ductwork system meets or exceeds the following minimum performance and design criteria:
- 12.25.4.1 supply air into the classroom is primarily through ceiling diffusers;
 - 12.25.4.2 supply air is distributed so as to have some air wash over the windows;
 - 12.25.4.3 fully conceal all ductwork within the suspended ceiling space;
 - 12.25.4.4 return air from the classroom is through either a sidewall or ceiling grille;
 - 12.25.4.5 supply air and return air ducting is acoustically treated as required to meet specified acoustic requirements; and
 - 12.25.4.6 motorized and insulated relief damper with ducting, gooseneck, grille and other related components to relieve outdoor air from the classroom during economizer cycles.

12.26 Control System

- 12.26.1 Project Co shall design an electronic control panel or Remote Control Unit (“RCU”) to control HVAC unit occupied/unoccupied run times, room temperatures, ventilation quantities and heat recovery performance and to perform data logging and remote access.

- 12.26.2 Project Co shall design control system hardware to be BACnet compliant and shall be connected to and programmed by the BMS located within the School. Project Co shall design sensors, devices, controllers, School interface terminal strip, programming and design documentation manuals as required.

12.27 Mechanical – Fire Protection

- 12.27.1 Project Co shall include a sprinkler system complete with capped supply line stubbed for easy connection to the School system.

12.28 Mechanical – Water and Plumbing

- 12.28.1 For each Relocatable Classroom, Project Co shall design for the following elements to allow the potential to use condensing furnaces:

- 12.28.1.1 a grey water sump of sufficient capacity, 40 litres minimum;
- 12.28.1.2 stubbed in drain lines plumbed to the grey water sump to allow for potential mechanical furnace condensate line; and
- 12.28.1.3 a sump drain pump, with integral level control, and discharge line, run in a heated space within the Relocatable Classroom, and shall be connected to School Structure sewage system.

12.29 LEED® Criteria and Certification Requirements for Relocatable Classrooms

- 12.29.1 In all cases, the LEED® credits for the Relocatable Classrooms that are being pursued shall be consistent with those being pursued for the School Structure, including without limitation the Relocatable Classrooms required in order to achieve School Service Commencement, as a whole shall be evaluated for LEED® Certification.

12.29.2 Acceptance Testing of Relocatable Classrooms

- 12.29.2.1 Project Co shall build one complete Relocatable Classroom in the factory to function as a prototype unit that shall be used to test and verify the performance of the Relocatable Classrooms and which shall be close enough to the final design in function that it shall be installed at a School once prototype testing is complete.
- 12.29.2.2 Project Co shall carry out the necessary modifications to the prototype unit to ensure compliance with the LEED® Certification requirements, this Part 13, and other technical requirements set out in this Schedule 3 [Design and Construction Specifications] generally, and with the results of the following tests specifically, before proceeding with the manufacture of any other Relocatable Classrooms.

- 12.29.2.3 Project Co shall perform blower-door testing for air tightness of the completed prototype unit's building envelope and submit results to the Province. Project Co shall make arrangements to allow for the Authority to witness this test.
- 12.29.2.4 Project Co shall perform testing of acoustic performance of the completed prototype unit including without limitation for reverberation, sound isolation, impact isolation and background noise. Project Co shall make arrangements to allow for the Authority to witness these tests.
- 12.29.2.5 Project Co shall modify the prototype unit in order to apply the performance of the prototype unit to subsequent production Relocatable Classrooms, and deliver the prototype unit as part of the total number of Relocatable Classrooms required under the Project Agreement.

PART 13. SCHOOL BOARD DESIGN VARIATIONS**13.1 General**

13.1.1 The following additional design variations are required for the respective Schools but may not be detailed in the Indicative Designs. The following additional design variations amend the functional area requirements set out in Appendix 3A [Functional Program], Appendix 3B [Functional Program Room Data Sheets] and Schedule 3, Parts 4 to 12, to reflect each respective School Board's program requirements.

13.2 Saskatoon Public School Board (SPS) Variations**13.2.1 Civil**

13.2.1.1 Existing Ice rink shall be moved by the City prior to Project Co take over at Hampton Village.

13.2.2 Mechanical

13.2.2.1 The Pre-Kindergarten and Kindergarten washrooms shall utilize manual flush value with toilets maximum 280 mm in height.

13.2.3 Electrical

13.2.3.1 RF video distribution system not required.

13.2.3.2 Theatrical stage lighting system not required.

13.2.4 Landscape

13.2.4.1 All SPS Schools: safety surfaces for future playground equipment shall be play sand

13.2.4.2 All SPS Schools: Mulch used on planting beds and trees shall be flax straw mulch. Flax straw mulch shall be clean, free from weeds, and shall be cut to landscape mulch grade.

13.2.4.3 All SPS Schools: Tree species used on the site will be chosen from the following list:

13.2.4.3(1) Silver Maple cultivars (*Acer saccharinum*)

13.2.4.3(2) Tatarian Maple cultivars (*Acer tataricum*)

13.2.4.3(3) Bur Oak (*Quercus macrophyllum*)

13.2.4.3(4) Green Ash cultivars (*Fraxinum pennsylvanica*)

13.2.4.3(5) American Elm (*Ulmus americana*)

13.2.4.3(6) Linden cultivars (*Tilia* spp.)

13.2.4.3(7) Pine (*Pinus* spp.)

13.2.4.4 Rosewood: Project Co shall provide a minimum of one hard surface pathway connection for SPS for future municipal reserve design and development immediately adjacent to the Project Co site boundary.

13.3 Greater Saskatoon Catholic Schools (GSCS) Saskatoon Variations

13.3.1 Electrical

13.3.1.1 Theatrical stage lighting system not required.

13.3.2 Landscape

13.3.2.1 Rosewood: Project Co shall provide a minimum of one hard surface pathway connection for GSCS for future municipal reserve design and development immediately adjacent to the Project Co site boundary.

13.3.2.2

13.3.3 GSCS Change Rooms

13.3.3.1 No lockers in change rooms. GSCS required change stalls for change rooms.

13.4 Prairie Spirit School Division (PSSD) / Greater Saskatoon Catholic Schools (GSCS) Variations

13.4.1 GSCS Change Rooms

13.4.1.1 No lockers in change rooms. GSCS required change stalls for change rooms.

13.4.2 Mechanical:

13.4.2.1 Lavatories in private washrooms shall be vitreous china with single lever, 100 mm chrome plated centre set and mixing valve.

13.4.2.2 Project Co shall include without limitation a dust collector that is suitably sized for the intended use of each CTS classroom, and

13.4.2.2(1) supply and install the dust collector suitable for outdoor installation and adjacent to the CTS room.

- 13.4.2.2(2) dust collector shall be a recirculation type that include without limitations a spark arrestor system.
- 13.4.2.2(3) the exterior enclosure shall be conducive to the overall aesthetics of the School exterior design.
- 13.4.3 Electrical
 - 13.4.3.1 IT Closets to be a minimum size of 3 m x 3.6 m.
 - 13.4.3.2 Require 1 Gb/s Data service to School.
 - 13.4.3.3 RF video distribution system not required.
 - 13.4.3.4 Gymnasium Sound System within the common gym with Multi-Purpose Room /Performance:
 - 13.4.3.4(1) To have a directional speaker layout with front of house speakers and stage monitors . Back stage speakers shall be distributed as part of the paging/class call system.
 - 13.4.3.4(2) To receive volume control stations, and wired and wireless microphone inputs hardwired back to fixed sound system equipment.
 - 13.4.3.4(3) To receive inputs for microphones, stage monitors, lighting control interface and power screen operator control within flush floor boxes.
 - 13.4.3.4(4) To receive inputs for hanging microphones in the stage area.
 - 13.4.3.5 Theatrical Stage lighting system required within the common gym with Multi-Purpose Room /Performance
- 13.4.4 Landscape for All GSCS / PSSD Schools:
 - 13.4.4.1 Accessible play surfaces for future playground equipment shall not be required for Pre-Kindergarten and Kindergarten ages. Area of required accessible play surface shall be divided equally between grades 1-3 and 4-6, where Site allows. The Pre-Kindergarten and Kindergarten stable enrolment numbers shall not be excluded from the calculation for the total required area for accessible play surfaces.
- 13.4.5 Warman School:
 - 13.4.5.1 Landscape:

- 13.4.5.1(1) The side yards and a portion of the front yards of the Warman School shall be fenced with 1200 mm high chain link fencing.
- 13.4.5.1(2) Project Co shall provide a vehicle path to access exterior door of industrial arts room. Pathway shall accommodate a ½ ton truck with flatbed trailer and be heavy duty asphalt with concrete pad at door. Pathway shall be provided with removable bollards to prevent unsanctioned vehicle access.
- 13.4.5.1(3) Project Co shall provide a minimum of three hard surface pathway connections (one each for PSSD and GSCS to the north and one shared to the west) for future municipal reserve design and development immediately adjacent to the Project Co site boundary.
- 13.4.6 Martensville School:
- 13.4.6.1 Landscape:
- 13.4.6.1(1) The side yards and a portion of the front yards of the Martensville School shall be fenced with 1200 mm high chain link fencing.
- 13.4.6.1(2) Project Co shall provide a vehicle path to access exterior door of industrial arts room. Pathway shall accommodate a ½ ton truck with flatbed trailer and be heavy duty asphalt with concrete pad at door. Pathway shall be provided with removable bollards to prevent unsanctioned vehicle access.
- 13.4.6.1(3) The side yards shall also be irrigated using an automated system.
- 13.4.6.1(4) Project Co shall provide a minimum of two hard surface pathway connections (one for PSSD and one for GSCS) for future municipal reserve design and development immediately North of the Project Co site boundary.
- 13.4.6.2 Civil:
- 13.4.6.2(1) Project Co shall service the sanitary sewer from Oliver Lane due to extremely deep sanitary servicing in Parr Hill Drive.

APPENDIX 3A: FUNCTIONAL PROGRAM

[See attached document]

APPENDIX 3B: FUNCTIONAL PROGRAM – ROOM DATA SHEETS

[See attached document]

APPENDIX 3C: REFERENCE STANDARDS

ANSI / ASHRAE

52.2-2012	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
55-2010	Thermal Environmental Conditions for Human Occupancy
62.1-2013	Ventilation for Acceptable Indoor Air Quality
90.1-2007	Energy Efficient Design for New Buildings
111-2008	Measurement, Testing, Adjusting & Balancing of Building HVAC Systems
129-1997 (RA 2002)	Measuring Air Change Effectiveness
135-2012	Data Communication Protocol for Building Automation & Control Networks; and

ASHRAE:

Handbooks:	2011 HVAC Applications, 2012 HVAC Systems and Equipment, 2013 Fundamentals, 2010 Refrigeration; 2012 Smoke Control Engineering; Advanced Energy Design Guide for K-12 School Buildings
Guideline 0-2005	The Commissioning Process.
Guideline 1.1-2007	HVAC & R Technical Requirements for the Commissioning process; and
Guideline 12-2000	Minimizing the Risk of Legionellosis Associated with Building Water Systems

ANSI / ASME:

B31.1-2012	Power Piping Code, for steam systems;
B31.2-1968	Fuel Gas Piping
B31.8-2012	Gas Transmission and Distribution Piping System
BPVC-IX-2013	Welding Qualifications

ANSI / ASSE

1015 Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

ANSI / AWWA

C506-78 (R83) Standard for Backflow-Prevention Devices-Reduced Pressure Principle and Double Check Valve Types

C509-09 Resilient-Seated Gate Valves for Water Supply Service

C900-89 Standard of Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. for Water Distribution

ANSI / BHMA

A156.1-2013 Butts & Hinges

A156.2-2011 Bored and Preassembled Locks and Latches

A156.3-2008 Exit Devices

A156.4-2013 Door Controls-Closers

A156.5-2010 Auxiliary Locks and Associated Products

A156.6-2010 Architectural Door Trim

A156.8-2010 Door Controls-Overhead Stops and Holders

A156.9-2010 Cabinet Hardware

A156.13-2012 Mortise Locks & Latches, Series 1000

A156.15-2011 Release Devices-Closer Holder, Electromagnetic and Electromechanical.

A156.16-2008 Auxiliary Hardware

A156.19-2013 Power Assist and Low Energy Power Operated Doors.

A156.21-2009 American National Standard for Thresholds

A156.22-2012 Door Gasketing and Edge Seal Systems

A156.25-2013 Electrified Locking Devices

A156.31-2007 American National Standard for Electric Strikes and Frame Mounted Actuators

TIA / EIA

455-5 Humidity Test Procedure For Fiber Optic Components - FOTP-5

526-7 Measurement Of Optical Power Loss Of Installed Single-Mode Fiber Cable Plant

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526-14	Optical Power Loss Measurements Of Installed Multimode Fiber Cable Plant
568.1/2/3	Commercial Building Standards for Telecommunications Pathways and Spaces
T568-A	UTP wiring/pinout

TIA / EIA (cont):

568-B.1	(CSA-T568.1-05 (R2010) Commercial Building Telecommunications Cabling Standard – Parts 1
568-B.2	(CSA-T568.2-05 (R2010) Commercial Building Telecommunications Cabling Standard – Parts 2
568-B3	(CSA-T568.3-05 (R2010)) Optical Fibre Cabling Components Standard;
568-C.0	Generic Telecommunications Cabling for Customer Premises
568-C.2	Commercial Building Telecommunications Cabling Standards - Part 2: Balanced Twisted Pair Cabling Components
568-C.3	Optical Fiber Cabling Components Standard
569	Commercial Building Standard for Telecommunications Pathway and Spaces
569-B	(CSA-T530-99) Commercial Building Standard for Telecommunications Pathways and Spaces;
606	The Administration Standard for the Telecommunications Infrastructure of Commercial Building
606A	(CAN/CSA-T528-96 (R1997)) Design Guidelines for Administration of Telecommunications Infrastructure of Commercial Buildings;
607	Commercial Building Ground (Earthing) and Bonding Requirements for Telecommunications
607A	(CSA-527-94 (R1999)) Grounding and Bonding for Telecommunications in Commercial Buildings.
758	Customer Owned Outside Plant Infrastructure Standard;
TIA/EIA/ANSI	Category 6A System and Testing – latest revision

ANSI / TIA

TSB-162	Telecommunications Cabling Guidelines for Wireless Access Points;
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ANSI / UL

ANSI / ESNA American National Standard Practice for Lighting

ASPE Plumbing Engineering Design Handbook, Volumes 1-4

ASTM:

A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM (cont):

A90 Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

A194 Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
B88-09 Standard Specification for Seamless Copper Water Tube

A795/A795M-13 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use

B75/B75M11 Standard Specification for Seamless Copper Tube

B88-14 Standard Specification for Seamless Copper Water Tube

B117 Practice for Operating Salt-Spray (Fog) Apparatus.

B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

C136-06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

C140 / C140M Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

C412-11 Standard Specification for Concrete Drain Tile

C423-09a Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

C472-99(2009) Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete

C475/C475M-12 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board

C645-13 Standard Specification for Nonstructural Steel Framing Members
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C1047-10A	Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
C1177/1177M-13	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
C1186-28(2012)	Standard Specification for Flat Fiber-Cement Sheets
C1311-10	Standard Specification for Solvent Release Sealants
C1372	Standard Specification for Dry-Cast Segmental Retaining Wall Units
C1396/C1396M-13	Standard Specification for Gypsum Board

ASTM (cont):

C1658/C1658M-13	Standard Specification for Glass Mat Gypsum Panels
D36/C36M-14e1	Standard Test Method for Softening Point of Bitumen
D146/D146M-04(2012)e1	Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing
D523	Test Method for Specular Gloss.
D714	Test Method for Evaluating Degree of Blistering in Paint.
D822	Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
D1308-02(2013)	Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
D1654	Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
D2239	Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
D2244	Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
D2464	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D2523-13	Standard Practice for Testing Load-Strain Properties of Roofing Membranes
D2609	Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe

D2729-11	Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D2794	Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
D3018/D3018M-11	Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules
D3273-12	Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
D3359	Test Method for Measuring Adhesion by Tape Test.
D4226-11	Standard Test Methods for Impact Resistance of Rigid Poly (Vinyl Chloride) (PVC) Building Products

ASTM (cont):

D4726-09	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors
D6162.00a(2008)	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
D6164/6164M-11	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements
D6222/6222M-11	Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements
D6223/6223M-02(2009)	Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
D6878/D6878M-11a	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing
E84-13a	Standard Test Method for Surface Burning Characteristics of Building Materials
E90-09	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
E96/E96M-13	Standard Test Methods for Water Vapor Transmission of Materials
E119-12a	Standard Test Methods for Fire Tests of Building Construction and Materials

E136-12	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg C
E283-04(2012)	Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
E330-02(2010)	Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
E331-00(2009)	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
E492-09	Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine

ASTM (cont):

E814-13a	Standard Test Method for Fire Tests of Penetration Firestop Systems
E1264-08e1	Standard Classification for Acoustical Ceiling Products
E1414/E1414M-11e1	Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
E1745-11	Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
E1966-07(2011)	Standard Test Method for Fire-Resistive Joint Systems
F714	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
F970-07(2011)	Standard Test Method for Static Load Limit
F1292-01	Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
F1859-12	Standard Specification for Rubber Sheet Floor Covering Without Backing
F1951	Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment
F2034-03e1	Standard Specification for Sheet Linoleum Floor Covering
F2075	Specification for Engineered Wood Fiber For Use as a Playground Safety Surface Under and Around Playground Equipment

F2408	Ornamental Fences Employing Galvanized Steel Tubular Pickets.
G21-09	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

CAN / ULC

S101-07	Standard Methods of Fire Endurance Tests of Building Construction and Materials
S102-10	Surface Burning Characteristics of Building Materials and Assemblies
S104-10	Standard Method for Fire Tests of Door Assemblies
S107-10	Methods of Fire Tests of Roof Coverings
S109-03	Flame Tests of Flame Resistant Fabrics and Films
S115-11	Standard Method of Fire Tests of Firestop Systems
UL 294	Standard for Safety for Access Control System Units
S524-06-AM1	Standard for the Installation of Fire Alarm Systems
S525-07	Audible Signal Devices for Fire Alarm Systems

CAN / ULC (cont):

S526-07	Visual Signal Devices for Fire Alarm Systems
S528-05	Manual Pull Stations for Fire Alarm Systems
S529-09	Smoke Detectors for Fire Alarm Systems
S536-04	Inspection and Testing of Fire Alarm Systems
S537-04	Verification of Fire Alarm Systems;
S601-07	Standard for Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids
S701-11	Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
S702-09-AM1	Standard for Thermal Insulation Mineral Fibre for Buildings
S704-11	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
S770-09	Standard Test Method for Determination of Long-term Thermal Resistance of Closed-cell Thermal Insulating Foams

CAN / CGSB

1-GP-178Ma	Primer, Zinc Dust/Zinc Oxide, Alkyd (For Galvanized Surfaces)
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12.1-M90	Tempered or Laminated Safety Glass
12.3-M91	Flat, Clear Float Glass.
12.8-97	Insulating Glass Units.
12.9-M91	Spandrel. Glass
12.11-M90	Wired Safety Glass.
19.13-M87	Sealing Compound, One-Component, Elastomeric, Chemical Curing
37-GP-9Ma	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing
51.33-M89	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
51.34-M86	Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
75.1-M88	Tile, Ceramic
79.1	Woven glass fibre mesh
138.1-96	Fabric for Chain Link Fence

CEC

C22.1-12 & C22.2-12 Canadian Electrical Code as adopted in Saskatchewan;

CISC

Code of Standard Practice for Structural Steel, Seventh Edition, adopted June 6, 2008

CAN / CSA

A23.1-09/A23.2-09	Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete, Includes Update No. 1 (2011);
A23.3-04(R2010)	Design of Concrete Structures; Includes Update thru to No. 3 (2009)
A23.4-09	Precast Concrete - Materials and Construction;
A82.1-M87 (R2003)	Burned Clay Brick (Solid Masonry Units Made from Clay or Shale).
A123.2(R2008)	Asphalt-Coated Roofing Sheets

A123.5(R2010)	Asphalt Saturated Organic Roofing Felt
A165 Series-04 (R2009)	CSA Standards on Concrete Masonry Units
A179-04(R2009)	Mortar and Grout for Unit Masonry
A231.2-14	Precast concrete pavers
A251-00	Qualification Code for Architectural and Structural Precast Concrete Products
A257 SERIES-09	Standards for Concrete Pipe and Manhole Sections
A370-04 (R2009)	Connectors for Masonry;
A371-04(R2009)	Masonry Construction for Buildings
A440-11	NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights
A440.4-07(R2012)	Window, Door, and Skylight Installation
A660-10	Certification of Manufacturers of Steel Building Systems
A3000-08	Cementitious Materials Compendium
B44-2010	Safety Code for Elevators and Escalators
B51-09	Boiler, Pressure vessel and Pressure Piping Code;
B52HB-05	Mechanical Refrigeration Code;
B111-1974(R2003)	Wire Nails, Spikes and Staples
B137.0	Thermoplastic Pressure Piping Compendium

CAN / CSA (cont):

B137.1	Polyethylene (PE) Pipe, Tubing, and Fittings for Cold-Water Pressure Services
B139-09	Installation code for oil-burning equipment
B149.1-10	Natural Gas and Propane Installation Code;
B651-12	Accessible Design for the Built Environment;
C22.2 No.94	Electrical Enclosures
C22.2 No. 214	Communications Cables (Bi-national Standard, with UL 444)
C22.2 No. 182.4	Plugs, Receptacles, and Connectors for Communication Systems
C282-09	Emergency Electrical Power Supply for Buildings;
C802.2-00	Maximum Losses for Distribution, Power and Dry-Type Transformers

G30.18-09	Carbon Steel Bars for Concrete Reinforcement
G30.5-M1983 (R1998)	Welded steel Wire Fabric for Concrete Construction
G40.2-04/G40.21-04	General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
G164-M92(R2003	Hot Dip Galvanizing of Irregularly Shaped Articles
O56-10	Round Wood Piles
O80 Series-08 (R2012)	Wood Preservation
O86-09	Engineering design in wood
O122-06(2011)	Structural Glued-Laminated Timber
O132.2-Series 90(R1998)	Wood Flush Doors
O177-06 (R2011)	Qualification Code for Manufacturers of Structural Glued-Laminated Timber
S16-09	Limit States Design of Steel Structures, Includes Updates thru to No 3 (2013)
S136-12	North American Specification for the Design of Cold Formed Steel Structural Members
S301	Central and Monitoring Station Burglar Alarm Systems
S302	Installation and Classification for Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults
S304.1-04 (R2010)	Design of Masonry Structures
S478-95 (R2007)	Guideline on Durability of Buildings
T529	Telecommunications Cabling Systems in Commercial Buildings (adopted ANSI/EIA TIA 568A with modifications)
S832-06 (R2011)	Seismic Risk Reduction of Operational and Functional Components (OFCS of buildings).
W47.1-09	Certification of Companies for Fusion Welding of Steel Structures, Includes Update No 5 (2012)
W59-03 (R2008)	Welded Steel Construction (Metal Arc Welding)

CAN / CSA (cont):

W186-M1990 (R2012)	Welding of Reinforcing Bars in Reinforced Concrete Construction;
Z614-14	Children's play spaces and equipment

CSSBI

30M-06 Standard for Steel Building Systems

NFPA (Fire)

10-2013 Portable Fire Extinguishers

13-2013 Standard for the Installation of Sprinkler Systems

14 Standard for the Installation of Standpipe and Hose System, 2013 Edition

54 / ANSI Z223.1 National Fuel Gas Code, 2012 Edition

58 Liquefied Petroleum Gas Code, 2014 Edition

56 Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems, 2014 Edition;

80 Standard for Fire Doors and Other Opening Protectives, 2013 Edition

90A Installation of Air Conditioning and Ventilation Systems; 2012 Edition

92A Standard for Smoke-Control Systems, 2012 Edition

96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. 2014 Edition

101 Life Safety Code, 2012 Edition

102 Standard for Assembly Seating, Tents and Membrane Structures

252 Fire Tests of Door Assemblies, 2012 Edition

701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, 2010 Edition

NLGA

Standard Grading Rules for Canadian Lumber, current edition

IEEE

519-1992 Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

802.1BA-2011 Standard for Local and Metropolitan area networks -, Audio/Video Bridging (ABV) Systems;

802.3-2012 Standard for Ethernet;

IEEE (cont)

802.11-2012	Standard for Information Technology – Telecommunications and Information Exchange Between Systems;
1159-2009	Monitoring Electric Power Quality
1250-2011	Guide for Identifying and Improving Voltage Quality in Power Systems
1346-1998	IEEE Recommended Practice for Evaluating Electric Power System Compatibility With Electronic Process Equipment

RSIC

Manual of Standard Practice (2004)

OTHERS:

ASPE	Plumbing Engineering Design Handbook
AWMAC	Architectural Woodwork Standards Edition 1 (2009) - Adopted and Published Jointly by Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturer's Association of Canada (AWMAC) and the Woodwork Institute.
AWWA	American Water Works Association
CNLA	Canadian Nursery Landscape Association
CRCA	Canadian Roofing Contractors Association
CSDMA	Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2000, by the Canadian Steel Door Manufacturer's Association (CSDMA)
	Saskatchewan Plumbing and Drainage Regulations.
	Saskatchewan Accessibility Guidelines by Saskatchewan Human Rights Commission.
DED Regulation	The Dutch Elm Disease Regulations, 2005, Province of Saskatchewan
DHI	Door and Hardware Institute Standards
IGMAC	Insulating Glass Manufacturers Association of Canada
Seeds Act	Seeds Regulations, Government of Canada
SRCA	Saskatchewan Roofing Contractors Association
TIAC	Thermal Insulation Association of Canada

TTMAC Terrazzo Tile and Marble Association of Canada (TTMAC)
Specification Guide 09 30 00 Tile Installation Manual (latest
edition)

IESNA

G-1-03 Guideline for Security Lighting for People, Property, and Public
Spaces

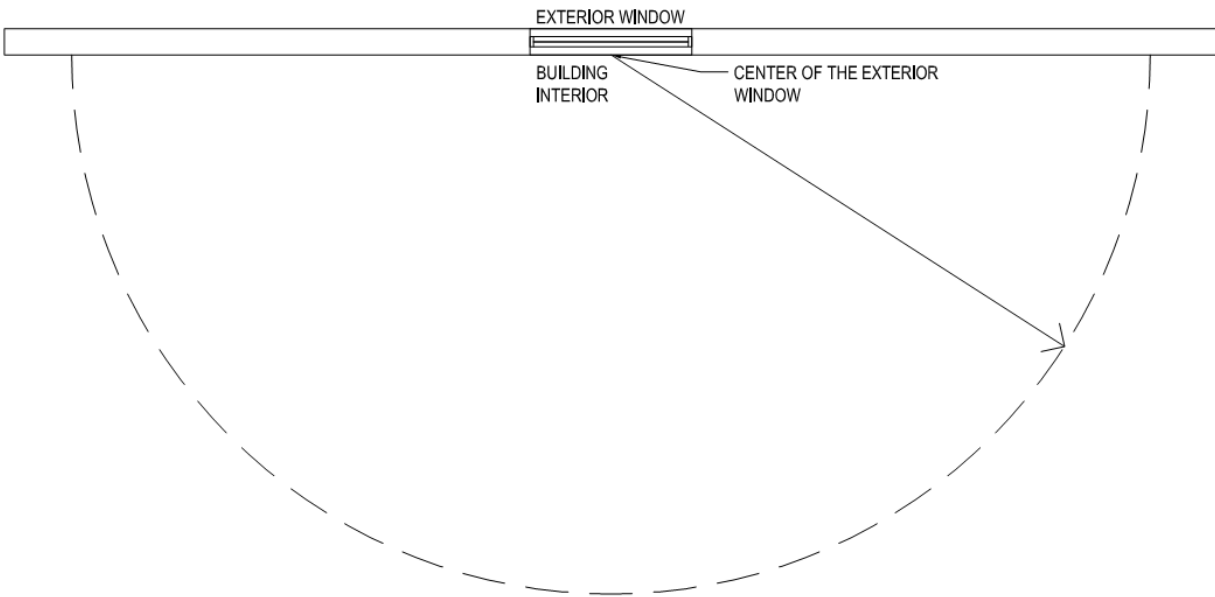
RP3 Guide for Educational Facilities Lighting

APPENDIX 3D: LIGHT MEASUREMENT METHODOLOGY

This document outlines the direct and borrowed light measurements.

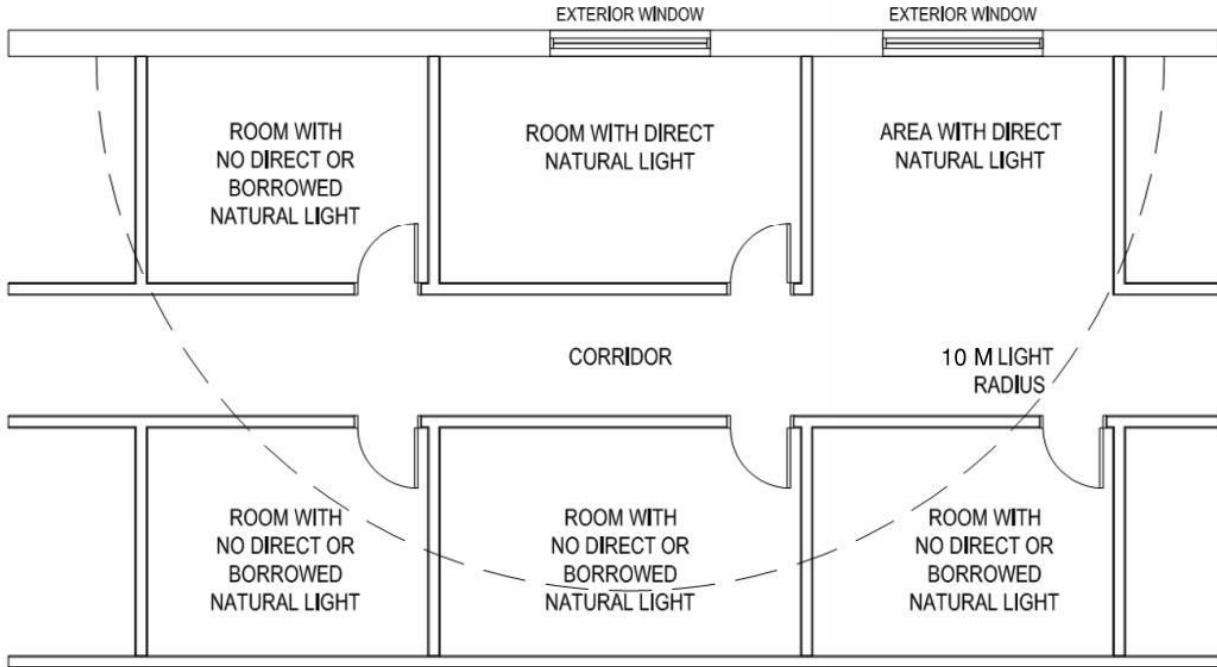
Measurement diagrams have been included that give examples.

- The light radius shall be 10 meters measured from any point of the exterior window.
- Direct natural light means a room or area has a window to the exterior.
- Borrowed light means there must be a window in the direction of an exterior window and the center of the area must fall within the 10 meter light radius.
- An area that does not have an exterior window must fall within the 10 meter light radius and have a window in the direction of an exterior window.

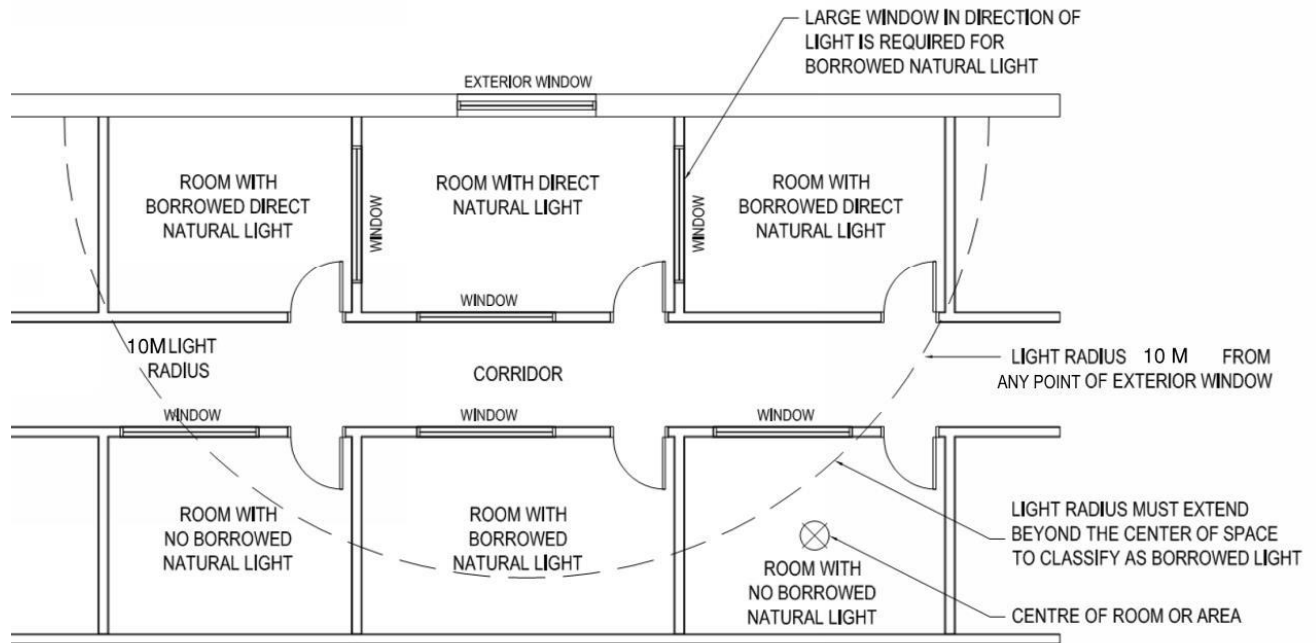


Measurement Examples:

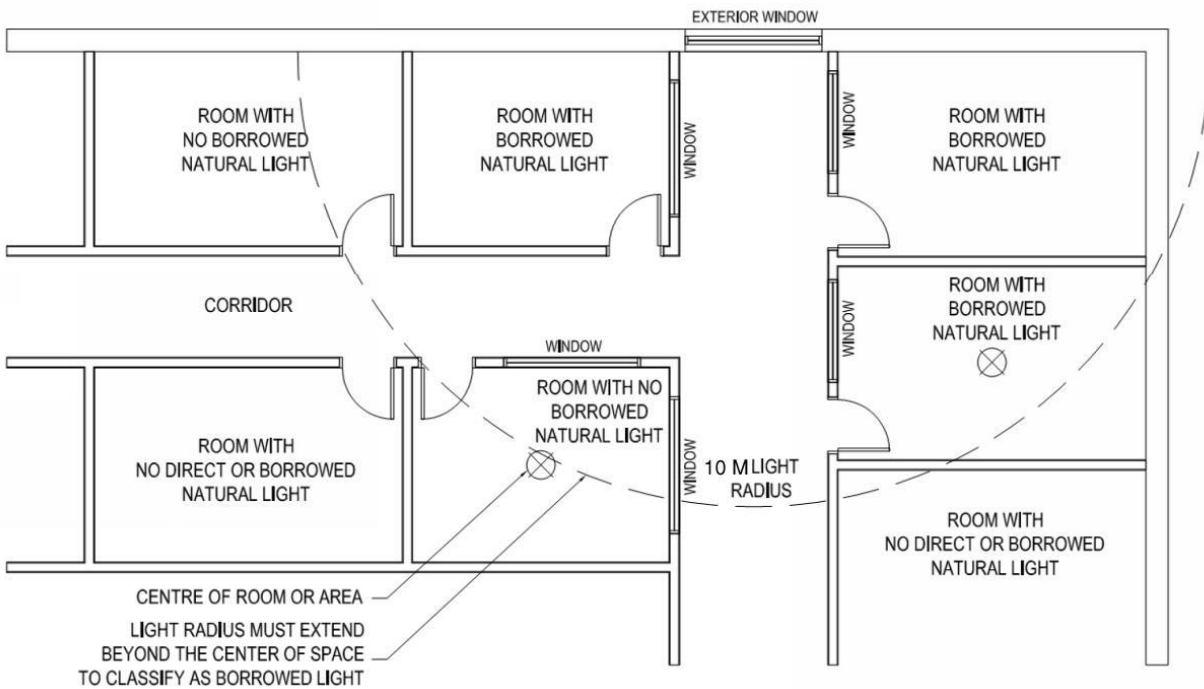
Example 1: Direct Natural Light



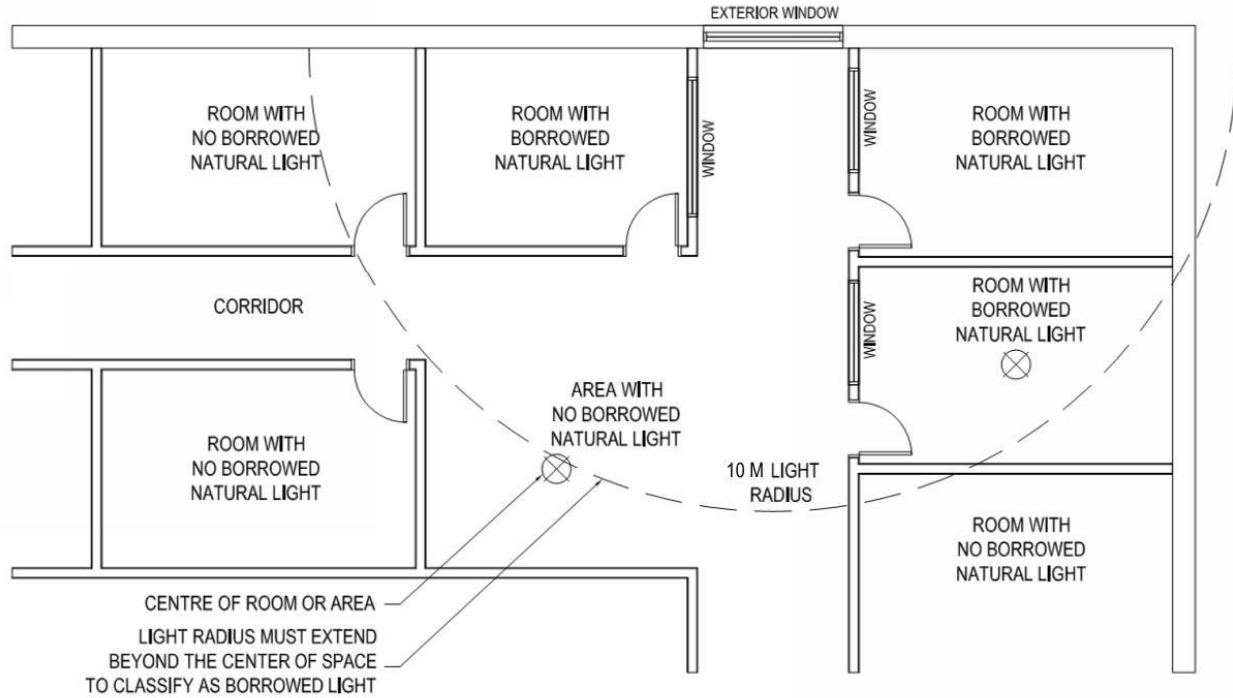
Example 2: Borrowed Natural Light



Example 3: Borrowed Natural Light



Example 4: Borrowed Natural Light



APPENDIX 3E: SPECIFIC IT EQUIPMENT REQUIREMENTS

The following is a summary of the information provided by each of the School Boards to be incorporated into the School designs. Schedule 3 performance requirements shall govern unless specific requirements are identified for individual School Boards in this Appendix.

Equipment shall be supplied and installed as per the below Equipment Category table.

Equipment	Equipment Category per School Board		
	GSCSD	SPSD	PSSD
Network Equipment (routers, switches, racks, etc)	4	4	4
WAP's	4	4	1
VOIP (Phones, routers, switches, etc)	4	4	4
CCTV (cameras, recorder if nec.)	4	4	4
DAC	4	4	4
UPS	3	3	3
Clocks	4	4	4
Projectors/Smabboards	2	2	2
Paging/Classcall/Bell Tones	3	3	3
Digital Signage including monitors	4	4	4
Gym Fixed Audio	3	3	3
Mobile Audio	3	3	3
Sound Enhancement	3	3	3
Stage Lighting/Sound	3	N/A	N/A

Greater Saskatoon Catholic Schools (GSCS)

General Technology Specs

- Network/Telephony
 - SIP compliant Cisco
 - Voice Gateway (2901/2911/2921)
 - Switches (model dependent on many factors)
 - Handsets
- Network Closets
 - Not shared with caretaker closets or other functions
 - Thermal load of equipment (switches, routers etc) factored into cooling requirements
- Structured Wiring System

- Installers **must** be *Data Certified*
- Single mode fiber (with SC terminations) from demarc to network closet, between closets and where dictated by lengths. CAT-6A everywhere else.
- Racks with equipment (paging/telephony/AV/UPS etc) will not be wall-mount type. Proprietary wall-mount racks purpose-built for, *and housing only* theatrical lighting dimmer packs are acceptable
- Data racks containing only punch panels are to be 2 post units, bolted to floor. Data racks containing equipment are to be 4 post units on casters. All racks are to be Hubbel brand with all rails tapped for #10-32.
- Patch panels are to be modular design. For each patch panel (2U), provide 1 horizontal cable management panel (2U) and open space (2U). For each Ethernet switch (2U), provide horizontal cable management panel (2U).
- All network structured wiring (including current/potential IP phone and IP camera locations) are to be blue. The only exceptions are uplink cables (yellow) and HDMI and USB cable extenders (green).
- Prior to data rack placement and Patch Panel punchdown, Installer must meet with GSCS IT personnel to coordinate rack placement and configuration as well as cable routing
- **Any** equipment being placed on our network (wired or wireless, for card access, HVAC systems, lighting control systems etc) must be pre-approved by GSCS IT
- Classroom Systems
 - *All classrooms (including LRC) designed with the assumption of presence of the standard 'classroom technology package', with data projector, Smartboard and soundfield system, in order to locate other classroom items such as whiteboards. Cabling provision and installation of data projectors, soundfields and Smartboards to be part of contract, including all patch cables. Equipment supply and install shall be as per Equipment Category table.*
 - Each classroom will have infrastructure to support the main teaching location ('Computer Plate', quad AC receptacle, and 2 network drops), the amp location ('Amp Plate', wireless mic receiver) and a bank of 4 computer workstations.
 - For rooms with standard height ceilings, use NEC M282X projector with Chief IC-PR-1A1S-02 mount and SBM-680 Smartboard. For rooms with tall (15' or more) or irregular ceilings, use the SB-600I integrated Smartboard.
 - AC (duplex) receptacle and wall plate for USB extension to be located at upper right-hand corner of SmartBoard, 85" from floor.
- Surveillance
 - Panasonic WJ-ND300 network recorder, NW502 (external), SF346 (internal) cameras.
 - Complete perimeter coverage.
 - Internal cameras located ~25' from each entrance, aimed towards entrance.
- Card Access

- Compatible with Millennium Enterprise software.
- Located at all entrances, at elevator and IT office/network closet
- UPS Systems
 - UPS systems (Eaton, including web card) need capacity to power all network, telephony and paging systems for full 180 minutes. This includes capacity to support classroom paging amplifiers, hallway/exterior paging systems, Gym amplifiers and processors. It also includes surveillance system recorder and all telephony and networking equipment including Ethernet switches (to support all structured wiring outlets + 40%), SRG, fiber media converters etc.

Network Equipment and associated components

Demarc

- 1 One complete wall covered/painted with G1S 3/4" plywood
- 2 CNET/Sasktel Fiber Circuit and Analog lines to be ordered 18 months prior to opening
- 3 In House Fiber from Demarcation to Main Network Room
 - SM 6 Fiber SC connectors Plenum/Riser Cable within 2" conduit.

Main Network Room

1. Network room will have a minimum 2 walls adjacent to network racks covered in 3/4" plywood (painted) to accommodate wall mounted infrastructure.
2. Data lines will enter room via ceiling horizontal basket tray and will waterfall to a vertical basket tray strapped to plywood directly behind 2 post rack. Cable bundle will meet raised floor basket and up into 2 post rack.
3. All terminations will be on a 2 post rack with vertical and horizontal cable management. Termination rack to be permanently anchored after consultation with GSCS IT.
 - a. Electron Metal – 1 @ 2 post Rack Series 700 (19x77) tapped 1 side with 2 vertical cable mgt. 5x6x77 #RK7K21-194400-BK
 - b. Hubbell – Horizontal Cable Mgt. Next Frame #HC219CE3M
 - c. Leviton - Cat 6 QuickPort Patch Panel, 48-Port 2U Unloaded #69586-A48
 - d. Leviton – Extreme Cat6 Quickport connectors (white)
 - e. Hubbell – Horizontal Power Bar #PR0615
 - f. Corning Fiber Lightscape rack mounted fiber termination enclosure
4. Network/Server Cabinet with Casters
 - a. Electron Metal – 1 @ 30"W X 42"D 48RU Network cabinet #CB4KNW-274842-BK
 - b. Electron Metal - Front only cable management for above cabinet
 - c. Set of 4 Pivoting 3" Casters with Series 4000 Mounting Plates black #CASSP4-000300-BK (installed)

- d. Geist - 1 @ Geist Vertical Power Bar 66" 20 Receptacle #VSSB204
- e. Electron Metal - 1 @ 4RU Heavy Duty Front Mount Shelf 20" #SHDFMT-190420
- f. UPLINKS between closets shall be SM 6 fiber LC plenum/riser cable. GBIX modules must be provided as required.

Remote/Satellite Network Closets

1. Electron Metal - 1 @ 2 post Cable Mgt. Rack (19x77) tapped one side. #RK7K21-194400. Anchored to floor after consultation with GSCS IT.
2. Electron Metal – 1 @ Network Cabinet 24"W X 36"D 44RU #CB4KSV-214436-BK
3. Set of 4 Pivoting 3" Casters with Series 4000 Mounting Plates black #CASSP4-000300-BK (installed)
4. Geist - 1 @ Geist Vertical Power Bar 66" 20 Receptacle #VSSB204
5. Hubbell – Horizontal Power Bar #PR0615

Room Conditions for Main and Satellite Network Closets

1. Under no circumstances will the network room have any water lines running through or above the room with the exception of fire protection. Fire protection must have release heads caged and protected. Any refrigerated/cooling lines must not run above equipment and must be insulated.
2. Network Cabinet cannot be closer than 3 feet to any wall.
3. Room size must accommodate 1 – 2 post rack and 1 network cabinet with room to add 1 additional network cabinet in the future. (Main Network Room only)
4. Must provide an additional wire basket located between and directly above (2 -6") 2 post rack and network cabinet to provide path for connectivity between racks.
5. Room cooling MUST be provided.
6. CNET Fiber connection equipment will be located in Main Network Room
7. All equipment must be on UPS power.

School Wiring for Data and A/V lines

1. Preference is for classrooms and offices to receive a 4" wire basket down the center of each room, then free air lines with hangers to conduit that has been stubbed from wall for all network and A/V wall outlets. Conduit from the hallway wire basket to the classroom/office has proven to be expensive and time consuming when changes to rooms are required during the lifetime of the building.
2. A Network drop is required in the ceiling for wireless radios in every room in the school that is accommodating staff or students. Hallways require a ceiling network drop every 50ft.
3. Labelling of network drops shall be based on ROOM NUMBERS ie. Rm105A,B,C, etc. Labelling scheme must be approved by owner prior to starting network infrastructure installation.
4. Room numbers must be approved by owner prior to final drawings as inventories for school are based on these numbers.

Following is a list of equipment required in Project 2 to ensure function and compatibility. The attached SchoolAVModel.pdf should be referenced throughout. Any proposed equivalent models require prior approval from GSCS.

- 'Standard' Classrooms
 - Data projector: NEC NP-M282x with Chief IC-PR-1A1S-02 Mount
 - Paging/sound enhancement system speaker: TOA F-122CU C/W HY-TB1
 - Paging/sound enhancement system mixer/amp: TOA BG-2035
 - Paging/sound enhancement system wireless headset mic package: TOA WS-5300H
 - Paging/sound enhancement system noise/buzz filter: Rolls HE18
 - Paging/sound enhancement system 'Teacher Plate': Ace Backstage WP-306 with one each:
 - Ace Backstage C25143 (SVGA)
 - Neutrik NE8FDV-Y110 (RJ-45)
 - Ace Backstage C-15142 (HDMI)
 - Ace Backstage C-25105 (RCA)
 - Ace Backstage C-25104 (F-Conn)
 - Ace Backstage C-15112 (Blank)
 - Paging/sound enhancement system 'Amp Plate': Ace Backstage WP-204 with one each:
 - Neutrik NC3MPP (XLR-M)
 - Neutrik NL4MP (SpeakON)
 - Ace Backstage C-25105 (RCA)
 - Ace Backstage C-15112 (Blank)
 - UPS power for mixer/amp, with 3 hour run time
 - Smartboard: SBM-680
 - USB over CAT-6 extenders for Smartboard
 - 120v AC receptacle located above upper right corner of Smartboard location
- 'Non-Standard' Classrooms
 - Although topology is *similar* to 'standard' classroom technology, some rooms (Band/Music, Library, MultiPurpose/Flex) may require different equipment due to intended usage and physical requirements.
 - Rooms with high ceilings require wall mounted NEC NP-UM330X-WK in place of standard projector, and may require different cabling, connectors and connector plates. Chief IC-PR-1A1S-02 mount not required with this model.
 - Larger spaces and Band/Music may require different amplifier and/or speakers. May include TOA A-712, TOA BG-2120, JBL Control 28, JBL Control 29AV
- Class Change Bells/Music
 - Timer: TOA TT-104
 - Mixer: Crown 14M

- Tuner: DT-930
- CD: Tascam CD-200
- MP3 input cable (1/8" TRS)
- Suitably housed and located in main office allowing ease of access
- Paging
 - Bogen PCM2000 with:
 - 1x PCMCPU
 - 1x PCMTIM
 - 3x PCMZPM
 - Paging zones:
 - Halls/corridors
 - Gym
 - Classrooms
 - LRC/Library
 - Music/band
 - Outside
 - Daycare/Pre-K
 - Common/shared areas
 - Distribution amp(s): Symetrix 581e or Rane DA-216S
 - DSP: BSS Audio Soundweb London BLU-100 with I/O expansion boxes as required
 - Suitable paging speakers in each hallway/corridor and potential workspace, as required for life-safety
 - 70v paging amp: Crown CTs-4200
 - Outdoor paging horns/speakers: Bogen KFLDS30T
 - Paging levels in hallways and gym modulated by ambient noise mic in respective area: TOA AN-9001
 - All paging system elements on UPS power with 3 hour run time
- Surveillance (all Panasonic)
 - Recorder:
 - Up to 16 cameras: WJ-NV300 (with 2x 4TB drives)
 - For greater than 16 cameras: WJ-ND400 with 0.5TB storage per camera.
 - Cameras:
 - Indoor: WV-SFR311
 - Outdoor: WV-SFV631L
- Digital Signage

- Digital signage server (located in staff workroom) with 1 license for Harris InfoCaster Creator
- 55" LED/LCD TVs (Sharp/Panasonic/Sony) as required
- Cabling as per SchoolAVModel.pdf
- Gym Fixed Audio/Video
 - FOH speakers (2): JBL AC2212/64
 - Amp: Crown CTs 600
 - Stage monitors (2): JBL EON 510
 - Backstage speakers (2): JBL Control 25
 - Stage floor boxes (2 required): Ace Backstage 122SLBK with 3 mic inputs, 2 monitor outputs and PE electrical outlet
 - Handheld wired stage mics: Shure SM-58
 - Hanging mics: AKG HM1000 / CK31
 - 'Always on' wireless headset mic package: TOA WS-5300H (with level control)
 - 'Always on' wired mic jack (with level control)
 - Assistive listening transmitter with 4 receivers
 - Screen: Da-Lite Cosmopolitan Electrol 70222L (16:10, 72.5"x116", Matte White, Low Voltage, with 24" drop and suitable mounting hardware)
 - Lighting (DMX-512):
 - Console: ETC SmartFade 1248
 - Dimmers: ETC, Strand
 - 12 channels, 2 receptacles per channel
 - 4 channels at Front of House (over audience)
 - Remaining 8 channels spread over two ceiling mounted pipe rails over stage
 - Multi-pin outlets (2) located in gym
- Commons
 - A separate but integrated sound system is required. Exact equipment models are dependent on size/configuration of Commons, but likely items would include:
 - 1 'always on' wired mic jack, with level control
 - Suitable speakers and amplifier
 - Multi-pin outlet(s) to support Rolling Audio Cart
- Gym/Commons Rolling Audio Cart:
 - Mixer: Soundcraft GB2R 12/2
 - CD: Denon-C615
 - Wireless handheld mic packages (2): Sennheiser EW135G3
 - Wireless headset mic packages (2): Sennheiser EW152G3

- Cart: Middle Atlantic SC-1427-1460BK with caster base and accessories
- 12m 18 pair Digiflex multi-pin umbilical to connect Rolling Audio Cart. Comes with cable management and 12m 14AWG power cable
- UPS
 - Appropriately sized to provide 3 hour run time for:
 - All network/phone equipment (switches, routers, fiber)
 - All paging systems (including classrooms, gym etc)
 - Eaton or Tripp Lite
- Phone/Network (Refer to 'Network Equipment and associated components.doc for additional detail)
 - Cisco Router: 2921-V/K9
 - Juniper Router: SRX220
 - Cisco Switch and GBIC: WS-C2960X-48FPS-L, GLC-T=
 - Cisco Phones:
 - General use: CP-7821-K9=
 - Office Coordinator, Principal, Vice Principal: CP-7841-K9=
 - Cisco Meraki Access Points:
 - Low density coverage areas: MR18
 - Higher density coverage areas: MR26
 - Data Racks
 - No wall mounted racks
 - Containing terminations/patch panels only:
 - 2 post
 - Anchored to floor after consultation with GSCS IT
 - Containing equipment (switches, routers etc):
 - 4 post
 - Castor kit
 - Patch panels:
 - Modular design
 - For each patch panel (2U), provide 1 horizontal cable management panel (2U) and open space (2U).
 - For each Ethernet switch (2U), provide horizontal cable management panel (2U).
 - Data/AV Cabling
 - Fiber
 - Required between demarc and main server room, between main server room and any additional server/network rooms/closets and any other locations as dictated by length

- Single mode 6 strand
- Minimum 2 pair terminated per cable with connectorization suitable for equipment employed
- CAT-6e
 - Blue: data, phone, camera
 - Yellow: Uplinks
 - Green: HDMI and/or USB over CAT-6 cable extenders
 - Any other color: HVAC or other control lines
 - Belden or equivalent
- Installed microphone or line level audio cabling
 - Belden 8451 or equivalent
- HDMI
 - Used in classrooms
 - HDMI 1.3 CAT-2 compliant
- Other AV cabling
 - Appropriate Belden or equivalent

Saskatoon Public Schools (SPS)

Classroom Projectors/Smartboards:

- Smart LightRaise 60wi2 interactive for all teaching areas
- Epson PowerLite 585W WXGA 3LCD Projector for areas needed projector but not interactive

Soundfield:

- TOA 5810 with 5325H for tuner/ transmitter
- TOA A-903mk2 for amplifier
- Or open to Lightspeed/FrontRow if preference for different brands

Network Recorder :

- Panasonic Model # WJ-ND400/1000
- 1TB disk

Expansion unit for DVR with 3TB HDD:

- Panasonic Model # WJ-HDE400/3000T3

Indoor/Outdoor Video camera:

- Panasonic WV-NW502S

Router/Switch:

- Cisco SG300 50 port for data
- Cisco 3560 48 port for PoE wireless
- Cisco 3560 48 port for router

Wireless Access Points:

- Meraki MR34 or Cisco 1602i (open to Meraki if preferred by sister division)

Paging:

- Bogen PCM2000 c/w one (1) PCMCPU, one (1) PCMTIM, and two (2)
- PCMZPM.

Telephone:

- Cisco.
- 1 Emergency Analog phone

Prairie Spirit School Division (PSSD)

- Each [IT/Communications] closet would have separate UPSs
- 3.5mm audio jack and HDMI for projectors

CCTV Equipment

- 3 weeks for on the storage.
- a) Cameras
 - Manufacturer: Panasonic or equivalent that provides high resolution, good quality, adequate recording storage, accessible over the network from Principals computer, POE cameras a must
- b) Recorders
 - Manufacturer: Matching above system
 - Length of time for database of video / still shots: ideally would be able to go back 6 months Quality of video / still shots: HD

Wireless Network Equipment

Wireless Network to match the infrastructure noted below.

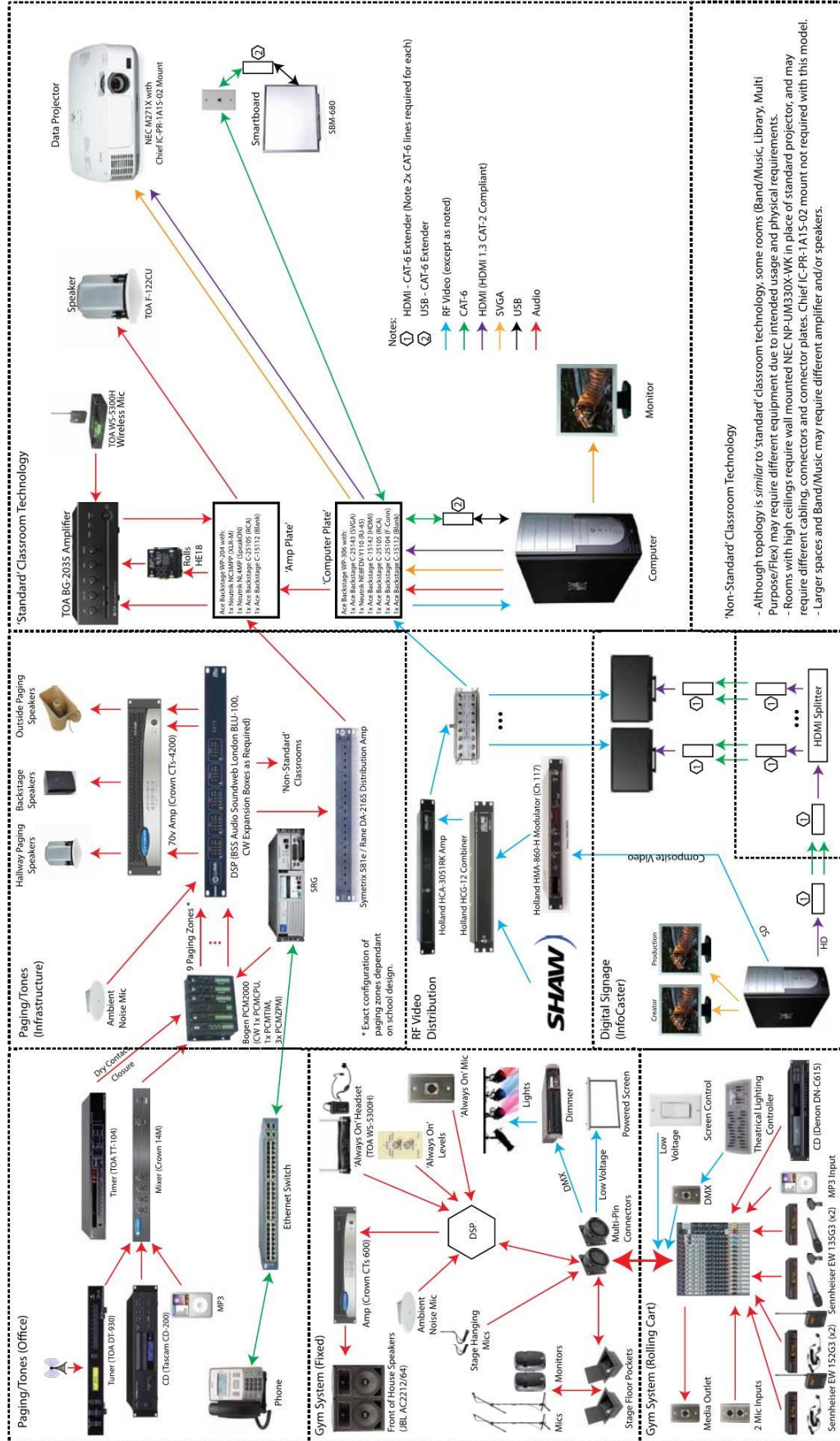
- a) Switches
 - Manufacturer: Nortel
 - Model: 5520-48port POE

- b) Routers
 - Manufacturer: Fortigate
 - Model: 100D
- c) Wireless Access Points and Controllers
 - Manufacturer: Ruckus
 - Model: Controller – Zone Director 1100; Access Points – Zone Flex R700 (802.11ac spec)

VOIP system equipment -**Class Call and Public Address Systems**

- a) Phones
 - Manufacturer: Avaya (this could change soon)
 - Model: CS1000 located centrally, phones are 1120e and 1140e. plus licenses per set to add these to CS1000

GSCS Elementary School Technology Template



APPENDIX 3F: STONEBRIDGE PUBLIC SCHOOL ADDITIONAL REQUIREMENTS

The Saskatoon School model is to be modified for the Stonebridge site to reflect the partnership between the Whitecap Dakota First Nation (WDFN) and the Saskatoon Public Schools (SPS).

Project Co is to accommodate a minimum of four meetings during the development of the design and construction documents with representatives of the WDFN and Authority team.

The design will be modified to increase peak capacity of SPS from 750 to 850 total students. This increase will accommodate up to 100 students in grades 5 through 8 to be bused from the Whitecap Dakota First Nation.

The Stonebridge public school will be increased by four additional Relocatable Classrooms and 140 sq. m. (approx. 1500 sq. ft.) in the form of a WDFN Cultural Room to the public school.

Scope of Change:

In order to meet the needs of the WDFN students and families the following elements are to be added or modified:

1. Multipurpose Art & Cultural Room (*from existing SOA allocation*)
2. Artifact & Supply Storage (*from existing SOA allocation*)
3. Student Advisory Counsellor Office (*from existing SOA allocation*)
4. WDFN Cultural Room (*additional area to the SOA*)
5. WDFN Cultural Room Washroom (*additional area to the SOA*)
6. SPS/WDFN Exterior Entrance & Canopy (*within existing SOA allocation*)
7. SPS/WDFN Main Entrance (*within existing SOA allocation*)

Scope Descriptions:**1. Multipurpose Art & Culture Room**

Previously identified in Appendix 3A -Functional Program as Multipurpose Science (P2.1) or Visual Arts (P2.8)

Purpose:

- o Primary: Whitecap/First Nations cultural studies and other science or visual art project based learning
 - For use by classes of students (up to 30) composed of Whitecap (Grades 5-8) and SPS students interacting with teacher/s and/or elder/s
 - To be available for use by all WDFN and SPS students
- o Potential activities (including but not limited to):
 - Beading
 - Drum making (increase STC to accommodate)
 - Art
 - Seasonal/ natural environment based projects
 - Storytelling/ language based learning
 - Hands-on learning
 - Movement-based learning for small groups
- o Direct access to an exterior learning environment on a roof top deck
- o Sinks to support natural environment and art based projects

Furniture/Equipment:

- o Reconfigurable tables and chairs
- o Millwork including sink
- o Wall or screen for projection

- o Hose bib required on rooftop outdoor classroom for seasonal water access
- Access/Security:
- o Easily accessed by:
 - Students (Gr 5- 8 from the upper floor of the public school)
 - Teachers/Itinerant Professionals (from the public school and the community)
 - Elders & Family Members (from the community)
 - o Required barrier free access (consistent with the rest of the School)
 - o Required interior connection to the SPS/WDFN school
 - o Available for use during the School Day
 - o Convenient Access to staff/adult/barrier free washrooms
 - o Convenient Access to elevator
- Location/Visual Identity:
- o Minimum wall area of 100 sq. ft. (approx. 9 sq. m.) dedicated to WDFN iconography/representation
- Daylighting:
- o Required
- Views:
- o To exterior required

2. Artifact & Supply Storage Room

From area previously allocated to Multipurpose Resource Cultural Room (G2.3) in Appendix 3A - Functional Program.

16.0 sq.m. (approx. 172 sq.ft.) of the previous 30 sq.m. to be allocated to this function.

- Purpose:
- o To store WDFN artifacts and objects for ceremonies and relating to history as well as supplies to support project based learning
- Location/Visual Identity:
- o In close proximity to the Multipurpose Art & Cultural Room(P2.1 or P2.8)
- Furniture/Equipment:
- o Lockable storage cabinets for culturally significant items
 - o Storage units for larger supplies such as sewing machines, drum making kits, etc.
- Access/Security:
- o Lockable
- Daylighting:
- o None

3. Student Advisory Counsellor Office

From space previously allocated as Multipurpose Resource Cultural Room (G2.3) in Appendix 3A - Functional Program.

14 sq.m. (approx. 150 sq.ft) of the previous 30 sq.m. to be allocated to this function.

- Purpose:
- To accommodate the Student Advisory Counselor to the WDFN and other First Nation students
 - Provide for meetings of up to 4 people
- Location/Visual Identity:
- Near to the learning communities for Grade 5-8 students
 - WDFN iconography/representation to be accommodated
- Furniture/Equipment:
- o Desk
 - o Chairs: 1 desk chair, 3 visitor

Access/Security:

- o Lockable
- o Sidelight next to door for view to interior area

Daylighting:

- o Preferred natural daylighting but not required

4. WDFN Cultural Room

Additional SOA area of 135.5 sq.m. (approx. 1452 sq. ft.)

Purpose:

- To reflect the spirit of alliance befitting a long history of partnership and understanding between WDFN and SPS
- To accommodate cultural education and community gathering needs for the WDFN students/ family/ community
- To engage students and persons of all races and religions, making them feel equally comfortable and welcome

Location/Visual Identity:

- Location and visual identity must reflect the profile and prominence of a highly-respected partner
- Preferred at the front of the facility, easily accessible from the public school
- With direct, accessible entrance from the exterior or public school main entrance vestibule
- No second floor space above
- Minimum wall area of 100 sq. ft. (9 sq m) dedicated to WDFN iconography/representation
- Requirement to reference curves/ circular design in the shape of the room, layout or finishes
- Natural materials such as wood, stone, river rock relating to WDFN history to be incorporated into interior finishing
- Cardinal compass points – N, S, E, W – to be incorporated into the interior design and/or orientation of the room
- Immediate Adjacency to one barrier free washroom
- Convenient Access to additional washrooms within the public school or the shared core
- Convenient Access to Servery
- Preferred Convenient Access to the Student Counsellor Advisory Office
- Preferred Convenient Access to the Cultural Storage Room

Storage/Furniture/Equipment:

- Reconfigurable tables and chairs for 60
- Separate mechanical ventilation to support smudging
- Minimum of 20 linear ft. of millwork, upper and lower cabinets, with dual sink and countertop
- Lockable storage for artifacts and supplies to be provided as a closet or furniture item

Access/Security:

- Lockable
- Accessible to the community during school hours and After School Hours
- Accessible to students from SPS/WDFN

Daylighting/Views

- Daylighting required
- Preferred view to the front of the school/main entrance area

5. WDFN Cultural Room Washroom

Approximate additional area of 4.5 sq.m. (approx. 48 sq. ft.)

Purpose:

- To provide access to a barrier free washroom for users of the WDFN Cultural Room
- For gatherings exceeding the allowable occupancy associated with a single toilet fixture access to the public school washrooms will be provided
- To provide for baby changing

Location/Visual Identity:

- Immediately Adjacent to the WDFN Cultural Room
- Direct view into washroom from WDFN Cultural Room is not permitted (i.e. door shall not open directly onto the main gathering space)

6. SPS/WDFN School Exterior Entrance & Canopy

Location/Visual Identity:

- At the front of the public school
- Provides access to the SPS/WDFN school
- Requirement to reference curves/circular design relating to WDFN culture in entrance and/or canopy form
- Natural materials relating to WDFN history to be incorporated into materiality

7. SPS/WDFN Main Entrance Interior Area

Location/Visual Identity:

- At the entrance to the SPS/WDFN school
- Welcoming to all cultures including the WDFN
- Requirement to reference curves/ circular design in interior design
- Natural materials relating to WDFN history to be incorporated into materiality
- Minimum wall area of 100 sq. ft. (9 sq. m.) dedicated to WDFN iconography/representation

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