

**PROVINCE OF NOVA SCOTIA  
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL**

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DTIR Document DC350

**PART 2  
EDUCATIONAL FACILITIES  
DESIGN REQUIREMENTS**

**2010 EDITION**

**Printed September 21, 2010**

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DC350, Part 2 is not intended to be a complete architectural, mechanical or electrical specification for a school project. Such a complete specification must be written for each project by the Project Consultant.

This section, in conjunction with DC350, Part 1 and the remainder of Part 2 and its associated appendices, does specify, in outline form, the minimum acceptable standards for school components.

**PART 2 - EDUCATIONAL FACILITIES DESIGN REQUIREMENTS**

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## **Preface - Educational Facility Design Requirements**

This portion of the DC350, Part 2, Educational Facilities Design Requirements was developed to further identify the minimum acceptable design and construction standards for schools built in Nova Scotia.

This portion of the DC350 was generated by a committee of representatives from the Nova Scotia Department of Education and the Nova Scotia Department of Transportation and Infrastructure Renewal with input from architects and engineers from the private sector.

This portion of the DC350 is to be read in conjunction with the remainder of the DC350 and a specific Space Allocation Program which will be issued for each individual school. The specific Space Allocation Program will define which and how many of the spaces described herein will be incorporated into an individual school, along with other information applicable specifically to that school.

The organization of this part is divided into 3 sections. The Educational Facilities General Design Requirements deals with broad scope, design preferences. The Educational Facilities Detailed Design Requirements and the Room Data Sheets are narrow scope and address requirements for specific educational facility designs.

Information, in Section 2 of this Part, is organized utilizing Construction Specifications Canada's Master Format numbering methodology.

**PROVINCE OF NOVA SCOTIA  
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL**

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**DTIR Document DC350**

**PART 2**

**EDUCATIONAL FACILITIES  
DESIGN REQUIREMENTS**

**Section 1**

**Educational Facilities  
General Design Requirements**

**2010 EDITION**

September 21, 2010

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DC350, Part 2 is not intended to be a complete architectural, mechanical or electrical specification for a school project. Such a complete specification must be written for each project by the Project Consultant.

This section, in conjunction with DC350, Part 1 and the remainder of Part 2 and associated Appendices, does specify, in outline form, the minimum acceptable standards for school components.

## **1 Codes and Bylaws**

- 1.1 Refer to requirements of DC350, Part 1, Section 1, unless otherwise specified in this paragraph.
- 1.2 All equipment installed in schools shall be approved, supplied and installed to current CSA Standards. Protective fall area and no encroachment zones are to be provided to CSA 1998 CAN Z614 Standards for children play spaces and equipment
- 1.3 Year 2000 Compliance
  - 1.3.1 To Requirements of DC350, Part 1, Section 1.
- 1.4 Schools will be designed and constructed to meet or exceed the codes, standards, and bylaws identified in the DC350, Part 1, Section 1, Codes and Bylaws, with the provision that wherever the requirements of this School Design Requirements Manual exceed the minimum standards, the Manual shall become the minimum acceptable standard.

## **2 CADD / Drawing Standards**

- 2.1 Refer to Part 1, Section 1, #13 CADD / Drawing Standards.

## **3 School Design:**

- 3.1 Overview of Educational Facilities
  - 3.1.1 In all levels of schooling, the design must provide flexibility of learning spaces. The school will be characterized by variety in size of learning spaces recognizing that learners, teachers, and others engaged in learning experiences will work in groups of different sizes. Spaces are needed for individuals, small groups, groups of typical class size, large groups of 60 to 100 learners, and for the entire school population. The design of schools must accommodate learning experiences in settings such as seminars, small project groups, large performances or presentations, laboratories, as well as in-classroom and community based settings.
  - 3.1.2 The design of the school must contain an image and exterior appearance that is reflective of the learning environment contained therein. Sensitivity to adjacent properties and environments are also to be acknowledged by the materials and massing incorporated. Careful consideration of scale, texture, colour, materials, proportions and

detailing is expected. Large expanses of unarticulated surfaces are to be avoided by the inclusion of reveals, textures and/or surface modeling to decrease the scales of facades. Design approaches are to be to the satisfaction of the Department of Transportation and Infrastructure Renewal, Department of Education and school board representatives and must be approved as a result of scheduled design reviews. Construction Document production shall not proceed without such approvals.

### 3.1.3 Colour

3.1.3.1 Colours are associated with various processes including relaxation, stimulation, focus and productivity. For example, pale yellow or coral is associated with stimulation; rust or hunter green promote relaxation, and the absence of certain colours with predominant use of beige and grey can result in loss of productivity.

3.1.3.2 Consider the effect of colours on learners when choosing wall finishes.

3.1.3.3 Ensure Floor pattern/design supports circulation function and identifies seating/gathering areas in the process.

3.1.4 Students are viewed as powerful resources. Their active participation in decision about the school program contributes to their development and adds a considerable measure of deep connection. Their ideas and actions increase the pool of creative thinking for problem solving and their school service responsibilities lighten the work load for staff. This reduces cost for remediation, discipline and property abuse.

3.1.5 Current pedagogy reflects a philosophy of student-centered learning. The teacher plays a range of roles in directing, managing, facilitating, and supporting student learning. These roles require the teacher to move freely about the classroom with easy access to all learning spaces. While teachers need their own working space within classrooms, the notion of a designated teacher space at the front of the room is outdated. Indeed, classrooms should not be designed with a discernible front and back.

3.1.6 To accommodate learners' diverse learning styles and preferences, each classroom and school ground will allow optimal opportunity for the use of a range of communication modes and activities.

3.1.7 The school program requires a variety of grouping arrangements to allow interactive and cooperative learning. It is essential that classrooms are large enough and furnished appropriately to allow learners to shift from individual activity to triad and small group learning experiences. In mathematics classrooms, for example, learners will be required to use manipulative for independent and small group learning experiences.

- 3.1.8 Students require opportunities to teach and learn from their peers. Mentoring and peer tutoring programs have been demonstrated as valuable in improving student achievement. One-on-one, side-by-side working spaces, and small group meeting spaces are required for such experiences.
- 3.1.9 School design needs to reflect the importance of technology in all subject areas. Technology is integral to curriculum, instruction, assessment, the accommodation of different learning styles, and increasing individualization of the learning process. It is important, therefore, that classroom size for all subject areas accommodate both the maximum number of students anticipated and the technology they will be using to learn.
- 3.1.10 Learners need opportunities to express themselves through the arts and to respond to various forms of the arts. All learners are required to include arts education in their high school program and therefore need education in the arts through all levels of schooling. In addition to visual arts, music, drama, and dance, arts education includes programming options such as design, film and video production, and multimedia. The facility should include production, performance, and exhibition facilities for learning in the arts such as display/gallery spaces accessible with ease to all learners and other members of the schools' community.
- 3.1.11 Schools collaborate with other community organizations and agencies (such as health, community services and justice) in the provision of a range of services to students. To facilitate the delivery of such services schools need office/consultation spaces which are easily accessible to both students and service providers yet offer some privacy.
- 3.1.12 Comprehensive guidance and counseling services require office space, secure storage capability for confidential records, and consultation facilities which afford privacy. In addition an easily accessible and "student-friendly" information center is required. This information center will provide access to both display and take-away materials. Some schools also provide career information services to the wider community.
- 3.1.13 Levels of Schooling
- 3.1.13.1 The public school program is described in terms of three levels of schooling: Elementary, (P-6), Junior High (7-9), and Senior High (10-12). However, throughout the province there are various configurations of grade levels within a school building or within administrative units. Most common of these configurations include grades P-6, P-8, P-9, P-12, 6-8, 7-12, 9-12 and 10-12.
- 3.1.13.2 As new schools are built, there is a growing trend towards configuring schools for

- early adolescent learners as grades 6-8, 7-9, or grades 5-8. New high schools may house grades 10-12, but in increasing numbers may include grade 9 learners as well.
- 3.1.13.3 There may also be a differentiation of school sites between urban, rural and suburban locations.
- 3.1.13.4 This document will organize information in three categories: Elementary, Junior High/Middle and High School. Individual school programs will reflect the specific nature of the grade levels included in the school. Requirements to be met according to the highest grade configuration.
- 3.1.13.5 Elementary School
- 3.1.13.5.1 Elementary school is the child's introduction to public school. The design of the school and the school grounds must recognize the needs of children as they make this significant transition from smaller environments of home, day care, pre-school, and other community settings to the larger public school setting. The design will facilitate the children's comfort and self-confidence within the building and on the grounds. Hallways will be short. The grounds will provide grassed areas with shade locations for creative, UVB protected play. Common learning, dining, and performance spaces will be centrally located and easily accessible from classrooms. Administration and support services will be accessible and inviting to the learners.
- 3.1.13.5.2 The elementary school will generally be designed for a maximum of 500 learners.
- 3.1.13.6 Junior High/Middle School
- 3.1.13.6.1 The school building for early adolescent learners will provide structures that encourage flexible grouping of learners, flexible schedules and variety in learning experiences which will include classroom learning as well as many small group settings. Flexible areas will facilitate interdisciplinary learning and teaching. The junior high/middle level school building will feature a number of gathering spaces that may be used for physical activity, performances, recreation, socializing and community meetings.
- 3.1.13.6.2 The building design must recognize the growing independence of the learners while providing spaces for a variety of interactions between the learners and school personnel. There will be spaces for small group meetings, for mentoring, counseling, and advising learners. Teachers will require a variety of meeting and working spaces as team planning and teaching are encouraged at these grade levels. There will be a least one such gathering space on the school grounds.
- 3.1.13.6.3 The junior high/middle level school will generally be designed for a maximum of 700 learners.
- 3.1.13.7 High School
- 3.1.13.7.1 The senior high program involves a range of common, shared learning experiences in particular for grade 10 learners. Spaces are required to

accommodate the need for a number of classes to participate in presentations, assemblies, expositions, and other large-scale events. Grades 11 and 12 are specialization years in which programming offers a range of options and requires significant opportunities for individual, independent, self-directed learning in laboratories, the library, and other learning, resource, and study centers. All senior high learners require assembly areas in a variety of sizes and locations for learning and for socializing both within the building and on the school grounds.

3.1.13.7.2 High schools will generally be designed for a maximum of 1000 learners.

### 3.1.14 Role of the School in the Community

3.1.14.1 The school is a valuable community resource providing gathering spaces for both large and small community groups. Consideration will be given in the design process to community use of school facilities.

3.1.14.2 The primary function of the school is the education of learners in the Nova Scotia public school program. Student success is influenced by the level of involvement of parents and other community members in school life and the educational program. Schools at all levels must be welcoming to parents and other community members.

3.1.14.3 An attractive school ground that utilizes a variety of natural features for increasing students' investigating, observing and awareness skills gives the school community a sense of pride. Facilitation of ideas from parents, students, and neighbours into neighbourhood values will be expected for school ground features. In this way, each school will be unique and the community will feel stewardship of their grounds while enjoying them.

3.1.14.4 While it is recognized that parent and community involvement is an important factor in student success, the school also has a role to play in the life of the community. Schools should be viewed as centers of life-long learning that contribute to meeting the continuing education needs of the community.

### 3.1.15 Technology

3.1.15.1 Technology in public schools is selected to enhance and extend learning.

Technology includes information technology, such as multimedia computers, data information systems and the Internet, as well as audio and video recording, still images and calculators. Technology education also includes modules that introduce students to design, production, manufacturing and publishing. In most grade levels and subjects, students will learn about technology by using technology to solve curriculum related activities. To accomplish the vision for the integration of information technologies within the public school programs all students and teachers must have access on an on-going basis to appropriate technologies with appropriate software within the classroom and school library or media center to support their



work in all French and English curriculum programs. In addition, some learners and teachers will require access to adaptive and assistive technology to provide support and access to the curriculum.

- 3.1.15.2 The use of technologies within education improves learning when those technologies are immediately accessible, flexible, responsive, empowering and integrated within the public school programs. Classroom computers will be part of a school-based LAN which is connected to regional, provincial and global information networks. Emphasis is on learners' use of productivity software, curriculum software, communications software, data collection probes and software information technologies to research and to communicate their understanding in verbal, visual and multimedia forms.
- 3.1.15.3 In Elementary and Junior High Schools, no special rooms are required for technology. Flexible spaces are required where small groups of students or community can access technology. The overall focus is on integration of technology within curriculum.

#### **4 Architectural Guidelines**

4.1 Hazardous Substances: Refer to Part 1, Section 1.

4.2 Environmental Impact

- 4.2.1 The environmental conditions within the building will be affected by a variety of conditions all of which must be considered early in the planning process:
- 4.2.2 Off site: Sources of noise, smoke, exhaust fumes, etc. must be considered early in the site selection process as well as in the overall site planning process.
- 4.2.3 On Site External Factors: Both the building layout and site planning have environmental considerations. The location of the air intake louvres for example must be carefully considered relative to prevailing winds; car, truck and bus exhausts; chimneys and building exhaust louvres.
- 4.2.4 Internal Factors: Noisy areas must be separated from quiet areas. Boiler rooms must be remote from academic wings and separated from the remainder of the school with outdoor access only. Air handling rooms and rooms containing electrical transformers cannot be above or adjacent to learning areas.
- 4.2.5 In rural areas insect screens on windows are a requirement.
- 4.2.6 Finishes: must be selected to minimize off gassing to the air in the school. All finishes must be non-toxic. This applies to furniture finishes as well as building finishes. Natural organic products are preferable to manufactured petroleum based products. Paints and adhesives must be specified to be low VOC and have "Ecologo" labels to meet emission

and toxicity standards published by Environment Canada and CSA.

- 4.2.7 Locate all fans, fixtures or other exterior building appendages a minimum of 12'-0" above finished grade.
- 4.2.8 Bird proof architectural designs.
- 4.2.9 Avoid use of interior planter, planting and decorative water fountains in areas other than designated for program.
- 4.2.10 Refer to DC350, Part 1, Section 1, Environmental Impact

#### 4.3 Functional Performance Testing (FPT)

- 4.3.1 Refer to DC350, Part 1, related sections.

#### 4.4 Longevity

- 4.4.1 To Requirements of DC350, Part 1, Section 1.

#### 4.5 Grouping of Spaces and Space Requirements

- 4.5.1 The cluster school groups instructional spaces are to form a small “school within a school” creating a more personal environment. The cluster is often a repeated geometrical form with a shared focus. The focus area may be an “extended learning” area for small group work, for the use of communications technology, or a shared space for gathering. The cluster organization helps to reduce the apparent interior scale or size of the building, which can often be overwhelming to students and teachers alike. It helps to personalize space for students and offers greater opportunity for professional exchange between teachers. Depending on the flexibility of the classroom design, the cluster arrangement can also facilitate independent study, multi-age teaching, group work and team teaching.

#### 4.6 Elementary Schools:

- 4.6.1 The child's first introduction to public school should be warm, inviting and friendly.
- 4.6.2 If the school is two stories a main or ceremonial stair is to be provided connecting the levels as a lobby design feature and is to be separate and apart from any emergency egress stairways.
- 4.6.3 Large schools must be sub-divided into smaller more intimate groups of spaces to reduce the scale to a level appropriate to the beginning student.
- 4.6.4 Corridors must be short and the layout straight forward and easily comprehended.
- 4.6.5 Flexibility in space utilization is required to offer opportunities for individual, small group and large group work.

#### 4.7 Middle/Junior High School

- 4.7.1 These schools should be more in character with elementary schools than senior high

schools.

- 4.7.2 Two storey designs are acceptable.
- 4.7.3 Two storey designs require an entrance lobby that clearly introduces both stories.
- 4.7.4 The main stairway and the elevator must be part of the main entrance lobby and must be clearly evident from the Administration offices and main building entrance.
- 4.7.5 Community offices and day care centres may be introduced.
- 4.7.6 Short corridors are a requirement.
- 4.7.7 Flexibility in space utilization is required to offer opportunities for individual, small group and large group work.

#### 4.8 Senior High School

- 4.8.1 Can be up to three stories.
- 4.8.2 Room groupings are by discipline.
- 4.8.3 Storage rooms will be required for each discipline.
- 4.8.4 Specialized labs and fine arts rooms are required.
- 4.8.5 Provide gallery and display spaces in areas other than transit areas.
- 4.8.6 Design the library to accommodate individual study and research.
- 4.8.7 Community office and day care centers may be introduced as schools move toward increased community involvement and support.
- 4.8.8 Flexibility in space utilization is required to offer opportunities for individual, small group and large group work.

#### 4.9 Community-Use Space

- 4.9.1 In addition to functioning as a school, the building will be used by the community during and after school hours.
- 4.9.2 Schools may have additional community spaces incorporated into the school and paid for by the community (see specific school program).
- 4.9.3 In all cases the school must be architecturally zoned to allow public access to specific areas only. These spaces at a minimum are:
  - 4.9.3.1 gym
  - 4.9.3.2 cafeteria
  - 4.9.3.3 library
  - 4.9.3.4 information technology classroom
  - 4.9.3.5 Other areas may also require public access (see specific school program).
- 4.9.4 The building design must allow for public access to these areas while providing security for all other areas. Public access includes the following:
  - 4.9.4.1 Access to public barrier-free washrooms.
  - 4.9.4.2 Access to exits as required by code.
  - 4.9.4.3 Access to an elevator if community use spaces are on a floor level other than the

- main entry level.
- 4.9.5 Zone the ventilation systems matching the architectural zoning so that specific public areas are ventilated without ventilating large blocks of unoccupied space.
- 4.9.6 Zone the security system matching the architectural zoning so that specific public areas are secure and prevent access to large blocks of unoccupied space.
- 4.9.7 Ensure the school facility is inviting to a variety of cultures, including the cultural representation within and specific to the community in which the school is located.
- 4.10 Noisy areas must be separated from quiet areas.
- 4.11 Boiler rooms must be remote from academic wings and completely separated from the remainder of the school with outdoor access only.
- 4.12 Air handling rooms and rooms containing electrical transformers cannot be above or adjacent to learning areas.
- 4.13 Natural Light
- 4.13.1 Daylight is critical to providing human comfort and to providing spaces conducive to learning. Operating windows to the exterior shall be provided in all areas to be occupied by students and staff, with the exception of the gymnasium and cafeteria kitchen. Windows in any room shall provide a minimum of 10% of the floor area in glazing. Within this 10% glass area, operating windows shall be provided so that , when open, an amount not less than 3% of the floor area of the room (or 1/3 of the glazed area) allows fresh (outside) air into the room. Learning areas must be able to be darkened to allow use of projection screens, etc.
- 4.13.2 All teaching spaces (including the library, cafeteria, administration, etc.) must be located on an exterior wall to provide natural light, or must have clerestory window areas to provide natural light to the above standards.
- 4.13.3 In all internalized teaching spaces, clerestory windows shall provide the same amount of glazed area as a classroom on exterior wall (10%) glass area.
- 4.14 Inclusion/Universal Design/Accessibility (see also Section on Barrier-Free Design)
- 4.14.1 The school must be able to be approached, entered and used by all persons. The main entrance must be at grade without stairs or ramps. All secondary entrances must be at grade without stairs. A concrete pad, sized and sloped to meet Accessibility Guidelines is acceptable, ramped areas to accommodate changes in grade, are unacceptable. Asphalt pathways are to be provided from all exits to the parking or sidewalk areas.
- 4.14.2 In all multi-storey schools at least one assisted care washroom with shower must be provided per floor.

- 4.14.3 Stages shall be provided with a commercial standard handicapped lift. Handicapped lift must be accessible directly from the main assembly area.
- 4.14.4 Schools of more than one storey shall be provided with at least one full size elevator. Whenever sinks, showers, or similar fixtures are provided in a room, at least one of each shall be barrier free.

#### 4.15 Selection of Finishes

- 4.15.1 Selection of finishes shall be made by a qualified Interior Designer. Interior design consultant services shall be retained for the duration of the associated design work and construction period, and Interior Designer shall provide complete consulting services during this period.
- 4.15.2 All finishes should be welcoming and attractive and environmentally safe with special emphasis on ease of maintenance and durability. Hard floor finishes for example are easier to keep clean and mould free than softer materials. Vinyl wall fabrics must be avoided as the adhesive provides an area that will support the growth of mould under certain environmental conditions.
  - 4.15.2.1.1 Carpet shall not be used as a floor finish in any part of the school including administration areas and libraries.
  - 4.15.2.1.2 Quarry tile, ceramic tile or porcelain tile is required in all washrooms, shower rooms, vestibules, lobbies and all stairways (treads and landings).
  - 4.15.2.1.3 Vinyl composite tile in 12" x 12" squares or sheet flooring such as linoleum or sheet vinyl appropriate for learning areas, secondary corridors, etc.
  - 4.15.2.1.4 In most cases the durability of wall finishes will control the selection. All corridor walls exposed to traffic and behind coat hanging areas, must be concrete block. Standard drywall is acceptable only in areas protected by lockers or other equipment.
  - 4.15.2.1.5 In learning areas concrete block or abuse restraint drywall is required for all exposed walls. Areas behind cabinets, communication boards, tack boards, etc. may be standard drywall.
  - 4.15.2.1.6 Note that abuse resistant drywall will require heavier gauge steel studs for support. Studs should be designed to suit loading conditions, height of wall and spacing.
  - 4.15.2.1.7 Main washrooms and all shower areas require ceramic tile for the full height of the wall. In secondary smaller washrooms the ceramic tile need only cover the lower half of the wall. In washrooms, shower areas and recycle rooms, concrete block wall with epoxy paint will be an acceptable alternate to ceramic wall tile. High school showers require ceramic tile for full height of walls.
  - 4.15.2.1.8 With the abundance of hard surfaces, acoustic control is a primary consideration. Acoustic tile ceilings are required in all learning and administration areas. Control

of sound is critical in music and drama rooms, gymnasiums, stages and cafeterias. Fabric wrapped acoustic panels are required in all of these areas.

- 4.15.2.1.9 Steel deck when exposed in gymnasiums, cafeterias, libraries, and music rooms must be acoustic deck.
- 4.15.2.1.10 Contrasting colours give important clues to people with visual challenges. All stairways, walls, floors to have contrasting color to assist use by visually challenged students and teachers.

## **5 Main Building Zones**

5.1 There are five Main Building Zones:

- 5.1.1 Learning Areas
- 5.1.2 Assembly Areas
- 5.1.3 Administration & Student Support Services
- 5.1.4 Circulation
- 5.1.5 Building Support Areas

5.2 The subdivision of some space allocation program areas may be necessary and is subject to the discretion of the school board in their need to deliver the intended programs. Some flexibility exists to move net floor area from one space to another in consultation with the Department and other stakeholders, including the school board and Department of Education staff. In all cases the net floor area requested in the building programs must be provided:

5.3 Learning Areas

- 5.3.1 Although every space in the school is a learning space, for the purpose of Part 2, learning areas are defined as:
  - 5.3.1.1.1 classrooms
  - 5.3.1.1.2 learning support rooms
  - 5.3.1.1.3 computer
  - 5.3.1.1.4 science
  - 5.3.1.1.5 arts
  - 5.3.1.1.6 technical education
  - 5.3.1.1.7 family studies rooms
  - 5.3.1.1.8 libraries
  - 5.3.1.1.9 project rooms

5.3.2 Refer to Room Data Sheets, Part 2 Section 3, for additional information.

5.3.3 Libraries and computer intensive rooms

- 5.3.3.1.1 are a transition space in that they relate to both student and community use.
- 5.3.3.1.2 must be close to the classrooms, but also within the semi-public area available for community use in a manner that will restrict after hours access to the remainder of the school.
- 5.3.3.1.3 Ensure the library receives north light.

5.3.4 Classrooms

- 5.3.4.1.1 make up the largest block of space in the school.
- 5.3.4.1.2 Groups of classrooms must be acoustically separated from noisy areas such as the gym and cafeteria and also high traffic areas such as lobbies and administration.
- 5.3.4.1.3 Ensure direct access to the exterior from academic clusters and relate to the uses of the exterior spaces, including, where applicable,
  - 5.3.4.1.3.1 proximity of primary and grade one to the children's playground,
  - 5.3.4.1.3.2 proximity of grades 5 and 6 to the outdoor basketball standards.
- 5.3.4.1.4 Classroom Clusters
  - 5.3.4.1.4.1 Classrooms in all schools may be grouped together in clusters in order to create families of students with the school.
  - 5.3.4.1.4.2 Clusters shall be four (4) to eight (8) classrooms depending on school population and building program requirements.
  - 5.3.4.1.4.3 Include in each cluster a shared group work area, and a teacher storage room.
  - 5.3.4.1.4.4 Within the four classrooms, flexibility of group will be provided by possibly interconnecting classrooms with a moveable wall.
  - 5.3.4.1.4.5 Provide one (1) moveable wall (complete classroom height and width) for every eight (8) classroom areas, or part thereof.
  - 5.3.4.1.4.6 These classroom clusters will be zoned by age, curriculum, or any other designation as may be decided by the school.
- 5.3.4.1.5 All classrooms require the flexibility to allow the teacher to work with the entire class or to have the class break into smaller activity groups.
  - 5.3.4.1.5.1 Space must also be provided for the computers and printers, as well as an overhead projector and ceiling mounted screen.

5.3.5 Learning Support Areas

- 5.3.5.1.1 Learning Support Rooms are rooms where students can receive individual or small group instruction.
- 5.3.5.1.2 In addition to the small group work areas in each classroom cluster, provide these rooms for learners with special needs.
- 5.3.5.1.3 Ensure these rooms are integrated into the classroom areas and not isolated in remote

locations.

- 5.3.5.1.4 Ensure design provides for inclusion of all students is promoted within learning support areas, including those with special needs who are obviously a part of the main classroom. Discuss such issues with Department staff prior to inclusion into design at any stage of document development.

### 5.3.6 Science

#### 5.3.6.1.1 Laboratory Classrooms:

- 5.3.6.1.1.1 Laboratory classrooms can be grouped as a cluster or spread throughout the classroom clusters.
- 5.3.6.1.1.2 With general natural science labs included in a school, it is convenient to design the chemistry, physics and biology differently as outlined in the Room Data Sheets.
- 5.3.6.1.1.3 If only one or two laboratories are programmed, the areas must be designed with greater flexibility in mind.
- 5.3.6.1.1.4 Storage and preparatory rooms will also be required.
- 5.3.6.1.1.5 In each laboratory, one student work station must be barrier-free.

### 5.3.7 Specialized Arts Rooms

- 5.3.7.1.1 Locate rooms to facilitate after-hours use.
- 5.3.7.1.2 Provide rooms dedicated to music and the performance arts in proximity to assembly areas

### 5.3.8 Technical Education

- 5.3.8.1.1 Technology Education Rooms can be located anywhere in the school.
- 5.3.8.1.2 Consideration must be given to material deliveries.
- 5.3.8.1.3 The heart of this group of activities will be a technology centre containing computers to be used to learn computer aided design techniques related to technology education activities.
- 5.3.8.1.4 Adjacent to or integrated with the technology centre will be areas specializing in components of the specific school program (for example: nutrition, electro technologies)
- 5.3.8.1.5 Technology education is moving from single use facilities to multiple use labs. Multiple use labs might contain a design and production area. It will be necessary to ensure that production areas can be isolated, if necessary, to maintain a “clean” environment in the design area.
- 5.3.8.1.6 In each area, one work station must be barrier-free accessible.

### 5.3.9 Nutrition and Textile Rooms



- 5.3.9.1.1 Nutrition and Textile rooms can be located anywhere in the school.
- 5.3.9.1.2 Consideration must be given to material deliveries.
- 5.3.9.1.3 The heart of this group of activities will be a technology centre containing computers to be used to learn family studies activities. Adjacent to or integrated with the technology centre will be areas specializing in components of the specific school program (for example: nutrition)
- 5.3.9.1.4 Family studies are moving from single use facilities to multiple use labs. Multiple use labs might contain a design and production area. It will be necessary to ensure that production areas can be isolated, if necessary, to maintain a “clean” environment in the design area.
- 5.3.9.1.5 In each area, one work station must be barrier-free accessible.
- 5.3.9.1.6 Communication Boards, Tackboards, Front Projection Screens, and room darkening window treatment for all exterior windows, telephone, intercom station, media retrieval and cable TV outlet can be shared between the Nutrition Area and the Clothing & Textile Area, where such areas are located in the same room.

#### 5.3.10 Libraries

- 5.3.10.1.1 Locate Library/Resource Centre in a prominent central location, easily accessible by the students and by the community. The library consists of a group of rooms providing traditional library services and seminar rooms
- 5.3.10.1.2 Locate within the library/resource centre
  - 5.3.10.1.2.1 a general library
  - 5.3.10.1.2.2 office/work room
  - 5.3.10.1.2.3 library seminar room
  - 5.3.10.1.2.4 library resource room
  - 5.3.10.1.2.5 multimedia project room
  - 5.3.10.1.2.6 sound booth
  - 5.3.10.1.2.7 storage room
- 5.3.10.1.3 Ensure all of these rooms will work together as one unit.
- 5.3.10.1.4 Ensure they are interconnected and have half- height windows between rooms to facilitate supervision and monitoring.
- 5.3.10.1.5 Libraries are a transition space in that they relate to both student and community use.
- 5.3.10.1.6 Ensure libraries are close to classrooms, and within the semi-public area available for community use in a manner that will restrict after hours access to the remainder of the school.
- 5.3.10.1.7 Ensure the library receives north light.

#### 5.3.11 Project Rooms

## 5.4 Assembly Areas

### 5.4.1 Assembly areas includes

- 5.4.1.1.1 gymnasium
- 5.4.1.1.2 cafeteria
- 5.4.1.1.3 stage and various support areas

5.4.2 Group such areas together and locate same, making them accessible from the main lobby without travelling through the classroom areas.

5.4.3 Refer to Part 2, Section 1, Item #6- Sound Isolation, for sound isolation requirements.

### 5.4.4 Optional Configurations

5.4.4.1.1 There are several possible configurations of gym/stage/cafeteria, depending on the intended usage of these spaces, the size of the spaces and the degree of flexibility required by the school.

5.4.4.1.2 The specific school program will give guidance as to, which of the following arrangements would be preferred.

5.4.4.1.3 A permanent or portable stage configuration may be used in the following arrangements:

5.4.4.1.3.1 Gym and stage separate from cafeteria

5.4.4.1.3.1.1 In this configuration the stage shall be on the long dimension of the gym.

5.4.4.1.3.2 Adjacent gym and cafeteria

5.4.4.1.3.2.1 Connected with an operable wall. This permits a small gym or cafeteria to be expanded for special assembly uses.

5.4.4.1.3.3 Stage and cafeteria separate from gym

5.4.4.1.3.3.1 This configuration works well if a theatre type setting is desired as an alternate use of the cafeteria.

5.4.4.1.3.4 Gym/Stage/Cafeteria

5.4.4.1.3.4.1 This configuration allows the stage to work with either the gym or the cafeteria or both. An operable wall is used to isolate the gym or cafeteria as required.

5.4.4.1.3.5 Cafeteria/Stage/Music Room

5.4.4.1.3.5.1 This grouping, usually separate from the gym, allows the stage to be used in conjunction with the cafeteria and also in conjunction with the music room. This combination provides a "second stage" for more intimate performances or for rehearsals. A moveable wall provides acoustic separation between the stage and the space not being utilized by the audience.

#### 5.4.5 Gymnasium

5.4.5.1.1 Provide easy and direct access to the play field, complete with vestibule ensuring entry of water and snow to the gym is eliminated.

5.4.5.1.2 Locate access from the gym to the play field in the immediate area of the locker rooms, ensuring:

5.4.5.1.2.1 access to locker rooms without crossing the gym floor

5.4.5.1.2.2 access to gymnasium without crossing a main driveway.

5.4.5.1.3 A gymnasium can be subdivided with a curtain into two teaching areas.

5.4.5.1.4 In gyms (GL5, GL6), independent access to the change rooms is required from each side of the gym.

5.4.5.1.5 Provide four, 20 foot long sections of retractable bleachers, 7 rows deep with 24" seating spacing in gyms GL5 and GL6.

#### 5.4.6 Kitchen

5.4.6.1.1 Provide an exterior service door remote from the front door of the school and other exterior recreation areas.

5.4.6.1.2 Ensure exhaust fan is not directly visible when approaching the main entry.

#### 5.4.7 Stage and Staging Area

5.4.7.1.1 Provide a separate staging area with a barrier free connection to the stage itself.

5.4.7.1.2 The music room can be used as a staging area.

#### 5.4.8 Cafeteria

5.4.8.1.1 Provide direct access from the cafeteria to an outdoor terrace.

5.4.8.1.2 Locate with south or southwest exposure. Terrace to have hard landscaped finish (concrete paver or institute concrete).

5.4.8.1.3 Where the site offers a view to the surrounding countryside, orient the cafeteria to capitalize on the view. Otherwise orient the cafeteria to receive south or southwest light.

### 5.5 Administration & Student Support Services

#### 5.5.1 Administration

5.5.1.1.1 Administration areas include the Principal's office, reception area and general office, and Student Support Services. Staff rooms and Workroom are also included in this section.

5.5.1.1.2 Ensure administration areas are adjacent the main lobby in order to welcome the visiting public as well as to monitor and control access to the school.

5.5.1.1.3 Provide a visual line of sight from the Administration area

- 5.5.1.1.3.1 to the main lobby and the bus drop-off
- 5.5.1.1.3.2 In schools with more than one storey, to the elevator and the main stair
- 5.5.1.1.4 Group Administration Rooms around a control reception/waiting area and a general office, which will be staffed by one or more secretaries.
- 5.5.1.1.5 Ensure adjoining the general office area are
  - 5.5.1.1.5.1 principal's office
  - 5.5.1.1.5.2 and vice principal's office,
  - 5.5.1.1.5.3 one sick room
- 5.5.1.1.6 Sick Room
  - 5.5.1.1.6.1 Ensure the sick room has direct access to a barrier free washroom.
  - 5.5.1.1.6.2 Ensure sick room is easily monitored by the secretary.
  - 5.5.1.1.6.3 Ensure the washroom has direct access to the administration washroom.
- 5.5.1.1.7 Refer to Part 2, Section 2, Division 08 for Door and sidelight requirements. Refer to Division 12 for requirements for Blinds.
- 5.5.1.1.8 Staff Rooms - See Room Data Sheets
- 5.5.1.1.9 Guidance Centre
  - 5.5.1.1.9.1 Guidance Centres consist of smaller consulting offices grouped around a central area containing displays and a table and chairs. See Room Data Sheet.
- 5.5.1.1.10 Itinerant Specialists - See Room Data Sheets
- 5.5.1.1.11 Community Support Rooms
  - 5.5.1.1.11.1 Community Support Agency Personnel could include a community liaison officer, a public health nurse or a mental health worker.
  - 5.5.1.1.11.2 In junior and senior high schools areas for teen health centres and wellness centres are often identified as critical components in meeting the needs of learners.
  - 5.5.1.1.11.3 The specific school program will identify when these rooms are required. If two community support rooms are required, one may be an office/meeting room and another equipped with locked storage spaces for medical supplies and a refrigerator. This room should be adjacent to a washroom, or part of a teen health/wellness centre.
- 5.5.2 Student Support Services - See Room Data Sheets
  - 5.5.2.1.1 Student Support Services include guidance, itinerant specialists, and other similar activities.
  - 5.5.2.1.2 Guidance and related student services are very sensitive with regard to location in the school. See Room Data Sheets
  - 5.5.2.1.3 Some or all of the noted areas will be provided within the space program allotment for student services
  - 5.5.2.1.4 Teen Health wellness Centres - See Room Data Sheet

## 5.6 Circulation

- 5.6.1 Circulation includes corridors, lobbies and stairs.
- 5.6.2 Lobbies will relate to how the students arrive and depart from the school, especially by school bus.
- 5.6.3 A main stair must be located adjacent to the main lobby.
- 5.6.4 Ensure secondary stairs will relate appropriately to other requirements for access to exterior spaces, playgrounds.
- 5.6.5 Within Circulation areas provide areas for gatherings of students, small group discussions, and displays of visual arts produced by the students.
- 5.6.6 Consider student arrival and departure in the circulation layout. For schools served by buses devise a logical system of arriving at and departing from the classroom areas. Ensure such devised system is accommodated in the building design.
- 5.6.7 Way Finding
  - 5.6.7.1.1 Refer to Part 2, Section 1, item 8 - Barrier Free Access/Universal Design
- 5.6.8 Main Lobby - See Room Data Sheet
- 5.6.9 Stairs - See Room Data Sheets
- 5.6.10 Elevator
  - 5.6.10.1.1 Refer to Part 2, Section 2, Division 14, item 14200 - Elevators.

## 5.7 Building Support Areas

- 5.7.1 Building Support Areas includes the boiler room, air handling areas, electrical room, janitorial rooms, communications room, storage rooms, and washrooms
- 5.7.2 Carefully locate Building Support Areas with respect to the other building zones.
- 5.7.3 Boiler Rooms - See Room Data sheets

- 5.7.4 Washrooms - See Room Data Sheets
- 5.7.5 Air Handling Rooms - See Room Data Sheets
- 5.7.6 Electrical Rooms - See Room Data Sheets
- 5.7.7 Communication Rooms See Room Data Sheets

## **6 Sound Isolation**

- 6.1 Ensure the assembly areas are acoustically separated from the learning areas. Corridors, storage rooms etc., shall be used to achieve this separation.

## **7 Building Security**

- 7.1 Refer to DC350, Part 1 and Part 2, Section 2, Division 08 and Division 28.

## **8 Barrier Free Access/Universal Design**

- 8.1 Except as noted otherwise, as a minimum provide:
  - 8.1.1 Barrier-free access to the requirements of the Nova Scotia Building Code Regulations.
  - 8.1.2 Barrier-free access to CAN/CSA-B651, Barrier Free Design Public Safety A National Standard of Canada.
- 8.2 Ensure the school can be approached, entered and used by all persons.
- 8.3 Ensure the main entrance is at grade, without stairs or ramps.
- 8.4 Ensure all secondary entrances are at grade, without stairs.
- 8.5 A concrete pad, sized and sloped to meet Accessibility Guidelines is required at all Secondary entrances, ramped areas to accommodate changes in grade are unacceptable.
- 8.6 Provide, in all multi-storey schools, at least one assisted care washroom with shower for each classroom wing.
- 8.7 Provide stages with a commercial standard handicapped lift. Ensure handicapped lift is accessible directly from the main assembly area.

- 8.8 Provide schools of more than one storey with at least one full size elevator.
- 8.9 Whenever sinks, showers, or similar fixtures are provided in a room, ensure at least one of each is barrier free.
- 8.10 Contrasting colours give important clues to people with visual challenges. Ensure All stairways, walls, floors to have contrasting color to assist facilitating use by visually challenged students and teachers.
- 8.11 Stair treads to have visual contrasting strip as per CAN/CSA-B651 4.5.2.
- 8.12 At the top of stairs and at stair landings, provide detectable warning surfaces to CAN/CSA-B651 4.5.3.
- 8.13 Way Finding
- 8.13.1 The layout of circulation spaces should be straight-forward and simple to encourage easy way finding.
- 8.13.2 Spaces should be light & bright and without any projections or obstacles which would impede physical movement for persons with visual impairments.
- 8.13.3 Provide adequate signage (barrier free) necessary to support and utilize all spaces.

## **9 Site Design**

- 9.1 Refer to DC350 Part 1, Section 1, Subsection 3 Site Planning.
- 9.2 School site design shall respect the physical environment. This is for a goal of instilling an environmental ethic, by example, while using authentic resources for learning in the school yard. The interrelationship between life cycles through the elements of soil, vegetation, air, solar energy and fauna can then be taught then in environmental education cross-curricular, multi-disciplinary programs. Wherever possible, the integration of conservation of existing habitat on-site, or restoring natural areas on school grounds through native species plantings creates a rich learning potential. These shall subject to regional school board approval.
- 9.3 Minimize the effects of off-site sources of noise, smoke, exhaust fumes, through project layout, orientation, planting and organization.
- 9.4 Environmental Ethics
- 9.4.1 Environmental ethics shall be incorporated into the design of the school site including

the following:

- 9.4.1.1 Environment as the integrating context is a framework for education: interdisciplinary, collaborative, hands-on and engaged learning. The use of the natural surroundings and community as a real-life learning medium takes students and teachers beyond walls through cross-curricular means. Within this framework, learning to respect living things comes through having physical and emotional contact with them. The provision of hands-on learning experiences through problem solving and project-based activities will break down traditional boundaries between subjects.
  - 9.4.1.2 The school grounds are to reflect and retain, as much as possible, the natural surroundings upon which the school site is located. Greening School Grounds meets the need of children to play in an aesthetically pleasing, creative and safe environment.
  - 9.4.1.3 An improved school ethos and sense of ownership and stewardship evolves out of receiving input from stakeholders of the new or renovated building site. This pride is entrenched further where a long-term Greening Grounds program has continuous change and ideas from students. A high degree of cooperation between school residents, teaching staff and maintenance staff further ensures sustainability of Greening School Grounds programs. The school site will respect and leave room for creative design of the grounds upon occupation. The School Planning Committee shall be consulted during the design process.
  - 9.4.1.4 Each school site shall include a minimum of one natural feature such as a meadow, woodland, or wetland. Existing natural features are to be preserved or a new natural feature created.
- 9.5 Site elements will be designed to suit each site and development program. The number and size of facilities will be determined by the school population. Specific requirements for each school will be determined by the Province and the School Planning Committee. Site elements will generally consist of the following:
- 9.5.1 For all school projects:
    - 9.5.1.1 bus driveway, loop and student loading / unloading area
    - 9.5.1.2 car driveway and student drop off area
    - 9.5.1.3 parking areas with spaces dedicated for staff, visitors and barrier-free
    - 9.5.1.4 pedestrian walkways from the public road to the building
    - 9.5.1.5 access to and around the building for service and emergency vehicles
    - 9.5.1.6 areas dedicated for outdoor building services such as fuel tanks and garbage storage
    - 9.5.1.7 sports and recreation facilities
    - 9.5.1.8 cafeteria terrace



- 9.5.1.9 covered outdoor spaces
- 9.5.1.10 natural learning area(s)
- 9.5.1.11 landscape areas
- 9.5.1.12 paved area for basketball
- 9.5.1.13 site furnishings and equipment

9.5.2 specific to elementary schools

- 9.5.2.1 play area(s) with recreation equipment and safety surface
- 9.5.2.2 sports field for soccer, baseball or softball as determined by the development program
- 9.5.2.3 paved areas for children's games and other activities

9.5.3 specific to junior and senior high schools

- 9.5.3.1 sports field for soccer, baseball or softball as determined by development program

9.5.4 specific to senior high schools

- 9.5.4.1 separate parking areas for staff and for students; where soccer fields are to be provided for high schools, the program may require adequate space for the future development of a 400 metre track

9.6 Description of Site Elements

9.6.1 Bus Driveway, Loop and Student Loading / Unloading Area

- 9.6.1.1 See Part 1, Section 1 and Section 2, Divisions 31 and 32.
- 9.6.1.2 The school bus area must be visible from the administration area and the Principal's office must view the complete main bus loop and the front entrance.
- 9.6.1.3 Locate the school bus drop-off as close to the front entrance as possible.
- 9.6.1.4 Student loading / unloading areas (sidewalks) shall be concrete pavement, minimum width 3.0 metres.
- 9.6.1.5 Options will be developed in cooperation with the Province, where this is not practical.
- 9.6.1.6 Depending on the location of the school, flexibility is needed in determining the location of the bus driveway, size of loop and loading/unloading areas while maintaining visual supervision and primary access to main entrance. Proposed design, including loop size must be included in the Preliminary Site Plan for review and approval.

9.6.2 Car Driveway and Student Drop-off Area

- 9.6.2.1 See Part 1, Section 2, Division 02. Site shall be designed to provide the separation

of bus and car traffic and provide safe pedestrian access, to meet the following conditions:

- 9.6.2.2 Cars dropping off individuals will not be permitted use of any dedicated bus driveways during school hours (7:00am to 5:00pm).
  - 9.6.2.3 The Student drop-off area must be close to the front door for elementary and middle schools. Distance from entrance to drop off area for high schools may be greater than for the lower level schools.
  - 9.6.2.4 Driveway circles shall have a radius not less than 8.0 metres.
  - 9.6.2.5 Ensure that cars will not be required to reverse.
  - 9.6.2.6 Drop-off shall not interfere with barrier free and visitor parking areas located close to the main entrance.
- 9.6.3 Parking Areas with Spaces Dedicated for Staff, Visitors and Barrier-free
- 9.6.3.1 See Part 1, Section 1 and Section 2, Divisions 31 and 32.
  - 9.6.3.2 Parking space allocation shall be in accordance with DTIR Traffic Consultant in collaboration with the Department of Education.
  - 9.6.3.3 Staff parking shall be located near either a secondary entrance or the main entrance.
  - 9.6.3.4 Barrier-free Parking shall be in close proximity to the main entrance. The number of barrier free parking spaces in according with the Nova Scotia Building Code latest edition..
  - 9.6.3.5 Visitor parking spaces shall be designated close to the main entrance.
  - 9.6.3.6 Parking shall be provided in practical proximity to the playing field, where possible.
  - 9.6.3.7 Parking areas in excess of 50 spaces shall be broken into smaller parking areas with significant landscape areas in between.
  - 9.6.3.8 To increase space utilization, 50% of all parking areas should be designed for private passenger vehicles based on intermediate or economy sizing. The size of these spaces is to be confirmed by DTIR.
  - 9.6.3.9 Design and locate parking areas and driveways so as to minimize their visual impact on the front view of the school.
  - 9.6.3.10 For senior high schools, distinct, separate parking areas shall be provided for staff and for students. Staff parking shall be provided close to main or secondary building entrance. Access to these distinct areas to the building shall be via different direct routes.
  - 9.6.3.11 There may be some differentiation in size and requirements of parking areas for visitors and students depending on urban or rural locations. Student parking may be located further from a school than other parking or in conjunction with sports field parking.
  - 9.6.3.12 The minimum number of parking spaces for daily school use and design additional parking for special events, to accommodate for permit or pre-paid parking shall be in

accordance with DTIR Traffic Consultant in collaboration with DOE.

#### 9.6.4 Pedestrian Access

- 9.6.4.1 See Part 1, Section 1 and Section 2, Divisions 31 and 32.
- 9.6.4.2 In Urban and suburban areas a sidewalk shall connect the main entrance to the public road without crossing a driveway. A walkway to connect the main entrance to the public road may not be required in rural areas. Such a variance must be approved by the Province during the Preliminary Site Plan stage.
- 9.6.4.3 All curbs to be concrete. All sidewalks to be concrete, asphalt or concrete precast pavers. Sidewalks leading to all entrances and between buildings shall be concrete. Other sidewalks may be asphalt or concrete.
- 9.6.4.4 Sidewalks and walkways shall be a minimum 1.5 m wide except as noted below.
- 9.6.4.5 Sidewalks adjacent to bus loop locations shall be a minimum of 2.0 metres wide.
- 9.6.4.6 Sidewalks adjacent to parking spaces shall be 2.0 metres wide.
- 9.6.4.7 A paved walkway shall connect the gymnasium to the playing fields, without crossing any driveways. This walkway shall meet barrier-free standards.
- 9.6.4.8 Provide lowered curbs as required to ensure proper barrier-free access.
- 9.6.4.9 Where outdoor stairs are required, riser height shall be 150 mm, provide handrail in accordance with CAN/CSA B651.

#### 9.6.5 Access To and Around the Building for Service and Emergency Vehicles

- 9.6.5.1 See Part 1, Section 1 and Section 2, Divisions 31 and 32.
- 9.6.5.2 Fire fighting vehicular access shall be designated to meet the local Fire Fighting Authority requirements and in collaboration with DTIR Traffic Consultants to ensure clearance on turning radius etc. The Site Plan shall be submitted to the local Fire Fighting Authority for review and comment at the 33% submission stage..
- 9.6.5.3 Control gates to prevent unauthorized traffic on the property are to be provided only as directed by DTIR in collaboration with.
- 9.6.5.4 Alternate solutions must address the turning radius of the fire trucks.
- 9.6.5.5 Where service vehicles are to share driveway area with buses, ensure the facilities administration can make provision to have deliveries scheduled to ensure minimal disruption in school operation and no impact on student health and safety.
- 9.6.5.6 Trucks must be kept well away from areas where students circulate or congregate and from air intake louvres.
- 9.6.5.7 Provide truck loading/unloading access to immediately outside the following building areas:
  - 9.6.5.7.1 kitchen
  - 9.6.5.7.2 boiler room
  - 9.6.5.7.3 garbage area

- 9.6.5.7.4 recycling room.
- 9.6.5.7.5 music and drama
- 9.6.5.7.6 technical education
- 9.6.5.7.7 Gymnasium/storage

9.6.6 Areas for Outdoor Building Services (Fuel Tanks, Waste Storage, Dust Collectors, etc.)

- 9.6.6.1 See Part 1, Section 1 and Section 2, Divisions 31 and 32.
- 9.6.6.2 Provide chain link fence enclosure tanks c/w lockable sliding gate for all fuel.
- 9.6.6.3 Waste Containment Area: Use cedar board construction unless directed and approved otherwise by DTIR. In some cases, school boards may wish to have the waste containment areas “open” to ensure surveillance and mitigate vandalism and comply with CPTED.
- 9.6.6.4 Fence to be not less than 2.4 m high.
- 9.6.6.5 Service gates to be a minimum of 10 feet wide.
- 9.6.6.6 Prior to location selection and design, consult with school board staff responsible for waste collection and pickup.
- 9.6.6.7 Containment area to be sized for a minimum of 10 cubic metre bins.
- 9.6.6.8 Fenced enclosures are to be located proximate to the building. There should be no ability to access the building roof from the top of any fenced enclosure.

9.6.7 Sports and Recreation Facilities

- 9.6.7.1 As specified later in this section.

9.6.8 Cafeteria Terrace

- 9.6.8.1 The cafeteria terrace shall include an area of concrete pavement immediately adjacent to the cafeteria.
- 9.6.8.2 The area of concrete pavement shall be 1/3 of the floor area of the school cafeteria with 50% of the area covered with an architectural canopy (see .10 covered outdoor space).
- 9.6.8.3 The pavement shall be differentiated from other paved areas with a pattern such as a 600 mm x 600 mm square joint pattern.

9.6.9 Covered Outdoor Spaces

- 9.6.9.1 A minimum of two covered outdoor spaces shall be created with structural canopies extended from the building over selected entrances.
- 9.6.9.2 The canopies shall be integrated into the building design by the architect and shall include the area required for Cafeteria Terrace plus one additional canopy to cover an equal area, as determined by the architect.
- 9.6.9.3 A canopy for shading is not required if one of the two outdoor spaces is designed to

be adjacent to the north side of the building.

#### 9.6.10 Natural Learning Areas

9.6.10.1 All school sites shall include at minimum of one natural learning area.

9.6.10.2 A natural area may be a previously existing condition that is protected and enhanced or a landscaped / engineered area to be included in the Contract.

9.6.10.3 natural learning areas shall be one of the following

9.6.10.3.1 water features: wetland, stream, or pond

9.6.10.3.2 woodland

9.6.10.3.3 meadow / fields

9.6.10.3.4 garden

9.6.10.3.5 arboretum / forest nursery

9.6.10.4 The type of natural area shall be determined by the Province in consultation with the Regional School Board as being most suitable for the school site.

9.6.10.5 The Contractor shall consult with regional school boards supervisors to ensure that all safety concerns are addressed.

9.6.10.6 The Contractor shall include an allowance for the creation or enhancement of a natural area, as directed by the Province, in addition to the planting specified in .12 Landscape Areas.

9.6.10.7 Natural Areas shall meet the following requirements:

9.6.10.7.1 Water Feature: Wetland, Stream, Pond

9.6.10.7.1.1 Where a water feature exists and is to remain, it shall be made safe. Provide a platform and / or boardwalk to provide safe access for viewing. Take measures necessary to protect and enhance the natural habitat.

9.6.10.7.1.2 Water features may be engineered and constructed as part of the site work. All engineered watercourses shall be “naturalized”, including the planting of natives grasses and wetland plants.

9.6.10.7.2 Meadow / Field

9.6.10.7.2.1 A meadow / field may be created by:

9.6.10.7.2.1.1 managing the natural regeneration of a previously existing open meadow

9.6.10.7.2.1.2 planting and seeding native species of trees, shrubs, grasses, etc.

9.6.10.7.2.2 The landscape architect shall clearly define the scope of work by the Contractor and the ongoing management requirements for the Regional School Board.

9.6.10.7.2.3 The area shall be bordered with a simple fence, such as wood post with wire or other approved detail.

9.6.10.7.3 Woodland

9.6.10.7.3.1 A woodland shall be an area consisting of young to mature aged native tree species.

9.6.10.7.3.2 Ensure that adequate measures are taken to protect woodland habitat during

- construction (see Part 2, Section 2, Divisions 31 and 32.
- 9.6.10.7.3.3 Ensure fallen logs and understorey vegetation are not disturbed.
  - 9.6.10.7.3.4 Ensure all debris and litter is removed from this habitat.
  - 9.6.10.7.4 Garden
    - 9.6.10.7.4.1 The size and location of the garden area shall be determined by the Province in association with the School Planning Committee.
    - 9.6.10.7.4.2 The garden shall consist of an area of improved organic planting soil, 600 mm deep, free of weeds and other deleterious materials.
    - 9.6.10.7.4.3 The garden area shall be well drained.
    - 9.6.10.7.4.4 The garden shall have an appropriate edging such as wood, natural stone, or commercial edging product to prevent invasion of weeds.
  - 9.6.10.7.5 Arboretum / Forest Nursery
    - 9.6.10.7.5.1 An arboretum / forest nursery shall be a selected area planted with young trees.
    - 9.6.10.7.5.2 The arboretum / forest nursery areas shall have good drainage and suitable soil.
    - 9.6.10.7.5.3 Tree species and spacing to be determined by the landscape architect.
    - 9.6.10.7.5.4 50% of the area is to remain unplanted, for future use by school
    - 9.6.10.7.5.5 The area shall be bordered with a simple fence, detail to be approved by the province.
- 9.6.11 Landscape Areas
- 9.6.11.1 All areas which are not paved, left in a natural condition or occupied by structures or sports fields shall be landscaped.
  - 9.6.11.2 Maximum slope for turf areas accessible to students shall be 1:3 (rise:run). Slopes up to 1:2(rise:run) may be permitted provided that maintenance is not required and student access is not permitted, as provided grade is reviewed with and approved by DTIR.
  - 9.6.11.3 Turf areas may be seeded or sodded, except as noted below, or as directed in the project Program.
  - 9.6.11.4 The following areas shall be sodded:
    - 9.6.11.4.1 all turf areas within 6.0 metres of the building
    - 9.6.11.4.2 the bottom of swales and ditches
    - 9.6.11.4.3 all areas susceptible to erosion
    - 9.6.11.4.4 The Contractor shall be responsible for protection of turf areas until grass has established.
    - 9.6.11.4.5 Ensure that turf areas will withstand the level of foot traffic anticipated. Otherwise, provide paved surfaces.
    - 9.6.11.4.6 For all turf areas, provide a layer of topsoil, a minimum of 150 mm deep.
    - 9.6.11.4.7 The quantity of trees and shrubs to be planted will be determined by the size of the school project based on the following formula. This quantity of plant material

is in addition to any planting included as part of a natural areas. Variations may be approved by the Province provided that the cost of the work is not less than the scope of specified below.

- 9.6.11.4.7.1 Trees: provide 8 trees per 1,000 sq. metres of ground floor area.
  - 9.6.11.4.7.2 Only low growing, low maintenance shrubs, groundcover and perennial plants are to be utilized on school sites. All planting areas are to be designated in consultation with the school board..
  - 9.6.11.4.8 The size of trees and shrubs to be planted will be sufficient to survive in a harsh environment, to meet the following minimum size requirements:
    - 9.6.11.4.8.1 Deciduous Trees: 50 mm caliper
    - 9.6.11.4.8.2 Coniferous Trees: 1250 mm minimum height
    - 9.6.11.4.8.3 Shrubs: 50 mm height.
  - 9.6.11.4.9 For planting areas, provide a minimum depth of 450 mm of planting soil mixture (topsoil and organic supplements).
  - 9.6.11.4.10 Provide appropriate plants for placement along pathways; do not use shrubs with thorns, poisonous plants or bearing large fruit.
  - 9.6.11.4.11 Plant trees at appropriate distances, including distance from buildings, boundaries, roads, paths, overhead services, and underground services. Do not plant within 900 mm of an exterior building wall. Trees are not to be planted any closer than 5.0 metres from the building.
  - 9.6.11.4.12 All plants used on the school sites shall be native species.
  - 9.6.11.4.13 Plant a mixture of deciduous and coniferous species and include planting with extended seasons of interest with an emphasis on winter colour and presence.
  - 9.6.11.4.14 Trees shall be planted near entrances, play areas and gathering spaces to provide shade and interest.
  - 9.6.11.4.15 Do not create concealed spaces with planting near walkways or building entrances.
  - 9.6.11.4.16 Planting shall not obscure the surveillance of the site from administration area.
  - 9.6.11.4.17 Consider future growth of the plant toward intakes and exhaust vents, and discourage intake of pollen or mold in placement of flowering plants by locating these plants distant from intakes.
  - 9.6.11.4.18 Provide a cast-in-place concrete or precast concrete pavers, of sufficient weight to prevent their removal for the complete building perimeter, except where there are other hard surfaced areas. Perimeter strip shall be 760 mm (30") in width.
- 9.6.12 Play Area(s) with Recreation Equipment and Safety Surface
- 9.6.12.1 Play areas shall be provided for all elementary school projects at a rate of one play area for every 350 student population.
  - 9.6.12.2 Plays areas shall consist of recreation equipment and safety surface.

- 9.6.12.3 Design play areas to meet CAN/CSA Z614-98.
- 9.6.12.4 Play areas shall be designed to meet the requirements of the school population as determined by the Province and the School Planning Committee.
- 9.6.12.5 The Contractor shall carry an allowance for recreation equipment, not including the cost of installation and safety surface, as directed by the Province.
- 9.6.12.6 Play areas shall be located such that they meet the following:
  - 9.6.12.6.1 easily supervised from the administration area, staff room, or student services
  - 9.6.12.6.2 close to the classrooms they serve
  - 9.6.12.6.3 within view from the public road .
- 9.6.12.7 Play areas shall be barrier free.
- 9.6.12.8 Play areas shall be sheltered by landscaping and south facing.
- 9.6.12.9 Play areas shall be level with a subgrade drainage system. Adjacent areas shall be sloped to direct surface drainage away from the play area.

**9.6.13 Paved Area for Basketball**

- 9.6.13.1 The student population shall be used to determine the number of basketball courts as follows:
  - 9.6.13.1.1 Middle and High Schools less than 500 student population, provide 1 court.
  - 9.6.13.1.2 Middle and High Schools between 500 and 1000, provide 2 courts.
  - 9.6.13.1.3 Middle and High Schools over 1000, provide 3 courts.
- 9.6.13.2 Court size and number of provided basketball hoops are to be provided in accordance with the following formula:

Elementary School	no Court	Quantity = 3 hoops (3 free standing)
Middle School	1 - 40 x 60	Quantity = 4 hoops (2 Court, 2 free standing)
High School	1 - 40 x 60	Quantity = 4 hoops (2 Court, 2 free standing)
- 9.6.13.3 For P-8 and P-12 schools there shall be a minimum of one court per school.
- 9.6.13.4 Courts areas shall be defined with painted pavement markings to match the court layout specified for the gymnasium floor.
- 9.6.13.5 The paved area of the bus loop will accommodate recreational activities only when approved by DTIR Traffic Consultant in consultation with DOE.
- 9.6.13.6 Court location should allow for visibility from street, sidewalks or residential neighbourhoods and shall not be obscured from view by buildings, shrubs or trees.

**9.6.14 Paved Area for Children’s Games and Other Activities**

- 9.6.14.1 During much of the school year, turf areas are not accessible to students because of wet conditions. In addition to active recreation spaces, paved areas are required for passive /social uses and unstructured play. These additional paved surfaces will be designated in collaboration between DTIR and DOE and will form prt of the Design



Document Site Planning.

9.6.14.2 Paved areas for service and emergency vehicle access may be used for this purpose provided that there are no hazards or conflicting uses and that equipment does not encroach on fire lanes.

9.6.14.3 For schools with grades P-6, provide a minimum of 4 pavement game locations complete with painted markings for hopscotch and four square, as shown on the sketch in Appendix C, ASK 3.

#### 9.6.15 Sports Fields - General

9.6.15.1 Sports fields , where currently existing, shall be incorporated within the site plan.

9.6.15.2 Requirements to provide a sports field irrigation system will vary across the province and will be identified in the Project Brief or School Program.

9.6.15.3 Grassed sports fields identified to be irrigated, shall conform to Part 1 Section 2, Division 32.

9.6.15.4 The type and size of sports field is to be determined by the Province as indicated in the Project Program.

9.6.15.5 Sports fields shall be located as close as possible to the gymnasium.

9.6.15.6 The sports field shall be designed by the Landscape Architect in association with the geo-technical and civil engineers. Refer to DC350 Appendix A - Performance Criteria for Design Projects. Duration and extent of Consultant Services shall apply to all project delivery types. Inspection and written certification by the Landscape Architect will be required for all finished sports field surfaces and landscape planting.

9.6.15.7 The design for the sports field shall include provisions for adequate surface and subsurface drainage in accordance with Part 2, Section 2, Division 32.

9.6.15.8 There shall be no areas of standing water in close proximity to the sports field. Users shall not have to walk through wet areas or ditches to access the sports field or retrieve balls which have gone beyond the field of play.

9.6.15.9 Sports field construction shall include a full 150 mm of topsoil. Topsoil shall be high quality sandy loam as specified in Part 2, Section 2, Division 32.

9.6.15.10 Sports fields shall be seeded unless specified to be sodded by the Province. The seeding of sports fields requires a high level of skill and maintenance and careful attention to the scheduling of the work . Contractors shall be made aware that nothing less than a perfect field of turf will be accepted by the Province.

9.6.15.11 The surface of the sports field shall be smooth and even completely free of gaps and undulations which may result in personal injury.

9.6.15.12 Where soccer fields are adjacent to long or steep slopes, fencing may be required to contain the soccer ball. The extent of fencing required shall be determined by the Province.

9.6.15.13 Sports fields shall be designed to the dimensions and requirements of Sport Nova Scotia. In all cases, fields shall be designed to the highest level of play unless directed otherwise by the Province.

#### 9.6.16 Soccer Field

9.6.16.1 Soccer field shall be designed to meet the minimum International Amateur Athletic Federation size and dimensions. Dimensions shall be 67.0 metres x 107.0 metres, which includes a 3.0 metre run-off zone on all four sides, unless otherwise directed by DTIR..

9.6.16.2 Soccer fields shall be oriented north-northwest / south-southeast for the long axis, unless directed otherwise by the Province.

#### 9.6.17 400 Metre Track

9.6.17.1 At senior high schools, space may be provided for the possible future addition of a 400 metre track by others.

9.6.17.2 When a track is included in the program, it shall surround the soccer field and shall meet the dimension requirements of the International Amateur Athletic Association, as shown in the sketch provided in Appendix C, ASK 2.

#### 9.6.18 Road Signs

9.6.18.1 Provide signage (pole mounted and pavement markings) to adequately describe and identify all traffic movement on site including the following:

9.6.18.1.1 bus driveways and other areas where use by private vehicles is restricted

9.6.18.1.2 bus standing areas

9.6.18.1.3 parking spaces

9.6.18.1.4 barrier-free zones

9.6.18.1.5 drop-off zones

9.6.18.1.6 fire lanes

9.6.18.1.7 driveway lanes

9.6.18.1.8 stop signs

9.6.18.1.9 one way lanes

9.6.18.2 All signs shall meet TAC standards.

#### 9.6.19 Site Furnishings and Equipment

##### 9.6.19.1 Flag Pole

9.6.19.1.1 Provide 1 flag pole in close proximity to the main entrance.

##### 9.6.19.2 Bicycle Racks

9.6.19.2.1 When required, provide for bicycle racks in close proximity to the main entrance.

9.6.19.2.2 Bicycle racks are required at all school sites with a capacity to meet or exceed

LEED requirements.

## **10 Building Design / Structural Criteria**

### 10.1 Foundation and Structure

- 10.1.1 Building foundations are to be designed to suit site topography. On sloping sites, the ground floor level shall be stepped to avoid large scale cut and fill and the creation of steep slopes.
- 10.1.2 The foundation system shall be established in the light of the recommendations of the geotechnical report.
- 10.1.3 Foundation and floor slabs to be of reinforced concrete construction designed by a structural engineer licensed to practice in the Province of Nova Scotia.

### 10.2 Structural Systems

- 10.2.1 Structural systems shall be structural steel, reinforced concrete or load bearing masonry.
- 10.2.2 Wood framing will not be acceptable except as follows:
  - 10.2.2.1 Wood trusses for sloped roofs only
  - 10.2.2.2 Heavy timber construction
  - 10.2.2.3 Prefabricated laminated wood post and beam systems with tongue and groove wood decks
- 10.2.3 All structural systems shall be designed by an engineer licensed to practice in the Province of Nova Scotia, all to meet the requirements of the DC350.

## **11 Building Envelope Assemblies**

### 11.1 General

- 11.1.1 Provide building envelopes that will effectively and efficiently separate the interior from the exterior environment by controlling the movement of air (not more than 0.1 L/S per m<sup>2</sup> at 75 Pa) water, heat and water vapour using assemblies that are practical, constructable and economical and that will minimize operating and maintenance life cycle costs.
- 11.1.2 Eliminate thermal bridges. Design walls so that condensation does not occur and air/vapour barrier continuity is maintained.
- 11.1.3 Refer to Part 1, Section 1, DTIR General Design Requirements - Item 7.7 - Design and Building Functionality - Performance Criteria, for CBIP energy performance requirements in educational facilities.
- 11.1.4 Design and detail the building envelope so that water cannot stand on any surface, and ice formation on the face of the building is minimized.
- 11.1.5 Locate fixtures and other exterior building appendages a minimum of 12'-0" above

finished grade.

#### 11.1.6 Air/Vapour Barrier

11.1.6.1 Design exterior walls to incorporate a continuous air barrier that is located on as flat and plane a surface as possible to provide as air tight a wall system as is practical.

#### 11.1.7 Rain Screen Principle

11.1.7.1 To requirements of the DC350, Part 1, Section 1.

11.1.7.2 Exterior wall design must be designed to be a “ ‘rainscreen’ principle providing a pressure-equalized cavity between the exterior cladding and the air/vapour barrier”.

11.1.7.3 Size and locate vents in the exterior wythe to achieve "nearly instantaneous" pressure equalization of the cavity and protect from rain entry.

11.1.7.4 Compartmentalization of all pressure equalized cavities is to be provided. Solid block of all corners is required. (Walls to be top vented and bottom weeped, minimum 24" o.c.)

### 11.2 Exterior Wall Assembly

11.2.1 Design exterior walls so that any moisture in the wall that is on the cold side of the vapour barrier can be dissipated to the outside atmosphere.

## 12 Mechanical Guidelines

### 12.1 School Ventilation

12.1.1 The school will require large quantities of fresh (outside) air to be delivered to every room. In some areas of the school this may be 100% outside air.

12.1.2 The large volume of air movement required in a school will usually result in more than one air handling unit in order to keep the ducts down to a manageable size. This provides an opportunity to provide air handling zones within the school.

12.1.3 The gymnasium and related areas shall have a separate unit that can operate independently from the learning hours. The cafeteria/kitchen shall also have a separate unit. This provides the opportunity to ventilate community use areas after normal school hours. Consideration shall also be given to other community use areas such as libraries and auditoriums.

12.1.4 Distribution of air handling equipment around the school raises several challenges. Noise and vibration are always associated with these units, which must never be located over or beside a learning space. Other spaces such as washrooms, storage rooms must be used as sound and vibration buffers.

12.1.5 Duct sizes will affect air handling noise, and sufficient space must be provided by the Consultant and support the design of properly sized and proportioned ducts. This is especially applicable to corridors and ceiling spaces above classrooms.

12.1.6 Provide air handling rooms or penthouses so that air handling systems are located

indoors. Provide access via stairs and not ladders and sufficient space within the air handling room or penthouse to permit proper servicing of the equipment, including the filters and motors. If mechanical penthouse is utilized, it shall be accessible by a permanent set of stairs and without crossing the roof of the building. Stairs are defined as a maximum rise of 7" (175 mm) with a tread of 9" (225 mm).

- 12.1.7 Consider the location of air intake louvres with respect to exhaust louvres, chimneys, school buses, parked cars, existing sources of pollution and prevailing winds. The location of exhaust louvres relative to neighbouring occupancies is also a consideration due to the large volumes of air being exhausted.

## 12.2 How M & E Systems Affect the Environment for Learning

- 12.2.1 Mechanical and electrical building support systems can have a profound effect on the Environmental Quality of the learning spaces. Even when these systems are working perfectly, they can be intrusive and disruptive if not properly designed and located.
- 12.2.2 Boiler Rooms containing fuel-fired appliances must be in a location remote from the learning, administration and assembly areas. Noise and vibration are serious concerns. In addition, products of combustion must not be able to migrate to any part of the school either through the corridors or the air handling system. Boilers providing steam for humidification cannot be located in air handling rooms for the same reasons.

**END**

**PROVINCE OF NOVA SCOTIA  
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL**

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**DTIR Document DC350**

**PART 2**

**EDUCATIONAL FACILITIES  
DESIGN REQUIREMENTS**

**Section 2**

**Educational Facilities  
Detailed Design Requirements**

**2010 EDITION**

January 2, 2010

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DC350, Part 2 is not intended to be a complete architectural, mechanical or electrical specification for a school project. Such a complete specification must be written for each project by the Project Consultant.

This section, in conjunction with DC350, Part 1 and the remainder of Part 2 and Associated Appendices, does specify, in outline form, the minimum acceptable standards for school components.



## **1 Introduction**

- 1.1 This section is not intended to be a complete architectural specification for a school project. Such a complete specification must be written for each project by the Project Architect.
- 1.2 This section does specify in outline form the minimum acceptable standards for the architectural components of the school.

## **2 General Building Requirements**

### **2.1 Foundation and Structure**

- 2.1.1 The foundation system shall be established in the light of the recommendations of the geotechnical report.
- 2.1.2 Foundation and floor slabs to be of reinforced concrete construction designed by a structural engineer licensed to practice in the Province of Nova Scotia.

### **2.2 Structural Systems**

- 2.2.1 Structural systems shall be structural steel, reinforced concrete or load bearing masonry.
- 2.2.2 Wood framing will not be acceptable except as follows:
  - 2.2.2.1 Wood trusses for sloped roofs only
  - 2.2.2.2 Heavy timber construction
  - 2.2.2.3 Prefabricated laminated wood post and beam systems with tongue and groove wood decks.
  - 2.2.2.4 All structural systems shall be designed by an engineer licensed to practice in the Province of Nova Scotia, all to meet the requirements of this manual.

### **2.3 Exterior Walls**

- 2.3.1 Acceptable materials for cladding exterior walls are;
  - 2.3.1.1 Jumbo claybrick.
  - 2.3.1.2 Architectural Concrete Block.
  - 2.3.1.3 Metal siding (minimum 24 gauge) for walls higher than 12' above finished grade. Metal siding of any gauge shall not be used as exterior wall cladding within 12'-0" of finished grade.
  - 2.3.1.4 Cement board with synthetic stucco finish for walls higher than 12' above finished grade. (Not to be located within 3'-0" of roof surface or where snow build-up can occur). Cement board with synthetic stucco finish shall not be used as exterior wall cladding within 12'-0" of finished grade.



- 2.3.1.5 Insulated pre-cast or tilt-up concrete panels. (Minimum 5000 psi concrete, maximum water absorption 5% @ 28 days)
- 2.3.2 Exterior wall design must be designed to be a “ ‘rainscreen’ principle providing a pressure-equalized cavity between the exterior cladding and the air/vapour barrier”. All masonry cavity wall systems shall be comprised of an interior concrete block wall component.
- 2.3.3 Size and locate vents in the exterior wythe to achieve "nearly instantaneous" pressure equalization of the cavity and protect from rain entry.
- 2.3.4 Compartmentalization of all pressure equalized cavities is to be provided. Solid block of all corners is required. (Walls to be top vented and bottomed weeped, minimum 24" o.c.)
- 2.3.5 Joints in Pre-cast or tilt-up concrete wall systems must contain an air chamber vented and weeped to the exterior, pressure equalized and sealed to perform as an adequate air barrier. Where steel stud back-up walls are utilized as a back up to pre-cast or tilt-up, they be constructed at 16" o.c. complete with 6mil polyethylene barrier and fibreglass batt insulation between the studs. Studs for steel stud back-up walls shall not be placed directly against the pre-cast or tilt-up concrete wall panels by shall be held away from the wall panels with a minimum 1" space.
- 2.3.6 Wood framing systems are not permitted in whole or in part of any exterior structural wall system.

## 2.4 Roofing Systems

- 2.4.1 Acceptable roof membrane systems are
  - 2.4.1.1 2 ply modified bitumen.
  - 2.4.1.2 Single-ply EPDM (fully adhered or mechanically fastened; non-ballasted).
  - 2.4.1.3 Asphalt shingles (30 year warranty).
- 2.4.2 A protective coverboard (min. 13mm) must be installed over the roof insulation prior to the installation of the roof membrane.
- 2.4.3 All roof systems must include exterior grade drywall on the metal deck before installation of the vapour barrier, and a protective fibre board over the roof insulation.
- 2.4.4 The roof membrane being the principal air barrier on the roof shall have all penetrations carefully detailed and components specified.
- 2.4.5 All low slope roofs less than 1:3, shall have installed inserts/slots for the purpose of retaining temporary guard rails (min. 42" high), for construction and maintenance purposes.

## 2.5 Insulation and Air/Vapour Barriers

- 2.5.1 Provide building envelopes that will effectively and efficiently separate the interior from

the exterior environment by controlling the movement of air (not more than 0.1 L/S per m<sup>2</sup> at 75 Pa) water, heat and water vapour using assemblies that are practical, constructable and economical and that will minimize operating and maintenance life cycle costs.

- 2.5.2 Provide building insulation to completely enclose the non-cladding parts of the structure.
  - 2.5.2.1 Perimeter Foundation Insulation:
    - 2.5.2.1.1 To 24" below finish grade on inside face of perimeter foundation walls.
    - 2.5.2.1.2 To 24" in from perimeter foundation wall under slabs on grade.
    - 2.5.2.1.3 2" thick expanded polystyrene type 2 or extruded polystyrene type 4.
  - 2.5.2.2 Cavity Wall: extruded or expanded polystyrene to CAN 2-51.20, minimum R value 15.
  - 2.5.2.3 Roof: Extruded/Expanded polystyrene to CGSB 51.20M, or fibrous glass insulation to CGSB 51.25-M87, or isocyanurate (urethane) insulation to CGSB 51.26M, minimum R value 30.
  - 2.5.2.4 Insulation values shall be as per Part 2, Section 2, item 07210.6.
- 2.5.3 Place air/vapour barrier on the warm side of the insulation.
- 2.5.4 Place the warm side of the insulation in direct contact with the air barrier.
- 2.5.5 Ensure that the air barrier is capable of maintaining its continuity and its contact with the insulation under all expected loading conditions.
- 2.5.6 Prepare large scale details (minimum ½ full size) to show how air barrier continuity is maintained at window surrounds, roof and wall junctions, envelope penetrations and changes of substrate materials.
- 2.5.7 Design and detail the building envelope so that water cannot stand on any surface, and ice formation on the face of the building is minimized.
- 2.5.8 Design exterior walls to incorporate a continuous air barrier that is located on as flat and plane a surface as possible to provide as air tight a wall system as is practical.
- 2.5.9 Consider building occupancy, particularly performance requirements (humidity), and "state of the art" construction as major influences in the choice of a wall system.
- 2.5.10 Design exterior walls so that any moisture in the wall that is on the cold side of the vapour barrier can be dissipated to the outside atmosphere.
- 2.5.11 Design masonry veneered exterior walls so that there is a minimum 50 mm air space between the insulation and the veneer material. Provide baffles in air space to compartmentalize the cavity into zones of equal pressure.
- 2.5.12 Eliminate thermal bridges. Design walls so that condensation does not occur and air/vapour barrier continuity is maintained.
- 2.5.13 At roof to wall junctions, the roof membrane shall be brought at least 300 mm up the wall. Construction sequence of the wall shall not interfere with the continuous

operation of the roofing work.

- 2.5.14 Design and locate air/vapour barrier for overhangs and hidden spaces in envelope so that condensation will not occur in these spaces. Consider air/vapour barrier continuity and build-ability, insulation location, thermal bridging and air circulation in order to determine if space will perform better as cold exterior or warm interior space.
- 2.5.15 Contractor shall provide verification of the NRC evaluation listings from manufacturers of wall and roof insulation used on the project.
- 2.5.16 Cavity wall insulation shall have a flame spread rating of less than 25.

## 2.6 Foundation:

- 2.6.1 The thickness of the foundation for paved areas shall be determined while taking into account the results of the soils tests, the properties of the foundation materials, the traffic type and frequency and the pavement thickness.
- 2.6.2 The grading of the aggregates shall be such that it shall allow sufficient draining of the foundation, towards the storm drains while protecting against infiltration by fine sub-grade materials.
- 2.6.3 All of the aggregate layers shall be compacted at least 90% modified proctor density. Where required sub-grade materials will be compacted in accordance with recommendations of soils consultant.

## 2.7 Asphalt Paving:

- 2.7.1 Asphalt paving shall be applied to all the parking areas, in addition to the access lanes and loading areas.
- 2.7.2 The minimum gradient for pavement shall be 2%. The gradient for paved ramps and loading areas shall be 2%.
- 2.7.3 The thickness of the asphalt pavement will be 2 ½" minimum in areas used by light traffic (vehicles of 1 ton or less) and 3" minimum for areas used by heavier vehicles, buses and trucks.
- 2.7.4 The materials, mixes, compacting and laying of pavement shall conform to the specifications set out by the Department of Transportation and Infrastructure Renewal of the Province of Nova Scotia for asphalt paving.
- 2.7.5 The parking areas and service areas shall be sloped for surface drainage to open ditches unless a municipal storm drainage system exists.

## 2.8 Sidewalks and Curbs:

- 2.8.1 All sidewalks and curbs shall be concrete.
- 2.8.2 All of the sidewalks and the concrete curbs shall be laid on a granular foundation.
- 2.8.3 The sidewalks and curbs will be on a 19mm (3/4") granular foundation. In the case of

sidewalks integrated with a curb, the foundation shall extend 10 cm (4") beyond the exterior face of the curb. The foundation of the curbs shall be 46 cm (18") wide.

- 2.8.4 At driveways, the sidewalk or curb will be lowered to allow the vehicles to pass.
  - 2.8.5 Provide lowered curbs as required to ensure proper barrier-free accesses.
  - 2.8.6 Expansion and on contraction joints shall be built at right angles to the sidewalk.
  - 2.8.7 The expansion joints shall be made of 12 mm piece of wood or asphalt felt laid at 15 m (50') intervals, and possibly less at critical places such as near utility poles, fire hydrants, drains, etc.
  - 2.8.8 Concrete sidewalks shall have a broom finish resulting in a non-slip surface. All sidewalks constructed to have a traverse slope of 2 to 3%..
  - 2.8.9 After finishing, polishing and cleaning up of edges, curing in accordance with CSA A23 shall be undertaken.
- 2.9 Excavation:
- 2.9.1 All organic soil shall be removed from the surface to be occupied by the buildings, roads, walks and parking areas. An adequate quantity shall be stockpiled for reuse in landscaping work.
  - 2.9.2 The depth of the excavation for the foundation walls and pilasters shall conform to the requirements of the codes and regulations. When subject to freezing, foundations shall not be less than 1.4 m (4'-0") below finished grade.
  - 2.9.3 Under all slabs on grade, trenches and sidewalks, the backfill shall be composed of granular material of non capillary characteristics and compacted to 95% modified proctor. This layer of granular material shall have thickness of not less than 200 mm. When clay soil is under the area to be backfilled, a 150 mm layer of sand or fine gravel or specially made filters shall be placed before the layer of granular material is laid down. Granular material should be used for backfilling of the inside of the walls and pilasters.
  - 2.9.4 Where a high water table is expected under slabs on grade below ground level, a drainage system shall be installed in order to avoid any hydrostatic pressure under the slabs. It shall consist of perforated pipes draining into a storm sewer system or into a sump. These drains shall be in and surrounded by a bed of granular material. Whenever possible, this system shall drain by gravity.

## **DIVISION 00 BIDDING AND CONTRACTING REQUIREMENTS**

### **00 20 00 Instructions to Bidders**

#### **1 General:**

1.1 Refer to DC350 Part, Section 2, Division 00; supplemented by the following:

##### **1.1.1 Reports, Documentation and Drawings**

1.1.1.1 The Contractor shall prepare the following documentation and submit to the Province for review and approval, prior to the commencement of construction.

1.1.1.2 All measurements provided on the documentation shall be metric.

### **00 31 21 Survey Information**

1 Provide detailed Site Plans.

2 Refer to DC350, Part 2, Section 2, Division 32.

### **00 31 24 Environmental Assessment Information**

1 See DC350 Part 1, Section 2, Division 00.

### **00 31 32 Geotechnical Data**

#### **1 Geotechnical Studies**

1.1 Provide a detailed soil investigation at the building site, on the sports field, in the playground areas and, at any other location which may require a special foundation. Soils investigation to be done by a professional engineer licensed to practice in Nova Scotia and with at least 10 years experience in soils engineering.

1.2 The number of holes shall be sufficient to provide accurate information concerning the prevailing soil, rock and ground water conditions at the proposed site. This data shall allow the Engineer to provide accurate recommendations with respect to foundation design and construction for the proposed structures.

1.3 The written report shall be prepared and signed by a Soils Engineer and will include:

1.3.1 The logs and the results of all the in-situ and laboratory tests.

- 1.3.2 A location plan showing, the proposed building layout.
- 1.3.3 A brief description of the field procedure and equipment used.
- 1.3.4 A description of the site and of all the encountered soil and rock layers.
- 1.3.5 Recommendations on the design and construction of the foundations of the proposed buildings and of any ancillary structures, i.e., access roads, parking lots, sports fields, etc.
  
- 1.4 The recommendations shall include the following items:
  - 1.4.1 Types of foundations with justifications of the choice.
  - 1.4.2 For shallow foundations: soil bearing capacity and settlement evaluation.
  - 1.4.3 For pile foundations: possible or recommended types, approximate pile tip elevation, design parameters for friction piles, negative friction evaluation if applicable.
  
- 1.5 Temporary and long-term drainage requirements.
  
- 1.6 Possibility of carrying slabs on grade.
  
- 1.7 Temporary excavation.
  
- 1.8 Design parameters for supported excavations, if applicable.
  
- 1.9 Type of materials and degree of compaction for backfill.

**00 40 00 Procurement Forms and Appendices**

- 1 See DC350 Part 1, Section 2, Division 00.

**00 52 00 Agreement Forms**

- 1 See DC350 Part 1, Section 2, Division 00.

**00 60 00 Project Forms**

- 1 See DC350 Part 1, Section 2, Division 00.

**00 72 00 General Conditions**

- 1 See DC350 Part 1, Section 2, Division 00.

**00 73 00 Supplementary Conditions**

1 See DC350 Part 1, Section 2, Division 00.

**00 90 00 Revisions, Clarifications and Modifications**

1 See DC350 Part 1, Section 2, Division 00.

**00 94 00 Record Modifications**

1 See DC350 Part 1, Section 2, Division 00.

**END**

## **DIVISION 01 GENERAL REQUIREMENTS**

### **01 00 00 General Instructions**

#### **1 Extended Warranties**

- 1.1 To Requirements of DC350, Part 1, Section 2, Division 01.

#### **2 Indoor Air Quality**

- 2.1 Indoor air quality, noise and illumination parameters will be measured by DTIR as part of the Functional Performance Testing Program. Designer/builder to provide all other tests/reports as required by authorities having jurisdiction and as outlined in other sections of this document.

#### **3 Jurisdictional Authorities**

- 3.1 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of building.

#### **4 Reference Standards**

- 4.1 Where edition date is not specified, consider that references to manufacturer's and published codes, standards and specifications are made to the latest edition, or revision approved by the issuing organization, current at the date of this Specification.
- 4.2 Reference standards and specifications are quoted in this Specification to establish minimum standards. Work that in quality exceeds these minimum standards shall be considered to conform.
- 4.3 Where reference is made to manufacturer's directions, instructions or they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.
- 4.4 Have a copy of each code, standard and specification, and directions, instructions and specifications, to which reference is made in this Specification, always available at construction site.
- 4.5 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the manual by their abbreviated designations. They are:
- AA - The Aluminum Association
  - AABC - Associated Air Balance Council
  - ACI - American Concrete Institute
  - AISI - American Iron and Steel Institute



- AMCA - Air Moving & Air Conditioning Association
- ANSI - American National Standards Institute
- ARI - Air Conditioning & Refrigeration Institute
- ASTM - American Society for Testing and Materials
- ASHRAE - American Society of Heating, Refrigeration & Air Conditioning Engineers, Inc.
- AWI - Architectural Woodwork Institute
- AWMAC - Architectural Woodwork Manufacturers Association of Canada
- CGSB - Canadian General Standards Board
- CISC - Canadian Institute of Steel Construction
- CPMA - Canadian Paint Manufacturers Association
- CSA - Canadian Standards Association
- DTIR - N.S. Department of Transportation & Infrastructure Renewal
- IAO - Insurers Advisory Organization
- MFMA - Maple Flooring Manufacturers Association
- NAMM - The National Association of Architectural Metal Manufacturers
- NBC - National Building Code
- NFPA - National Fire Protection Association
- NRC - National Research Council, Canada
- SAE - Society of Automotive Engineers
- SMACNA - Sheet Metal & Air-Conditioning Contractors National Association Inc.
- ULC - Underwriters Laboratories of Canada
- ULI - Underwriters Laboratories Incorporated

4.6 CSA Approval: all equipment installed in schools will be CSA approved.

4.7 Fire Separation

- 4.7.1 Where fire separations are required between rooms, floors, etc., provide written description of entire system being used to achieve fire separation with appropriate ULC number.

**END**

**DIVISION 02 EXISTING CONDITIONS**

**02 00 00 Existing Conditions - General**

1 Refer to Part 1.

**END**

**DIVISION 03 CONCRETE**

**03 00 00 Concrete - General**

1 Design

- 1.1 See DC350, Part 1, Section 2, Division 03, item 03 00 00.

2 References:

- 2.1 CAN/CSA-S269.3, Concrete Formwork.  
2.2 CAN/CSA-G30.18 , Billet-Steel Bars for Concrete Reinforcement.  
2.3 Manual of Standard Practice - Reinforcing Steel Institute of Ontario.  
2.4 CAN/CGSB-37.2, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.  
2.5 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.  
2.6 CAN/CSA-A5, Portland Cement.  
2.7 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.  
2.8 CAN/CSA-A23.2, Methods of Test for Concrete.  
2.9 CAN/CSA-A23.5, Supplementary Cementing Materials.  
2.10 CAN3-A266.1, Air-Entraining Admixtures for Concrete.  
2.11 CAN3-A266.2, Chemical Admixtures for Concrete.  
2.12 CAN3-A266.4, Guidelines for the Use of Admixtures in Concrete.  
2.13 CAN/CSA A363, Cementitious Hydraulic Slag.

3 Quality Assurance

- 3.1 Have all concrete produced and delivered by a ready-mix plant that is a member of the Atlantic Provinces Ready Mixed Concrete Association (APRMCA) and holds a current "Certificate of Ready Mixed Concrete Production Facilities" issued by the Association.

4 Materials

- 4.1 See DC350, Part 1, Section 2, Division 03, item 03 10 00.

5 Curing Material

- 5.1 Curing compound for all concrete floor areas, except those which are to receive seamless flooring, epoxy or latex coatings, or quarry tile cured using CGSB Spec. 90-GP-1a or equal.

6 Formwork Materials

- 6.1 Use form materials to CSA Spec. CAN3 A23.1.

6.2 For form coating, use a non-staining form coating.

7 Concrete adequately strong and leakproof formwork to CAN3-A23.1.

### **03 10 00 Concrete Forming and Accessories**

1 See DC350 Part 1, Section 2, Division 03, item 03 10 00

### **03 20 00 Concrete Reinforcing**

1 Welded steel wire fabric

1.1 to CSA G30.5.

2 See DC350 Part 1, Section 2, Division 03, item 03 20 00

### **03 30 00 Cast -in -Place Concrete**

1 See DC350 Part 1, Section 2, Division 03, item 03 30 00

### **03 41 00 Precast Structural Concrete**

1 See DC350 Part 1, Section 2, Division 03, item 03 41 00

2 For Exterior Walls, insulated pre-cast or tilt-up concrete panels are acceptable, providing:

2.1 The panel has a minimum strength of 35 mPa concrete, and maximum water absorption 5%  
(@ 28 days)

3 Joints in pre-cast or tilt-up concrete wall systems must contain an air chamber vented and weeped to the exterior, pressure equalized and sealed to perform as an adequate air barrier.

4 Refer also to DC350, Part 2, Section 2, Division 09, items 09 22 16 for steel stud back up requirements, & 07 20 00 for insulation requirements, & 07 25 00 for vapour barrier requirements.

### **03 45 00 Precast Architectural Concrete**

1 See DC350, Part 1, Section 2, Division 03, item 03 45 00.

**DIVISION 04 MASONRY**

**04 00 00 Masonry - General**

- 1 Ensure all masonry cavity wall systems are comprised of an interior concrete block wall component.
- 2 Design masonry veneered exterior walls so that there is a minimum 25 mm air space between the insulation and the veneer material. Provide baffles in air space to compartmentalize the cavity into zones of equal pressure.
- 3 Mock ups required.
- 4 Masonry Procedures
  - 4.1 Refer to DC350, Part 1, Section 2, Division 04, 04 00 00, unless specified otherwise.
  - 4.2 Protect freshly laid masonry from curing too rapidly, by means of waterproof, non-staining coverings.

**04 05 00 Common Work Results for Masonry**

- 1 Mortar and Masonry Grout
  - 1.1 See DC350, Part 1, Section 2, Division 04, 04 05 00.
- 2 Masonry Reinforcement and Connectors
  - 2.1 See DC350, Part 1, Section 2, Division 04, 04 05 00
- 3 Masonry Accessories
  - 3.1 See DC350, Part 1, Section 2, Division 04, 04 05 00.

**04 21 00 Clay Unit Masonry**

- 1 Jumbo clay brick is an acceptable material for cladding exterior walls.
- 2 Face Brick
  - 2.1 Clay Face Brick: to CSA A82.1.
    - 2.1.1 Type: FBS
    - 2.1.2 Grade: SW

- 2.1.3 Size: Metric modular
- 2.1.4 Include special shapes as required

**04 22 00 Concrete Unit Masonry**

- 1 All corridor walls exposed to traffic and behind coat hanging areas, must be concrete block. Refer to Part 1, Section 2, Division 09, item 09 21 16.
- 2 In learning areas concrete block or abuse resistant drywall is required for all exposed walls.
- 3 Architectural Concrete Block is an acceptable material for cladding exterior walls.
- 4 Materials
  - 4.1 Standard Concrete Masonry Units: to CSA A165.1.
    - 4.1.1 Classification: Hollow units H/15/A/M, solid units S/15/A/M.
    - 4.1.2 Special Shapes:
      - 4.1.2.1 Provide bull-nosed units for all exposed corners and at window sills.
      - 4.1.2.2 Provide purpose-made shapes for lintels and bond beams.
      - 4.1.2.3 Provide additional special shapes as required.
  - 4.2 Architectural Concrete Block
    - 4.2.1 Split Faced and Two Rib Split Faced block. Color to be selected by Architect, in consultation with the Department of Education and school board.
    - 4.2.2 Provide special shapes as required.
    - 4.2.3 Architectural concrete block to: C.S.A. Standard CANS-A.165.

**END**

**DIVISION 05 METALS**

**05 00 00 Metals - General**

1 Refer to Part 1, Section 2, Division 05.

**05 10 00 Structural Metal Framing**

1 Design

1.1 All structural steel work is to be designed and inspected by a Professional Engineer licensed to practice in Nova Scotia.

2 References

- 2.1 ASTM A36/A36, Specification for Structural Steel.
- 2.2 CAN/CGSB-85.100, Painting, Section 09 90 00.
- 2.3 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- 2.4 CAN/CSA-G40.21, Structural Quality Steels.
- 2.5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- 2.6 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- 2.7 CAN/CSA-S136, Cold Formed Steel Structural Members.
- 2.8 CSA W47.1, Certification of Companies for Fusion Welding of Steel structures.
- 2.9 CSA W48, Electrodes.
- 2.10 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- 2.11 CSA W59, Welded Steel Construction Metal Arc Welding.
- 2.12 CISC/CPMA 1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.

3 Design of Details and Connections

3.1 Design details and connections in accordance with requirements of CAN/CSA-S16.1 to resist forces, moments, shears and allow for movements indicated.

4 See DC350, Part 1, Section 2, Division 05, item 05 10 00

5 Welding

- 5.1 Do welding in accordance with CSA W59.
- 5.2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

5.3 Provided certification that all welders joints are qualified by Canadian Welding Bureau

### **05 21 00 Steel Joist Framing**

#### 1 References

- 1.1 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- 1.2 CAN/CSA-G40.21, Structural Quality Steels.
- 1.3 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- 1.4 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- 1.5 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- 1.6 CSA W59, Welded Steel Construction Metal Arc Welding.
- 1.7 CISC/CPMA 2-75, Quick-Drying, Primer for Use on Structural Steel.

2 See DC350, Part 1, Section 2, Division 05, item 05 21 00, for Design of Steel Joists and Bridging, Materials, and Shop Painting.

#### 3 Fabrication

- 3.1 Fabricate steel joists and accessories as indicated in accordance with CAN/CSA-S16.1, CAN/CSA-S136 and in accordance with reviewed shop drawings.
- 3.2 Weld in accordance with CSA W59 and with CSA W59S1.
- 3.3 Provide top, bottom chord extensions where indicated.
- 3.4 Provide diagonal and horizontal bridgings and anchorages as required.
- 3.5 Make allowance through the top chord of the joists for drilling holes to support lighting, etc. in the gymnasium.

#### 4 Erection

- 4.1 Erect steel joists and bridging as indicated in accordance with CAN/CSA-S16.1.
- 4.2 Complete installation of all bridging and anchorages before placing construction loads on joists.
- 4.3 Obtain written approval from Engineer prior to field cutting or altering joists or bridging.
- 4.4 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

### **05 30 00 Steel Deck**

1 Steel deck may be exposed only in gymnasiums, and raised drama areas and shall be acoustic deck. Use of exposed steel deck in classroom applications to be submitted to the province for



Department of Education approval.

## 2 References

- 2.1 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- 2.2 CAN/CSA-S136, Cold Formed Steel Structural Members.
- 2.3 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- 2.4 CSA W59S1, Supplement No. 1 to W59, Welded Steel Construction Metal Arc Welding.
- 2.5 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
- 2.6 CSSBI 10M-86(Rev. 88), Steel Roof Deck.
- 2.7 CSSBI 101M, Zinc Coated Structural Quality Steel Sheet for Steel Deck.
- 2.8 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- 2.9 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

## 3 Types of Decking

- 3.1 Acoustic steel roof deck
  - 3.1.1 Perforated on vertical face of flutes, interlocking side laps.
  - 3.1.2 Provide acoustic deck over the gymnasium, cafeteria, music room, stage and stage storage.

## 4 Materials

- 4.1 Zinc-iron Alloy ZF coated steel sheet
  - 4.1.1 to ASTM A446/A446M or CSSBI 101M structural quality Grade A with ZF75 coating, for interior surfaces not exposed to weather, where no finish painting is to occur .76 mm base steel thickness.
  - 4.1.2 Where deck is to be painted, supply wiped or satin coated decking.
- 4.2 Acoustic insulation
  - 4.2.1 fibrous glass 17.5 kg/m<sup>3</sup> density profiled to suit deck flutes.
- 4.3 Closures as recommended by manufacturer.
- 4.4 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.
- 4.5 Touch Up Primer: zinc rich, ready mix to CAN/CGSB-1.181.

5 All exposed fasteners extending below deck in gymnasiums and drama areas shall be cut flush with the underside of deck.

6 For Design Criteria, Erection, Closures, Openings and Areas of Concentrated Loads, and Connections see DC 35, Part 1, Section 2, Division 05, item 05 30 00.

**05 50 00 Metal Fabrications**

1 References

- 1.1 ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - 1.2 ASTM A269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - 1.3 ASTM A307 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
  - 1.4 CGSB 1-GP-40 Primer, Structural Steel, Oil Alkyd Type.
  - 1.5 CGSB 1-GP-181 Coating, Zinc-Rich, Organic, Ready Mixed.
  - 1.6 CAN/CSA-G40.21 Structural Quality Steels.
  - 1.7 CSA G164 Hot Dip Galvanizing of Irregularly Shaped Articles.
  - 1.8 CAN/CSA-S16.1 Limit States Design of Steel Structures.
  - 1.9 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
  - 1.10 CSA W55.3 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - 1.11 CSA W59 Welded Steel Construction Metal Arc Welding.
- 2 See DC350, Part 1, Section 2, Division 05, item 05 50 00, and Room Data Sheets for specific Room requirements.

3 Metal Shelving

- 3.1 Storage Room/Photocopy Cabinets, General Storage Room Shelves, Gymnasium Storage Room Shelves
  - 3.1.1 Supply of metal storage shelving shall be provided the province. Consultant shall provide shelving design in modular format, to be provided to the school board to determine final room location for units.

**05 51 00 Metal Stairs and Ladders**

1 References:

- 1.1 Aluminum Association Designation System for Aluminum Finishes-1980.
- 1.2 ASTM A36M Specification for Structural Steel.
- 1.3 ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- 1.4 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- 1.5 ASTM A325, Specification for High-Strength Bolts for Structural Steel Joints.

- 1.6 ANSI/NAAMM MBG 531-88 Metal Bar Grating Manual.
  - 1.7 CAN/CGSB-1.40 Primer, Structural Steel, Oil Alkyd Type.
  - 1.8 CAN/CSA-G40.21 General Requirements for Rolled or Welded Structural Quality Steel.
  - 1.9 CSA W59 Welded Steel Construction (Metal Arc Welding).
- 2 Design Criteria
- 2.1 Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.
  - 2.2 Detail and fabricate stairs to NAAMM Metal Stairs Manual fourth edition 1982.
  - 2.3 All handrails to be of stainless steel construction.
- 3 See DC350, Part 1, Section 2, Division 05, item 05 51 00.

**END**

## **DIVISION 06 WOOD, PLASTICS AND COMPOSITES**

### **06 10 00 Rough Carpentry**

- 1 Wood framing systems are not permitted in whole or in part of any structural system.
- 2 See DC350, Part 1, Section 2, Division 06, item 06 10 00.
- 3 Stage subfloor construction:
  - 3.1 Tongue & Groove
    - 3.1.1 Construct the stage floor using 16mm T&G.
    - 3.1.2 Select Spruce plywood (base sheet permanently nailed in place), and 10mm Square Edge G.I.S. Poplar plywood (finish sheet, screwed in place for ease of removal) painted flat black, and supported by wood framing. The wood framing support for the plywood floor shall consist of either: 2" x 6" S-P-F stud support walls supporting 2" x 6" S-P-F joists @ 16" o/c; or, 16 x 89 KD S-P-F strapping installed on its flat, secured at 24" o/c, to a concrete slab-on-deck with approved fasteners.

### **06 20 00 Finish Carpentry**

- 1 Reference Standards
  - 1.1 Do millwork to Quality Standards of Architectural Woodwork Manufacturers' Association of Canada.
- 2 Cabinet Construction
  - 2.1 All Cabinet construction shall be hardwood plywood veneer core or melamine surfaced multicore panels constructed to the requirements of Part 1, Section 2, Division 06, 06 20 00. Particle core is not an acceptable core material for use in school cabinet construction.
  - 2.2 Wood type selected shall be consistent throughout the building.
  - 2.3 Finish on hardwood plywood veneer core construction to be clear urethane to manufacturer's recommendations.
- 3 Fixed Wall Mounted Coat Hooks & Hat Rack
  - 3.1 Provide fixed wall mounted coat hooks and hat rack in corridors as per Appendix C, ASK-18.
  - 3.2 Provide fixed wall mounted coat hooks and hat rack for 20 persons in the Change and

Shower Rooms of Elementary Schools as per Appendix C, ASK-18.

#### 4 Permanent Stage Construction

4.1 Where a permanent stage is required, ensure permanent stage construction of:

- 4.1.1 2x6 @ 24" o.c. framing material or 2x4 framing material @ 16" o.c. on concrete deck with
- 4.1.2 Sheathing: 3/4" T&G select spruce plywood, base sheet.
- 4.1.3 Flooring: 1/2" square edge poplar plywood, finished sheet, screwed in place and painted black.
- 4.1.4 Refer to Part 2, Section 2, Division 09, 09 64 00.

#### 5 Storage Rooms (Building Support Services) Shelving

##### 5.1 Wood/metal Shelving Units

- 5.1.1 built-in wood/metal shelving to suit room
- 5.1.2 layout 5 shelves high minimum amount.
- 5.1.3 general storage:
  - 5.1.3.1 50 lineal feet x 24" deep
  - 5.1.3.2 120 lineal feet x 18" deep
  - 5.1.3.3 60 lineal feet x 12" deep

#### **06 41 00 Architectural Wood Casework**

##### 1 Custom Cabinets

1.1 Provide the following custom cabinets where required by project specific or program requirements. Refer to Part 2, Section 3, Room Data Sheets for typical classroom casework consisting of 14 lineal feet overall divided into four equal units.

- 1.1.1 Typical classroom casework to be constructed in accordance with PART 2, Section 2, Division 06, 06 20 00.2 .
  - 1.1.1.1 All upper custom cabinets shall include 50% open shelving area. The remaining 50% shelving area will be covered by cabinet doors.
- 1.1.2 Refer to Part 2, Section 2, Division 05, item 05 50 00 - Metal fabrications for specification information of areas to receive metal shelving.

##### 1.2 Kitchen / Laundry Unit

- 1.2.1 A barrier free residential style kitchen/laundry unit consisting of 20 lineal feet of base and upper cabinet incorporating the following for middle and high school.
  - 1.2.1.1 a counter top range

- 1.2.1.2 a convection (accessible) oven
- 1.2.1.3 a microwave oven
- 1.2.1.4 a 30" refrigerator/freezer
- 1.2.1.5 a double sink
- 1.2.1.6 a clothes washer & dryer
- 1.2.2 For elementary schools incorporate for laundry area items only.
- 1.2.3 Lockable Cupboards (Upper cabinets):
  - 1.2.3.1 Provide lockable cupboards above kitchen/laundry unit for full length of counter.

### 1.3 Pantry Style Storage Unit

- 1.3.1 Provide a built-in storage pantry style storage unit containing a minimum of 5 adjustable shelves x 18" deep x 6' long, with lockable doors

### 1.4 Built-in Book Case

- 1.4.1 Built-in bookcases providing a minimum of 30 lineal feet of shelving 12" deep (i.e. 2 rows x 15' long)

### 1.5 Tray Storage Shelving

- 1.5.1 Tray Storage Shelving to accommodate thirty storage trays each 18" x 30" x 8" slot to slot depth.

### 1.6 Tote Storage Unit

- 1.6.1 See Appendix C, ASK-15.

### 1.7 Storage Room/Photocopy Cabinets

- 1.7.1 Workbench Shelving Combination Unit
  - 1.7.1.1 one workbench minimum 8' long x 36" wide, 32" high complete with three 8' long x 12" shelves over.

### 1.8 Human Skeleton Cabinet

- 1.8.1 Size and detailing to accommodate appropriate storage for 1 human skeleton.
- 1.8.2 Lockable, glass doors
- 1.8.3 Location:
  - 1.8.3.1 Biology Laboratory
  - 1.8.3.2 General Science Laboratories

### 1.9 Music Storage Base Cabinet

1.9.1 Minimum 10 ft long

1.9.2 lockable doors

1.9.2.1 If the area of the music storage room is incorporated into the music room, then the storage of all instruments must be in lockable cabinets sized to accommodate the various instruments.

1.9.2.2 If a storage room is provided then the cabinets within the storage room can be open adjustable shelving.

1.10 Music Storage Wall Cabinet

1.10.1 If a storage room is provided then the cabinets within the storage room can be open adjustable shelving.

1.10.2 adjustable shelving

1.11 Laundry Station includes

1.11.1 5 lineal feet of base cabinet

1.11.2 Space to accommodate the following:

1.11.2.1 Domestic Washing Machine

1.11.2.2 Domestic Clothes Dryer

1.11.2.3 Double Sink

1.11.3 Location:

1.11.3.1 Clothing & Textiles Area

1.12 General Storage Cabinet

1.12.1 12 lineal feet x 24 " deep x Floor to ceiling height

1.12.2 adjustable shelving

1.12.3 lockable doors

1.12.4 Location:

1.12.4.1 Clothing & Textiles Area

1.13 Production Storage Cabinet

1.13.1 adjustable shelving

1.13.2 lockable doors

1.13.3 See Room Data Sheets, Technology Production Area, Casework .1.

1.13.4 Location:

1.13.4.1 Technology Production Area

1.14 Production Wall Cabinet

1.14.1 12 lineal feet

1.14.2 lockable

1.14.3 Location:

1.14.3.1 Production Area ( Technology Education)

1.15 Production Work Benches

1.15.1 Each bench must accommodate 8 students

1.15.2 Contain lockable storage units with drawers

1.15.3 Location:

1.15.3.1 Production Area ( Technology Education)

1.16 Kitchen (Assembly Areas) Casework

1.16.1 base and overhead cabinets as required to suit layout

1.17 Storage/Photocopy (Administration) Casework

1.17.1 Base cabinet

1.17.1.1 minimum 8' long x 24" wide x 36" high

1.17.1.2 adjustable shelving and doors

1.17.2 Wall cabinet

1.17.2.1 8' long x 36" high x 12" clear inside width

1.17.2.2 Adjustable shelving and doors

1.17.3 Floor to Ceiling Shelving

1.17.3.1 One unit, 10 lineal feet, open shelving with 6 adjustable shelves each section.  
Provide end gables and support gables according to 06200.

**END**



## **DIVISION 07 THERMAL & MOISTURE PROTECTION**

### **07 00 00 Thermal and Moisture Protection - General**

1 See DC350, Part 1, Section 2, Division 07, 07 00 00 - General.

#### **2 Roofing Systems**

- 2.1 Ensure all BUR roof systems and Membrane Roof Systems include exterior grade gypsum board sheathing on the metal deck before installation of the vapour barrier, and a protective coverboard over the roof insulation.
- 2.2 The roof membrane being the principal air barrier on the roof, ensure all penetrations are carefully detailed and components specified.
- 2.3 At roof to wall junctions, the roof membrane shall be brought at least 300 mm up the wall. Construction sequence of the wall shall not interfere with the continuous operation of the roofing work.

### **07 10 00 Damp-proofing and Waterproofing**

#### **1 Bituminous Membrane Waterproofing**

- 1.1 Materials: See DC350, Part 1, Section 2, Division 07, Section 07 10 0.

### **07 18 00 Elastomeric Roof Coating**

1 See DC350, Part 1, Section 2, Division 07, 07 10 00 Damp-proofing, Waterproofing.

### **07 20 00 Thermal Protection**

1 See DC350, Part 1, Section 2, Division 07, Section 07 20 00.

2 Spray applied insulation and spray applied fireproofing are not to be used in school construction unless noted otherwise in project specific brief or individual specification sections or as otherwise approved by DTIR.

#### **3 Perimeter Foundation Insulation:**

- 3.1 To 24" below finish grade on inside face of perimeter foundation walls.
- 3.2 To 24" in from perimeter foundation wall under slabs on grade.
- 3.3 2" thick expanded polystyrene type 2 or extruded polystyrene type 4.

**4 Cavity Wall:**

- 4.1 Extruded or expanded polystyrene to CAN/ULC S770 or CGSB 51.20, min. R value 10.

**5 Roof**

- 5.1 Extruded/Expanded polystyrene to CAN/ULC S701, or fibrous glass insulation to CAN/ULC S703, or isocyanurate (urethane) insulation to CAN/ULC S704, minimum R value 20.
- 5.2 Provide design details showing minimum thicknesses of applicable insulation.

**6 Materials**

- 6.1 Protective Coverboard: The use of asphalt impregnated gypsum board will not be acceptable as a protective coverboard in schools.

**7 Batt Insulation**

- 7.1 See DC350, Part 1, Section 2, Division 07, 07 20 00.

**8 Installation**

**8.1 Batt Insulation**

- 8.1.1 See DC350, Part 1, Section 2, Division 07, 07 20 00.

**8.2 Cavity Wall Installation:**

- 8.2.1 See DC350, Part 1, Section 2, Division 07, 07 20 00.

**8.3 Adhesive Installation on Foundation Walls:**

- 8.3.1 Secure installation by adhesive if backfilling is not immediately placed to retain panels in place.
- 8.3.2 Prime surfaces before application of adhesive only where and as recommended by adhesive manufacturer.
- 8.3.3 Apply 2" diameter pads of adhesive to faces of panels as required to hold board in place on walls.
- 8.3.4 Position and press boards into full contact with adhesive, and temporarily hold them in place until adhesive has set.
- 8.3.5 Ensure that backfilling is completed within 24 hours, and that it does not dislodge or damage insulation.

- 8.4 Insulation over metal decks shall have a single uniform thickness meeting the required insulation values over the general field of the roof.

**07 24 00 Exterior Insulation and Finish System (EIFS)**

- 1 See DC350, Part 1, Section 2, Division 07, Section 07 24 00.

**07 25 00 Weather Barriers / Vapour Retarders / Air Barriers**

- 1 See DC350, Part 1, Section 2, Division 07, 07 25 00.
- 2 For Pre-cast Concrete Panels and Tilt-Up Concrete Wall Systems requiring steel stud backup walls, provide a 6 ml polyethylene vapour barrier over the studs.
- 3 Design and locate air/vapour barrier for overhangs and hidden spaces in envelope so that condensation will not occur in these spaces. Consider air/vapour barrier continuity and buildability, insulation location, thermal bridging and air circulation in order to determine if space will perform better as cold exterior or warm interior space.
  - 3.1 Sheet Vapour Barrier
    - 3.1.1 Polyethylene Film
      - 3.1.1.1 to CGSB 51.34-M86, Type CMHC approved, Milrol-2000, 0.15 mm thick.
  - 4 Membrane Air Barrier & Flexible Membrane Flashings
    - 4.1 SBS modified bituminous air barrier membrane, minimum 40 mil thick.
    - 4.2 Brick ties and other penetrations should be sealed with mastic.
  - 5 Sheet Vapour Barrier Installation
    - 5.1 See DC350, Part 1, Section 2, Division 07, 07 25 00, Item 8 - Sheet Vapour Barrier Installation.
  - 6 Air Barrier Installation
    - 6.1 See DC350, Part 1, Section 2, Division 07, Section 07 25 00, Item 9 - Air Barrier Installation.

**07 30 00 Steep Slope Roofing (Shingles, Roof Tiles, and Roof Coverings)**

- 1 Asphalt shingles with a 30 year warranty is an acceptable roofing material.
- 2 Provide complete details of eaves, valleys, all penetrations and flashed areas.

**07 40 00 Roofing and Siding Panels**

1 Preformed Metal Cladding/Siding

1.1 See DC350, Part 1, Section 2, 07 40 00, Supplemented by the following:

- 1.1.1 For exterior walls metal siding (minimum 24 gauge) is acceptable for walls higher than 12' above finished grade. Metal siding of any gauge shall not be used as exterior wall cladding within 12'-0" of finished grade.

**07 51 00 Built-up Bituminous Roofing**

- 1 A 2 ply modified bitumen is an acceptable roofing system.
- 2 See DC350 Part 1, Section 2, Division 07, Section 07 51 00, unless otherwise specified.
- 3 Where roofing is applied over metal deck, Type X or exterior grade drywall is not an acceptable product prior to vapour barrier installation. The design shall include a direct to deck membrane vapour barrier.

**07 52 00 Modified Bituminous Membrane Roofing**

- 1 See DC350 - Part 1, Section 2, Division 07, Section 07 00 00 and Section 07 52 00 unless otherwise specified.
- 2 Where roofing is applied over metal deck, Type X or exterior grade drywall is not an acceptable product prior to vapour barrier installation. The design shall include a direct to deck membrane vapour barrier.
- 3 Asphalt Primer
- 3.1 Black bituminous varnish. An asphalt modified bitumen with thermoplastic polymers and volatile solvents.
- 4 Asphalt
- 4.1 Type II and III in compliance with CSA A123.
- 5 Asphalt Felts
- 5.1 No. 15 perforated asphalt felts.
- 6 Insulation

- 6.1 CFC free.
  - 6.2 Extruded polystyrene Type IV or polyisocyanurate or expanded polystyrene, Type 1.
  - 6.3 Average, over entire roof area, R-20. Provide design details indicating thickness of selected insulation to meet thermal resistance requirements.
  - 6.4 Tapered where required to ensure positive drainage, minimum slope 2% to drains.
- 7 Protective Coverboard
- 7.1 See DC350 - Part 1, Section 2, Division 07, 07 20 00 - Protective Coverboard.
- 8 Membranes
- 8.1 Base Sheet
    - 8.1.1 Reinforcement: non-woven polyester 180 g<sup>M2</sup>
    - 8.1.2 Elastomeric asphalt: mix of selected bitumen and thermoplastic polymer.
    - 8.1.3 Top face covered with a thermofusible plastic film.
    - 8.1.4 Underface lightly sanded.
    - 8.1.5 Minimum thickness 2mm.
  - 8.2 Base Flashing:
    - 8.2.1 Have a non-woven polyester reinforcement and thermofusible elastomeric asphalt. Both sides shall be protected by a thermofusible plastic film. This membrane is to be applied by torching only.
    - 8.2.2 Reinforcement: non-woven polyester, 180 g<sup>M2</sup>.
    - 8.2.3 Thermofusible elastomeric asphalt: mix of selected bitumen and SBS thermoplastic polymer.
    - 8.2.4 Minimum thickness 2.8 mm.
  - 8.3 Cap Sheet and Cap Sheet Flashing.
    - 8.3.1 Shall have a non-woven polyester reinforcement and thermofusible elastomeric asphalt. The top side shall be self-protected with coloured granules. The underside shall be protected by a thermofusible film. This membrane is to be applied by torching only.
    - 8.3.2 Reinforcement: 250 g<sup>M2</sup> of non-woven polyester.
    - 8.3.3 Elastomeric asphalt: mix of selected bitumen and SBS thermoplastic polymer.
    - 8.3.4 Minimum thickness 3.8 mm. Combined thickness of base sheet and cap sheet must be a minimum of 6mm.
    - 8.3.5 Top face protection: ceramic granules, colour from Manufacturer's standard selection.
  - 8.4 Expansion joint membrane:

- 8.4.1 Elastomeric modified bitumen waterproofing membrane.
- 8.4.2 Reinforcing: polyester tissue.
- 8.4.3 Surfaced with thermoplastic foil and a protective silicon paper.
- 8.4.4 Minimum thickness 3.8 mm.
- 8.4.5 Minimum width 18".
- 8.4.6 Use tape guard with a minimum of 3" overlap, at roof penetrations and curbs.

8.5 Provide purpose made gussets, etc. as recommended by the manufacturer.

8.6 Provide all other membrane fittings, termination bars, etc. as required to complete the project.

**07 53 00 Elastomeric Membrane Roofing - Ethylene Propylene Diene Monomer Roofing (EPDM)**

- 1 A Single-ply EPDM (fully adhered or mechanically fastened; non-ballasted) is an acceptable roofing system.
- 2 See DC350 - Part 1, Section 2, Division 07, 07 53 00, unless otherwise specified.
- 3 Where roofing is applied over metal deck, Type X or exterior grade drywall is not an acceptable product prior to vapour barrier installation. The design shall include a direct to deck membrane vapour barrier.

**07 54 00 Thermoplastic Membrane Roofing**

- 1 See DC350 - Part 1, Section 2, Division 07, 07 54 00 unless otherwise specified.
- 2 Where roofing is applied over metal deck, Type X or exterior grade drywall is not an acceptable product prior to vapour barrier installation. The design shall include a direct to deck membrane vapour barrier.

**07 72 00 Roof Accessories**

- 1 Permanent Travel Restraint System is not required. Ensure temporary fall protection systems meet applicable code requirements.

**07 80 00 Fire and Smoke Protection**

- 1 See DC350, Part 1, Section 2, Division 07, 07 80 00, except as follows.
- 2 Spray on material to achieve fire separation between assemblies is not permitted in school buildings with the exception of a heating plant boiler room.

**07 84 00 Fire Stopping**

- 1 See DC350, Part 1, Section 2, Division 07, 07 84 00.

**07 90 00 Joint Sealants**

- 1 See DC350, Part 1, Section 2, Division 07, 07 90 00 Joint Sealants.

**END**

**DIVISION 08 OPENINGS**

**08 00 00 Openings - General**

- 1 Refer to DC350, Part 1, Section 2, Division 08, 08 00 00 General unless otherwise specified herein.
- 2 Provide all administration offices and meeting rooms relating to the administration zone with a 600mm wide full height sidelight and solid door.
- 3 Provide all other office/classroom/support areas relating to the administration zone with a door light (minimum 8" x 30").
- 4 Provide all offices in the student support services area, with a 600mm (2 ft. wide) full height sidelight and a solid door.
- 5 Exterior operating windows shall be provided in all areas to be occupied by students and staff, with the exception of the gymnasium and cafeteria kitchen.
- 6 Ensure windows in any room provide a minimum of 10% of the floor area in glazing. Within this 10% glass area, provide operating windows so that, when open, an amount not less than 3% of the floor area of the room (or 1/3 of the glazed area) allows fresh (outside) air into the room.
- 7 All teaching spaces (including the library, cafeteria, administration) to be located on an exterior wall to provide natural light, or have clerestory window areas to provide natural light to the above standards.
- 8 In all internalized teaching spaces, where clerestory windows are incorporated into the design, they shall provide the same amount of glazed area as a classroom on exterior wall (10%) glass area.
- 9 Insect screens on windows are a requirement.
- 10 Ensure Administration and reception areas have natural light.
- 11 Ensure General Library is provided with natural light, either by exterior windows, or if



located in the middle of the building, clerestory glazing.  
11.1 Glazing area is a minimum of 10% of the floor area.

#### **08 11 00 Metal Doors and Frames**

1 See DC350 Part 1, Section 2, Division 08, Item 08 11 00 Metal Doors & Frames

#### **08 11 16 Aluminum Doors and Frames**

1 See DC350 Part 1, Section 2, Division 08, Item 08 11 16 Aluminum Doors & Frames

#### **08 14 00 Wood Doors**

- 1 See DC350 Part 1, Section 2, Division 08, Item 08 14 00 Wood Doors, except as follows.
- 2 All wood flush doors to be seven-ply solid with hardwood face and clear finish.

#### **08 50 00 Windows**

- 1 See DC350 Part 1, Section 2, Division 08, Item 08 50 00 Windows, except as follows.
- 2 Window types to be double hanging and double sliding.
- 3 All classroom and office windows to be of a standard size and type.
- 4 Fenestration systems in Educational facilities shall not be designed with low-e or tinted glazing, with the following exception:
  - 4.1 Soft coat Low -E glazing (Solarban 60) is an acceptable glazing product for use in schools.
- 5 Non-Vision / Translucent Glazing Units (TGU) may be used where appropriate.
  - 5.1 See DC350 Part 1, Section 2, Division 08, 08 80 00 Glazing.
  - 5.2 Use tempered or safety glass in outer pane of TGUs when TGUs are incorporated into ground floor window design.

#### **08 60 00 Roof Windows and Skylights**

- 1 Skylights shall not be used in Educational Facilities without written approval from the Minister's Representative.

- 2 For design requirements of clerestory windows, refer to PART 1, Section 2, Division 08, 08 00 00 Openings - General, 08 60 00 Roof Windows and Skylights, and 08800 Glazing.

## **08 71 00 Door Hardware**

### **1 Design Criteria**

#### **1.1 Coordination**

- 1.1.1 Hold a door hardware coordination meeting following preliminary design development, but prior to detailed design and specification development to confirm requirements of client group. A second meeting should be held prior to specification finalization.
- 1.1.2 Meeting shall include representatives from the following:
- 1.1.2.1 Department of Transportation and Infrastructure Renewal
  - 1.1.2.2 Department of Education
  - 1.1.2.3 SST
  - 1.1.2.4 School Board
  - 1.1.2.5 School Faculty
  - 1.1.2.6 School Maintenance personnel
  - 1.1.2.7 Consultant
  - 1.1.2.8 The Consultant may include other sub-consultants as required; such as an Architectural Hardware Consultant and Electrical Sub-Consultant.
- 1.1.3 Topics of discussion should include: master and grand master keying requirements with respect to current School Board standards; zoning and function of building; theory of use and access; relationship of hardware to electrical and security systems; and primary consideration shall be given to compatibility and maintenance requirements with respect to existing systems.

#### **1.2 Reference Standards**

- 1.2.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacture's Association.
- 1.2.2 CAN/CGSB-69.18 /ANSI/BHMA A156.1, Butts and Hinges.
- 1.2.3 CAN/CGSB-69.19 /ANSI/BHMA A156.3, Exit Devices.
- 1.2.4 CAN/CGSB-69.20 /ANSI/BHMA A156.4, Door Controls (closers).
- 1.2.5 CAN/CGSB-69.21 /ANSI/BHMA A156.5, Auxiliary Locks & Products.
- 1.2.6 CAN/CGSB-69.22 /ANSI/BHMA A156.6, Architectural Door Trim.
- 1.2.7 CAN/CGSB-69.24 /ANSI/BHMA A156.8, Door Controls - Overhead Holders.
- 1.2.8 CAN/CGSB-69.29 /ANSI/BHMA A156.13, Mortise Locks and Latches.
- 1.2.9 CAN/CGSB-69.34 /ANSI/BHMA A156.18, Materials and Finishes.

1.2.10 CAN/CGSB-69.35 /ANSI/BHMA A156.19, Power Assist and Low Energy Power Operated Doors.

1.3 Requirements Regulatory Agencies

1.3.1 Use ULC/ULI listed and labeled hardware for doors in fire separations and exit doors.

1.4 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

1.5 After installation, ensure a regular member of the Architectural Hardware Consultants inspect and certify, in writing, that all items and their installation are in accordance with specified requirements, are functioning properly and are in compliance with the Contract Documents.

2 Materials

2.1 Series 100 - Door Butts and Hinges

2.1.1 Hinges:

2.1.1.1 Provide one hinge for each 750 mm or fraction thereof of door height.

2.1.1.2 Use ball bearing on all doors unless noted otherwise.

2.1.1.3 Size and apply hinges to manufacturer's hinge specification guide. Minimum size for 45 mm door is 112 mm x 100 mm.

2.1.1.4 Exterior doors and doors in wet areas are to have non ferrous hinges of bronze or stainless steel.

2.1.1.5 Exterior and out-swinging doors are to have non-removable pins NRP.

2.2 Series 200 - Lockset & Latchsets

2.2.1 Lock Sets:

2.2.1.1 All locks and latch sets are to be mortised.

2.2.1.2 Lever sets are to be ANSI 156.13 Grade 1.

2.2.1.3 All mortise locks are to incorporate the following features: backset 70 mm backset, 2 piece mechanical anti-friction latch bolt of 19 mm throw deadbolt throw 25 mm, curved lip strike ANSI 115.1 Listing ULC 120 1D16.2.19. Cylinders are to be 6 pin interchangeable construction core.

2.2.1.4 All hardware shall be lever style.

2.3 Series 300 - Operating Trim

2.3.1 Overhead Stops and Holders:

2.3.1.1 Steel arms on interior doors, bronze arms for exterior doors, standard or heavy duty as indicated.

## 2.4 Series 400 - Exit Device Accessories

### 2.4.1 Exit Devices:

- 2.4.1.1 All exit devices are to be ANSI 156.3 Grade 1. to be listed under "Panic Hardware" in ULC Accident Hazard Section. All exit devices regardless of type shall be of matching design. Use labeled fire exit devices on fire doors. All trim for exit devices shall be thru bolted to the lock style case. Where required, exit devices shall have touch bar locked down by inside cylinder feature. Finishes shall be in accordance with the finish section of this specification. All exit devices must be of plated finish, painted finishes are not acceptable.

## 2.5 Series 500 - Overhead Closing Devices

### 2.5.1 Door Closers:

- 2.5.1.1 Door closers are to be of modern design with full cover, rack and pinion. Shall meet ANSI A156.4 Grade 1 operational tests and have a minimum 10 year warranty. Closer body shall be warranted for the life of the building. Piston shall be 37 mm minimum diameter. The pinion shaft shall be 16 mm diameter. Back check feature shall be controlled two valves strength and position. non handed. To have heavy duty shock absorber on all exterior doors, i.e. Unitrol parallel arm mounted closer with heavy duty shock absorbing positive stop.

## 2.6 Series 600 - Door Controls

### 2.6.1 Automatic Door Openers:

- 2.6.1.1 Switch actuated power operator shall meet the requirements of ANSI 156.19 Rack and Pinion design. Cast aluminum housing. Closing force shall be adjustable to ensure adequate closing control. The unit shall have three position switch ON, OFF, HOLD OPEN. When the motor is energized the door shall be power opened at both a speed and force which are adjustable. Upon reaching the full open position, it shall be adjustable 0-30 seconds. The door shall close under full spring power when the operator motor is shut off at the unit using the OFF switch. Signs shall be provided indicating an automatic barrier free entrance. Provide push button switches as determined by the specific project. Switches are to be located with easy visibility of door but clear of door travel.

## 2.7 Series 700 - Protective Plates and Trim

### 2.7.1 Kick plates:

- 2.7.1.1 Kick plates are to be applied to the push side of doors. Polishing lines or dominant direction of any surface pattern to run across the door . Kick plates are to be applied

to all washroom service, secondary exit, stairway, locker, kitchen, cafeteria and storage room doors with the exception of classroom doors.

- 2.7.1.2 Material: 16 ga. thick 304 stainless steel.
- 2.7.1.3 Size: Height as listed, Width - door width less 37 mm doors, 25 mm less for pairs of doors.
- 2.7.1.4 Fasteners: No. 6 screws spaced equal distance along a center line, 12.5 mm from edge all around plate and counter sunk.

### 2.8 Series 800 - Door Stops, Holders, and Bumpers

- 2.8.1 Specify wherever an open doors or any item of hardware thereon strikes a wall, column, or other part of the building.

### 2.9 Series 900 - Special Door Accessories

- 2.9.1 Door bottom seal: heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene seal, surface mounted closed ends, adjustable automatic retract mechanism when door is open, clear anodized finish.
- 2.9.2 Thresholds: width as listed for full width of opening, depth to match frame depth.
- 2.9.3 Weatherstripping
  - 2.9.3.1 To be applied continuously around perimeter of head, jambs and mullions of all exterior doors. Extruded aluminum with neoprene gasket.
- 2.9.4 Indexed key control system
  - 2.9.4.1 To CAN/CGSB069.21, wall mounted portable system, type, colour enamel paint finish.
  - 2.9.4.2 To accommodate 1.75 times the number of key changes, dual tag system with permanent loan register.

## 3 Fastenings

- 3.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- 3.2 Exposed fastenings devices to match finish of hardware.
- 3.3 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- 3.4 Use fasteners compatible with material through which they pass.

## 4 Keying

- 4.1 Doors to be keyed differently, keyed alike, keyed alike in groups and sub and Grand master keyed as directed. Prepare detailed keying schedule for approval after consultation with

- Contractor's Consultant and user groups.
- 4.2 Provide keys in duplicate for every lock in this Contract.
  - 4.3 Provide three masterkeys for each MK group.
  - 4.4 Stamp keying code numbers on keys and cylinders.
  - 4.5 All locks and cylinders are to be provided with interchangeable construction cores.
- 5 Key Storage Cabinet
- 5.1 Provide wall mounted, lockable, metal, indexed, key control cabinet, enamel paint finish.
  - 5.2 Ensure key controls system is set up with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.

**08 74 00 Electro-Mechanical Hardware**

- 1 See DC350 Part 1, Section 2, Division 08, Item 08 74 00 Electro-Mechanical Hardware.

**08 80 00 Glazing**

- 1 Design Criteria
  - 1.1 See DC350 Part 1, Section 2, Division 08, Item 08 80 00 Glazing.
  - 1.2 One way Glass:
    - 1.2.1 6' wide x 3' high one way glass, suitable to tilt one pane or provide triple glazing to ensure reduction in acoustic transmission through glass area and intercom system.
    - 1.2.2 Provide One Way Glass for:
      - 1.2.2.1 Reading Support Service Room
      - 1.2.2.2 Other project specific locations identified in the program.
  - 1.3 For Elementary Schools, Junior High Schools, and High Schools.
- 2 Materials
  - 2.1 Non-Vision / Translucent Glazing Units (TGU)
    - 2.1.1 Where non-vision / translucent glazing units are incorporated into the design specify 66% translucent and 34% transparent.
    - 2.1.2 Ensure orientation and filter fabric specifications are as recommended by manufacturer.
    - 2.1.3 Acceptable translucent glazing unit manufacturers:
      - 2.1.3.1 Solera by Advanced Glazings Limited, Sydney, N.S. or equivalent.
    - 2.1.4 6mm clear outer glass, 5mm clear inner glass
    - 2.1.5 U-Value: 0.14 BTU /hr FT<sup>2</sup> °F
    - 2.1.6 light transmittance: 40%
    - 2.1.7 Fabrication and installation to manufacturer's printed specifications.

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**DTIR - DC350**  
**Design Requirements Manual**  
**2010 EDITION**

**Education Facilities**  
**Detailed**  
**Design Requirements**  
**OPENINGS**

**Part 2, Section 2**  
**Division 08**  
**September 21, 2010**

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**END**

## **DIVISION 09 FINISHES**

### **09 00 00 Finishes - General**

- 1 Refer to DC350, Part 1, Section 2, Division 9, Supplemented by the following:
  - 1.1 Finishes must be selected to minimize off gassing to the air in the school.
  - 1.2 All finishes must be non-toxic. This applies to furniture finishes as well as building finishes.
  - 1.3 Natural organic products are preferable to manufactured petroleum based products.
  - 1.4 Paints and adhesives must be specified to be low VOC and have "Ecologo" labels to meet emission and toxicity standards published by Environment Canada and CSA.
  - 1.5 All finishes should be welcoming and attractive and environmentally safe with special emphasis on ease of maintenance and durability.
  - 1.6 All alternatives to flooring materials specified herein are to be reviewed by an air quality consultant and approved in writing by the Minister's Representative prior to use or installation. Flooring alternatives thus approved may be subject to additional air quality testing prior to, during or after installation.

### **09 21 16 Gypsum Board Assemblies**

- 1 Standard Drywall
  - 1.1 For corridor walls exposed to traffic and behind coat hanging areas, standard drywall is acceptable only when in areas protected by lockers or other equipment. Refer to Part 1, Section 2, Division 04, 04 22 00 Concrete Unit Masonry.
  - 1.2 Areas behind cabinets, communication boards, tack boards, etc. may be standard drywall.
- 2 Abuse Resistant Drywall
  - 2.1 In learning areas concrete block or abuse resistant drywall is required for all exposed walls.
  - 2.2 Refer to Part 1, Section 2, Division 09, 09 22 16 Non-Structural Metal Framing..
  - 2.3 Abuse resistant drywall shall be
    - 2.3.1 Fiberock Brand V.H.I. (Very High Impact) Abuse-Resistant Gypsum Fiber Panels as manufactured by CGC and installed as per manufacturer's recommendations.
- 3 Cement Board
  - 3.1 For exterior walls, it is acceptable to use Cement Board providing:
    - 3.1.1 The Cement Board is not located within 3'-0" of roof surface or where snow build-up can occur.



3.1.2 The Cement Board with synthetic stucco finish shall not be used as exterior wall cladding within 12'-0" of finished grade.

#### 4 Water resistant board

- 4.1 To CSA A82.27 standard ½" thick, 4'-0" wide x maximum practical length.
- 4.2 In all washrooms, janitor closets and wet or humid locations use water resistant board as principle sheathing material for wall area.
- 4.3 If epoxy painted concrete block is utilized as a finished wall surface in the washroom, janitor and other wet or humid locations, water resistant board is not a requirement.

#### 5 Metal Furring and Suspension Systems

- 5.1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M, galvanized.
- 5.2 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

#### 6 Fastenings

- 6.1 Screws
  - 6.1.1 To CSA A82.31. Self-drilling, self-tapping, case hardened, Philips head, drywall screws, with corrosion resistant finish.

#### 7 Accessories

- 7.1 Casing beads, corner beads fill type: 0.5 mm base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525, perforated flanges; one piece length per location.
- 7.2 Acoustic Sealant: to CGSB 19-GP-21M.
- 7.3 Polyethylene: to CGSB A51.33, 6 mil.
- 7.4 Joint Compound: to CSA A82.31, asbestos free.
- 7.5 Joint Tape: 2" x 0.012" thick, perforated paper with chamfered edges.
- 7.6 Control Joints: Crimped rolled-formed zinc, with flanges for tape reinforcement, or two casing beads, set with gap for movement and backed with flexible air seal membrane.
- 7.7 Special purpose made angles and channels as required and as detailed to support radiant heating panels where applicable.

#### 8 Partition System

- 8.1 Interior Steel Studs
  - 8.1.1 Minimum 25 ga. steel, (minimum 20 ga. in all areas where abuse resistant drywall is used) galvanized, having knurled flanges 1 1/4" wide edges double back at least 3/16", with girts as required, and with service access holes. Sizes as indicated on drawings.
  - 8.1.2 Partition Runners: as specified for studs, with flanges a minimum of 7/8" high, and to

suit width of studs.

8.1.3 Bracing Channels: 18 ga. 1 1/2" x 3/4" cold rolled steel, wipe coated.

## 9 Insulation

9.1 Thermafibresound sound attenuation batts. Minimum 3" thick.

## 10 Hanger Devices

10.1 Zinc coated annealed steel wire; to support a maximum weight of 310 lbs. per hanger.

### **09 22 16 Non-Structural Metal Framing**

- 1 Provide heavy gauge steel studs as support where Abuse Resistant Drywall is used. Gauge size to suit wall height, loading conditions, size and spacing of studs, (min. 20 gauge).
- 2 For Pre-cast Concrete Panels and Tilt-Up Concrete Wall Systems, where steel stud back-up walls are utilized as a back up to pre-cast or tilt-up, they shall be constructed at 16" o.c. Complete with 6 mil polyethylene vapour barrier and fibreglass batt insulation between the studs. Studs for steel stud back-up walls shall not be placed directly against the pre-cast or tilt-up concrete wall panels and shall be held away from the wall panels with a minimum 1" space.

### **09 30 00 Tiling**

- 1 Quarry tile, ceramic tile or porcelain tile is required in all washrooms, shower rooms, vestibules, lobbies, and all stairways except where noted elsewhere (treads and landings).
- 2 Main washrooms areas require ceramic tile for the lower half of the wall.
- 3 All shower areas require ceramic tile for the full height of the wall.
- 4 Staff washroom walls do not require ceramic tile. Refer to associated Room Data Sheets.
- 5 Refer to Part 2, Section 2, Division 09, 09 90 00, Item .2 for alternative finish of washrooms, shower areas and recycle rooms, where wall construction is of concrete block

## 6 Materials

### 6.1 Ceramic Mosaic Floor Tile

6.1.1 To CAN-75.1, Type 2, Class MR2.

6.2 Ceramic Wall Tile

6.2.1 To CAN-75.1, Type 5, Class MR4.

6.3 Ceramic Tile Base

6.3.1 finished curve, top and capped cut tile

6.3.2 100 mm high coved base to match ceramic wall tile.

6.3.3 Cut horizontal edges are unacceptable.

6.4 Quarry Tile Type 1 (Porcelain)

6.4.1 Field: to CAN2-75.1, Type 4, Class MR1, plain face cushioned edges.

6.5 Quarry Tile Type 2

6.5.1 To CAN2-75.1, Type 4, Class MR2.

6.6 Quarry Tile Base

6.6.1 finished curve, top and capped cut tile.

6.6.2 100 mm high coved base to match floor tile. Cut horizontal edges are unacceptable.

6.7 Workmanship

6.7.1 Install tile in accordance with details and specifications of the Terrazzo, Tile and Marble Association of Canada Installation Manual.

6.7.2 Clean and seal tile as recommended by product manufacturer.

7 Maintenance material, 2% of each product type used for owner use.

**09 51 00 Acoustical Ceilings**

1 Provide acoustic tile ceilings as specified in Part 2, Section 3, Room Data Sheets.

2 Materials

2.1 Acoustical Ceiling Tile to meet the following unless otherwise required to meet applicable health regulations:

2.1.1 Type: CGSB 92.1, Type 3

2.1.2 NRC 0.50-0.60

2.1.3 Size: 24" x 48" x 5/8"

2.1.4 Fire rated as required.

2.2 Humidity Resistant Acoustical Ceiling Tile:

2.2.1 Type: CGSB 92.1, Type 3 or ASTM 1264, Type III

2.2.2 NRC 0.5-0.6

2.2.3 Size: 24" x 48"

2.2.4 Fire rated as required

2.2.5 Humidity resistance properties shall include sag resistance, mold and mildew growth resistance and low VOCs.

2.2.6 Provide for all washrooms including, but not limited to, Assistive Case Washroom, Change & Shower Rooms, Sick Room - Washroom (Administration), Staff Washrooms, Student Washrooms.

3 Maintenance material, 2% of each product type used for owner use.

### **09 53 00 Acoustical Ceiling Suspension Assemblies**

#### 1 Reference Standards

1.1 Installation to ASTM C636 except where specified otherwise.

#### 2 Design Criteria

2.1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

#### 3 Materials

3.1 Exposed tee bar grid components: two directional 24" x 48" shop painted satin sheen white unless noted on drawings. Components die cut. Main tee with double web, rectangular bulb and 1" rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Fire rated where required.

3.2 Hanger Wire: galvanized soft annealed steel wire, 9 ga.

3.3 Hanger Inserts: purpose made.

3.4 Accessories: splices, clips, wire ties, retainers and wall mounting flush reveal, to complement suspension system components, as recommended by system manufacturer.

3.5 Fire-rated as required.

### **09 64 00 Wood Flooring**

#### 1 Performance Testing

1.1 In addition to the requirements of Part 1 and those listed herein, all Junior, Middle and Senior High school gymnasium flooring system designers and contractors must provide proof to the Building Design Group of DTIR that a floor system under consideration as an acceptable system has been independently tested to meet or exceed all six of the requirements of the DIN 18032 Part 2 (1991 or 2001) tests, **prior to consideration as an approved system**. The Building Design Group of DTIR will only consider approval of pre-engineered athletic flooring systems after such proof is provided and includes complete system specifications and copies of current independent test results for the exact systems proposed. For Design-Build proposals, alternatives will only be considered during the

- tender period in the manner prescribed in the Instructions to Bidders.
- 1.2 Elementary schools gymnasium flooring system designers and contractors must provide proof to the Building Design Group of DTIR that a floor system under consideration as an acceptable system has been independently tested to meet or exceed the requirements of the DIN 18032 Part 2, 1991 or 2001 tests for Shock Absorption, Ball Rebound, Rolling Load and Friction tests, **prior to consideration as an approved system**. The Building Design Group of DTIR will only consider approval of pre-engineered athletic flooring systems after such proof is provided and includes complete system specifications and copies of current independent test results for the exact systems proposed. For Design-Build proposals, alternatives will only be considered during the tender period in the manner prescribed in the Instructions to Bidders
  - 1.3 Manufacturers are to provide specification information and DIN test report identification information in order to have reports sent directly to the Minister from the independent DIN testing agency for request of approval of alternate systems.
  - 1.4 Engineering Performance
    - 1.4.1 Only pre-engineered athletic flooring systems will be approved for use in schools.
- 2 Environmental Requirements
- 2.1 See DC350, Part 1, Section 2, Division 09, 09 64 00.
  - 2.2 Coordinate design and construction schedule of new schools to ensure that the gymnasium flooring is installed with sufficient time to allow for the required ventilation period (a minimum of 8 weeks) prior to occupancy.
  - 2.3 Gymnasium Floor Finishing Procedures in School
    - 2.3.1 No painting (this includes painting of the lines) while students are present.
    - 2.3.2 Isolate gymnasium area from remainder of the school including all openings, fixtures (including fabric acoustic panels) and HVAC supply and return diffusers/grilles. Cover with 6 ml. plastic sheets and tape joints.
    - 2.3.3 Install negative air units with high efficiency particulate air exhaust. Units must run at all times to ensure negative pressure in the gym (including the application and curing of the floor finish and line paint).
      - 2.3.3.1 To adequately ventilate the gym during floor finishing, a minimum of 12,000 cfm @ 0.25 sp. air flow is required. The fan inlet should have a plastic connection and be sealed tight around one of the outside doors to make a plenum type connection. Plastic discharge duct should be connected to the negative air units and run a minimum of 30 feet from the building and located to minimize air return potential.

Ensure that all openings to the gym are sealed tight with the exception of one outside door to allow for make-up air during fan operation. The gymnasium air handling unit is to be “locked out” and remain off at all times during this process.

- 2.3.4 No interior exit from the work area is to be used (only an outside entrance).
- 2.3.5 After sanding, cleaning shall be done using proper equipment and the gymnasium will require final inspection prior to turn over to the school.
- 2.3.6 Gymnasium is to remain closed for 5 days after the last finish coat is applied and the gym is to remain isolated and the negative air units operating.
- 2.3.7 Air Tests
  - 2.3.7.1 An air test shall be taken outside the gym (at a location to be determined by the testing agency) prior to the application of the first coat of floor finish. This will be the reference air test.
  - 2.3.7.2 An air test shall be taken outside the gym (at the same location as the reference test) immediately after the completion of the application of the first coat of floor finish.
  - 2.3.7.3 An air test shall be taken outside the gym (at the same location as the reference test) immediately after the completion of the application of floor lines.
  - 2.3.7.4 An air test shall be taken outside the gym (at the same location as the reference test) immediately after the last coat of floor finish is applied.
  - 2.3.7.5 An air test shall be taken inside the gym (at a location to be determined by the testing agency) seven days after the last coat of floor finish is applied.
- 2.3.8 Information of the process for the gym floor finish shall be communicated to the staff, students and parents of the school through DTIR and DOE. i.e. Sub-Contractor → General Contractor → DTIR Representative → DOE → School Board/School Staff → Students.
- 2.3.9 No deviation from the work schedule shall be made unless the procedure is also changed and new communications are provided to that effect.
- 2.3.10 A person shall be appointed by the Contractor to ensure that this procedure is followed prior to commencement and during work process. A daily report shall be prepared and provided to DTIR representative for distribution to DTIR & DOE.
- 2.3.11 Fire extinguishers to be located in Gym while work is being carried out.
- 2.3.12 Employees shall be trained on produce specific (WHMIS) and proper use of PPE (personal protective equipment).
- 2.3.13 No open flames or source of ignition allowed in Gym area at time of application.
- 2.3.14 Projects which involve installation or repair of gymnasium floors during periods when the school is occupied will require conformation from all team members that these restrictions are understood and will be followed. Those team members are listed below and specification documents shall contain a form for submission to the DTIR Representative before gymnasium work begins.

<b>Partner</b>	<b>Signature</b>	<b>Date</b>
DTIR	_____	_____
Department of Education	_____	_____
School Board	_____	_____
<b>Others</b>	<b>Signature</b>	<b>Date</b>
Principal	_____	_____
General Contractor	_____	_____
Sub-Contractor	_____	_____

3 Protection

- 3.1 Barricade areas where floor laying and finishing is in progress to prevent traffic over flooring.
  - 3.2 Cover finished flooring installations with protection adequate to prevent traffic damage, and maintain and replace protection as necessary until Project Completion.
- 4 Prohibit smoking, use spark-proof equipment and take all other precautions to avoid fire or explosion, or both, in areas where flammable materials are being used.

5 Materials

- 5.1 Kiln dry flooring and ensure that at time of installation it has an average moisture content of 8%, with permitted range of 6% to 10% in individual pieces.
- 5.2 Gymnasium Strip flooring
  - 5.2.1 No. 2 or better grade to CLA Grading Rules for Canadian Hardwood Strip Flooring, latest edition, minimum 50% No. 1 stock or, Grade 3 or better, Select Northern Hard Maple, MFMA Certified. 25/32" X 21/4" strip flooring

- 5.3 Stage Strip Flooring, leading edges 25/32" x 1 ½" T & G, maple to match gym flooring.
- 5.4 Fasteners:
- 5.4.1 Channel Anchors:
- 5.4.1.1 minimum 1-1/2" long concrete screws at 24" o.c., or
- 5.4.1.2 minimum 1 1/4" long steel powder actuated or pneumatic anchors to achieve 900lbs pull-out strength, spaced not less than 22 ½" staggered anchoring.
- 5.4.2 Subfloor anchors: 1" to 1-3/4" subfloor nails or staples
- 5.4.3 Flooring Fasteners: 2" barbed cleats or coated staples
- 5.5 Membrane: 6 mil polyethylene, ultra plus.
- 5.6 Resilient Pads :
- 5.6.1 Polyurethane pads,  
**OR**
- 5.6.2 Hemispherical or double trapezoidal profiled EPDM Pads :
- 5.6.3 Ensure a minimum of 1 pad / square foot
- 5.6.4 hot-melt glued to underside of plywood panels or sleepers or encased in steel channels between channel and sleepers allowing room for sleeper movement for resilient function.
- 5.7 Subfloor:
- 5.7.1 Factory assembly 2 layers 15/32" CDX grade APA plywood,  
**OR**
- 5.7.2 Factory assembly 1 layer 23/32" CDX grade APA plywood, with minimum 1" plywood sleepers
- 5.8 Continuous Steel Channels
- 5.8.1 16 gauge zinc treated steel, 8' long
- 5.8.2 "Hat" shaped or "C" shaped
- 5.9 Standard of acceptance
- 5.9.1 For elementary and middle schools gymnasiums:
- 5.9.1.1 Robbins "Bio-Cushion" or
- 5.9.1.2 Connor "Neo-Shok" systems.
- 5.9.2 For high schools:
- 5.9.2.1 Robbins "Bio-Channel" or
- 5.9.2.2 Connors "Rezill Channel" systems.



5.10 Heavy aluminum thresholds at all door openings and understage storage openings.

5.11 Rubber angle base

5.11.1 Moulded 3"x 4" vent base heavy duty rubber complete with premoulded corners.

5.12 Game Lines

5.12.1 Enamel paint to colours as indicated on drawings, type compatible with floor finish.

5.13 Finish: oil-modified Urethane floor finish.

6 Ensure that:

6.1 Environmental conditions have been provided as requested and specified.

6.2 Work specified in other Sections which in execution could interfere with or damage flooring installation has been completed.

6.3 Quality Assurance:

6.3.1 To manufacturers written requirements.

6.3.2 Ensure that no contaminants are present on subfloor that would affect bond of adhesive.

6.3.3 Defective Work resulting from installation of flooring on unsatisfactory surfaces or because of adverse environmental conditions will be considered the responsibility of those performing the Work of this Section.

7 Preparation:

7.1 Clean subfloors to remove dirt, oil, grease and other foreign materials, and vacuum clean.

8 Installation:

8.1 Gymnasium Floor:

8.1.1 Apply one layer vapour barrier membrane, lapping edges 4" and up walls 3". Tape all joints with product approved by Gymnasium flooring manufacturer.

8.1.2 Install plywood subfloor in accordance with manufacturers printed instructions.

8.1.3 Install base in accordance with manufacturer's instructions.

8.1.4 Install floor sockets and equipment anchors supplied by others.

8.2 Sanding and Finishing

8.2.1 Floors shall be sanded after all other trades are finished.

8.2.2 All flooring shall be sanded to smooth, even, and uniform surface with a minimum of three cuts using coarse, medium and fine sandpapers.

8.2.3 Final sanding of pattern floors should be performed with a screen and disc sander. This

final sanding should provide a smooth and even surface, free from scratches.

8.2.4 After sanding, contractor shall thoroughly vacuum floor with heavy duty commercial type vacuum to remove sanding dust from entire surface and request an inspection by Consultant before any finishing work shall start.

8.2.5 Apply two (2) coats of approved seal and two (2) coats of approved finish per manufacturer's instructions.

8.2.5.1 Ensure that first two coats of finish is applied immediately after sanding to avoid raised grain.

8.2.6 Buff and clean floor between coats.

8.2.7 Game lines: apply game lines between seal and first coat of finish.

### 8.3 Game Lines

8.3.1 Apply game lines to gymnasium floor to colours and areas as indicated on drawings.

8.3.2 School crest school steering committee to provide art work including colours, lettering and design to contractor. Contractor to engage Graphic Designer to generate an accurate, electronic version of same to facilitate implementation on floor. Contractor is responsible to do this.

## 9 Adjustment and Cleaning

9.1 Refinish damaged or defective Work so that no variation in surface appearance is discernible.

9.2 At completion of Work, and after finish has cured for at least 72 hours, clean flooring.

## **09 65 13 Resilient Base and Accessories**

1 Refer to DC-350, PART 1, Section 2, Division 09, 09 6513.

## **09 65 19 Resilient Tile Flooring**

1 Vinyl composite tile in 12" x 12" squares shall be used where indicated in PART 2, Section 3, Room Data Sheets.

### 2 Materials

2.1 Vinyl composition tile: 1/8" thick, 12" x 12" size.

2.2 Resilient base: top set covered rubber, minimum 4'-0" length and 4" high, including premoulded end stops and external corners.

2.3 Resilient stair riser: top set vinyl 1/8" thick, full riser height, solid pattern.

2.4 Stair Treads for Service Stairs: resilient stair treads with integral nosing. Top set vinyl 1/8"

thick full tread width and length.

### 3 Mock -Up

- 3.1 Prior to installation ensure that a mock-up room is prepared, for approval by the DTIR Project Manager.

### 4 Tile Application

- 4.1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- 4.2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- 4.3 Install flooring to square grid pattern with all joints aligned with pattern grain alternating.
- 4.4 Cut tile and fit neatly around fixed objects.
- 4.5 Terminate flooring at center line of door in openings where adjacent floor finish or colour is dissimilar.

### 5 Stair Application

- 5.1 Install stair risers and nosings one piece for full width of stair. Adhere over entire surface and fit accurately. Bring tread level up with filler to ensure resilient tile tread flush with nosing, where used on service stairs.

### 6 Base Application

- 6.1 Lay out base to keep number of joints at minimum.
- 6.2 Set base in full bed of adhesive, tightly against wall and floor surfaces.
- 6.3 Install straight and level to variation of 1:1000.
- 6.4 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- 6.5 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

### 7 Accessories

- 7.1 Install reducer strips at terminations of resilient tile flooring where edges are exposed to view.
- 7.2 At door openings, install reducer strips and transition strips under doors.
- 7.3 Secure strips and adapters to subfloor with contact bond adhesive to ensure complete bond.

- 8 Maintenance material: supply 2% of each product type used to owner.

- 9 Ensure that sealing and waxing of tile flooring is to manufacturer's recommended finish procedures.

## **09 67 00 Fluid-Applied Flooring**

### **1 Seamless Composite Floor System**

#### **1.1 Quality Assurance:**

##### **1.1.1 General:**

- 1.1.1.1 Materials provided shall incorporate the manufacturer's latest improvements in materials available at time of manufacture.
- 1.1.1.2 Manufacturer of resilient flooring shall be a firm specializing in manufacturing products specified herein.
- 1.1.1.3 The complete installation of the flooring system shall be carried out by an experienced and certified flooring contractor approved by the manufacturer and the work shall be performed in accordance with the most recent installation instructions of the manufacturer.

#### **1.2 Site Conditions:**

##### **1.2.1 Subfloors:**

- 1.2.1.1 Shall be adequately waterproofed beneath the slab and around the perimeter using a suitable membrane.
- 1.2.1.2 Shall be true and level being very flat in accordance with C.S.A. classification A23.1 subsection 22.1.2. Install subfloor to ensure level of finish is within 3 mm of established elevations in any 6 metre area, and shall when measured with a 3 metre straight edge the gap at any point shall not exceed 3 mm; ensure that finish levels do not vary by more than 1 mm per 300 mm.
- 1.2.1.3 Subfloors shall have a steel troweled finish, and be fully cured; maximum moisture content of 3% measured by the volume percentage method.

#### **1.3 Products**

##### **1.3.1 General:**

- 1.3.1.1 All urethane materials shall be free of any heavy metals such as lead or mercury which could seriously affect human health.
- 1.3.1.2 All urethane materials shall be manufactured by the same manufacturer and designed to chemically react with the previous layer to enhance bonding.
- 1.3.1.3 Shall have a minimum overall thickness of 11 mm.
- 1.3.1.4 Flooring system to be DIN tested and rated.

1.3.1.4.1 Subject to compliance with all requirements listed herein, approved synthetic flooring systems.

1.3.1.4.2 All applications shall be

1.3.1.4.2.1 "Elastiplus" as manufactured by Connor and

1.3.1.4.2.2 "Pulastic 2000" as manufactured by Robbins.

1.3.2 Acceptable Materials:

1.3.2.1 Seamless urethane composition flooring system to meet the following standards:

1.3.2.1.1 Surface hardness according to DIN 53505

1.3.2.1.2 Shore A 76 deg.

1.3.2.1.3 Compressive modulus by D.S.F. 8 Kgf/cm<sup>2</sup>/mm

1.3.2.1.4 Rebound resilience DIN 53512 29%

1.3.2.1.5 Ball Rebound 1.29/2.00 m

1.3.2.1.6 Wear Resistance Taber h18:

1.3.2.1.6.1 500 cycles 1.7% vol.

1.3.2.1.6.2 1000 cycles 1.9%

1.3.2.1.7 Compression set DIN 53517 1.9%

1.3.2.1.8 Impact Resistance by OGI 2 Kgm/cm<sup>2</sup>

1.3.2.1.9 Rolling Load Resistance no damage (DIN 18032 100 kg)

1.3.2.1.10 Tensile Strength DIN 53571 6.5N/m<sup>2</sup>

1.3.2.1.11 Elongation at Break DIN 53571 140%

1.3.2.1.12 Water Absorption Top Layer 2%

1.3.2.1.13 Water Absorption Under Layer 20.8%

1.3.2.1.14 Heat Resistance 0.089 kw/m<sup>2</sup>

1.4 Installation Procedure

1.4.1 Application:

1.4.1.1 Resilient underlay shall be bonded to the subfloor surface using approved adhesive applied at a minimum rate of .625 kg/sq.m., cut neatly around any fixed objects; terminate flooring at center line of openings where adjacent floor finish or colour is dissimilar.

1.4.1.2 Apply sealer at a minimum rate of .5 kg/Sq. M. to the joints and over the entire surface of the resilient underlay.

1.4.1.3 Layers shall be applied at a minimum rate of 2.8 kg/sq M and to a total thickness of 2 mm, being applied in two applications so that any irregularities that occur in the first application can be corrected in the second application.

1.4.1.4 Apply mat finish at a minimum rate of .15 kg/Sq. M. and allow to cure prior to application of the games lines.

1.4.1.5 Games lines shall be laid out and painted in accordance with the approved standards.

1.4.2 Accessories:

1.4.2.1 Thresholds

1.4.2.1.1 Install thresholds or reducer strips to cover spaces at doorways or changes in floor finishes.

1.4.2.2 Resilient Base

1.4.2.2.1 Install to walls using adhesive, providing a neat application without deformation.

1.4.3 Protection:

1.4.3.1 Allow a minimum of 72 hours after completion of the floor prior to allowing any access to the area.

1.4.3.2 Should access be required after this period, ensure the General Contractor is responsible to protect the floor surface using cardboard or non-fibred kraft paper with joints taped as per manufacturer's specifications.

**09 68 00 Carpeting**

1 Do not use Carpet as a floor finish in any part of the school including administration areas and libraries.

**09 72 16 Vinyl-Coated Fabric Wall Covering**

1 Do not use Vinyl wall fabrics as the adhesive provides an area that will support the growth of mould under certain environmental conditions.

**09 80 00 Acoustical Treatment**

1 Provide for control of sound in music and drama rooms, gymnasiums, stages and cafeterias.

2 Provide for an acoustical analysis to be conducted by a qualified sound quality professional which identifies effective design solutions and construction efficiency.

3 Sound Absorbing Panels:

3.1 Provide 2" thick panels to gymnasium, cafeteria, with top and bottom impact supports; and 3" thick panels to music room walls, etc. where required. 7 pound per cubic foot fibreglass with standard fabric covering, with flame spread rating of 25 or less. Bullnosed vertical edges.

3.2 Sound absorbing panels in gymnasium to be impact resistant, with scrim facing between fabric and insulation board.

4 Maintenance material, 2% of each product type used for owner use.

### **09 90 00 Painting and Coating**

- 1 See DC350, PART 1, Section 2, Division 09, 09 90 00, unless otherwise specified.
- 2 In lieu of ceramic tile finish specified for washroom, shower areas and recycle rooms (Refer to PART 1, Section 2, Division 09, 09 30 00), and where wall construction is of concrete block, epoxy paint is an acceptable alternate finish.
- 3 The best practices specified or recommended in CGSB 85.100 shall govern for materials, methods and procedures.
- 4 Environmental Requirements
  - 4.1 Refer to DC350, PART 1, Section 2, Division 09, 09 00 00 Finishes - General and 09 90 00 Painting and Coating.
- 5 Product Delivery, Storage And Handling
  - 5.1 Deliver to site each container sealed and labeled with manufacturer's name, catalogue number or brand name, colour, formulation type, reducing instructions, and reference standard specification number if applicable.
  - 5.2 Store only acceptable project materials at site, and in an area specifically set aside for purpose that is locked, ventilated, maintained at a temperature of over 4°C, and protected from direct rays of sun. Ensure that health and fire regulations are complied with in storage area.
- 6 Products
  - 6.1 All paint products are to be "Eco-Logo" approved products. Supply appropriate certificate from manufacturer.
  - 6.2 Location and Paint:
    - 6.2.1 Gymnasium Hardwood Floors:
      - 6.2.1.1 Apply first coat modified urethane thinned 25%.
      - 6.2.1.2 Apply 3 coats modified urethane over gym Court line markings. Apply 3 coats over finish carpentry hardwood.
      - 6.2.1.3 Gym Court Lines: latex - 2 coats.
    - 6.2.2 Typical Classroom and Corridor Concrete Block Walls:
      - 6.2.2.1 100% Acrylic satin Industrial enamel; 2 colour coats.

- 6.2.3 Typical Offices and Gypsum Board Walls:
  - 6.2.3.1 Hi Build Latex primer sealer; 1 coat, applied at 80-90 sq. ft. per gallon.
  - 6.2.3.2 Latex Satin or Semi gloss, 2 colour coats. Applied 3 mils dry.
- 6.2.4 Gymnasium Concrete Block Walls:
  - 6.2.4.1 Heavy duty Epoxy Block Filler; 1 coat.
  - 6.2.4.2 Water based epoxy; 2 coats colour. Note that there is to be a variance in colour between coats.
- 6.2.5 Kitchen, Cafeteria, Washrooms and Lockers, Concrete Block:
  - 6.2.5.1 Epoxy Block Filler: 1 coat.
  - 6.2.5.2 Water based epoxy; 2 coats colour applied at 2.5 mils per coat.
- 6.2.6 Exposed Deck and Structure: Sprayed Dry Fog alkyd semi-gloss colour coat: 1 coat.
- 6.2.7 Metal Handrails: (interior)
  - 6.2.7.1 1 coat primer.
  - 6.2.7.2 Scrubbable gloss latex; 2 colour coats.
- 6.2.8 Steel Doors & Frames
  - 6.2.8.1 1 coat primer.
  - 6.2.8.2 Scrubbable satin latex; 2 colour coats.
- 6.2.9 Wood Base (Typical):
  - 6.2.9.1 1 coat latex primer.
  - 6.2.9.2 Latex semi-gloss; 2 colour coats. Applied 3 mils dry.
- 6.2.10 Metal Columns (Exterior):
  - 6.2.10.1 1 coat primer epoxy.
  - 6.2.10.2 Water based epoxy, 2 coats colour.
- 6.2.11 Floors (Exposed): 2 coats colour on exposed concrete.
- 6.2.12 Maintenance materials. See DC350 Part 1, Section 2, Division 09, Item 09 90 00 .8

## 7 Preparation Of Surfaces

### 7.1 General

- 7.1.1 Vacuum clean interior areas immediately before finishing work commences.
- 7.1.2 Remove from surfaces: grease, oil, dirt, dust, ridges, and other soil and materials that would adversely affect the adhesion or appearance of finish coatings.
- 7.1.3 Rust on surfaces primed under work of other Sections shall be removed and the areas reprimed under the Work of these Sections.
- 7.1.4 Finish, patch and smooth surfaces to remove cracks, holes, ridges, and similar blemishes.
- 7.1.5 Touch-up damaged prime coats on shop primed metals with same priming material. Feather out edges of shop coat and smooth repair coat into shop coat surfaces.
- 7.1.6 Scrub mildewed surfaces with a solution of tri-sodium phosphate, bleach with a solution



of one part sodium hypochlorite (Javex) to three parts water, and rinse with clear water.

- 7.1.7 Cover or mask surface adjacent to those receiving finish to protect work of others from damage and soil.

7.2 Gypsum Board:

- 7.2.1 Fill minor holes and depressions, caused by accidental damage, with drywall joint compound, and sand smooth when it is set, taking care not to raise nap of paper cover.

8 Application

- 8.1 Sand and dust between each coat to remove defects.  
8.2 Apply each coat only after preceding coat is dry and hard or as otherwise directed by material manufacturer.

**END**

## **DIVISION 10 SPECIALTIES**

### **10 11 00 Visual Display Surfaces**

- 1 To DC350, PART 1, Section 2, Division 10, and as specified below.
- 2 Communication Boards
  - 2.1 Complete with trim or frame with coloured inserts, map rail, map hooks. Four rows of permanent music lines on one board of music room whiteboards, see Room Data Sheets. Mounting heights, extent and location as per individual room requirements.
  - 2.2 Gymnasium:
    - 2.2.1 provide 2 white boards in all high schools, and in all P-12 schools with gyms greater than 5000 sqft having a gym divider curtain. Recess such whiteboards into gym wall and locate one on each side of the curtain divider. All white boards to be 40 sqft each.

### **10 11 23 Tack Boards and Bulletin Boards**

- 1 Generally 1/8" natural cork (light colour), laminated to 3/8" fibreboard backing, sealed at edges. Trim as for communication boards. Mounting heights and extent as per individual room requirement.
- 2 Type 1 Tackboard - feature strip
  - 2.1 one foot high strip above communication boards, in addition to the Type 2, general square foot requirements for tack boards.
  - 2.2 Provide Type 1 Tack Boards for:
    - 2.2.1 Typical Classroom (P-4 classrooms only)
    - 2.2.2 Language Classroom
- 3 Type 2 Tackboard - general massing
  - 3.1 Provide the following square foot requirements as per the Room Data Sheets.

### **10 14 00 Signage**

- 1 Incorporate building numbering system into the drawing numbering system.
- 2 Interior Signage:
  - 2.1 Materials: aluminum, with black letters and numbers.

- 2.2 Faces of colour 3/16" acrylic sheet, raised character number and name plates, radiused corners, non glare finish, color contrast required.
- 2.3 Mounted with stainless steel screws, countersunk.
- 2.4 Number plates shall be sized to accommodate number location on the door frame.
- 2.5 Combination name and number plates to be provided for program areas only. 3" high and 20" long. Locate on or beside doorway as operation will support.
- 2.6 All rooms to have a number. Name plates to be located on classroom doors where possible, beside washroom openings on corridor wall and on all speciality areas. (ie. Gym, cafeteria, library, tech ed. chemistry lab, music, etc.) (Learning Support classroom to be identified as "classroom" only)
- 2.7 All interior signage to be designed and mounted in accordance with CAN CSA B651 Barrier Free Design, Public Safety A National Standard of Canada.
- 2.8 Room numbering system must be established so as to allow consecutive numbering of all classroom and major assembly areas, to assist in way finding. (ie. Classroom 100, 101, 102, 103...(first floor) physic Lab 200, Chemistry lab 201...(second floor))
- 2.9 Room name plates are required on all specialized rooms.
- 2.10 Identification Devices:
  - 2.10.1 Provide male or female pictograms for all washrooms/shower. Size, colour and style to be selected by Consultant.
  - 2.10.2 International symbol of access (CAN 2 321) indicating barrier free accessibility for all washrooms.
- 3 Exterior Building Identification Signage.
  - 3.1 Exterior Signage to be graphically designed to be appealing and functionally consistent with the nature, intent and functionality of the project.
  - 3.2 Quantity of letters and digits to suit design and identify building per official approved name and civic number.
  - 3.3 All exterior signage to conform with applicable local by-laws and regulations as well as the requirements of Emergency Measures Organization Standards.
  - 3.4 Signage designer will consider project function when establishing location, size, layout and illumination of building identification signage.
  - 3.5 Coordinate security illumination with signage illumination.
  - 3.6 Unless approved otherwise, minimum exterior digits and letters to be 300 mm high (12") prefinished baked enamel individual cast aluminum consistent with Aluminum Association Alloy Designation C443.2 unless anodic coating selected in which case cast aluminum will conform with Aluminum Association Alloy Designation 514.2 or A514.2.
  - 3.7 Colour to closely match approved project colours utilizing manufacturer's standard colours where feasible.

- 3.8 Letter and digit style to be sans serif as per the CAN CSA B651 Barrier Free Design, Public Safety A National Standard of Canada.
- 3.9 Letters and digits of Exterior Building Identification Signage is to be individually affixed to building, projection mounted.

### **10 21 13 Plastic Laminate Toilet Compartments**

- 1 To DC350, PART 1, Section 2, Division 10, 10 21 13.

### **10 22 23 Operable Partitions**

- 1 Operable door to be Modern fold, finish to be heavy duty vinyl, complete with 'matching pass door' made of same construction as panel. Sound transmission rating of STC 48 as-specified in DC350, Part 2, Section 2.

### **10 28 00 Toilet, Bath, and Laundry Accessories**

#### **1 Student Washrooms (Building Support Services)**

- 1.1 Provide barrier-free accessories as required, including mirrors, soap, paper towel and dispensers.

#### **2 Materials**

##### **2.1 Washroom Accessories**

- 2.1.1 Specified manufacturer's catalogue references establish minimum acceptable standards for Work of this Section.

##### **2.2 Provide all items listed in DC350, PART 1, Section 2, Division 10, 10 28 00 except as follows:**

###### **2.2.1 Washroom partitions:**

- 2.2.1.1 Elementary Schools: partitions may be constructed of plastic laminate over a particle core. Construct Middle and High Schools washroom partitions to Part 1, Section 2 Division 10, 10 28 00 requirements.

- 2.2.1.2 Washroom partitions in schools are to be floor mounted and overhead braced.

###### **2.2.2 Hand dryers are not required in school washrooms.**

- 2.2.3 Soap and towel dispensers are to be designed into washroom layout, shall be provided by the school board, and installed by the Contractor.

**10 44 00 Fire Protection Specialties**

1 Fire Blanket Station

- 1.1 Fire retardant 100% wool blanket in wall mounted metal case.
- 1.2 Blanket size: 60" x 80".
- 1.3 Acceptable product: Fisher Scientific Model 10-004; Northwest 17-5153A or National Fire Equipment.

2 Flammable Storage Cabinet

- 2.1 One required in each science lab.
- 2.2 Cabinet to have double walls of 18 ga. steel with 1 1/2" air space and welded joints.
- 2.3 Self-closing door with fusible link to assure automatic closing of door in case of fire in cabinet.
- 2.4 Large red lettering on door reading: *Flammable - Keep Fire Away*.
- 2.5 cabinet to be secured to wall at studs
- 2.6 self closing door with fusible link to assure automatic closing of doors in case of fire in cabinet.
- 2.7 Capacity:
  - 2.7.1 120 litre capacity with one 14" deep adjustable shelf.
- 2.8 Overall size
  - 2.8.1 18" x 43" x 44".
- 2.9 Acceptable Product:
  - 2.9.1 Fisher Scientific Model 14-204.

**10 51 00 Lockers**

1 Half Height Lockers

- 1.1 For Junior High, Middle & High Schools in the Change & Shower Rooms, provide
  - 1.1.1 32 half height, heavy duty lockers, 15" wide, 12" deep complete with 30" deep, 18" high bench base, per change room.
  - 1.1.2 Provide three hardwood benches, 8 ft. long per change room not fixed in a manner to restrict wheelchair access.
- 1.2 For Junior High, Middle and High Schools in the Corridors, provide
  - 1.2.1 Half-height, heavy duty lockers
    - 1.2.1.1 15" wide X 12" deep.
    - 1.2.1.2 One locker for each student as per design occupant load is required.
- 1.3 Top: Sloping
- 1.4 Accessories: Hat shelf, 2 coat hooks.

- 1.5 Latch: for Owner's padlock.
- 1.6 Number Plates: As directed.
- 1.7 Colours: As indicated on colour schedule.
- 1.8 All lockers to be factory assembled.
- 1.9 Doors: Double pan design, 16 ga. outer panel and 24 ga. steel inner panel, complete with reinforcing z bars per door.
- 1.10 Frame: 16 ga. steel.
- 1.11 Sides and back - 24 ga. steel.
- 1.12 Top: 20 ga. steel.
- 1.13 Manufacturer: GSW; Shanahan; Lincora; List. Hadrian
- 1.14 Continuous hinges
- 1.15 Corridor lockers have to have venting below, above, or through doors, and through sloped top, shelves and sides. Gym change room locker doors are to be perforated. See ASK-19 attached for locker detail for block walls.

#### **10 57 00 Wardrobe and Closet Specialties**

##### **1 Coat Racks**

- 1.1 For elementary schools, provide coat racks.
- 1.2 Ensure coat rack heights for grades P, 1 and 2 are lower than for grades 3-6.
- 1.3 Ensure coat racks and are in located in corridors, are in reasonable proximity to the learner's classroom and barrier-free.

#### **10 73 00 Protective Covers**

##### **1 Canopies**

- 1.1 Provide a canopy at the main entrance to the school used by children waiting for buses or parent pick-up.
- 1.2 The canopy to be a minimum of 200 sq. ft. and maximum of 300 sq. ft. in size.
- 1.3 Design canopy as an integral part of the main entrance to the school. All columns to be architecturally finished, all drainage from canopy to be diverted to downspout, roof drains or other as per acceptable industry standards.
- 1.4 Canopy shall include a finished soffit with no exposed beams or frame supports which could allow bird habitation.

#### **10 75 00 Flagpoles**

- 1 Flagpole material to be aluminum. Aluminum Association Alloy AA 6063-T5 seamless

extruded aluminum tubing. Sateen finish.

- 2 Complete unit to be 9.0 m long flagpole including base mounting brackets, anchorage and fittings.
- 3 Cone tapered flagpole, seamless, uniform, straight line tapered section above cylindrical butt section.
- 4 Tapered 25 mm in 1.7 m of run.
- 5 Provide internal splicing, self-aligning sleeve of same material as flagpole for snug fitting, watertight field joints.
- 6 Finial: 152 mm diameter ball of 4.7 mm minimum thick, aluminum, anodized, colour gold.
- 7 Truck Assembly: stainless steel ball bearing, non-fouling, revolving double truck assembly, finish to match flagpole.
- 8 Halyard: internal nylon, braided, with steel or bronze core. Retaining loop and weights for internal halyard, stainless.
- 9 Swivel Snaps: two per halyard; aluminum with neoprene or vinyl covers.
- 10 Cleat Box: one per cleat; cast aluminum finish to match flagpole. Furnish hasp for padlock, hinged cover, and tamper-proof screws. Include lockable cleat box. Finish: Clear anodized. Acceptable Manufacturers: All-Canadian Flag Pole Co. ACC-30; John +Ewing & Co. Inc.

**END**

## **DIVISION 11 EQUIPMENT**

### **11 00 00 Equipment - General**

1 To DC350, PART 1, Section 2, Division 11, unless otherwise specified.

### **11 31 00 Residential Equipment**

#### **1 Domestic Washing Machine**

1.1 Provide at the following locations:

1.1.1 Clothing & Textile Area, and Learning Support Area. See Room Data Sheets.

1.1.2 Front console / loading

1.1.3 Stackable

1.2 Acceptable Product

1.2.1 GE model WCXH208AWW or Maytag model MAH2400A

#### **2 Domestic Clothes Dryers**

2.1 Provide at the following locations:

2.1.1 Clothing & Textile Area, and Learning Support Area. See Room Data Sheets.

2.1.2 Front console

2.1.3 Stackable

2.2 Acceptable Product

2.2.1 GE model PSXH43ECWW or Maytag model MDE2400A

#### **3 Microwave Ovens**

3.1 Provide for Nutrition Area (Family Studies), Learning Support and Staff Kitchen, see Room Data Sheets

3.2 1.2 cu.ft. Capacity, 1250-1300 watts, auto cook menu, defrost.

3.3 Acceptable Product

3.3.1 Panasonic NN-T665SF

#### **4 Convection Countertop Microwave Oven**

4.1 Provide for Nutrition Area (Family Studies), see Room Data Sheets

4.2 1.5 cu.ft., 1100 watts, defrost, two level cooking

4.3 Acceptable Product

4.3.1 Panasonic NN-C980W



**5 Self Cleaning Ceran Top Range**

- 5.1 Provide for Learning Support and Nutrition Area (Family Studies).
- 5.2 Upswept Ceramic Glass Cooktop.
- 5.3 Hot surface indicator.
- 5.4 Front or side controls
- 5.5 Acceptable Product
  - 5.5.1 GE model JCBP65WKWW or Maytag model PERL451A

**6 Built-in Dishwasher**

- 6.1 Provide for Nutrition Area ( Family Studies) and Laboratory Storage / Preparation Room, see Room Data Sheets
- 6.2 6 push button, 2-6 hour delay start, temperature boost
- 6.3 Acceptable Product
  - 6.3.1 Maytag model PDBL290A

**7 Refrigerator**

- 7.1 Provide for learning Support and Nutrition Area (Family Studies). See Room Data Sheets.
  - 7.1.1 18 cubic foot, top freezer, with reversible doors,
  - 7.1.2 Acceptable product:
    - 7.1.2.1 Maytag model MTB 1891A or GE model GTH18JBRWW

**8 Upright Freezer**

- 8.1 Provide for Nutrition Area (Family Studies).
- 8.2 Acceptable Product
  - 8.2.1 GE model FUM17DRRWH or Amana model AFU1705B

**11 40 00 Food Service Equipment**

**1 Food Service Equipment for Kitchen (Assembly Area)**

- 1.1 Materials and Components
  - 1.1.1 Stainless Steel: to CSA ASTM A167, Type 304 with No. 4 finish unless otherwise indicated.
  - 1.1.2 Stainless Steel Tubing: to ASTM A269, Type 302 commercial grade, seamless welded with No. 4 finish.
  - 1.1.3 Fastenings: for securing corrosion resistant or plated metal parts to be as corrosion resistant as, and colour matched to materials being fastened. Fastenings used for securing unplated ferrous metal or wood parts are to have a minimum protective coating of cadmium or zinc. Where possibility of food or food acid contact, plating to be

chromium; cadmium, zinc. Toxic coatings not accepted.

- 1.1.4 Chrome and Nickel Plating: to ASTM B456 Service Condition Number SC 3, polished finish.
- 1.1.5 Sealant: aluminum coloured sealing compound such as Dow Corning Silastic 732 RTV silicone adhesive sealant, to meet requirements of the National Sanitation Foundation (NSF) for direct contact with food, and stay flexible during long term exposure to temperatures ranging from - 73.3 deg. C. to 232.0 deg. C. Seal all back-splashes to walls.
- 1.1.6 Where amounts and sizes of units are provided for work tables, work tables with sinks and bakers Tables these shall be considered typical and are provided for information. It remains the responsibility of the Design Build team to design to the requirements of the Part 2 General and Detailed Requirements, Room Data Sheets and ASK -11 Drawing Equipment legend, and to suit the individual room layout

## 1.2 Fabrication

- 1.2.1 Fabricate work square, true, straight, to fit conditions and as indicated. Design is to afford maximum sanitary conditions and is not to have any areas where disease-causing bacteria may accumulate.
- 1.2.2 Fabricate equipment from stainless steel, except as otherwise indicated.
- 1.2.3 Fit and shop-assemble equipment ready for erection where possible.
- 1.2.4 Carefully deburr and smooth all edges.
- 1.2.5 Straight Lengths:
  - 1.2.5.1 Counter tops, table tops, drain boards, tray rails, shelving and the like to be one continuous piece if 10' or less in length. If over 10', stainless steel sections to be welded, including field joints, unless otherwise indicated.
- 1.2.6 Welding: to be sound, non-porous, and free from imperfections. Weld metal to be colour matched to, and as corrosion resistant as the parent metal. All other welds to be ground smooth. The welding or finishing is not to impair the corrosion resistance of the finished article. All welds, except spot welds, are to be continuous unless otherwise indicated.

## 1.3 Dish Tabling

- 1.3.1 Custom built or Diamond Metal, or MKE Industries 30" wide x 36" high.
- 1.3.2 All stainless steel construction 16 ga.
- 1.3.3 Include sinks as per plans.
- 1.3.4 Stainless steel tops with stainless steel legs and under shelving indicated. Reinforced, front up and rolled, ends turned down into dishwasher and sink drain board. Raised splash back.

1.4 Dish Rack

1.4.1 Overshelf

1.4.1.1 Stainless steel sloped suited to hold 2 standard dish racks

1.4.1.2 Acceptable manufacturer: Diamond Metal, or MKE Industries

1.5 Dishwasher

1.5.1 Undercounter type, 2 or more programable cycles, digital display, built-in/integrated booster, c/w 2 racks for dish, cup, bowl and silverware. Consider 70° booster where design for supply water may not be consistently delivering water above 140°F.

1.5.2 Construction

1.5.2.1 Stainless steel tank, frame, top and side panels, with welded steel base and stainless steel adjustable legs.

1.5.3 Acceptable Manufacturer / Product:

1.5.3.1 Swissh 25PCL

1.5.3.2 Jackson Tempstar JPX-300H

1.5.3.3 Hobart

1.5.3.4 Blakeslee

1.5.3.5 Champion/Moyer Diebel

1.5.3.6 Fagor FI -64W

1.6 Clean Dish Tabling and Pot Sinks:

1.6.1 Three Compartment Pot Sink: 16 ga. stainless steel all-welded construction on galvanized legs/ overflow, drains and guards.

1.6.2 Pot sink to be continuous with adjacent counter top. Sink to be integral with counter top. Pot sink to be complete with stainless steel slats to accommodate 20" x 20" tray and basket inserts.

1.6.3 Sanitizing sink to be equipped with an indication thermometer.

1.6.4 Acceptable Product:

1.6.4.1 Custom

1.6.4.2 Royal Food equipment Model PVS

1.6.4.3 MKE

1.7 Freezer

1.7.1 Reach-in freezer type

1.7.2 45 cubic feet capacity; two section c/w

1.7.2.1 full door and six vinyl coated shelves

1.7.2.2 6" adjustable legs

- 1.7.2.3 digital thermometer
- 1.7.2.4 defrost indication and door activation light
- 1.7.2.5 condensation pan.
- 1.7.3 Finish
  - 1.7.3.1 stainless steel exterior
  - 1.7.3.2 white interior
- 1.7.4 Electrical Characteristics
  - 1.7.4.1 120 volt, single phase.
  - 1.7.4.2 Quantity: one only.
- 1.7.5 Acceptable Product
  - 1.7.5.1 Delfield 6100 XL
  - 1.7.5.2 Curtis RF-2-TM
  - 1.7.5.3 Master -Bult BSD -52DFA
  - 1.7.5.4 True 49 series

## 1.8 Shelving

- 1.8.1 Wire shelves, five tier high on 72" posts with "s" hooks at corners to permit unobstructed access.
- 1.8.2 One side and back 24" wide; other side 18" wide. Lengths to fit room as per plan, confirmed by site dimensions.
- 1.8.3 Finish: Chrome.
- 1.8.4 Quantity: one lot.
- 1.8.5 Acceptable Product
  - 1.8.5.1 Cari-All
  - 1.8.5.2 Tarrison
  - 1.8.5.3 Johnson-Rose

## 1.9 Refrigerator

- 1.9.1 Reach-in Refrigerator Type, minimum 48" width.
- 1.9.2 49/50 cubic feet capacity; two sections c/w
  - 1.9.2.1 full doors and six vinyl coated shelves
  - 1.9.2.2 adjustable legs or casters
  - 1.9.2.3 Digital thermometer, power-on indicator and door activation light.
  - 1.9.2.4 condensation pan
- 1.9.3 Finish
  - 1.9.3.1 stainless steel exterior
  - 1.9.3.2 ABS liner interior
- 1.9.4 Electrical Characteristics

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- 1.9.4.1 120 volt, single phase, cord and plug
- 1.9.5 Acceptable Product
  - 1.9.5.1 Delfield Model 6000XL
  - 1.9.5.2 Curtis, RR-2-TM
  - 1.9.5.3 True - 49 series
  - 1.9.5.4 Master-Bilt BSD-52DRA

1.10 Work Table

- 1.10.1 Stainless steel utility unit/work table complete with stainless steel top, overshef, and solid undershef. At least one unit shall be sized for provision of two ingredient bins.
- 1.10.2 Size: 60" long x 32" deep x 35" high.
- 1.10.3 Acceptable Manufacturers
  - 1.10.3.1 Diamond Metal
  - 1.10.3.2 Royal Food
  - 1.10.3.3 Custom
  - 1.10.3.4 MKE Industries CT-6032 c/w HS-S

1.11 Heavy Duty Range

- 1.11.1 Heavy-duty ranges c/w oven base; adjustable sanitary legs.
  - 1.11.1.1 One with 24 x 24 combination top with two heat zones and two 8 ½" dia. tubular elements.
  - 1.11.1.2 One with hot top and oven base, for second range where student population exceeds 800.
- 1.11.2 Finish
  - 1.11.2.1 Stainless steel front and back guard
  - 1.11.2.2 baked enamel sides.
- 1.11.3 Electrical Characteristics
  - 1.11.3.1 208 volt, three phase.
- 1.11.4 Quantity-student populations in excess of 800, two ranges required.
- 1.11.5 Acceptable Product
  - 1.11.5.1 Garland Model 36ER32-3
  - 1.11.5.2 Vulcan
  - 1.11.5.3 MKE Industries 836-2
- 1.11.6 This item requires an exhaust hood, provided by Mechanical. Ensure the two components are co-ordinated.

1.12 Microwave Oven

- 1.12.1 Commercial stainless steel in and out heavy duty, 0.6 cu.ft. interior 1000 or 1200 watts,

programmable

1.12.2 Ensure Microwave Oven has a dedicated 20 amp circuit associated to it.

1.12.3 Acceptable Product

1.12.3.1 Panasonic NE-1064

1.12.3.2 Amana

1.13 Convection Oven

1.13.1 Single deck electric convection oven, as per program.

1.13.2 29W" x 24"H x 24"D

1.13.3 Five (5) oven racks with ten (10) position rack guides)

1.13.4 Six (6) oven racks with thirteen (13) position rack guides where student population exceeds 800.

1.13.5 Two speed fan motor ½ hp, 60,000 btu cavity.

1.13.6 Acceptable product

1.13.6.1 Garland MC0 ES-10/20-S

1.13.6.2 Vulcan VCE series with Electronic Controls

1.13.6.3 Imperial ICVE -1

1.14 Overshelf for Hot Food Table

1.14.1 All stainless steel construction.

1.14.2 Provide one infrared heat lamp.

1.14.3 Complete with sneeze guard.

1.14.4 Acceptable Product

1.14.4.1 Diamond Metal

1.14.4.2 Royal Food Equipment.

1.14.4.3 MKE Industries HS-SBP

1.15 Hot Food Table

1.15.1 All stainless steel water pan electric steam table with open base, c/w

1.15.1.1 stainless steel pans and covers

1.15.1.2 ½" drains

1.15.1.3 10" wide maple cutting board

1.15.1.4 sneeze guards

1.15.2 Provide one section 2-1/2 size pans 6" deep; one section full size pan 4" deep; one section 3-1/3 size pans 2" deep; 2 full size pans 2" deep complete with covers.

1.15.3 Acceptable Product

1.15.3.1 MKE HFTS-48AW-3-AR

1.15.3.2 Diamond Metal.

1.15.3.3 Custom HFT48W31W

1.16 Pass Through Shelf

1.16.1 All stainless steel construction by general contractor. See details on drawings.

1.17 Tray Rail

1.17.1 Stainless steel tray rail as per drawings.

1.18 Work Table with Sink

1.18.1 Stainless steel utility unit/work table complete with stainless steel top with integral sink and backsplash, overshelf and solid undershelf.

1.18.2 Size 72" long x 32" deep x 35" high.

1.18.3 Faucet by Mechanical. Ensure the components are co-ordinated.

1.18.4 Acceptable Manufacturers

1.18.4.1 Diamond Metal

1.18.4.2 Royal Food, Model

1.18.4.3 Custom

1.18.4.4 MKE Industries CT-7232 c/w HS-S

1.19 Pot Rack

1.19.1 All stainless steel construction.

1.19.2 Table mounted to lower shelf.

1.19.3 Complete with "S" hooks @ 6" o.c.

1.19.4 Size: 66" long x 18" wide.

1.20 Bakers Table

1.20.1 Stainless steel utility unit/work table complete with hardwood table top, 2" nominal thickness, and stainless steel over shelf. Stainless steel legs complete with cross bracing at sides and rear.

1.20.2 Size: 48" long x 32" deep x 35" high.

1.20.3 Acceptable Manufacturers

1.20.3.1 Diamond Metal Royal Food.

1.20.3.2 Custom

1.20.3.3 MKE Industries BT-4832 c/w HS-S

1.21 Ingredient Bins

1.21.1 Heavy-duty plastic bins for bakers table.

1.21.2 Acceptable Product

- 1.21.2.1 Diamond Metal Rubbermaid 3600
- 1.21.2.2 Cambro BS20

#### 1.22 Vegetable Sink

- 1.22.1 Two compartment vegetable sink, one compartment to be an integral left drain board c/w overflow, drain and perforated guard.
- 1.22.2 Construction
  - 1.22.2.1 16 ga. stainless steel all-welded construction on galvanized legs.
- 1.22.3 Acceptable Product
  - 1.22.3.1 Diamond Metal
  - 1.22.3.2 Royal Food Equipment Model PVS-24-16 sink with DO-24 left hand drain board.
  - 1.22.3.3 MKE Industries PS-48-24LD

#### 1.23 Glass Front Fridge

- 1.23.1 Reach in refrigerated storage cabinet c/w
  - 1.23.1.1 2 glass doors
  - 1.23.1.2 fluorescent lighting
  - 1.23.1.3 6 heavy duty shelves.
- 1.23.2 Colour
  - 1.23.2.1 White inside and out.
- 1.23.3 Electrical characteristics
  - 1.23.3.1 1/3 hp, single phase, 115V.
- 1.23.4 Digital thermometer
- 1.23.5 Acceptable Product
  - 1.23.5.1 Coldmatic RSL-40-GC
  - 1.23.5.2 True T-49.
  - 1.23.5.3 Master-Bilt MBGR48S

#### 1.24 Sandwich Table

- 1.24.1 Refrigerated sandwich preparation table
- 1.24.2 Acceptable Product
  - 1.24.2.1 Delfield, 4427N-6
  - 1.24.2.2 True, TSSU-27-8
  - 1.24.2.3 Master-Bilt MBSP27-8

#### 1.25 Cueing bar

- 1.25.1 Stainless steel construction with recessed anchors to full depth of slab, designed to meet horizontal loading requirements and to run the full length of the servery.



- 1.26 Servery and dish return window
- 2 Kitchen Storage Shelving
  - 2.1 Cari-all ,Tarrison, Johnson-Rose.
- 3 Where electrical equipment is in a barrier free cabinet, ensure controls are front or side mounted.

### **11 52 00 Audio-Visual Equipment**

- 1 Projection Screen
  - 1.1 Motorized, Electrically Operated Projection Screens:
    - 1.1.1 Screen: Mildew resistant, Fiberglass matte white viewing surface, glass beaded and fire resistant.
    - 1.1.2 Case: Warp-resistant composition wood case complete with universal mounting brackets for side or suspend mounting.
    - 1.1.3 Location: Stage
      - 1.1.3.1 Minimum size: 12' x 16'
    - 1.1.4 Location: Gymnasium and Cafeteria:
      - 1.1.4.1 Minimum size: 12' x 12'
    - 1.1.5 Standard of Acceptance: Draper Rolleramic or approved equal.
  - 2 Wall Mounted Spring Roller Projection Screens:
  - 3 Front Projection Screens:
    - 3.1 Screen: Mildew resistant, Fiberglass matte white viewing surface, glass beaded and flame resistant.
      - 3.1.1 Case: 22 Ga. Steel case, flat back design with matching 12 Ga. End caps complete with universal mounting brackets.
    - 3.2 Locations:
      - 3.2.1 Typical Classroom
      - 3.2.2 Primary Classroom
      - 3.2.3 Grade One Classroom
      - 3.2.4 Language Classroom
      - 3.2.5 Learning Support.
    - 3.3 Size: 72" x 96".
      - 3.3.1 Standard of Acceptance: Draper Luma 2 or approved equal.

4 Ceiling Mounted Screens:

- 4.1 As per Item 11130.1.2 with universal mounting brackets equipped for ceiling mounting.
- 4.2 Locations: Where required by Department of Education, or as noted in Project Specific Design Briefs.

**11 53 00 Laboratory Equipment**

1 Fume hood:

- 1.1 Provide for Chemistry Laboratory and/or Laboratory Storage/Preparation Room. Refer to Room Data Sheets
- 1.2 Design to meet all applicable SEFA, ULC, and CSA standards, and provincial barrier-free requirements on the classroom side; and as follows:
  - 1.2.1 Laboratory exhaust ductwork (serving chemical fume hoods and chemical storage cabinets) shall be minimum 18 gauge type 316 stainless steel with welded joints.
  - 1.2.2 With water
  - 1.2.3 Exhausted directly outdoors.
  - 1.2.4 Lockable from classroom side.
  - 1.2.5 Standard air fume hood.
  - 1.2.6 Integral light complete with switch.
  - 1.2.7 Full view laminated safety glass.
  - 1.2.8 Complete with base cabinetry, sink, and pre-wired electrical outlet.
  - 1.2.9 Stainless steel surface.
  - 1.2.10 Stainless steel liner panels
  - 1.2.11 100 FPM average face velocity.
- 1.3 Consultant shall provide complete cabinet and hood design details with construction tender documents.
- 1.4 Standard of Acceptance: MottLab

**11 57 00 Vocational Shop Equipment**

- 1 See Technology Production Area Room Data Sheet.
- 2 All built in equipment including Technology Production equipment supply and installation shall be coordinated and provided by the Contractor including, unload, placement, wiring, and dust collection systems.

**11 61 00 Theater and Stage Equipment**

1 Stage Curtain Track

- 1.1 Provide fireproof, electric drawn drapery track.
- 1.2 Provide ½ hp. electric draw curtain machine and 3/16" galvanized aircraft cable, c/w disconnect switch, overload protection breakers and motor thermal overload.
- 1.3 Acceptable Material:
  - 1.3.1 Model #916, by Quality Stage Drapery.
  - 1.3.2 GC Stage Equipment.

2 Stage Curtain

- 2.1 Provide flameproof, 20 oz. quality velour curtain c/w valence, to match curtain
- 2.2 height of valence to be 36".
- 2.3 Fullness of curtain and valence shall both be 80%.
- 2.4 Colour as selected by Consultant.
- 2.5 Acceptable Material
  - 2.5.1 Camrose by Quality Stage.
  - 2.5.2 GC Stage Equipment/JB Martin Fabrics.

3 Proscenium arch curtains(s), mechanically operated

4 Cyclorama Track (backdrop) curtains.

- 4.1 Provide Cyclorama track and curtain at stage as indicated on drawing.
- 4.2 Track: I Beam track constructed of 11 gauge extruded mill finished aluminum, with top, intermediate and bottom flanges. Track complete with carriers @ 8" o.c., curtain hooks, and all necessary ceiling clamps. Acceptable Product: #403 Track by Quality Stage.
- 4.3 Curtain: 16 oz. stage velvet, flame resistant backdrop curtain, 35% fullness. Curtain to be grommeted at 8" o.c. with brass grommets and be attached to the center of a trim chain on the track carrier with "S" hooks. Provide curtains in three pieces: one 35' long, two 25' long. Colour: Black. Acceptable Product: Provost backdrop curtain by Quality Textiles. Alternate: GC Stage Equipment, to match.
- 4.4 Quantity: as required to suit design.

5 Under stage chair storage dollies.

- 5.1 Assembly complete with angle floor guide system and swivel ball bearing casters; minimum quantity.
- 5.2 10' x 8' match to capacity of seating area long units and 10' x 6' long units ganged together in pairs to form 10' x 14' long units number to accommodate maximum seating capacity of

related assembly areas.

## **11 66 23 Gymnasium Equipment**

1 Refer to Gymnasium Room Data Sheet for quantities.

### **2 Backstop Specifications**

- 2.1.1 Glass backboards - ceiling suspended swing up basketball backstops c/w official glass rectangular backboard, regulation 18" diameter reflex breakaway goal, electric winch, foam safety edging, backstop safety belts and all mounting accessories. Frame width to accommodate rectangular board (approx.63"). Adjustable H.D.net (8'-0" X 10'-0" AFF)
  - 2.1.1.1 Standard of acceptance: Kodiak industries, RS 110-U, painted white.
  - 2.1.1.2 Acceptable alternate manufacturer: Madsen Sheridan, Laurentian: Gymnasium and Health equipment.
- 2.1.2 Steel backboards - ceiling suspended swing up basketball backstops complete with regulation fan shaped steel backboard, regulation 18" dia. Goal, backstop safety belts, electric winch and all mounting accessories.
  - 2.1.2.1 Standard of acceptance: Laurentian Gymnastic Industries, Model LG-50BB
  - 2.1.2.2 Acceptable Alternate manufacturer: Madsen-Sheridan, Royal Steward, Kodiak.
- 2.1.3 Steel backboard wall mounted - c/w rectangular shaped steel backboard, regulation 18" dia. Goal and all mounting accessories.
  - 2.1.3.1 Standard of acceptance: Kodiak RS - 119 HD, painted white adjustable height (8'-0" and 10'-0")
  - 2.1.3.2 Acceptable alternate manufacturer: Madsen-Sheridan, Laurentian: gymnasium & Health Equipment.

### **3 Volleyball Posts and Net**

- 3.1 Provide competition volleyball posts and nets to the following standards. Posts are to be self-supporting requiring no guy wires.
  - 3.1.1 Spieth Anderson #226EW/EH "Sport Plus" end posts complete with ratchets.
  - 3.1.2 Spieth Anderson #219 post padding
  - 3.1.3 Spieth Anderson #221 judge's stand
  - 3.1.4 Spieth Anderson #207 judge's stand padding
  - 3.1.5 Spieth Anderson #214 VB floor sockets
  - 3.1.6 Court -1 - VBN-500 Championship volleyball net
  - 3.1.7 Court -1 - VNA-100 net antenna
- 3.2 Provide sets cross court volleyball posts and nets to the following standards:
  - 3.2.1 End posts: Laurentian 500202/Centaur @158E

- 3.2.2 Centre posts: Laurentian 500201/Centaur C158C
- 3.2.3 Nets: Court - 1, VBN 300
- 3.2.4 Alternate Manufacturers: Madsen, Sheridan, Gymnasium and Health Equipment to meet specified requirements.
- 3.3 Floor sockets as required. Ensure floor sockets and posts are compatible before installation of sockets.

#### 4 Badminton Posts and Nets

- 4.1 Provide sets of badminton posts and nets to the following standards:
  - 4.1.1 PV posts: Laurentian 500111/Centaur C160B complete with ratchets.
  - 4.1.2 Floor sockets: Centaur C164. Ensure floor sockets and posts are compatible before installation of sockets.
  - 4.1.3 Nets: 20', G & HE, BN-250, Badminton nets shall fit the specified court design size.
  - 4.1.4 Alternate Manufacturers: Spieth Anderson, Madsen, Sheridan, Gymnasium and Health Equipment to meet specified requirements.

#### 5 Gymnasium Divider Curtain

- 5.1 Provide fold-up divider curtain; material: vinyl coated, double wall for high schools and single wall for elementary and middle schools, polyester rated as flame retardant by ULC. The curtain shall be vinyl for the first 10 ft. from the floor and the balance shall be 1 1/4" vinylized netting. Curtain c/w electric winch, key switch, track and hardware and all mounting accessories. Colour selected by architect, including the following additional features:
  - 5.1.1 Extra heavy duty chain supports
  - 5.1.2 Heavy duty "S" hooks
  - 5.1.3 Stainless steel pulleys
- 5.2 Acceptable Manufacturer:
  - 5.2.1 Gym Fold
  - 5.2.2 Qued
  - 5.2.3 Hamilton Gymnasium Equipment

#### 6 Telescopic Bleachers

- 6.1 Provide banks of bleachers at standard modular lengths, synthetic bench seating, continuously roll-formed nose beam and rear risers, and plywood decking, self-storing (non-demountable) guard rails. Size and weight to be consistent with the loading capacity of the floor finish design and compatible with operation requirements.
- 6.2 Each section to have 7 rows spaced at 24". Rise: 12".
- 6.3 Bleachers to have the following accessories: 42" high folding end rails; 36" wide seat level

aisles and front step; 96" x 15" scorer's table complete with steel sockets for legs mounted to bleacher, and end panels. Color to be selected by architect.

- 6.4 Acceptable Product: Hussey-Maxam Other manufacturer will be accepted if they meet the requirements and are in compliance with the specifications of the acceptable product.

## **11 68 00 Play Field Equipment and Structures**

### **1 Play Systems**

- 1.1 Provide one adventure play system and base material for every 350, or part there of, elementary students.
- 1.2 Coordinate play system with design and construction of play area safety surface, (see Section 02911).
- 1.3 Play Systems shall be all steel, polyester powder coated and colour coordinated, to meet the following:
  - 1.3.1 posts shall be pre-drilled 89 mm square, 12 gauge pre-galvanized steel.
  - 1.3.2 platforms shall be steel, 11 gauge, coated with textured PVC.
  - 1.3.3 all bolts and fasteners shall be tamper-proof stainless steel
  - 1.3.4 provide all necessary safety rails and safety panels.
- 1.4 Safety certification on installation . Installation to be done by qualified installers.
- 1.5 Play Systems to include:
  - 1.5.1 6 steel platforms, one covered with a roof
  - 1.5.2 2 chinning / turning bars
  - 1.5.3 1 - 2.4 m wavy challenge ladder
  - 1.5.4 1 chain net climber, coated
  - 1.5.5 1 arch climber
  - 1.5.6 1 rung ladder
  - 1.5.7 2 ladder panels
  - 1.5.8 1 spiral slide
  - 1.5.9 1 double wide poly slide
  - 1.5.10 1 sliding pole
  - 1.5.11 1 safety panel with wheel
  - 1.5.12 1 bubble safety panel
  - 1.5.13 5 stepping stones

### **2 Outdoor Basketball Equipment**

- 2.1 Outdoor basketball goal shall meet the following and as detailed in ASK 20:
  - 2.1.1 114 mm O.D. galvanized cantilever post, 1.22 m extension
  - 2.1.2 steel fan shaped backboard, powder coated white

- 2.1.3 rear mount super goal (double rim)
- 2.1.4 steel chain net

**END**

## **DIVISION 12 FURNISHINGS**

### **12 21 00 Window Blinds**

#### **1 Horizontal Vane Window Blinds - Metal**

- 1.1 Provide all administration offices and meeting rooms in the Administration Zone with horizontal metal window blinds for and where sidelight is required. Refer to Part 2, Section 2, Division 08.
- 1.2 25 mm horizontal blinds, brushed aluminum finish, wall mounted with pull cord.
- 1.3 Blinds are to be supported by wall structure. Drywall support is not acceptable.
- 1.4 Acceptable Manufacturer: Hunter Douglas Commercial
- 1.5 Where Vertical Vane Window Blinds are required, the Consultant may make a request for substitution Horizontal Metal Blinds of a similar quality to the Minister for consideration and approval, prior to incorporation into the design or construction documents.

#### **2 Vertical Vane Window Blinds**

##### **2.1 Cord Control**

- 2.1.1 The system shall have one single cord to control both the rotation and the traversing of the vanes

##### **2.2 Header**

- 2.2.1 Ceiling and wall mounted blinds are to be supported by wall or ceiling structure. Drywall support is not acceptable.
- 2.2.2 The header shall be made of 8063-T6 aluminum, architect to co-ordinate colour, measuring 25 mm (1") high and 44 mm (1 3/4") in width.
- 2.2.3 The vanes shall be fastened to the rail by means of vane holder, leaving not more than 14 mm (5/8") of space between headrail and top of vanes.
- 2.2.4 The headrail shall be ceiling mounted with metal ceiling or wall brackets spaced approximately 800-1000mm (30-40") apart.

##### **2.3 Warranty**

- 2.3.1 Ensure the Contractor provides a warranty from the Manufacturer to the Minister that the Metal Window Blinds shall be free of defects for 5 years from the date of substantial completion of the work for the specific project.
- 2.3.2 Definition of defects to include, but not be limited to, mechanical failure of the blind or rail system.

##### **2.4 Approved Product:**

###### **2.4.1 Vertical Blind System**

- 2.4.1.1 Silent Gliss Canada Limited #2400 to all windows and all borrowed lites, complete



with all necessary components, including

- 2.4.1.1.1 rotation elements
  - 2.4.1.1.1.1 #2445/45 (for 3.5" vanes) or
  - 2.4.1.1.1.2 #2441-42 (for 5" vanes), spaced evenly at 75 mm (3.5") o.c.
- 2.4.1.1.2 vane holder
  - 2.4.1.1.2.1 #2477
- 2.4.1.1.3 Headrail mounting brackets
  - 2.4.1.1.3.1 #2419 metal ceiling brackets (ceiling mounted) or
  - 2.4.1.1.3.2 #2419 brackets wall brackets (wall mounted)

### 3 Roller Blinds and Shades

- 3.1 When the General Library is provided with natural light, provide crank operated roller blinds.
- 3.2 Roller blinds are required on all exterior windows.
- 3.3 Low VOC emittance from fabric less than 5ppm.
- 3.4 The following roller blinds manufacturers and products may be used.
  - 3.4.1 Silent Gliss
  - 3.4.2 Sun Project Canada Inc. Shadecloth 3000 series.
- 3.5 Ceiling and wall mounted roller blinds are to be supported by wall or ceiling structure. Drywall support is not acceptable.

## **12 30 00 Manufactured Casework**

### 1 Adult Change Table

- 1.1 Stainless steel type, adjustable. May be fold-down or fixed style.
- 1.2 Minimum size: 24 " x 62" long.
- 1.3 Provide for Assistive Care Washrooms.
- 1.4 Acceptable Product
  - 1.4.1 Brocar Model 100-SSE-R, [www.brocar.com](http://www.brocar.com)

### 2 Library Shelving

- 2.1 Consultant to design and provide Library shelving layout. Shelving to be provided by DTIR.

### 3 Chemical Storage Cabinet

- 3.1 Double wall construction, 1-1/2" air insulated cabinet.
- 3.2 Bottom and shelves to be corrosive-resistant polyethylene trays to contain spills.
- 3.3 Size 44" high x 42" deep x 18" deep complete with 2 shelves and 3 trays.

- 3.4 Standard of Acceptance:
  - 3.4.1 MottLab Model -6622480.
- 3.5 Ensure cabinet is securely fastened and direct vented to exterior.
  - 3.5.1 Laboratory exhaust ductwork serving chemical storage cabinet to be a minimum 18 gauge type 316 stainless steel with welded joints.
- 4 Music Instrument Locker
  - 4.1 Varying sizes to accommodate both large and small instruments.
  - 4.2 Lockable Doors
    - 4.2.1 If the area of the music storage room is incorporated into the music room, then the storage of all instruments must be in lockable cabinets sized to accommodate the various instruments.
    - 4.2.2 If a storage room is provided then the cabinets within the storage room can be open adjustable shelving.
  - 4.3 Minimum of fifty individual lockers required.
- 5 Technology Education Computer Desk / Work Stations
  - 5.1 All built in equipment including Technology Education tabling and Communication Technology tabling supply and installation shall be coordinated and provided by the Contractor including, unload, placement, and wiring.
  - 5.2 8 double units. Refer to ASK -10 and ASK-14 drawings for layout and detail guidelines.
  - 5.3 Ve-Rez 53 Series Computer Table.
  - 5.4 71" L x 36" D x 29" H
  - 5.5 Top: 1" thick core with .050" high pressure laminate in colour selection by Consultant. 0.020" backer, solid bullnose edge with 5 ½" overhang each side.
  - 5.6 ¾" plastic laminate sides, modesty panel and CPU box.
  - 5.7 6" x 4" x 53 7/8" fixed horizontal wire tray behind CPU box, vertical fixed wire tray attached to one piece between uprights at left leg.
  - 5.8 Ganging device.
  - 5.9 One grommet in top and one in Modesty panel.
  - 5.10 Adjustable glides.
  - 5.11 Powder coat tubular steel frame/legs.

#### **12 48 00 Rugs and Mats**

- 1 Refer to DC350, Part1, Section 2, Division 12, 12 48 00.
- 2 All floor mats and grilles to be recessed complete with appropriate drainage sized to suit

purpose and coordinated with mechanical.

**12 56 51 Library Furniture**

1 Consultant to design and provide Library furniture layout. Furniture to be provided by DTIR.

**12 93 00 Site Furnishings**

1 Bicycle Racks

- 1.1 Bicycle rack shall be of hot dipped galvanized steel construction.
- 1.2 Posts, permanently anchored to concrete pavement, mounting plate minimum 4" x 4" x 1/4".
- 1.3 1.6" O.D. steel
- 1.4 solid bar stock - hot dip galvanized steel for rings 1/2" - 1"
- 1.5 All peices to be rustproofed.
- 1.6 Post and ring or similar style,
  - 1.6.1 9" from ground to bottom of loop.
  - 1.6.2 Minimum 18" diameter loop.
  - 1.6.3 9" from top of loop to tip of post.
  - 1.6.4 total height of rack equals 36"
- 1.7 Multi-unit racks
  - 1.7.1 rack to be no higher than 32"
  - 1.7.2 Distance between upright or hanging rings /triangles to be no less than 10" apart.

**END**

**DIVISION 14 CONVEYING SYSTEMS**

**14 20 00 Elevators**

1 Refer to DC350, PART 1, Section 2, 14 20 00.

**END**

The following general requirements for **FACILITY SERVICES SUBGROUPS - (FSS-G)** shall be applied as applicable to all related Sections in Divisions 20-29 specified herein or otherwise required within the **EDUCATIONAL FACILITIES** Project Design Brief provided. Ensure that these requirements are met and coordinated as required with all other specific Facility Services Subgroup Divisions.

## **1 Facility Services Subgroup - General (FSS-G)**

### **1.1 General Mechanical Requirements**

1.1.1 This Mechanical Outline is to be read in addition to the Part 1, Section 2, FSS-G and Divisions 21-28.

#### **1.1.2 Environmental Conditions**

1.1.2.1 Refer to Room Data Sheets for Acoustical Criteria.

1.1.2.2 Unless otherwise indicated base occupancy on the following:

Classrooms Groupings 1 occupant per 25 ft<sup>2</sup>

Laboratory Classrooms Equivalent to a Classroom

Arts Equivalent to a Classroom

Technical Education and Family Studies Equivalent to a Classroom

1.1.2.3 Minimum temperature to be 72 degrees F, minimum humidity to be 30 percent.

1.1.2.4 Air conditioning (mechanical cooling) is required in the building as outlined in other sections of this document. Mechanical design engineer to inform DTIR when there is a likelihood that overheating may occur in other building spaces due to factors such as heat gain from equipment and solar loads. The need for air conditioning shall then be further determined. Water cooled air conditioning units (using municipal or well water which is then dumped to drain) are not permitted..

**END**

## **DIVISION 21 FIRE SUPPRESSION**

### **21 00 00 Fire Suppression - General**

#### **1 Fire Protection**

##### **1.1 General**

- 1.1.1 The materials, equipment and assemblies shall meet the minimum requirements of Underwriters Laboratories of Canada.
- 1.1.2 No water main supplying a hydrant system is to be less than NPS 6 diameter. Dead-ended mains are to be avoided where possible by looping of mains. Sectional valves are to be installed so that the majority of hydrants may remain in service during a water outage caused by a break or maintenance.

#### **2 Fire Protection Water Supply Sources**

- 2.1 There may be areas where there is no established water supply, but due to features of construction and occupancy, a water supply for a system of fire hydrants, sprinklers, etc. is required. Water supply sources may consist of a connection to a public or private water main system, gravity tank, compartmentalized reservoir and fire pumps, rivers, lakes, etc.
- 2.2 In areas where there is no established water supply and an outside hydrant system is not required, a water supply for an internal fire hose and standpipe system may be required. Water supply sources may consist of a pressure tank or a non-pressurized source, such as a reservoir, cistern or tank with a pumping system.

- 3 Where water storage is required, fire protection water shall be held in a separate storage device which may be located in or under rooms containing mechanical equipment and/or fuel storage tanks (this is not permitted for other underground cisterns/reservoirs). Potable water shall be stored above grade, but is not permitted in boiler rooms or other spaces with heat generating equipment. The minimum storage volume for water serving the plumbing fixtures shall be two days supply, based on a minimum usage of 12 litres/day per occupant for potable water and 12 litres/day per occupant for non-potable (eg. toilet flushing) water.

- 4 Mechanical design engineer to consult with DTIR on project requirements for non-potable water supply and rainwater collection systems.

**END**

## **DIVISION 22 PLUMBING**

### **22 00 00 Plumbing - General**

#### **1 Water Supplies**

- 1.1 Every building shall be provided with a reliable and adequate water supply available to fire department mobile pumping apparatus, building fire protection systems and potable domestic water.
- 1.2 Water Supply Systems:
  - 1.2.1 The minimum water pressure required for plumbing fixtures on the top floor of a building is 25 psi
  - 1.2.2 Conform to Nova Scotia Department of Environment and Labour standards for Canadian Drinking Water.
- 1.3 Refer also to PART 2 Section 2, 21 00 00 for Fire Suppression additional requirements.

#### **2 Plumbing**

##### **2.1 Service Water Pipe**

- 2.1.1 Cement mortar lining for ductile iron pipe: to ANSI/AWWA C104/A21.4.

##### **2.2 Sewage Pumps**

- 2.2.1 General: Only the facilities which cannot drain by gravity to the main sewer, shall be connected to the sump pit.
- 2.2.2 Equipment for Raising Sewage: Use duplex sewage pumps with automatic transfer switch.
- 2.2.3 Provide high water alarms in each sump pit.

##### **2.3 Water Supply System**

- 2.3.1 Service lines must enter the building in an accessible location. They must never enter in fuel rooms, storage rooms, switchgear rooms, or transformer vaults.

##### **2.4 Domestic Hot Water**

- 2.4.1 Generation of domestic hot water shall not be by the main boiler plant but instead by a separate oil fired boiler serving indirect domestic hot water heaters. Alternative strategies for heating of domestic hot water may be considered but will be allowed only with written permission from DTIR.

**END**

## **DIVISION 23 - HVAC**

### **23 00 00 HVAC - General**

#### **1 Heating**

- 1.1 Provide heat at all windows and clerestory glazing.

#### **2 Air Distribution**

##### **2.1 Welding and Paint Spray Booths**

- 2.1.1 Adequate exhaust velocities across the open frontal areas must be maintained and the fire hazard considered. Tempered makeup air must be provided.

##### **2.2 Fume Hoods for Laboratory**

- 2.2.1 Provide sash velocity control by varying the exhaust fan volume or by by-passing air.

#### **3 Space Heat**

- 3.1 Heat distribution units mounted less than 7'0" above finish floor shall have a maximum surface temperature of 120°F (50°C). Space heating in areas with finished ceilings shall be by radiant ceiling panels except where other types are required due to the specific heating load (entrances etc.)

#### **4 Electric Heating**

- 4.1 Electric resistance heating will only be considered where an owning and operating cost advantage is indicated by a comparative cost study of alternative heating systems (for example, in a remote vestibule a long distance from a boiler room). The use of electric heat requires approval in writing from DTIR.

#### **5 Sound Attenuation**

- 5.1 Acoustic duct liner not permitted.

##### **5.2 Room Sound Levels:**

- 5.2.1 Typical classroom unoccupied room, 30 RC(N) maximum.
- 5.2.2 Sound Booth: unoccupied, 20 RC(N) maximum
- 5.2.3 Music Room: unoccupied room, 30 RC(N) maximum
- 5.2.4 Cafeteria: unoccupied room, 40 RC(N) maximum
- 5.2.5 Office: unoccupied room 30 RC(N) maximum



**23 10 00 Facility Fuel Systems**

1 Oil Storage Tanks - Above Ground

1.1 Refer to DC350, Part 1, Section 2, Division 23, 23 10 00, Facility Fuel Systems.

**END**

**DIVISION 25 - INTEGRATED AUTOMATION**

**Refer to Part 1 Section 2**

**END**

## **DIVISION 26 - ELECTRICAL**

### **26 00 00 Electrical General Requirements**

#### **1 Overhead Electrical Service:**

- 1.1 Refer to DC350, Part 1, Section 2, Division 26 and Section 33 71 00 - Electrical Utility Transmission and Distribution.

#### **2 Underground Electrical Service:**

- 2.1 Refer to DC350, Part 1, Section 2, Division 26 and Section 33 71 00 - Electrical Utility Transmission and Distribution.

#### **3 Security Door Supervision:**

- 3.1 Refer to DC350, Part 1, Section 2, Division 28 - Security System.

#### **4 Lighting Control Equipment - Low Voltage:**

- 4.1 Refer to DC350, Part 1, Section 2, Division 26, Section 26 09 00 - Instrumentation and Control for Electrical Systems.

#### **5 Fire Alarm System:**

- 5.1 Refer to DC350, Part 1, Section 2, Division 26 and Section 28 30 00 - Electronic Detection and Alarm or Section 26 24 00 Switchboards and Panels.

#### **6 Electric Heat:**

- 6.1 Refer to DC350, Part 1, Section 2, Division 26 and Section 23 80 00 - Decentralized HVAC Equipment.

#### **7 General:**

- 7.1 Provide all necessary equipment to interface fire alarm, security, telephone, computer, public address and interphone, television and multi-media systems.
- 7.2 Indicate wiring diagrams and riser for each system including interfacing.
- 7.3 Provide protective type guards for all of the following electrical related items:
  - 7.3.1 Gymnasium lighting fixtures of "all" types.
  - 7.3.2 Exterior wall mounted building (brackets) lighting fixtures.
  - 7.3.3 All interior gymnasium and exterior building speakers.
  - 7.3.4 All of the following devices installed in the gymnasium:
    - 7.3.4.1 Theatrical lights if applicable.

- 7.3.4.2 Fire Alarm manual pull stations.
- 7.3.4.3 Fire Alarm smoke detectors.
- 7.3.4.4 Emergency lights, including battery packs and/or remote heads.
- 7.3.4.5 Exit signs.
- 7.3.4.6 Motion detectors.
- 7.3.4.7 All, or any other types of electrical devices that may protrude, or extend beyond flush surfaces that could/might be subject to damage.
- 7.4 Main breakers on all new incoming switch boards shall be rated for 100% continuous load.
- 7.5 All outlets in gymnasium walls below 10' A.F.F. are to be recessed 2" in the block utilizing ½ block increments.
- 7.6 Regardless of the system involved, all outlets shall have stainless steel cover plates, e.g. light switches, receptacles, voice/data structured cabling outlets, CATV outlets, multi-media outlets, etc.
- 7.7 All system racks/cabinets are to be bolted to the floor.
- 7.8 Standard 19" racks shall be provided for structured cabling only. All other systems head ends shall be housed in stand alone cabinets c/w lockable doors. Provide ventilation as required.
- 7.9 Where a school is designated as an EMO site, provide an emergency power system c/w a manual transfer switch and an exterior male receptacle to accommodate a portable NIC generator.
- 7.10 Open Ceiling Concept:
  - 7.10.1 General:
    - 7.10.1.1 All exposed wiring is to be run in conduit or enclosed raceway.
    - 7.10.1.2 Outlets in exterior walls will have to be piped back to accessible T-bar ceiling in corridors.
  - 7.10.2 Lighting:
    - 7.10.2.1 Use proper indirect fixtures manufactured for that purpose as opposed to upside down industrial fixtures, etc.
    - 7.10.2.2 Relay panels are to be concealed above ceiling, yet accessible. Where this leads to a corridor location, ensure that this is not above cable tray - full access is required.
    - 7.10.2.3 Ensure exposed portions of lighting branch circuits are aesthetically pleasing - no AC90.
    - 7.10.2.4 Ensure ductwork is coordinated with lighting layout.
  - 7.10.3 Power Distribution:
    - 7.10.3.1 No exposed AC90.
    - 7.10.3.2 Where boxes are not concealed, such as in an open ceiling concept, discs are to be fastened directly to the outside of the boxes after architectural painting is complete.

Coverplates for boxes containing branch circuits, are to have each branch circuit number neatly identified on the inside of the coverplate. Felt marker-pen may be used for this purpose.

7.10.4 Structured Cabling:

7.10.4.1 Conduit must be run in walls to provide for future changes. Provide bulkhead or other means to accommodate future wiring to reach accessible T-bar ceiling in corridors in a concealed manner.

7.10.5 Multimedia:

7.10.5.1 Ensure LCD projector ceiling installation and wiring is aesthetically pleasing. Provide a multimedia ceiling outlet similar to the multimedia wall outlet.

**26 05 00 Common Work Results**

1 Outlet Boxes, Conduit Boxes & Fittings

1.1 Floor Boxes are prohibited.

**26 05 33 Raceways and Boxes for Electrical Systems**

1 Stage:

1.1 Provide a flush installed 12" x 12" x 4" type "D" box in wall adjacent to panel c/w the following:

1.1.1 2" empty EMT conduit between stage panel and same "D" box.

1.1.2 2" chase nipple installed in middle of 13" X 13" oversized metal cover plate to accommodate above conduit.

**26 08 00 Electrical Commissioning**

1 See Part 1, Section 2, Division 26, 26 08 00 Electrical Commissioning.

**26 09 24 Instrumentation and Control for Electrical Systems**

**1 Lighting Control Equipment - Low Voltage**

1.1 Switches:

1.1.1 Common areas (corridors, washrooms, stairs, change rooms, etc.) are to be controlled by a bank of low voltage switches located in the administration area. These same switches are to be identified as to areas and/or rooms they "each" control, and contain clear plastic protective "switch lids."

- 1.1.2 Common area room types are to be controlled by separate switches, e.g. washrooms are to be controlled separately from corridors.
  - 1.1.3 All lights in gymnasium are to be controlled by keyed switches adjacent the main gym entrance, not by remote switches in the gym office.
  - 1.1.4 Key type low voltage switches regardless of locations installed, are to each incorporate LED type pilot light function.
  - 1.1.5 Rooms containing a teacher's desk are to have light switches located at the teacher's desk in addition to the regular location(s).
  - 1.1.6 Washrooms are to have additional local control from dual technology occupancy sensors.
- 1.2 Relay Panels:
- 1.2.1 Low voltage relay panels are to be located on walls immediately above finish T-Bar type ceilings in classrooms, directly above low voltage switches on latch side of door. Otherwise, relay panels are to be located in electrical rooms/closets.
  - 1.2.2 Line voltage 347V, 20 amp, single or multi-pole light switch is to be installed in surface type box on wall adjacent to relay panel. Switch is to be wired in manner so as to interrupt 347 volt power source(s) or branch circuit(s) feeding respective relay panel. Local disconnecting means is provided to both, safely de-energize relay panel, and minimize "shut-down" time when performing maintenance procedures within same.
  - 1.2.3 Factory installed neutral and bonding termination strips.

## **26 09 61 Theatrical Lighting Controls**

- 1 Provide a dimming system to accommodate dimming of the following incandescent fixtures:
  - 1.1 Gymnasium incandescent house lights.
  - 1.2 Stage lighting.
- 2 Dimming system shall include the following:
  - 2.1 Panel(s) as required c/w 350 micro-second rise time dimmers, circuit breakers, terminal strip output, and cooling fan(s).
  - 2.2 Elementary Schools:
    - 2.2.1 Stationary lighting control console.
  - 2.3 Junior High and High Schools:
    - 2.3.1 Portable lighting control console c/w 24 channels, 2-scene preset memory, LCD menu screen with choice of English or French, programmable effects and manual, timed and recorded cross fades, 25' cable/D5M connector, power supply, and dust cover.

- 2.3.2 Input receptacles for portable lighting control console c/w D5M receptacle insert, and stainless steel cover plate. Provide appropriate cabling in conduit between the dimmer panel and the receptacle.
- 2.4 Gymnasium Lighting - Provide a six channel control station with six manual dimmer switches and ON and OFF pushbuttons. Stations to be c/w protective, hinged, locking cover and located adjacent the keyed low voltage switches controlling the non-dimmed lighting.
- 2.5 Zone control unit for scene selection. All initial scenes are to be programmed by the manufacturer's representative in coordination with the end user.
- 2.6 Entrance pushbutton control c/w protective, hinged, locking cover at all gym/theatre entrances.

## **26 24 00 Switchboards and Panel boards**

### **1 Panelboards Breaker Type**

- 1.1 Stage:
  - 1.1.1 Install a 100A, 120/208V, 3Ø, 4W, 30 circuit panelboard reserved exclusively for supplying power to equipment for bands, etc. It shall be installed in an electrical closet on the stage. This panel shall contain the following circuit breakers:
    - 1.1.1.1 6 X 15A, 1P.
    - 1.1.1.2 2 X 20A, 1P.
    - 1.1.1.3 2 X 30A, 1P.
    - 1.1.1.4 1 X 30A, 2P.
    - 1.1.1.5 1 X 50A, 2P.
- 1.2 Unless otherwise noted, panelboards shall not be located in corridors, classrooms, or any other rooms where accessible to students or unauthorized personnel.
- 1.3 Panelboards shall not be located in Janitor's rooms or any other room where water presents a danger.
- 1.4 Unless otherwise noted, panelboards shall be located in locked rooms accessible to authorized personnel only.
- 1.5 Where panelboards are located in storage rooms, they shall be located near the entrance door so that stored materials do not render them inaccessible.

## **26 27 00 Low Voltage Distribution Equipment**

- 1 Finish cover plates for flush installed devices shall be stainless steel.
- 2 Switches (line voltage):
  - 2.1 Line voltage 347V, 20A, single or multi-pole light switch is to be installed in surface type box on wall adjacent to lighting relay panels. Switch(es) are to be wired in manner so as to interrupt 347V power source(s) or branch circuit(s) feeding respective relay panel. Local disconnecting means is provided to both, safely de-energized relay panel, and minimize “shut-down” time when performing maintenance procedures within same.
- 3 Receptacles:
  - 3.1 Classroom - Provide two (2) housekeeping receptacles on same separate branch circuit.
  - 3.2 Gymnasium - Provide duplex housekeeping receptacles at a minimum 10m spacing, maximum of three (3) receptacles per circuit.
  - 3.3 Exterior Entrances - Provide one exterior 15/20A, 120V T-slot duplex receptacle c/w lockable cover installed on adjacent wall. Feed from GFCI breaker.
  - 3.4 Staff Washrooms - Provide one 15A, 120V duplex receptacle adjacent to sink. Feed from GFCI breaker.
  - 3.5 Kiln (where applicable) - Provide “flush” installed device box c/w matching receptacle and angle plug of voltage(s), amps and poles as may be required. Cabtire between plug and “kiln” to be sized as required for the particular application.
  - 3.6 LCD Projectors - Provide 15A, 120V duplex receptacle. Receptacle is to be ceiling mounted so the plug side is vertical to allow for both LCD and speaker block transformer plug in, if required.
  - 3.7 Multi Purpose Room - Provide one 15/20A, 120V T-slot duplex receptacle. Coordinate location with end user.
  - 3.8 Kitchen - Provide one 30, 120V receptacle for the bagel machine. Coordinate location with end user.
  - 3.9 Stage:
    - 3.9.1 Provide the following flush installed receptacles c/w matching stainless steel device plates, in wall directly below panel at approximately 18" A.F.F.:
      - 3.9.1.1 2 X 15A, 120V.
      - 3.9.1.2 1 X 20A, 120V.
      - 3.9.1.3 1 X 30A, 120V.
      - 3.9.1.4 1 X 30A, 120/208V, 1Ph, 3W.
      - 3.9.1.5 1 X 50A, 120/208V, 1Ph, 3W.



3.9.2 Provide a minimum of four (4), duplex receptacles on the stage walls.

3.10 Main Communications Room:

3.10.1 The 2 duplex power outlets beside each dual data outlet are to be fed from a separate circuit (i.e. 1 circuit for each 2 duplex power outlets).

3.10.2 The 6-port bar for each rack is to be fed from a separate circuit (i.e. 1 circuit for each 6-port power bar).

3.10.3 Provide on-line, double conversion, solid state, UPS to feed branch circuit panel which in turn feeds all receptacles and power bars in main communications/server room and main communications office. UPS to be complete with surge suppression, power factor correction, rectifier, charger, inverter, batteries, internal bypass, and external wrap-around bypass. UPS shall operate during power outage for a minimum of 30 minutes.

3.11 Chemistry Labs:

3.11.1 Provide sufficient circuit capacity to accommodate 1 “electric Bunsen burner” per workstation.

## **26 28 00 Low Voltage Circuit Protective Devices**

### **1 Disconnect Switches - Fused and Non-Fused Up To 1000 Volts**

1.1 Disconnect switches are not to be accessible to students but are to be installed in locked rooms which are only accessible to staff.

1.2 Provide local unfused disconnect(s) for moveable basketball backboards.

## **26 43 00 Transient Voltage Surge Suppression (TVSS)**

1 Provide TVSS in the main switchboard only.

## **26 50 00 Lighting Equipment**

1 Unless otherwise noted, provide a 3500K colour temperature c/w highest CRI for all fluorescent lamps.

2 Cove lighting is permitted in corridors.

3 All lighting in entrance vestibules is to be of the unswitched, night light type.

4 “Paint after fabrication” is not a requirement for light fixtures on school projects.

- 5 Valence lighting under cupboards installed above counters is not a requirement for school projects.
- 6 Recessed, 2-lamp fluorescent troffers are to be installed in “dry-wall” type ceilings as per the following:
  - 6.1 Washrooms.
  - 6.2 Changing rooms.
  - 6.3 Corridors.
- 7 Classrooms:
  - 7.1 Provide fluorescent, recessed, 2' x 4' troffers, c/w multi-level switching. Occupancy sensors are also to be incorporated. Rows of fixtures are to be installed parallel to the exterior (window) wall.
  - 7.2 Classrooms dedicated solely for computer use shall be provided with glare control utilizing direct/indirect fluorescent lighting fixtures that are RP-3 Compliant (preferred). Fixtures are to be c/w T8 lamps providing multi-level switching. Provide aluminum housing/reflector.
- 8 Offices:
  - 8.1 Provide fluorescent, recessed troffers c/w multi-level switching.
- 9 Library:
  - 9.1 Provide fluorescent, recessed, 2' x 4' troffers, c/w multi-level switching.
  - 9.2 For book shelf illumination, provide fluorescent direct/indirect light fixtures similar to classrooms dedicated solely for computer use.
- 10 Gymnasium:
  - 10.1 Where white paint is applied, it shall be baked polyester powder enamel with 90% minimum reflectivity applied after fabrication using an electrostatic process.
  - 10.2 Fluorescent Lighting:
    - 10.2.1 Gymnasiums serving students up to grade six shall incorporate direct fluorescent lighting fixtures as follows:
      - 10.2.1.1 4 X 32W, T8, RS, 3500K, highest CRI lamps.
      - 10.2.1.2 Premium electronic ballasts. One ballast for every two lamps. Provide 4-level lighting.
      - 10.2.1.3 Dimming ballast for 1 level of lighting may be used in lieu of incandescent house

- lighting requirement.
- 10.2.1.4 Specification grade (as opposed to commodity grade or “off the shelf”).
  - 10.2.1.5 Manufactured specifically for T8 lamps. Unable to accommodate T12 lamps. Sockets are to be snap/push in, pressure lock type.
  - 10.2.1.6 Lenses shall be pattern 12 low brightness UV stabilized, 100% virgin acrylic lenses (0.125"). A minimum thickness of 0.125" shall be used regardless of manufacturers pattern 12 designation.
  - 10.2.1.7 Fixtures are to be mounted on a support structure secured to the bottom chord of the Open Web Steel Joists
  - 10.2.1.8 Provide full wire guard.
  - 10.2.1.9 CSA approved.
- 10.3 H.I.D. Lighting:
- 10.3.1 Gymnasiums serving students up to grade nine shall incorporate 50/50 direct/indirect Metal Halide type lighting system as follows:
    - 10.3.1.1 All units are to include an integral HID ballast potted for sound reduction and enclosed in a die cast aluminum housing. Stem length is to be as recommended by the manufacturer for each particular location.
    - 10.3.1.2 Optical refractor is to be made of low brightness, high efficient borosilicate glass, providing 50% “down light” component and glare control.
  - 10.3.2 Gymnasiums serving students up to grade twelve shall incorporate totally indirect, 1000W metal halide fixtures.
    - 10.3.2.1 Ensure ceiling height permits manufacturer’s recommended spacing between fixture and ceiling while maintaining minimum required mounting height to the floor.
    - 10.3.2.2 Ballasts are to be remote wall mounted in an adjacent electrical or mechanical room, encased and potted CWA-HPF design. Provide a legend of identification under plexiglass adjacent the ballast installation to allow easy identification of ballast/fixture combination.
    - 10.3.2.3 Provide dent and lamp damage protection from sports balls.
- 10.4 Incandescent Lighting:
- 10.4.1 Provide additional incandescent house lighting on dimmers.
- 10.5 Each unit is to be c/w a “wire guard” provided by fixture manufacturer.
- 10.6 Provide quartz auxiliary lamps for 1/3 of all Metal Halide type light fixtures.
- 10.7 Coordinate with other disciplines in order to achieve maximum ceiling reflectance with even ceiling distributed illumination, minus “any” ceiling “hot spots,” as per IES recommendations.
- 10.8 Each light fixture is to incorporate steel “safety cables” installed as per the following:
- 10.8.1 Between main ceiling structure and fixture/ballast housing.

- 10.8.2 Between fixture/ballast housing and optical assembly.
- 10.9 Lighting fixtures installed in ceilings containing open steel type joist construction are to be pendant type, stem hung (from hooks) as per the following:
- 10.9.1 Stem hung from “eye” type hooks unless specifically indicated otherwise.
- 10.9.2 To be suspended from “overhead” structure utilizing rigid galvanized steel conduit stem sized per fixture manufacturer’s recommendation c/w accompanying hook. Individual stem length(s) are to be as required for their particular location(s).
- 10.9.3 Stem to be threaded into a female hanger hook containing a safety screw c/w 5/8" wire and 3/8" jaw openings and capable of supporting not less than a 75 lb. (34.0 kg) weight.
- 10.9.4 Stem is to include a #715 open loop hook, (3)- conductor cabtire type cable and be c/w a 480 volt (L820-P), 20 Amp twist-lock plug.
- 10.9.5 Cabtire type cables are to be of adequate lengths as may be required to accommodate differing, or contrasting stem lengths.
- 10.9.6 Matching (L820-R) twist-lock receptacle is to be supplied and installed in a separate cast type “FSD” box secured directly to overhead metal “Q” deck, and be c/w a matching steel type “FS” one hole receptacle plate.
- 10.9.7 Hanger hook is to be adequately secured to overhead metal Q-Decking or structure via an approved type of steel “eye” capable of supporting not less than a “minimum” of 75 lb. (34.0 kg) weight.
- 10.9.8 Fixture stem is not to be secured directly to box containing its power source, but rather installed to ceiling adjacent to, or off to one side of same ..... From deck, to hook, to ballast, to fixture body.
- 10.9.9 Fixtures may also be chain hung.
- 10.9.10 Where 1000 W completely indirect units are used, they may be mounted direct to the 4 inch octagon box and incorporate a minimum 30 degree swivel aligner. The swivel aligner is not to be utilized for bonding purposes.
- 11 Stage Lighting:
- 11.1 Safety cages are to be provided for front of house (FOH) lights mounted in gymnasium. Recommendations/examples are available from the theatrical fixture manufacturers.
- 11.2 Provide lensed wraparound fluorescent lighting fixtures for house lighting.
- 11.3 Elementary Schools:
- 11.3.1 All equipment is to be commercial/specification grade. Residential grade is not acceptable.
- 11.4 Junior High and High Schools:
- 11.4.1 Provide colour gels for the ellipsoidal and Fresnel theatrical fixtures.
- 11.4.2 Focusable 23/50 degree ellipsoidal dimmable theatrical lights - zoom variable focus

units c/w 120V, 575W GLA 1500 hour lamp, mounting yoke, colour frame, C-clamp, 1m power cable, safety cable, and L5-20P plug.

- 11.4.3 6" Fresnel dimmable theatrical lights - medium pre-focus socket, 120V, 500W BTM lamp, 4-way barn door, mounting yoke, colour frame, C-clamp, 1m power cable, safety cable and L5-20P plug.
- 11.4.4 Cyclorama Floodlights - three compartments c/w 120V, 500W FDN lamps, colour frame, 1m power cable per compartment, safety cables, and L5-20P plug.
- 11.4.5 Provide L5-20R receptacles for all theatrical stage lights. Provide pipe mounted plug-in boxes as required c/w 2 or 3 flush mounted receptacles and associated lamicaid identification. Provide appropriate wiring in conduit between the dimmer panel and the plug-in boxes.

12 Cafeteria:

- 12.1 Unless otherwise noted, track/theatrical lighting are not to be used in the cafeteria.

13 Site Lighting:

- 13.1 Mount lighting fixtures on side of the building where possible.
- 13.2 Flood lights are not to be used on the front of the building.
  - 13.2.1 All lights fixtures installed on building exterior are to be c/w protective guards.
- 13.3 Fixture selections are to minimize glare and light trespass on adjacent sites.
- 13.4 Provide free-standing light standards as required. Poles may be steel or aluminum. Where steel is used, it is to be galvanized and painted after fabrication with a polyester powder coat. Confirm pole height with DOE.
- 13.5 Provide the following average, maintained illumination levels:
  - 13.5.1 Landscaped areas: (1) footcandle, extending 20' away from the bldg.
  - 13.5.2 Parking lots: (1) footcandle.
  - 13.5.3 Sidewalks: (1) footcandle.
  - 13.5.4 Driveways/Roadways (1) footcandle.
  - 13.5.5 Bus loops: (1) footcandle.
- 13.6 Lighting uniformity (minimum levels, max/min ratios, etc.) are to meet or exceed IES recommended practice. This notwithstanding, due consideration is to be given to avoiding "over-illumination".
- 13.7 Utilizing rental lights from the power utility is permitted. Include for all costs until the end of the 1 year warranty period.

**26 52 00 Emergency Lighting**

- 1 Provide emergency lighting for the following:
  - 1.1 Kitchens and areas with cooking appliances.
  - 1.2 Interior changing rooms.
  - 1.3 Washrooms.
  - 1.4 Electrical rooms.
  - 1.5 Mechanical rooms.
  - 1.6 Boiler rooms.
  - 1.7 Stairwells.
  - 1.8 All other areas as required by applicable codes.
- 2 Emergency lighting units are not to be installed on gymnasium walls behind basketball nets.
- 3 In lieu of stand alone units, a central inverter system shall also be permitted.
  - 3.1 Warranty: Electronics - 3 years, Batteries - 10 years.
  - 3.2 Maintenance Bypass Switch.
  - 3.3 Metering / Data Acquisition.
  - 3.4 Remote Annunciator.
  - 3.5 Provision for monitoring similar to security and fire alarm systems.
  - 3.6 Sprinkler Guard.
- 4 Small electrical closets, where the door(s) is used to obtain the code required 1m clearance in front of the panelboard(s), need not contain emergency lighting.

**26 53 00 Exit Signs**

- 1 Exit signs shall be specification grade, vandal resistant, LED type complete with DC backup. Faceplate to be fastened with appropriate tamper proof screws. Metal portions of body to be white, painted after fabrication with a polyester powder coat. CSA C860 certified.
- 2 Exit signs are to be wall mounted as much as possible.
- 3 Where ceiling mount cannot be avoided, provide rigid support to the T-bar ceiling or building structure.
- 4 Provide an exit sign at the exit from the stage area.

**END**

## **DIVISION 27 - COMMUNICATIONS**

### **27 10 00 Structured Cabling System**

- 1 Provide a complete structured cabling system as described in the Nova Scotia Government Structured Cabling Guidelines and referenced in DC350 Part 1, Section 2. Provide a riser diagram on the drawings.
- 2 The voice portion of the structured cabling system is to accommodate the following:
  - 2.1 Centrex system (switching performed by the telephone authority). The designated orange field on the equipment rack will accommodate this.
  - 2.2 PBX system (switching performed by the local combination public address / intercom / telephone system). Provide a separate field, blue in colour, on the equipment rack to accommodate this.
  - 2.3 VoIP system (voice over internet protocol utilizing the local area network and high speed internet connection):
    - 2.3.1 VoIP systems are for HRSB schools only at the present time in lieu of the PBX system.
    - 2.3.2 Routers, telephones, LAN switches, and voicemail service are NIC.
    - 2.3.3 Provide Centrex lines for the following:
      - 2.3.3.1 Elevators
      - 2.3.3.2 Mechanical Controls
      - 2.3.3.3 Fire Alarm / Security (2)
      - 2.3.3.4 Fax Service
      - 2.3.3.5 911 Service
  - 2.4 All horizontal voice cables will terminate on the designated blue field and then cross connect to either one of the above fields as required by the end user.
- 3 The structured cabling system is to accommodate all active equipment provided by the Department of Education (DOE), including network switches. Patch panels are to be 48 port, low density.
- 4 All Racks are to contain 25% spare space. Enclosed type racks/cabinets are not to be used.
- 5 Manufacturer testing/verification is to be complete prior to project Substantial Completion. This is to include all labelling.

## **27 40 00 Television and Multimedia System**

- 1 Provide a complete television system. Provide a riser diagram on the drawings.
- 2 This section provides a complete Television System, including, but not limited to the following:
  - 2.1 Head end equipment to include:
    - 2.1.1 DVD Player in combined DVD/VCR.
    - 2.1.2 Video Cassette Recorder in combined DVD/VCR.
    - 2.1.3 RF tuner.
    - 2.1.4 Input-Output source control module.
  - 2.2 CATV connection from cable television provider.
  - 2.3 CATV Distribution Amplifier.
  - 2.4 Coaxial cable distribution system.
  - 2.5 Bi-directional cable television wall outlets.
  - 2.6 Internal Television Broadcast Capability.
  - 2.7 Portable Modulators - with channels not used in local cable area.
  - 2.8 Colour television sets and mounting.
  - 2.9 Multimedia projector speakers and support.
  - 2.10 Mobile Television carts.
  - 2.11 Main source rack.
  - 2.12 Interconnection between television cable and main source device rack.
  - 2.13 RS232 data switch.
  - 2.14 VGA Distribution Amplifiers.
  - 2.15 Equipment wiring c/w all necessary connections.
- 3 Multimedia Projectors:
  - 3.1.1 The multimedia projector and the mounting plate (the plate that connects the multimedia projector to the pipe, not the mounting bracket which connects the pipe to the ceiling truss) are provided by DTIR inventory control and therefore do not form a part of the base building construction contract. Fixed ceiling truss brackets and pipes are being replaced in most installations by the use of a ceiling tile replacement kit which will be part of the base building construction contract.
  - 3.1.2 Provide separate amplified speaker adjacent multimedia projector.



4 CATV Head End:

4.1 Wall Mounted Cabinet

- 4.1.1 Provide a wall mounted cabinet in the main communications room suitable for installing applicable head-end equipment. This cabinet shall provide ample space for all equipment as required plus 25% space for future installations.

4.2 Floor Mounted Cabinet

- 4.2.1 Provide a floor mounted equipment rack located as follows:

4.2.1.1 Library - Elementary Schools.

4.2.1.2 Multimedia Room - Middle & High Schools.

- 4.2.2 Size for all applicable equipment including the following:

4.2.2.1 DVD Player or component of dual DVD/VCR unit.

4.2.2.2 VCR Recorder/Player or component of dual DVD/VCR unit.

4.2.2.3 Text Generator.

4.2.2.4 Modulators.

4.2.2.5 20% spare space for future growth.

4.2.2.6 Locking front and rear door.

- 4.2.3 Rack shall be bolted to the floor. Provide code required clearances in front, in back, and on at least one side.

5 Video Cassette Recorder or VCR Component of Dual DVD/VCR:

- 5.1 Provide a VCR Component incorporating the following features as part of the head end equipment:

5.1.1 On-screen programming.

5.1.2 Wireless remote control.

5.1.3 Commercial model.

5.1.4 VHS NTSC standard with Hi-Fi VHS Stereo audio with MTS decoder, 4 head 19 micron or better heads, Front access AV inputs, AV outputs including RCA video out, L/R audio out, digital AV tracking, auto SP-EP timer recording, AC 120 V, 60 Hz, Hi-Fi frequency 20Hz to 20,000 Hz or better, Channel coverage VHF, UHF, CATV(113 channels), active video calibration, plug & play setup, picture control features, head cleaning warning. Power, RCA video, L/R Audio and coaxial cables provided.

6 Internal Television Broadcast Capability:

- 6.1 All CATV outlets are to be bi-directional so that any outlet in the building can be used for broadcast, reception, or both.

- 6.2 Provide two (2) portable modulators (MAVMs) each mounted on a separate wide body TV cart. The modulators shall be equipped with wiring and connectors as required.

- 6.3 Provide one (1) signal processor for each modulator.
- 6.4 Provide a bi-directional amplifier.

## 7 Colour Television Sets:

- 7.1 Provide three (3) 32" colour television sets c/w associated CATV outlets. Confirm cafeteria locations with architect. Each TV set shall incorporate the following features:
  - 7.1.1 Stereo receiver.
  - 7.1.2 Digital comb filter.
  - 7.1.3 Minimum of 700 lines horizontal resolution.
  - 7.1.4 On-screen menu display.
  - 7.1.5 Wireless remote control.
  - 7.1.6 Close caption/ text mode.
  - 7.1.7 Inputs/Outputs.
    - 7.1.7.1 (2 - one front, one rear) L/R AV audio & 1 RCA video input
    - 7.1.7.2 S-Video input.
    - 7.1.7.3 AV compulink EX.
    - 7.1.7.4 Switchable fixed/variable audio output.
    - 7.1.7.5 RF channel tuner.
  - 7.1.8 (180) channel tuner.

## 8 Television Distribution System:

- 8.1 Provide a complete television distribution system, including cables, conduits, outlets, splitters, amplifiers, modulators, taps, etc. to permit the following:
  - 8.1.1 Interconnection of all video/data LED projectors to the TV distribution system.
  - 8.1.2 Connections between TV distribution system and VCRs.
  - 8.1.3 Connections between TV distribution system and the TV sets .
  - 8.1.4 Connections between the internal broadcasting system and the main TV distribution system.
- 8.2 The television distribution system is to accommodate a frequency range of between 50 and 1000 MHZ.
- 8.3 Should channel elimination be required, channels to be eliminated are to be confirmed with the school principal.

## 9 DVD Player or DVD Component of dual DVD/VCR:

- 9.1 Provide one DVD/VCR player on main source rack.
  - 9.1.1 NTSC.
  - 9.1.2 DVD Video.

- 9.1.3 Video: Capable of 500 lines horizontal resolution. (SN - 85 dB)
  - 9.1.4 Audio: 20 bit linear PCM sound. (S/N - 100 dB)
  - 9.1.5 Wireless remote control (IR).
  - 9.1.6 Rack mount adapter.
  - 9.1.7 Commercial model.
  - 9.1.8 Twin Laser Pickup, 27 Mhz/10 bit or better Video D/A converter, Super High speed scan rate, ABCD features, still picture display, component, discrete composite and S-video out, analog and digital optical audio out, 4:3 TV zoom, quick set up guide, multi Format playback including DVD-R, CD-R/RW, WMA, MP3, chapter Preview and on screen menu icons.
  - 9.1.9 Video Text Generator:
- 9.2 Provide one video text generator and associated modulator (MAVM). The text generator shall incorporate all the following features:
- 9.2.1 Digital video technology.
  - 9.2.2 Versatile keyboard.
  - 9.2.3 (1) million colour plus.
  - 9.2.4 Multiple font selection (200 plus).
  - 9.2.5 Versatile superimpose over video.
- 10 Theatre Video Control & Distribution System:
- 10.1 "Theatre" equipment is only to be provided where the school contains a theatre installation.
- 10.2 Provide a complete theatre video control and distribution system with components in locations as directed by DTIR. Equipment wiring and interconnections shall be supplied to provide a complete working system. The system shall include, but not necessarily limited to the following:
- 10.2.1 System switcher which shall incorporate the following features:
    - 10.2.1.1 (8) universal inputs, each consisting of (5) BNC connectors and a captive screw terminal connector.
    - 10.2.1.2 Universal projector control, factory preset for the multimedia data/video projector is to be supplied under this section.
    - 10.2.1.3 Separate outputs for RGB and sync, video, S-video and audio.
    - 10.2.1.4 300 MHz bandwidth.
    - 10.2.1.5 Switcher control as per the following:
      - 10.2.1.5.1 Front panel buttons.
      - 10.2.1.5.2 Remote control connector.
      - 10.2.1.5.3 RS-232.
  - 10.2.2 Integrated Central Controller incorporating the following features:

- 10.2.2.1 (6) data ports for RS 232 control.
- 10.2.2.2 (6) serial ports for IR/IR serial control.
- 10.2.2.3 (6) channel I/O port for closure.
- 10.2.2.4 (8) channel relay port.
- 10.2.3 Colour Passive Tiltscreen Touch Panel incorporating the following features:
  - 10.2.3.1 8.5" colour passive matrix LCD screen.
  - 10.2.3.2 (6) step tilt adjustment.
  - 10.2.3.3 (256) colour, (640) x (480) VGA display.
  - 10.2.3.4 Full set of graphic tools.
  - 10.2.3.5 Graphic control pages created on screen.
  - 10.2.3.6 12 volt DC power supply.
- 10.2.4 Wall Mounted Rack”
  - 10.2.4.1 Provide a wall mounted rack in control room suitably sized to mount the system switcher, integrated central controller and video cassette recorder, including space to mount (1) future VCR. unit.
  - 10.2.4.2 Provide a power bar.
  - 10.2.4.3 Provide a PS4.2 power supply.
- 10.2.5 Universal Mountable Interfaces incorporating the following features:
  - 10.2.5.1 Universal (3) gang analog interface.
  - 10.2.5.2 Computer video interface.
  - 10.2.5.3 Stereo audio input connector.
  - 10.2.5.4 300 MHz video bandwidth.
- 10.2.6 Required connecting cables, boxes, connectors.
- 10.2.7 Remote volume control - AMX.
- 10.2.8 Software programming is to be provided on-site to owner’s equipment and provide a user-friendly design with modifications as required. Functions for control panel are to include the following:
  - 10.2.8.1 VCR transport control to incorporate the following:
    - 10.2.8.1.1 Stop/start/fast/forward/rewind/record/pause/ channel up/down.
    - 10.2.8.1.2 Lighting control , up to (8) scenes.
    - 10.2.8.1.3 House audio control (master for A/V data sources).
    - 10.2.8.1.4 Source switching up to (8) sources - RGB, video c/w audio sources on any selected source.
    - 10.2.8.1.5 Screen up/down control.
- 10.2.9 Installation, terminations, testing and commissioning.

## 11 Supports:

11.1 Provide wall yoke mount support for each television set, as per the following:

- 11.1.1 Mounting and cover plate.
- 11.1.2 Tubing extended arm.
- 11.1.3 Yoke arms and tray.
- 11.1.4 Ensure compatibility of all components installed between support structure and television set. Approval from structural engineer is required prior to attaching yoke-mount to wall.

11.2 When Ceiling Tile Replacement Kits are not specified , provide following:

- 11.2.1 Multimedia Projector mounting brackets
- 11.2.2 ceiling mount supports for each multimedia projector, including a 1-1/2" threaded steel pipe, fittings, ceiling escutcheon plate, projector bracket and all other associated hardware.
- 11.2.3 Steel pipe is to be capped if not in use. Locate pipe centre at 11.5' from screen wall centred on the screen location (acceptable range between 10.5' and 12.5' from wall) Ensure no paint on the threads. The MPT standard thread must be at right angles to the vertical to ensure proper alignment of the multimedia projector mounting bracket.
- 11.2.4 Pipe is to extend 4-6" below the finished ceiling tile grid and centered on the screen. In the case of a vaulted ceiling, the pipe must further extend within a 2 foot maximum from the top level of the screen to allow for proper installation.
- 11.2.5 Ensure that ceiling mount (pipe) system not only provides for adjustments in roll, pitch and yaw, but after completion, is vertically "plumb".
- 11.2.6 Coordinate with Learning Resources & Technology (LRT), Dept of Education multimedia projector manufacturer for exact location and to ensure that hardware installed between projector ceiling support and projector is compatible.
- 11.2.7 Wiring for the projector and powered ceiling speaker should be run individually (not wrapped) through the pipe and terminated with the correct terminations.
- 11.2.8 Room locations for multimedia projector mounting brackets to be according to program requirements.
- 11.2.9 Where T-bar is provided (horizontal or sloped), utilize T-bar mounted supports. Provide T-bar reinforcement as required.

11.3 When Ceiling Tile Replacement Kits are specified , provide following:

- 11.3.1 Install Ceiling Tile Replacement Kit in ceiling tile T-Bar according to manufacturer's installation procedures.
- 11.3.2 Pipe is to be centered on screen and tile kit adjustments made accordingly.
- 11.3.3 Where T-bar is provided (horizontal or sloped), utilize T-bar mounted supports. Provide

T-bar reinforcement as required.

- 11.3.4 Room locations for multimedia projector mounting to be according to program requirements. Check with LRT before commencing installs to verify locations.
- 11.3.5 Wiring for the projector should be run individually (not wrapped) through the pipe and terminated with the correct terminations
- 11.3.6 Wiring for the projector and powered ceiling speaker should be run individually (not wrapped) through the pipe and terminated with the correct terminations.

## 12 Wiring Methods:

- 12.1 Install communications wiring in cable trough where available.
- 12.2 Cabling from multimedia outlets to multimedia projector locations shall be as follows:
  - 12.2.1 Length as required to reach final multimedia projector location plus 3m (10') spare.
  - 12.2.2 Coiled in ceiling space above multimedia projector location.
  - 12.2.3 Female connectors at multimedia outlet and male connectors at multimedia projector locations.
  - 12.2.4 All cables are to be factory terminated. Field termination is not acceptable.
  - 12.2.5 One (1) DB15 VGA cable for multimedia projector video.
  - 12.2.6 One (1) S-video cable for DVD video component of DVD/VCR unit.
  - 12.2.7 Two (2) RCA audio cables for L/R audio of DVD/VCR unit.
  - 12.2.8 One (1) RCA video cable for VCR video component of DVD/VCR unit.
  - 12.2.9 One (1) DSUB 3.5mm (1/8") stereo mini jack/cable for computer audio.

## **27 51 16 Public Address and Mass Notification Systems**

- 1 Provide a complete public address, intercom, and telephone system. Provide a riser diagram on the drawings.
- 2 Notwithstanding the above, the telephone portion of the system is to be deleted in HRSB schools in favour of a VoIP system. Coordinate with HRSB IT personnel. Provide an appropriate interface between the Public Address/Intercom System and the VoIP System.
- 3 Telephone:
  - 3.1 Complete PBX Telephone System for offices and classrooms.
  - 3.2 Auto Attendants.
  - 3.3 Voice Mail with automatic message light indication on all phones.
  - 3.4 Home Work help line.
  - 3.5 Do Not Disturb feature.

- 3.6 Automatic Page feature.
- 3.7 Enhanced 911 with on-site notification.
- 3.8 Urgent call-In.
- 3.9 2 X 3 Party conference.
- 3.10 Power Failure transfer.
- 3.11 Attendant and Staff PC telephones.
- 3.12 Automatic Out-Bound dialing.
- 3.13 Caller ID.
- 3.14 Automatic call distribution.
- 3.15 Attendant software.
- 3.16 Telephone service for the PBX from the Telephone Authority shall be arranged by the owner in conjunction with the equipment supplier.
- 3.17 Refer to Part 1, Section 2, Division 26 and Part 2, Section 2, Division 26, items 27 10 00 in each, for structured cabling requirements.

#### 4 Intercom:

- 4.1 Individual classroom speakers.
- 4.2 Urgent call replacement.
- 4.3 Identify instructor calling-in by room #.
- 4.4 Classroom speaker intercom during 911 call from on-site security officer.
- 4.5 Classroom speaker intercom during 911 call from operator.
- 4.6 Classroom speaker intercom during a crisis from the rescue team.
- 4.7 AM/FM, Cassette and CD player components.
- 4.8 Automatic Transfer between classroom speaker and intercom phone.

#### 5 Public Address:

- 5.1 Characteristics:
  - 5.1.1 All-Call announcements.
  - 5.1.2 Emergency announcements.
  - 5.1.3 Automatic page.
  - 5.1.4 911 page.
  - 5.1.5 Urgent call-in page.
  - 5.1.6 Off-Hook call-in page.
  - 5.1.7 Audio program distribution.
  - 5.1.8 Zone paging.
  - 5.1.9 Monitor areas of the building during a crisis from either the rescue team, or the on-site security officer.

5.1.10 Page areas of the building during a crisis from either the rescue team, or the on-site security officer.

5.2 Program Source Unit (desk mounted):

5.2.1 Remote control unit.

5.2.2 AM/FM Tuner.

5.2.2.1 Controls and indicators on front panel:

5.2.2.1.1 AM/FM tuning control.

5.2.2.1.2 Power on/off switch.

5.2.2.1.3 Interchannel push in/out switch.

5.2.2.1.4 AM/FM selector switch.

5.2.2.1.5 Peak meter.

5.2.2.1.6 FM zero center switch.

5.2.2.1.7 Bass, treble, volume controls.

5.2.2.1.8 Tuning meter for FM/AM.

5.2.2.2 Receptacles on rear of panel:

5.2.2.2.1 Audio output jack.

5.2.2.2.2 AM/FM antenna connections.

5.2.2.3 FM channel:

5.2.2.3.1 Tuning range: 87.9 to 107.9 MHz.

5.2.2.3.2 Signal to noise ratio: 70 dB.

5.2.2.3.3 Frequency response: +/- 3 dB, 20 - 20 kHz.

5.2.2.3.4 Stereo Separation: 35 dB at 1000 Hz.

5.2.2.3.5 AM channel:

5.2.2.3.5.1 Tuning range: 530 to 1650 kHz.

5.2.2.3.5.2 Hum and noise level: 56 dB below 100% modulation.

5.2.2.3.5.3 Frequency response: -6 dB at 4.0 kHz.

5.2.2.3.5.4 Antenna: transformer with low impedance primary for use with external antenna wire.

5.2.2.4 Antenna:

5.2.2.4.1 Provide antenna to obtain satisfactory signal.

5.2.2.4.2 Provide external antenna if required.

5.2.3 Cassette Player:

5.2.3.1 Tape Speed: 1 7/8 IPS.

5.2.3.2 Frequency Response (+/- 3 dB) 20 - 20 kHz.

5.2.3.3 S/N ratio: 52 dB.

5.2.4 Compact Disc Player:

5.2.4.1 Single disk unit.



- 5.2.4.2 Frequency response 20 Hz - 20 kHz, +/- 3 dB.
- 5.2.4.3 Total Harmonic Distortion: Less than 0.03% at 1 kHz.
- 5.2.4.4 S/N ratio more than 100 dB.

### 5.3 Speakers:

#### 5.3.1 All locations unless otherwise noted:

- 5.3.1.1 Cone type: 8" diameter.
- 5.3.1.2 Finish colour: white.
- 5.3.1.3 Magnet: 6 ounce ceramic.
- 5.3.1.4 Range: 50 Hz - 14 kHz.
- 5.3.1.5 Power input to voice coil: 10W continuous.
- 5.3.1.6 Complete with back box, baffle assembly.
- 5.3.1.7 Ceiling or wall mount.
- 5.3.1.8 25 V line matching transformer.
- 5.3.1.9 Speakers recessed in either T-Bar or dry-wall type ceilings, require independent supporting, and are not to be reliant on tiles or dry-wall for their support.

#### 5.3.2 Exterior:

- 5.3.2.1 Horn Type: 8" wide, 8" high, 9" deep.
- 5.3.2.2 Finish: beige baked enamel.
- 5.3.2.3 Frequency response: 275 Hz - 14 kHz.
- 5.3.2.4 Power rating: 15 watts full range.
- 5.3.2.5 Complete with adjustable mounting brackets, shockproof and weatherproof housing, transformer.
- 5.3.2.6 Provide at least one unit per building exposure.

### 6 Time Control And Event Scheduler:

- 6.1 (8) Schedules of classroom change signals.
- 6.2 (8) Zones of classroom change signals.
- 6.3 (512) Classroom change signal events.
- 6.4 Weekly system event scheduler.
- 6.5 (114) Weekly team events.
- 6.6 Storm alert tones.
- 6.7 Digital synchronized clock displays.

### 7 Back-Up Power Source:

- 7.1 Provide on-line, double conversion, solid state, rack mounted UPS to support previous noted items. UPS to be complete with surge suppression, power factor correction, rectifier, charger, inverter, batteries, and internal bypass. UPS shall operate during power outage for

a minimum of 30 minutes. Minimum capacity to be 1800VA/1440W.

**8 Classroom Sound Amplification System:**

**8.1 Mixer/Amplifier**

- 8.1.1 15 watt
- 8.1.2 5 input channels
- 8.1.3 25V, 70V and 4 ohm speaker outputs
- 8.1.4 50 Hz - 20kHz frequency response
- 8.1.5 0.05% at 1kHz total harmonic distortion

**8.2 UHF Wireless Tuner**

- 8.2.1 16 selectable channels on 3 (a,b,c) subcarriers
- 8.2.2 diversity technology
- 8.2.3 >80 dB, S/N ratio receiving sensitivity
- 8.2.4 >140 dB signal to noise ratio

**8.3 UHF Headset Wireless Microphone**

- 8.3.1 electret condenser cardioid microphone
- 8.3.2 input sensitivity control
- 8.3.3 low battery LED
- 8.3.4 rechargeable 9 volt NiMh battery and charger

**8.4 Full Range Processed Ceiling Speaker**

- 8.4.1 12 cm full range speaker
- 8.4.2 30 watt input @ 70V
- 8.4.3 flush mounted
- 8.4.4 90dB SPL
- 8.4.5 20Hz - 20kHz
- 8.4.6 white baffle/grill

**27 51 16.01 Cafeteria/Gymnasium Public Address System**

- 1 Provide a complete cafeteria/gymnasium public address system. Provide a riser diagram on the drawings.
- 2 Shall consist of, but not necessarily limited to the following components:
  - 2.1 Central Control Unit
  - 2.2 Mixer / pre-amplifier
  - 2.3 Compressor/Limiter
  - 2.4 Graphic equalizer

- 2.5 Power Amplifiers
  - 2.6 Speakers
  - 2.7 Microphones
  - 2.8 CD Player
  - 2.9 Assistive Listening Equipment.
  - 2.10 Surge Protected Power Strips.
  - 2.11 Equipment rack. Rack shall be sized for all equipment c/w 20% spare space for future growth and c/w locking front and rear door. Rack shall be bolted to the floor. Provide code required clearances in front, in back, and on at least one side.
- 3 Central Control Unit.
- 3.1 Multichannel, microprocessor controlled, programmable unit.
- 4 Mixer/Pre-amplifier:
- 4.1 Rack mounted.
  - 4.2 Inputs:
    - 4.2.1 Up to 8 Program inputs
      - 4.2.1.1 Minimum 2 microphone-level, XLR, balanced inputs
      - 4.2.1.2 Minimum 2 line-level, unbalanced RCA or 1/4" TS inputs for CD player and one spare
  - 4.3 Controls:
    - 4.3.1 Up to 8 input level controls
    - 4.3.2 Base & treble controls.
    - 4.3.3 Master volume control.
    - 4.3.4 Tone control bypass switch.
  - 4.4 Outputs:
    - 4.4.1 Balanced, line-level XLR male to Compressor/Limiter
    - 4.4.2 1/4" TS unbalanced or RCA male, line-level, mono sum to assistive hearing transmitter
    - 4.4.3 1/4" TS unbalanced or RCA male stereo, line-level to cassette deck record
  - 4.5 Frequency response: 20 Hz-20 kHz, +/- 3 dB, 0.01% THD
- 5 Compressor / Limiter:
- 5.1 Rack mounted.
  - 5.2 Up to 45 dB of signal compression at ratios of infinity: 1 to 1 with variable attack times of 0.2 ms to 10 ms and release times from 0.5 seconds to infinity.
  - 5.3 Maximum output of 6 VRMS into 600 ohm load.
  - 5.4 Total Harmonic Distortion: less than 0.05%.

- 5.5 Frequency Response: 20 - 20 kHz +/- 3.0 dB.
- 5.6 Input: Balanced XLR or 1/4" TRS female, line-level left and right from Mixer/Preamplifier
- 5.7 Output: Balanced XLR or 1/4" TRS male, line-level left and right to EQ.
  
- 6 Graphic Equalizer:
  - 6.1 Rack mounted.
  - 6.2 31 active filters @ 20 - 20 kHz.
  - 6.3 31 slide controllers through a range of +/- 12 dB.
  - 6.4 Adjustable high/low pass filters with a slope of 12 dB/octave and a high pass range of 10-400 Hz and a low pass range of 10 kHz to 30 kHz.
  - 6.5 Input impedance greater than 50 k $\Omega$ .
  - 6.6 Distortion less than 0.05% @ 1 VRMS.
  - 6.7 Input: Balanced XLR or 1/4" TRS female, line-level left and right from Compressor/Limiter
  - 6.8 Output: Balanced XLR or 1/4" TRS male, line-level left and right to Power Amplifier.
  
- 7 Power Amplifiers:
  - 7.1 Rack mounted.
  - 7.2 Cafeteria Power Amplifier:
    - 7.2.1 Power Output: 120W RMS
    - 7.2.2 Total Harmonic Distortion: 0.05%, 45 - 20 kHz
    - 7.2.3 Frequency Response: 20 Hz - 20 kHz, +/- 3dB
    - 7.2.4 Signal to Noise Ratio: greater than 90 dB below rated output.
  - 7.3 Gymnasium Power Amplifier (1 required):
    - 7.3.1 Power Output: 225 Watts RMS into 8 Ohms, left and right
    - 7.3.2 Total Harmonic Distortion: less than 0.05% at 1 kHz.
    - 7.3.3 Frequency Response: 20 Hz - 20 kHz, +/- 3dB
  - 7.4 Connections:
    - 7.4.1 Input: Balanced XLR or 1/4" TRS female, line-level left and right from EQ
    - 7.4.2 Output: Direct, low-impedance, 8 Ohms and common terminals for both left and right, stereo signal to loudspeakers
  
- 8 Speakers:
  - 8.1 Gymnasium:
    - 8.1.1 Three way units as follows:
      - 8.1.1.1 1-15 inch LF.
      - 8.1.1.2 1-6.5 inch MF.

- 8.1.1.3 1-PST Horn HF.
- 8.1.2 Frequency response: 40 Hz - 20 kHz.
- 8.1.3 Impedance: 8 ohms.
- 8.1.4 Power handling rating: 200 Watts RMS into 8 Ohms, each channel
- 8.1.5 Complete with aluminum extrusion grille.
- 8.1.6 Finish colour: white.
- 8.1.7 Minimum number of units: 2 (if more than 2, connected in parallel to provide 8 Ohms load to amplifier)
- 8.1.8 Connections to amplifier via appropriate gauge, shielded, copper wire so as to broadcast stereo signal and reject RF energy.
- 8.2 Cafeteria:
  - 8.2.1 Two way units as follows:
    - 8.2.1.1 1-8 inch LF.
    - 8.2.1.2 1-3 inch HF.
  - 8.2.2 Frequency response: 45 Hz - 18 kHz.
  - 8.2.3 Power rating: 20 W RMS.
  - 8.2.4 Complete with back box, baffler assembly, transformer.
  - 8.2.5 Finish colour: white.
  - 8.2.6 Minimum number of units to be not less than (4).
- 9 Microphones ( 2 required):
  - 9.1 Cardioid pattern.
  - 9.2 Dynamic element.
  - 9.3 Frequency response: 20 Hz to 20 kHz.
  - 9.4 Impedance: Low (150-250 ohms).
  - 9.5 Mic Switch: Line Shorting.
  - 9.6 Provide 2 table stands and 2 floor stands.
  - 9.7 Microphone connections at the rack are to be XLR plug-in type, not hard wired.
- 10 Compact Disc Player.
  - 10.1 Rack mounted.
  - 10.2 Standard Audio CD Player
  - 10.3 Able to hold up to 5 CD at one time.
  - 10.4 Remote control unit.
  - 10.5 Frequency response 20 Hz - 20 kHz, +/- 3dB.
  - 10.6 Harmonic Distortion: Less than 0.03% at 1 kHz.
  - 10.7 S/N ratio more than 100 dB.

10.8 RCA or 1/4" TS, unbalanced stereo line-level output to mixer.

11 Assistive Listening Equipment:

11.1 Gym / Cafeteria

11.1.1 Rack mounted base station as follows:

- 11.1.1.1 Frequency Modulation.
- 11.1.1.2 RCA female, line-level mono-sum input from Mixer
- 11.1.1.3 Automatic gain control range: 30 dB.
- 11.1.1.4 Signal to noise ratio: 58 dB.
- 11.1.1.5 Maximum radiated power: 50 mW.
- 11.1.1.6 Frequency band: 72-76 MHz.
- 11.1.1.7 Frequency deviation: 125 kHz.
- 11.1.1.8 Rack mount kit
- 11.1.1.9 RF fault indicator
- 11.1.1.10 Overload indicator
- 11.1.1.11 Digital display
- 11.1.1.12 Large area antenna
- 11.1.1.13 Omni directional lapel microphone.

11.1.2 Portable Transmitter

11.1.2.1 Beltpack transmitter as follows:

- 11.1.2.1.1 Audio input characteristics:
  - 11.1.2.1.1.1 High level auxiliary: 27 mV.
  - 11.1.2.1.1.2 MIC level auxiliary: 3mV.
  - 11.1.2.1.1.3 MIC/ANT Jack - Adjustable: 3 to 30 mV
- 11.1.2.1.2 Automatic gain control: 40 dB.
- 11.1.2.1.3 Signal to noise ratio: 45 dB.
- 11.1.2.1.4 2 AA batteries.
- 11.1.2.1.5 Maximum radiated power: 8000  $\mu$ V/m at 30m.
- 11.1.2.1.6 Battery life: 30 hours NICAD.

11.1.3 Receivers:

- 11.1.3.1 Eighteen channel model.
- 11.1.3.2 Power requirements: 2 AA NICAD
- 11.1.3.3 Sensitivity: 0.5  $\mu$ V typical, 1.0  $\mu$ V maximum, 12 dB SINAD.
- 11.1.3.4 Signal to noise greater than 55 dB.
- 11.1.3.5 Distortion: less than 2%.
- 11.1.3.6 Controls: volume, on-off control.
- 11.1.3.7 Various ear buds available.

- 11.1.3.8 Indicator light
- 11.1.3.9 FCC and Industry Canada Approved.
- 11.1.3.10 Receiving Frequency Band 72-76MHz.

**END**

## **DIVISION 28 - ELECTRONIC SAFETY AND SECURITY**

### **28 00 00 Security Systems**

- 1 Provide a complete security system as described herein and in DC350 Part 1 in accordance with DOE current policy. Provide a riser diagram on the drawings.
- 2 Intrusion Alarm/Access Control
  - 2.1 Door strikes, and card readers are not required unless otherwise noted.
  - 2.2 Maglocks require special permission from DTIR.
  - 2.3 Keypads shall be wall mounted 48" AFF and located as follows in accordance with DOE current policy:
    - 2.3.1 Main entrance.
    - 2.3.2 Designated service entrance.
  - 2.4 Main intrusion alarm control panel to be located in the main communications room.
  - 2.5 Audible signals/alerts are to provided through the installed PA system.
- 3 Video Surveillance (CCTV)
  - 3.1 The basic system will consist of a complete functioning digital IP based security video system.
  - 3.2 Cameras will be provided in accordance with the DOE policy, which states, in part:  
"The basic system will consist of a camera monitoring each main entrance to the school from both the inside, and the outside. All outside cameras will be attached to the building and will not be pole mounted. In addition, a camera shall be installed monitoring the reception area of the administration office."  
Confirm locations with DOE, after consultation with the local school board.
  - 3.3 Wiring:
    - 3.3.1 In addition to the designated camera locations, drops consisting of 40' coils of the latest NS Government Structured Cabling Guidelines approved cabling, terminated with the appropriate jack, shall be provided in the ceiling, for future cameras, in an amount equal to the number of cameras provided in the base building. These drops will located by the consultant and confirmed by DOE. The head end of these drops will be terminated in dedicated patch panels in the Comm room(s).

### **28 31 00 Fire Detection and Alarm**

- 1 Provide a complete fire alarm system as described herein and in DC350 Part 1, Section 2.



Provide a riser diagram on the drawings.

- 2 All bells/horns are to be combination horn/strobe signaling devices with a configurable "high" and "low" output.
- 3 Provide strobe lights in all student washrooms and change rooms.
- 4 Small electrical closets, where the door(s) is used to obtain the code required 1m clearance in front of the panelboard(s), need not contain smoke detectors.

**END**

## **DIVISION 31 - EARTHWORK**

### **31 10 00 Site Clearing - Tree, Shrub and Natural Areas Preservation**

- 1 Existing vegetation and natural areas are to be preserved whenever possible and shall be indicated on the preliminary site plan provided by the Province.
- 2 There shall be no disturbance within the area designated to be preserved unless directed by the Province.
- 3 Areas designated to be preserved shall be protected as follows:
  - 3.1 The preservation area shall be clearly indicated on all site plans.
  - 3.2 The perimeter of the preservation area shall be fenced with orange PVC snow fencing or other approved temporary fence and approved and recorded by the Province before any cutting is permitted (including cutting for surveying purposes).
  - 3.3 There shall be no disturbance within the preservation area, unless indicated on the Site Plan.
  - 3.4 The Contractor shall repair any damage within the preservation area resulting from construction activity to the approval of the Province.
  - 3.5 The preservation area shall be periodically monitored by the Province during construction and inspected for damage at the end of the construction.
  - 3.6 All hazardous deadwood may be removed from the preservation zone as directed by the Province.

### **31 14 00 Earth Stripping and Stockpiling - Preservation of Topsoil**

- 1 All organic soil shall be removed from the surface to be occupied by the buildings, roads, parking areas, walkways, pavements, sports fields and other areas which require structural stability. An adequate quantity of topsoil shall be screened and stockpiled on site for improvement and use in site landscaping under the direction of the Landscape Architect. All surplus material shall be removed from the site.
- 2 Topsoil used for landscaping shall be treated as described in PART 1, Section 2, Divisions 31 and 32.

**31 20 00 Earth Moving**

1 Tests and Inspections

- 1.1 Do not begin backfilling or filling operations until material has been approved for use by the Geotechnical Engineer.
- 1.2 Not later than 48 h before backfilling or filling with approved material, notify Geotechnical Engineer so that compaction tests can be carried out by the designated testing agency.

2 Performance

- 2.1 Perform all aspects of earthwork to the satisfaction of the Geotechnical Engineer. Provide written confirmation of acceptance from the Geotechnical Engineer.

**31 22 00 Grading**

1 Refer to Part 1 Section 2 and as follows.

2 Preparation of Subgrade for school sports fields:

- 2.1 Verify that grades are correct. If discrepancies occur, notify project Manager and do not commence work until instructed. Prior to work commencing on site, the general Contractor is to provide a topographic survey to confirm the subgrade elevations.

**END**

## **DIVISION 32 - EXTERIOR IMPROVEMENTS**

### **32 00 00 Site Design and Construction - General**

#### **1 Reference Standards**

- 1.1 Halifax Regional Municipality, Engineering & Works Department Standards for Municipal Services.
- 1.2 Standard specification for Municipal Services - NSRBA and NSCEA.
- 1.3 CAN/CSA-B651-95 for Barrier-free Design.
- 1.4 Halifax Regional Water Commission Design Standards, Latest Edition.

#### **2 Role of the Landscape Architect**

- 2.1 The Contractor shall include the services of a landscape architect in the project consultant team. The role of the landscape architect shall include the following:
  - 2.1.1 preparation of a Site Analysis Plan including identification of natural resources and development constraints
  - 2.1.2 preparation of a Site Plan Concept
  - 2.1.3 preparation of the Site Layout and Grading Plan
  - 2.1.4 meeting with School Planning Committee to confirm community needs and interests including:
    - 2.1.4.1 type and location of play equipment
    - 2.1.4.2 type and location of natural learning area
    - 2.1.4.3 landscaping priorities
  - 2.1.5 preparation of construction drawings and tender documents for site work in association with project architect and engineers
  - 2.1.6 preparation of Landscape Plan
  - 2.1.7 on wooded sites, conduct site visit prior to commencement of construction to ensure adequate fencing and protection of preservation areas, special places and trees.
  - 2.1.8 site visits during construction as required
  - 2.1.9 site visit at completion of construction to ensure compliance with tender documents
  - 2.1.10 preparation of maintenance specifications

#### **3 Design Process**

- 3.1 The site design shall be developed in consultation with the Province. The level of involvement in this process of a School Steering Team or the School Board, shall be as directed by the Province.

### 3.2 Submittals / Approvals

- 3.2.1 The following Site Design Plans are required to be submitted by the Contractor prior to the commencement of specified activities.
  - 3.2.1.1 A Site Analysis Plan and report prepared by a Landscape Architect to the Province for review prior to proceeding with site planning. The Site Analysis Plan shall identify natural features including topography and vegetation as well as development constraints.
  - 3.2.1.2 A Site Plan Concept drawing prepared by a qualified site designer for review and approval by the Province prior to proceeding with the preparation of construction and tender drawings. The Site Concept Plan drawing shall also be submitted to the School Planning Committee for review, as directed by the Department of Education.
  - 3.2.1.3 A Site Layout and Grading Plan prepared by a qualified site designer for review and approval by the Department of Education prior to proceeding with construction (see Part 2, Section 2, Division 00 and Division 01).
  - 3.2.1.4 A Landscape Plan prepared by a qualified Landscape Architect for review and approval by the Department of Education prior to proceeding with construction. The Landscape and Planting Plan shall also be submitted to the School Planning Committee for review, as coordinated by the Department of Education.
  - 3.2.1.5 Permits: As specified in DC350, Part 1, Section 2, Division 32

## **32 10 00 Bases, Ballasts, and Paving**

### **1 Asphalt Concrete Pavement**

- 1.1 Refer to Part 1, Section 2, Division 02, 32 10 00.
- 1.2 Quality Assurance
  - 1.2.1 Obtain and submit certificates from asphalt suppliers attesting that materials comply with specifications upon request.
  - 1.2.2 Submit affidavits that fill materials placed under Work of this Section have been compacted to specified density and approved by the soils consultant.
  - 1.2.3 Obtain and submit certificates from rubberized surface suppliers attesting that materials comply with specifications upon request.
- 1.3 References
  - 1.3.1 ASTM C88-90, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
  - 1.3.2 ASTM C117-90, Test Method for Material Finer Than 0.075 mm Sieve in Mineral

Aggregates by Washing.

- 1.3.3 ASTM C123-83(1990), Test Method for Lightweight Pieces in Aggregate.
- 1.3.4 ASTM C127-88, Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- 1.3.5 ASTM C128-88, Test Method for Specific Gravity and Absorption of Fine Aggregate.
- 1.3.6 ASTM C131-89, Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- 1.3.7 ASTM C136-84a, Method for Sieve Analysis of Fine and Coarse Aggregates.
- 1.3.8 ASTM D698-91, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m<sup>3</sup>).
- 1.3.9 ASTM D995-88, Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- 1.3.10 ASTM D1559-89, Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
- 1.3.11 ASTM D2419-91, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- 1.3.12 ASTM D3203-91, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- 1.3.13 ASTM D4318-84, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- 1.3.14 ASTM D4791-89, Test Method for Flat or Elongated Particles in Coarse Aggregate.
- 1.3.15 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire.
- 1.3.16 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
- 1.3.17 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
- 1.3.18 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
- 1.3.19 CAN/CGSB-16.3-M90, Asphalt Cements for Road Purposes.
- 1.3.20 Asphalt Institute MS-2-88, Mix Design Method for Asphalt Concrete.

#### 1.4 Materials

- 1.4.1 Tack Coat: to meet specified requirements of Nova Scotia DTIR Standard Specification Highway Construction & Maintenance, Division 04, Section 1 for emulsified asphalt.
- 1.4.2 Bituminous paving: use asphalt concrete type B-HF for base course and type C-HF for riding surface...asphalt cement should be 150-200 and conform to specification for 150/200 penetration asphalt cement.
- 1.4.3 Granular base course:
  - 1.4.3.1 Sub-base: 8" of type 2.
  - 1.4.3.2 Base course: 6" of type 1
  - 1.4.3.3 Line Marking Paint: Traffic line marking paint by PPG or C.I.L. Colour: Yellow,

except handicapped area markings shall be blue.

1.4.3.4 Installation

1.4.3.4.1 Sub-base gravel to be placed and compacted in layers not exceeding 4" in thickness

1.4.3.4.2 Bituminous Paving: Asphalt concrete thickness (spread rate) to be type B-HF, @ 135 kg/m<sup>2</sup>; type C-HF @ 110 kg/m<sup>2</sup>.

1.4.3.4.3 Levelling: Build up with surfacing and seal material all hollows and low spots found to retain water, until a uniform grade is achieved. Feather edges of built up areas evenly and uniformly to meet previously installed paving.

1.4.3.5 Joints In Pavement:

1.4.3.5.1 Make transverse and longitudinal joints, and joints between new and old work, precisely and carefully.

1.4.3.5.2 Make joints by keying or butting and bond them well.

1.4.3.5.3 Ensure that a bond is provided between new and old pavements, or between work of successive days, by cutting through full depth of older course to expose a clean vertical surface, clean and remove loose or broken material from vertical surface, and paint it with tack coat. Place hot mixture of new pavement against joint and rake to required depth and grade.

1.4.3.6 Line Painting: Apply two coats of line marking paint for parking stall lines 4" wide.

**32 18 00 Athletic and Recreational Surfacing**

**1 Sports Fields**

1.1 Build sports fields to the dimensions specified in PART2, Section 1, or as specifically described in the Program.

1.2 Where the sports field to be provided is for soccer, there must be a minimum slope of 1.5% on the finished turf surface.

1.3 Where surface and subgrade conditions are dry, and the subgrade is considered to be adequate to provide subsurface drainage by a Geotechnical Engineer and the Landscape Architect, surface drainage may be relied upon for drainage.

1.4 Where the subgrade conditions are low permeable soil (clay, or compacted silty material), a sand layer will be provided under the topsoil layer, and will be specified by the Landscape Architect, informed by the Geotechnical Report.

- 1.5 Where subsurface drainage is required, it shall be accomplished with perforated PVC DR 35 pipe, laid at grade for positive drainage. Field drainage shall be discharged into the formal site drainage system.
- 1.6 All topsoil must meet the requirements of PART 1, Section 2, Division 31 and 32.
- 1.7 All seeded areas and sod shall meet the requirements of PART 1, Section 2, Paragraph 02920, except where modified by the Landscape Architect and approved by the Province.
- 1.8 Subgrade, topsoil and drainage materials and design shall allow for straightforward installation of field irrigation system if a sports field irrigation system is required for the school, as noted in PART 2, Section , 9 Site Design.
- 1.9 Where required, sports field irrigation systems shall be designed to PART 1, Section 2, Division 32, 32 84 23.

## **2 Play Area Safety Surface**

- 2.1 CSA approved engineered wood fibre play safety surface or CSA approved poured in place rubber surface at the discretion and direction of DTIR in collaboration with DOE. :
  - 2.1.1 an edging system with accessible ramp
  - 2.1.2 special mat product under swings and at slide exits
  - 2.1.3 prefabricated or engineered subgrade drainage system
  - 2.1.4 geotextile
  - 2.1.5 subgrade preparation and construction to be in strict accordance with manufacturers' specifications
- 2.2 Materials and installation shall comply with the following:
  - 2.2.1 ASTM 1292 Standard Specification of Impact Attenuation of Surface Systems Under and Around Playground Equipment for new and 12 year old engineered wood fibre material.
  - 2.2.2 ASTM 1991 Standard Specification for Determination of Accessibility of Safety Systems Under and Around Playground Equipment.
  - 2.2.3 Americans with Disabilities Act proposed regulations.
  - 2.2.4 Standard CAN / CSA - Z614 Children's Play Spaces and Equipment, latest edition.
- 2.3 Acceptable Products: Fibar System, as supplied by ABC Recreation Ltd. Paris, Ontario, tel:



800 267-5753, or Woodcarpet Recreational Surfacing, as supplied by Zeager Bros. Inc., Middletown, Pennsylvania, tel: 800 364-8524, or approved equal.

- 2.4 Engineered wood fibre shall be placed to a depth after compaction to accommodate the maximum height of fall from the play equipment, in accordance with the “Critical Heights of Various Surfacing Materials” table prepared by the Consumer Product Safety Commission’s Handbook for Public Playground Safety. Depth of material as specified by the supplier.
- 2.5 Edging for safety surface to be set flush with adjoining grades.
- 2.6 A subsurface drainage system shall be provided for all play areas unless directed otherwise by the Province.

### **32 32 00 Retaining Walls**

- 1 The use of retaining walls should only be employed when demonstrated by civil engineers that no other option exists including, but not limited to, site grading techniques.
- 2 When necessary to incorporate retaining walls into landscaping design, the structure features of retaining walls shall be designed by a structural engineer licenced to practice in Nova Scotia.

### **32 90 00 Planting**

- 1 Plant trees, shrubs and ground covers in accordance with the Canadian Standards for Nursery Stock Seventh Edition of the Canadian Nursery Landscape Association.
- 2 Assure plant materials for landscape development are suitable for the locality, using native plant species material where practical.
- 3 Do not plant under building overhangs or within 900 mm of foundations.
- 4 The Contractor shall warrant that plant material will remain free of defects for 1 full growing season, following date of Acceptance.
- 5 The Contractor shall perform the following maintenance operations during the warranty

period.

- 5.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion. For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
- 5.2 Remove weeds monthly.
- 5.3 Replace or respread damaged, missing or disturbed mulch.
- 5.4 For non-mulched areas, cultivate and remove weeds monthly.
- 5.5 Apply fertilizer in early spring at manufacturer's suggested rate.
- 5.6 Avoid use of pesticides. When required to control insects, fungus or disease, apply pesticides only with approval from the TIR Representative and in accordance with Federal, Provincial and Municipal regulations.
- 5.7 Remove dead or broken branches from plant material.
- 5.8 Keep trunk protection and guy wires in proper repair and adjustment.
- 5.9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- 5.10 Remove trunk protection, tree supports and level watering saucers at end of first growing season.

### **32 91 00 Planting Preparation**

#### **1 General Topsoil and Finish Grading:**

- 1.1 The Contractor shall provide all topsoil required to complete the work . This may include improved grubbing material stockpiled on-site, and topsoil imported from off site.
- 1.2 Topsoil shall meet the requirements for its intended use and for the vegetation to be established according to the landscape plan.
- 1.3 Source Quality Control
  - 1.3.1 Advise DTIR of source of topsoil to be utilized 7 days in advance of starting work.
  - 1.3.2 Contractor is responsible for soil analysis and amendments to soil as specified.
- 1.4 Testing
  - 1.4.1 All topsoil or other planting medium to be used in any project shall be tested for soil texture by an approved laboratory designated by the Province of Nova Scotia. Soil sampling, testing and analysis to be in accordance with provincial standards. Contractor will arrange and pay for cost of tests. Contractor shall submit copies of Soils Texture Report to the Province for approval prior to delivery of soil to the site.
  - 1.4.2 All topsoil or other planting medium to be used in any project shall be tested for fertility, organic matter sieve analysis, chemical analysis and pH value by the NS Department of Agriculture and Fisheries laboratory in Truro, NS. Soil sampling, testing

and analysis to be in accordance with provincial standards. Contractor will arrange and pay for cost of tests. Contractor shall submit copies of Soils Analysis Report to the Province for approval prior to delivery to the site and again prior to Acceptance.

## 2 Products

- 2.1 Topsoil or other planting medium to be used for any project to consist of material stripped from site (grubbings) and/or imported topsoil to be supplied by the Contractor.
  - 2.1.1 Topsoil: mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - 2.1.2 Lime, fertilizer and/or compost amendments to be made according to the fertility and pH requirements specified in the Soil Analysis Report.
  - 2.1.3 Contain no toxic elements or growth inhibiting materials.
  - 2.1.4 Free from debris and stones over 25 mm diameter and coarse vegetative material, 12 mm diameter and 50 mm length, occupying more than 2% of soil volume.
  - 2.1.5 Consistence: friable when moist.
- 2.2 Planting Soil for Trees, Shrubs and Groundcover
  - 2.2.1 A mixture consisting of 7 - 8 parts topsoil, and 2 - 3 parts compost, manure, peat moss or decomposed ground bark.
  - 2.2.2 Soil Amendments to improve fertility and/or texture
    - 2.2.2.1 2.2.2.1 Peat moss: Derived from partially decomposed species of Sphagnum Mosses; Elastic and homogeneous, brown in colour; Free of wood and deleterious material which could prohibit growth; Shredded particle minimum size: 5 mm.
  - 2.2.3 Sand: washed coarse silica sand, medium to coarse textured.
  - 2.2.4 Limestone: Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%; Graduation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
  - 2.2.5 Fertilizer: Complete, commercial, with 35% soluble nitrogen.
  - 2.2.6 Manure: Well aged cattle manure, free of lumps and impurities.
  - 2.2.7 Compost: Shall meet provincial and CCME guidelines.

## 3 Execution

- 3.1 Preparation of Subgrade
  - 3.1.1 Verify that grades are correct. If discrepancies occur, notify DTIR and do not commence work until instructed.

- 3.1.2 Grade soil, eliminating uneven areas and low spots to ensure positive drainage.
- 3.1.3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 50 mm above surface. Dispose of removed material at an approved site.
- 3.1.4 Coarse cultivate entire area which is to receive topsoil to depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading have compacted soil.
  
- 3.2 Placing and Spreading of Topsoil/Planting Soil
  - 3.2.1 Place topsoil after subgrade has been approved by DTIR.
  - 3.2.2 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen sub-grade free of standing water.
  - 3.2.3 Spread topsoil over areas to be seeded to a minimum depth of 100 mm after settlement and 80% compaction.
  - 3.2.4 Place planting soil in shrub planting beds and pits to a minimum depth of 450 mm after settlement.
  - 3.2.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
  
- 3.3 Soil Amendments
  - 3.3.1 Apply and thoroughly mix soil amendments and fertilizer into full depth of soil at rates recommended by Soils Analysis Report or qualified Vegetation Consultant.
  
- 3.4 Finish Grading
  - 3.4.1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
  - 3.4.2 Consolidate topsoil to leave surfaces smooth, uniform and firm against deep foot printing.
  
- 3.5 Acceptance
  - 3.5.1 DTIR will inspect materials in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material subject to soil testing and analysis.
  - 3.5.2 Restoration of Stockpile Sites: Restore stockpile sites acceptable to DTIR
  - 3.5.3 Surplus Material: Dispose of materials not required at approved site.

## **32 92 00 Turf and Grasses**

### **1 General**

#### **1.1 Related Sections**

##### **1.1.1 Section 32 91 00 - Planting Preparation**

#### **1.2 Product Data: Provide product data for: Seed, fertilizer and soil amendments**

#### **1.3 Scheduling:**

##### **1.3.1 Seed between May 1 and June 1, or between August 25 and September 10, when possible.**

##### **1.3.2 When seeding is required during summer months, contractor must be prepared to irrigate to maintain moisture until seeded mixture is well established.**

#### **1.4 Warranty**

##### **1.4.1 All lawns shall remain free of defects for 1 full growing season, commencing at final acceptance.**

##### **1.4.2 A growing season shall be from May 1 - Oct. 31.**

##### **1.4.3 End of warranty inspection to be conducted by DTIR.**

##### **1.4.4 Warranty may be extended if development and growth is not sufficient to ensure future survival as determined by the DTIR.**

##### **1.4.5 For seeded and sodded areas accepted before June 30, warranty period may end on October 31 of the same year provided all conditions have been met.**

### **2 Products**

#### **2.1 Grass Seed**

##### **2.1.1 Canada "Certified" seed, in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".**

##### **2.1.2 Use seed mix approved for end use of area to be seeded.**

##### **2.1.2.1 "Canada No. 1 Lawn Grass Mixture" for lawns and other areas to consist of Creeping Red Fescue, Kentucky or Canada Bluegrass, Annual Rye and White Clover in an approved mixture, or at the recommendations of a Turf Specialist.**

##### **2.1.2.2 Canada No. 1 Grass seed mixture for sports field to be determined by a Turf Specialist to meet the requirements at the site.**

##### **2.1.2.3 For reclamation sites, the Nova Scotia Highway Seed Mix may be used, or other reclamation mixture recommended by a Reclamation Specialist.**

##### **2.1.2.4 In packages individually labeled in accordance with "Seeds Regulations" and indicating name and supplier and date bagged.**

## 2.2 Sod

- 2.2.1 Nursery grown sod shall be a cultivated product utilizing specific turf grass species containing not less than 40% Kentucky Bluegrass and shall be free of weeds and having no surface soil visible when mowed to a height of 50 mm. The soil portion shall be of uniform thickness of not more than 20 mm and conform to Section 17 of the Canadian Standards for Nursery Stock.
- 2.2.2 Sodding is useful on disturbed areas which require immediate and permanent vegetative cover, or where it is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are: a. waterways and channels carrying intermittent flow at acceptable velocities, b. areas around drop inlets, when the drainage area has been stabilized, c. lawns, d. steep critical areas and under the face of a building.
- 2.2.3 The sod shall be strongly rooted and free of noxious weeds, undesirable plants, roots, stones, and other foreign materials that will be detrimental or will hinder the proper development of the sod. It shall be cut from living, thickly matted turf and shall be mowed to a height not to exceed 50 - 70 mm and thoroughly watered before the sod is cut.
- 2.2.4 Documentation of the source of the sod and verification of species used in the sod shall be submitted to the DTIR.
- 2.2.5 Care shall be exercised at all times to retain soil on the sod roots during transportation, handling and planting. The sod shall be transported to the site within twenty-four (24) hours from the time it is cut, unless it can be stored to the satisfaction of the Project Engineer. During delivery and while in stacks, all sod shall be kept moist and protected from exposure to the wind, sun and freezing. All damaged or dry sod shall be rejected.

## 2.3 Water

- 2.3.1 Free of impurities that would inhibit germination and growth.
- 2.3.2 Supplied by Contractor.

## 2.4 Fertilizer

- 2.4.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
- 2.4.2 Complete synthetic, slow release with 35% of nitrogen content in water insoluble form.

## 2.5 Organic Binder or Tackifier

- 2.5.1 Binder or Tackifier acts as an adhesive to bind soil, fiber and seed particles together and to temporarily control the effects of wind and water erosion during seed germination and plant establishment.

2.5.2 May be supplied in liquid or powder form and shall be applied at the Manufacturer's recommended application rate. It shall not contain any toxic or growth inhibiting chemicals or compounds.

## 2.6 Hydraulic Mulch

2.6.1 Hydraulic mulch is specifically manufactured for use in hydraulic seeding equipment.

2.6.2 It shall be locally procured, non-toxic, water activated, green coloured, and free of germination and growth inhibiting factors. Requests to use other products not locally produced shall be submitted to DTIR for approval before they are used.

2.7 Organic Amendments to Enhance germination or growth may be used at the discretion of DTIR. This includes compost.

## 2.8 Herbicide

2.8.1 No herbicide shall be used.

## 3 Execution

### 3.1 Workmanship

3.1.1 Work is not to be undertaken under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.

### 3.2 Seed or Sod Bed Preparation

3.2.1 Verify that grades are correct. If discrepancies occur, notify DTIR and do not commence work until instructed.

3.2.2 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated, to tolerance of plus or minus 15 mm, surface draining naturally.

3.2.3 Cultivate fine grade approved by DTIR to 25 mm depth immediately prior to seeding.

3.2.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; at an approved site.

3.2.5 If seeding using a mechanical seeder or when sodding, work fertilizer and lime at rates recommended by the Soil Analysis Report, into the top few centimeters of soil prior to seeding or laying sod.

### 3.3 Turf Establishment, Mechanical Seeding

3.3.1 Use mechanical landscape seeder such as "Brillion" type which accurately places seed at specified depth and rate and rolls in a single operation.

- 3.3.2 On cultivated surfaces, sow seed uniformly at rate of 1.0 kg/22.5 sq metres along with appropriate proportion of water and fertilizer.
- 3.3.3 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
- 3.3.4 Sow half of required amount of seed in one direction and remainder at right angles.
- 3.3.5 Embed seed into soil to depth of 10 mm. Not less than 85% of seed to be placed at specified depth and covered by soil.
- 3.3.6 Immediately after seeding, use agricultural, water ballast type roller, not less than 500 mm diameter with smooth steel drum and a width not less than the width of the landscape seeder to mechanically consolidate the seeded area if soil conditions warrant or if directed by DTIR.
- 3.3.7 Water with fine spray to avoid seed wash-out. Water to ensure penetration of minimum 50 mm.
- 3.3.8 Protect seeded areas against damage. Remove this protection after lawn areas have been accepted.

#### 3.4 Turf Establishment, Hydraulic Seeding

- 3.4.1 Thoroughly mix the specified seed mixture, recommended fertilizer, lime if needed, hydraulic mulch and tackifier with water and apply with an approved hydraulic seeder.
- 3.4.2 Seed mix at rate of 100 kg/ha
- 3.4.3 Fertilizer at recommended formulation at rate of 625 kg/ha
- 3.4.4 Hydraulic mulch shall be mixed in a hydroseeding unit with the other ingredients, and sprayed evenly and uniformly over the designated areas at a rate of 2200 kg/ha +/- 10%.
- 3.4.5 Hydroseed during calm wind conditions. Re-apply where application is not uniform.
- 3.4.6 Remove slurry from areas and items not designated to be sprayed.

#### 3.5 Turf Establishment, Sodding

- 3.5.1 Sod delivered to the site shall not be dried out nor frozen. Sod shall not be dumped from vehicles nor shall it be handled with pitch forks.
- 3.5.2 Sod should be placed as soon as possible after the ground surface has been graded, to take advantage of the ground moisture. Sod shall not be applied on frozen ground. The sod bed shall be moist prior to laying the sod.
- 3.5.3 Sod may be laid any time from April until December. Sod should not be laid between June 10 and September 10 without irrigation or some other means of assuring the roots are in contact with moist soil.
- 3.5.4 The sod shall be applied by hand in rows at right angles to the direction of the slope, starting at the base of the area to be sodded and working upward. The strips shall be laid together tightly so that no open joints are left between strips or between the ends of



- strips. The joints shall be staggered between the ends of strips. The edges of the sod at the top of the slopes shall be tucked slightly under. A layer of soil shall be compacted over the edge to conduct surface water over and onto the top of the sod.
- 3.5.5 Sod shall be laid perpendicular to the flow of water on slopes and in ditches and waterways.
- 3.5.6 The sod shall be firmly tamped or rolled immediately after it is placed to eliminate all air pockets and to provide a smooth, even surface.
- 3.5.7 Immediately after rolling or tamping the sod, sufficient water will be applied to completely saturate the sod.
- 3.5.8 All excess earth, stones or other debris shall be removed by the Contractor when sodding is completed.
- 3.5.9 Sodding at face of building: Sod to a distance from the face of building minimum distance of 7 m with the balance of the site seeded, unless required otherwise by the program. Water run-off from the building will be directed away from any sodded areas around building perimeter.
- 3.6 Maintenance During Establishment Period: Perform following operations from time of seed and sod application until acceptance by Project Manager:
- 3.6.1 Water seeded and sodded areas with fine spray to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
- 3.6.2 At the Contractor's expense, any sod which shows signs of settlement shall be cut out and replaced.
- 3.6.3 Dead or bare spots shall be repaired and re-seeded to allow establishment of turf prior to acceptance.
- 3.6.4 For lawns and other manicured areas, cut grass to 50 mm whenever it reaches height of 75 mm.
- 3.6.5 Fertilize seeded and sodded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.
- 3.6.6 Eliminate weeds by means approved by Project Manager.
- 3.7 Fertilizing Program
- 3.7.1 In the fall following seeding of lawn areas, apply a general fall lawn fertilizer.
- 3.7.2 In the following spring, apply an application of 6-12-12 fertilizer at the recommended rate to all areas seeded or sodded the year before.
- 3.8 Acceptance: Seeded or sodded areas will be accepted by Project Manager provided that:

- 3.8.1 Seeded or sodded areas are uniformly established and turf is healthy, dark green and free of rutted, eroded, bare or dead spots and free of weeds.
- 3.8.2 Lawn areas have been cut at least twice.
- 3.8.3 All seeded and sodded areas have been fertilized.
  
- 3.9 Maintenance During Warranty Period. Perform following operations from time of acceptance until end of warranty period:
  - 3.9.1 Repair and reseed dead or bare spots to satisfaction of Project Manager.
  - 3.9.2 Fertilize seeded areas in accordance with fertilizing program. On lawn areas, spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.
  - 3.9.3 Eliminate weeds by means approved by Project Manager.

**32 93 00 Recommended Plants for Landscaping**

- 1 Inspection and written certification by the Landscape Architect will be required for all landscape planting.
  
- 2 The following is a list of native and other hardy plants recommended for planting at school sites in the province of Nova Scotia. (\* indicates non native species) The plants on this list are recommended for the following reasons:
  - 2.1 disease resistance
  - 2.2 low maintenance
  - 2.3 year round interest berries, flowers, fall colour, interesting bark and twigs
  - 2.4 attract birds
  - 2.5 to promote and sustain natural habitat and ecosystems

**2.5.1 Deciduous Trees**

<b>Common Name</b>	<b>Botanical Name</b>
Red Maple	Acer rubrum
Sugar Maple	Acer saccharum
Striped Maple	Acer pensylvanicum
Serviceberry	Amelanchier laevis
Yellow Birch	Betula alleghaniensis
Paper Birch	Betula papyrifera
White Ash	Fraxinus americana
Beech	Fagus grandifolia

Ironwood	<i>Ostrya virginiana</i>
Trembling Aspen	<i>Populus tremuloides</i>
Red Oak	<i>Quercus rubra</i>
Mountain Ash	<i>Sorbus americana</i>
Basswood	<i>Tilia americana</i>

**2.5.2 Coniferous Trees**

<b>Common Name</b>	<b>Botanical Name</b>
White Spruce	<i>Picea glauca</i>
White Pine	<i>Pinus strobus</i>
Eastern Hemlock	<i>Tsuga canadensis</i>

**2.5.3 Shrubs: refer to Part 2 Section 1, Site Design**

**2.5.4 Groundcover**

<b>Common Name</b>	<b>Botanical Name</b>
Bearberry	<i>Arctostaphylos uva ursi</i>
Bunchberry	<i>Cornus canadensis</i>
Teaberry	<i>Gaultheria procumbens</i>
Wild Blueberry	<i>Vaccinium angustifolium</i>
Partridgeberry	<i>Vaccinium vitis-idaea minor</i>
Cranberry	<i>Vaccinium vitis-idaea major</i>

**END**

## **DIVISION 33 - UTILITIES**

### **33 00 00 Utilities - General / Site Services**

#### **1 Reference Standards**

- 1.1 Halifax Regional Municipality, Engineering & Works Department Standards for site servicing, Latest Edition.
- 1.2 Standard Specification for Municipal Services - NSRBA and NSCEA, Latest Edition.
- 1.3 Halifax Regional Water Commission Engineering Design Standards, Latest Edition.
- 1.4 Guidelines Respecting On Site Sewage Disposal - Nova Scotia Department, Latest Edition.

#### **2 Quality Assurance**

##### **2.1 Requirements of Regulatory Agencies:**

- 2.1.1 Give necessary notices, obtain permits, pay for fees and furnish certificates as evidence that the Work as installed conforms with the laws and regulations of governing authorities.
- 2.1.2 Determine detailed requirements of jurisdictional authorities and conform to those requirements.

#### **3 Submittals**

##### **3.1 As-built Drawings:**

- 3.1.1 On completion of Work, of this Section, submit one set of "as-built" drawings, showing exact locations of service lines, tanks, disposal beds, manholes and catch basins, top and invert elevations at service lines and manholes.

#### **4 Permits and Fees**

- 4.1 Apply and pay for all permits, fees and inspections required from the authorities having jurisdiction on each service system. Comply with all by-laws, codes and regulations.

#### **5 On-Site Sewage Disposal Systems**

- 5.1 If required shall be designed, permitted by the NS Department of Environment and Labour, inspected and approved by an engineer licensed to practice in the Province of Nova Scotia and experienced in such work.

#### **6 Materials**

- 6.1 Sewage Piping:

6.1.1 Generally: Rigid polyvinyl chloride (PVC) pipe, push on joints conforming to the CSA B137.3-M90, including lubricant standard cast iron, mechanical joint fittings, complete with glands, rubber gaskets, nuts and bolts.

**OR**

6.1.2 Concrete Pipe and Fittings: 6"-10" diameter, non-reinforced concrete, over 10", reinforced concrete extra strength, rubber gasket joints to ASTM C14 and CSA A257-01 as manufactured by L.E. Shaw Ltd. Rubber gaskets for concrete pipe to ASTM C443 and CSA A257-3.

6.2 Water Supply Lines

6.2.1 Ductile iron cement mortar lined to AWWA C151 Class 52 minimum with mortar lined fittings having minimum pressure rating of 1035 ka to AWWA C110. Cement mortar lining to AWWA C104.

6.3 Gate Valves:

6.3.1 Buried to: AWWA C500, minimum pressure rating 1025 ka, minimum working pressure rating 1380 ka and as follows:

6.3.1.1 Body: cast-iron with mechanical joint ends.

6.3.1.2 Mechanism (AWWA C500): bronze mount solid wedge or double disc gates, non-rise spindle, and 0-ring seals.

6.3.1.3 Mechanism (AWWA C509): wedge disc resilient rubber seat ring and machined seating surface, non-rising spindle, and 0-ring seals.

6.3.1.4 Direction of opening: counter-clockwise.

6.3.1.5 Operating nut: 50 mm square.

6.3.1.6 Provide centering disc.

6.3.1.7 Supply one key of appropriate length operator valves.

6.4 Valve Boxes: to AWWA C500 and as follows:

6.4.1 Cast-iron, slide type, adjustable for depth of pipe below finished grade.

6.4.2 Covers marked "Water".

6.4.3 Lugged to prevent turning and rolling of cover and cover notched to suit.

6.5 Concrete for thrust blocks, encasement, cradles and supports: to meet the requirements of 5.3 Concrete.

6.6 Disinfectant: sodium hypochlorite or calcium hypochlorite to AWWA B300 or liquid chlorine to AWWA B301.

- 6.7 Culverts: Plain, galvanized corrugated steel pipe, conforming to Corrugated Steel Pipe Institute Specification No. 501-78, complete with coupling bands, bolts and end flares as detailed, all to Department of Transportation and Infrastructure Renewal' approval.
- 6.8 Precast Manholes: Reinforced concrete sections to ASTM C478. Provide sections with closed cell neoprene gaskets conforming to ASTM C443. Sizes as indicated on drawings, as manufactured by L. E. Shaw Ltd., Borchardt Concrete Products Ltd. or Gordon Shaw Concrete Products.
- 6.9 Precast Catch Basins: Reinforced concrete units conforming to same specifications as for manholes. Sizes as indicated on drawings.
- 6.10 Manhole Frame and Cover: IMP Group Ltd. Type No. R10 or L.E. Shaw Model 5405-15.
- 6.11 Catch Basin Frame and Cover: IMP Group Ltd. Type No. R11 or L.E. Shaw Model 5405-35W.
- 6.12 Manhole Ladder: IMP Group Ltd. Type No. L1 in lengths to suit.
- 6.13 Pipe Bedding: To meet specified requirements of Reference Standards.
- 6.14 Concrete
- 6.14.1 To meet specified requirements of 5.3 Concrete.
- 6.14.2 Bases and Aprons for Manholes and Catch Basins: 3,000 psi compressive strength for bases and 5,000 psi for aprons after 28 days. Air entraining admixture to ASTM C260-66T. Air content of concrete 5% to 7%. Reinforcing steel of yield stress Grade 50 20,000 psi.
- 6.15 Installation
- 6.15.1 Pipe Laying:
- 6.15.1.1 Handle, lay, bed, join and cover pipes carefully and in such a manner as to preclude any possibility of damage thereto.
- 6.15.1.2 Lay and join pipes in strict accordance with written manufacturer's instructions and generally as follows:
- 6.15.1.2.1 in straight lines and to required even grades
- 6.15.1.2.2 clean pipe thoroughly before laying and protect from dirt and water infiltration.

- 6.15.1.2.3 support pipe on Class B bedding, if not shown or noted otherwise. Provide suitable pockets for the bells or coupling of pipe, so that the total length of the bottom segment of the pipe barrel is evenly and firmly supported.
- 6.15.1.2.4 Where pipes enter or leave manhole or other structure, support them on compacted crushed stone bed or concrete cradle through the backfilled area. The pipe support shall extend laterally from undisturbed soil to the face of the wall through which the pipes pass.
- 6.15.2 Install PVC plastic pipe, and corrugated steel pipe in strict accordance with manufacturer's written instructions.
- 6.15.3 Face bell ends of water pipe in direction of laying. On grades 5% or greater lay pipe up grade. Do not exceed maximum joint deflection recommended by manufacturer. Deflect only after joint is completed.
- 6.15.4 Prevent entry of bedding material, water or other foreign matter into pipe. Use temporary water-tight heads when pipe laying is not in progress.
- 6.15.5 Install gaskets in accordance with manufacturer's instructions. During cold weather store gaskets in heated area to assure flexibility.
- 6.15.6 Install concrete pipe in accordance with AWWA M.9 manual for concrete pipe installation, where applicable.

### **33 42 00 Pipe Culverts**

- 1 All pipe inlets and outfalls on and adjacent to the school site shall be made safe.
- 2 For all pipes greater than 300 mm in diameter, ends shall be covered with secure safety grate to prevent access by children.
- 3 All inlets and outfalls shall include a headwall constructed as a single precast concrete unit. If industry available precast units do not correspond to the necessary dimensions or applications then the headwall shall be constructed with dry laid rock or pre-cast concrete retaining wall block and approved by civil engineer for application. Used only to retain slopes greater than 1:3 (rise:run).
- 4 All vertical drops greater than 1.0 metres and other hazards shall be protected with chain link fence or other approved guard.

### **33 71 00 Electrical Utility Transmission and Distribution**

#### **1 Overhead Electrical Service**

- 1.1 The primary service from the street to the padmount transformer can utilize poles, provided the overhead cables do not cross school driveways, sidewalks, playgrounds, sports fields, or any part of a building.
- 1.2 Communication cables (telephone and cable T.V.) shall follow the same overhead routing as power cables.

#### **2 Underground Electrical Service**

- 2.1 Three-phase power is a requirement. Although some rural sites may only have single-phase power, this must be upgraded to 3 phase.
- 2.2 An underground power service is a safety requirement for all schools. The power cables from the padmount transformer to the building will always be underground.
- 2.3 Communication cables (telephone and cable T.V.) shall follow the same underground routing as power cables except where they must separate to terminate in their respective service rooms.
- 2.4 Electrical power, telephone, and Cable T.V. services are to enter the building from the rear side of property, and not from front.
- 2.5 Padmount transformers are to be located at the rear side of building property and be protected from vehicle and pedestrian traffic.

### **33 80 00 Communications Utilities**

- 1 The Contractor shall include for all the costs associated with the provision and installation of CATV services to the building. Provide all hardware as required for a complete operating system. The installation of this service is to be coordinated with DTIR and the school board.
- 2 The Contractor shall include for all the costs associated with the provision and installation of internet services via optical fibre link ( or the highest level of service available) to the building. Provide all hardware required for a complete operating system. The installation of these services is to be co-ordinated with DTIR and the school board.

**END**