

**TOWN OF WASAGA BEACH**

**WASAGA STARS ARENA &  
RECREATION CAMP**



**STRUCTURAL & BUILDING  
ASSESSMENT / AUDIT**

SEPTEMBER 30, 2013

**FINAL REPORT**

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**BARILL**

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## 1.0 Introduction

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### 1.1 Building History

The Wasaga Stars Arena (located at 425 River Road West - Wasaga Beach, Ontario), was originally built in 1973. The original building included a single pad ice surface (sand floor covering brine refrigeration piping), four (4) dressing rooms, viewing lobby, a concession booth, a pro-shop, public washrooms on the ground floor level and an auditorium, bar and full kitchen on the second floor level that can service a capacity of 182 persons for banquet and private functions. In 1986, a ground level addition was constructed along the west end of the building (ie. Dressing Room Nos. 5 & 6). In 1999, a new mechanical HVAC system (which included four roof-top HVAC units) was installed, providing heating and air conditioning of the entire ground floor level (Lobby & Dressing Rooms) as well as the second level Auditorium. In 2001, a second ground level addition was added to the west end of the building (adjacent to the front entrance) to house a new elevator lift. In 2003, a third ground level addition was added to the north side of the building that provided an expansion to existing Dressing Room Nos. 1 & 2.

#### Photo 1 – Wasaga Stars Arena Facility



The Wasaga Stars Arena building is now 40 years old; despite its age, it appears to have been well maintained over the years. There have been annual upgrades to the premises as reported and documented in other separate municipal reports and work ledgers. However, a number of the Dressing Rooms are in desperate need of upgrading, as are the public washrooms on the ground floor level. In addition, the dressing rooms generally lack privacy (specifically the washroom / shower areas).

Since the rink surface consist of a sand floor base (in lieu of a concrete slab-on-grade), year-round ice is maintained thus restricting other multi-use activities on the rink surface. As a result, this facility is considered an ice-based facility only.

Also located on the property (ie. north-west corner of the property) is a full operational sports camp, consisting of seven (7) seasonal cabins / bunk houses, one (1) wash-house building and a recreation hall building (capacity for 96 persons). The Wasaga Stars Recreation Camp was also built in 1973; the primary use of the camp buildings is to house overnight guests (typically used in conjunction with sport or instructional camp activity relating to the Wasaga Stars Arena). The Recreation Camp buildings appear clean and in relatively good condition. These camp buildings are simplistic and they work well as an acceptable site for summer youth camps and sports camps. However, this recreation camp has minimal use in the off-season and is not well suited for cold weather use.

Photo 2 – Wasaga Stars Recreation Camp



## **1.2 Purpose of Building Assessment / Audit**

The purpose of this building assessment was to identify the general condition of the buildings including physical characteristics, details and materials of the existing building components with respect to the Ontario Building Code, the Ontario Fire Code and the current draft report for the Accessibility for Ontarians with Disabilities Act regulations. A general review of the building components including building envelope, building structure (including foundations) and operating systems was performed by the undersigned.

Specific building deficiencies (based on our site reviews) are noted below including the assignment of prioritization levels for the various building deficiencies. In addition, cost breakdowns are provided for the building upgrades and remedial repair of the reported deficiencies.

Existing design drawings of the various building additions were made available by the Town of Wasaga Beach Parks, Facilities & Recreation Department and were subsequently reviewed by the undersigned. Design drawings of the original building, however, were not made available. A number of on-site reviews were performed by the undersigned with conclusions based on what was visible at that time of our site reviews; no destructive work or testing procedures was performed by the undersigned.

This report will also summarize the author's opinion regarding the anticipated remaining life span of the buildings, and identify the expected cessation period for the facility.

## ***2.0 Architectural Evaluation / Assessment of Existing Buildings***

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A detailed inspection of the arena facility (ie. architectural components including building envelope) was initially completed by Mr. Guy Bellehumeur (GB Architect Inc.) on April 24, 2013. A follow-up site review was subsequently completed by Mr. Guy Bellehumeur (GB Architect Inc.) on July 10, 2013.

### ***2.1 Executive Summary***

Two (2) major building code deficiencies (as it relates to the 2006 Ontario Building Code) were observed and reported by Mr. Bellehumeur; they are summarized as follows:

- the lack of legal exits from the upper level Auditorium (Wasaga Stars Arena), and
- the lack of a proper vestibule access into the Refrigeration Room (from the Olympia Room).

In addition, there are numerous minor OBC infractions throughout the facility including deficiencies in the construction of vertical & horizontal fire separations.

In regards to Accessibility for Ontarians with Disabilities, there are numerous issues regarding accessibility throughout the Wasaga Stars Arena.

Other than the roof leak over the Main Entry Vestibule, there was no noticeable indication of water infiltration or condensation within the building.

Refer to the "Designated Substance and Hazardous Building Materials Audit" prepared by MTE consultants for identified presence of such matters (Appendix 'B').

### ***2.2 Reference Drawings***

'As-built' floor plans have been created by Barill Engineering Limited, which generally reflects the current layout of the Wasaga Stars Arena Facility. Refer to Appendix 'A'. Specific comments made here-in are referenced on these drawings with a corresponding alphabet letter tag.

For the purpose of this report, 'River Road West' (ie. King's Highway #92) is situated on the north side of the property (ie. project orientation / bearings).

### **2.3 Building Code & Fire Code Parameters**

Wasaga Stars Arena: Designated use is Group 'A3" Assembly (Arena) & Group 'A2" Assembly (Upper Hall / Auditorium)

- Building is not equipped with a sprinkler system
- Building is not equipped with a stand-pipe system
- Building is equipped with Fire Alarm System
- 2-storey building height (no basement); 11'-4" (3.45 metres) floor-to-floor height
- Building 'faces 3 streets' (by OBC definition)
- Construction is a combination of combustible & non-combustible materials
- Building footprint area is +/- 24,360 square feet (2263 square meters)

Wasaga Stars Recreation Camp:

Small single sleeping cabin units designated as a Group 'C' - Residential Use  
Separate 'wash-house' building designated as a Group 'A2' - Assembly Use  
Multi-Purpose Hall building designated as a Group 'A2' - Assembly Use

- Buildings are not equipped with a sprinkler system
- Buildings are not equipped with a stand-pipe system
- Multi-Purpose Hall is equipped with Fire Alarm System
- Single storey buildings
- Combustible construction

### **2.4 Ontario Building Code (OBC) Designations**

The Arena building is classified in the Ontario Building Code (OBC) under both Section 3.2.2.26 and Section 3.2.2.30 (Refer to Appendix 'C'), both of which demand:

- 1) a full sprinkler system in all parts of the building, and
- 2) a minimum 45-minute fire separation assembly between the main floor level and the upper level Hall / Auditorium.

In its current condition, the Wasaga Stars Arena does not have a sprinkler system, nor is there a 45 minute fire separation between the upper level Hall / Auditorium and the lower level Lobby & Dressing Rooms.

However, this building has been what is commonly known as "grandfathered" under the Ontario Building Code (OBC) and under the Ontario Fire Code (OFC) as an existing non-conforming building.

This means that there is no current mandate to upgrade the building accordingly, provided there is no major changes made to 'affect' the building (i.e. major interior refurbishment; larger building addition; increased occupant load capacity; change of the "use" of the building; and similar conditions).

At the time of this report, there were no known Orders to Comply / Upgrade issued by the Town of Wasaga Beach Building Department and/or Town of Wasaga Beach Fire Department.

## **2.5 Interior Fire Separations**

At this time, there are limited existing vertical and horizontal fire separations (ie. fire-rated wall and ceiling assemblies) in the Wasaga Stars Arena. However, to meet today's building code standards, there should be a horizontal fire separation between the upper level Hall and the floor below, a vertical fire separation between the upper level Hall and the adjacent rink area, vertical and horizontal fire separations between the stairways and the rest of the building (both floor levels), a vertical fire separation between the Refrigeration Room and the adjacent Ice-Resurfacers Machine Room as well as vertical and horizontal fire separations on both of the two (2) Janitor Rooms. All fire resistance ratings must be a minimum of 45-minutes, except for the Refrigeration Room which must be 2-hours.

There are no required fire separation assemblies required within the recreational camp buildings.

As noted above, there are numerous fire separation deficiencies observed throughout the Wasaga Stars Arena building. However, once again, it is noted that this building is "grandfathered" under the OBC and under the Ontario Fire Code (OFC) as an existing non-conforming building. This means that there is no current mandate to upgrade the missing fire separations in this building accordingly, provided the current use of the building does not change. It is, however, strongly recommended that a maintenance program be implemented to upgrade fire separations to at least the Service rooms, the Janitor Rooms, the Refrigeration Room and the exit stairwells. The scope of work would include walls constructed of 5/8" rated Type 'X' drywall on both sides of wood or metal studs, fully taped, mudded and sealed - all such that there are no voids whatsoever. Fully sealed 8" thick concrete block walls can be used as an alternative. Scope of work should also include fire stopping of all service penetrations through the floor, wall and ceiling membranes in these rooms; the use of fire stop caulking for metal pipe and conduit penetrations; the use of fire rated collars (commonly known as "donuts") for PVC/ABS pipe penetrations; and 45-minute rated fire dampers on all mechanical ductwork penetrations.

Scope of work should also include upgrades to all existing doors and frames to these rooms with minimum 45-minute rated hollow metal doors and rated hollow metal frames; doors shall be equipped with a door closer and self-latching hardware.



## **2.6 Occupant Load**

The 'legal' occupant load for the Wasaga Stars Arena has been calculated at 283 bench seating + 229 standing spaces as per OBC 3.3.2.7. (seat width per person is 17.75"). A total load of 512 persons can be legally accommodated in the rink area. In reality, persons standing and sitting typically use more than the 17.75" space allotted by the OBC; therefore, the 'actual', more comfortable capacity of +/- 420 (230 sitting + 180 standing) is recommended.

The occupant load for the upper Hall / Auditorium is 'posted' to a maximum of 182 persons at any one time.

The occupant load of the Lobby and other miscellaneous rooms will not adversely affect the buildings ability to accommodate egress and exiting. These spaces can be considered as having a "non-concurrent occupant load". Overall, the available number and width of all existing "exit doors, paths of egress, and exit stairways" will easily accommodate the Arena building's maximum occupant load capacity.

The occupant load for the Recreation Camp Multi-Purpose Hall Building (30' x 60') is 'posted' to a maximum of 96 persons at any one time, and is easily accommodated with the available "exit doors and paths of egress widths".

## **2.7 Washroom Capacity**

Loading for the Wasaga Stars Arena at full capacity (seat + standing) as per OBC Table 3.7.4.3.(12) requires 3 male water closets + 4 female water closets. Currently, there are 3 water closets in each washroom, which leaves a deficiency of 1 female water closet. However, in reality, there is a need for much more female washroom facilities above and beyond the minimum OBC standards for this type of building use, and as such it is recommended that the number of male and female washrooms should be doubled.

The OBC demands the provision of a barrier-free washroom; a single unisex room is required as a minimum, but separate designated male/female rooms are certainly recommended. There are currently no barrier-free washroom facilities on the Main floor level. Modification to the south end of the current under-utilized Snack Bar / Concession Booth could be easily renovated to accommodate a single unisex barrier-free washroom accessible from the Lobby area. As such, it is recommended that this room be provided.

Loading for the posted occupant load capacity in the upper level Hall / Auditorium (182 persons) as per OBC Table 3.7.4.3.A requires 2 male facilities (water closets)+ 4 female facilities (water closets). Currently, there are 3 water closets in each washroom, which leaves a deficiency of 1 female water closet. Each of the washrooms has an enclosed stall for wheelchair use. However, the OBC minimum wheelchair clearances at the stall doors and inside the stall itself do not currently meet minimum standards.

At present, there is no separate Staff Washroom available. This is not a code infraction but more of a preferred convenience for facility staff.

## **2.8 Assessment of Specific Components**

Specific facility components, rooms and spaces have been reviewed and analyzed individually. The majority of these items are considered to be 'grandfathered'. Each item is assigned a work priority number, as follows:

**Priority #1** - items requires immediate attention,

**Priority #2** - items should be scheduled at the first convenient opportunity, and

**Priority #3** - items have low importance but should still be considered pending budget availability.

Where necessary, each item has been referenced to the 'as-built' floor plan drawing using corresponding alphabet letter heading.

The following comments are listed for consideration:

### **a) Barrier-Free Lift (Elevator):**

No review was made to the existing barrier-free lift assembly. It is assumed that in order to use the lift, the Municipality would have an on-going maintenance program with an approved licensed vertical lift device company, and therefore should have a clean "bill of health". Based on our discussions with Phil Eichler – Facilities Foreman (Town of Wasaga Beach), it is our understanding that Elevator 1 Inc. (Barrie, Ontario) has performed service on this lift in the past. If this is not the case, an inspection by a certified elevator company is recommended.

It should be noted that the existing lift is not a full service elevator. In accordance with the Accessibility for Ontarians with Disabilities Act (draft regulation), a full-service elevator would be required for disabled access to the upper level Hall / Auditorium.

### **b) North & South Exit Stairways:**

#### **North Stairway**

This stair leads directly from the second level Auditorium to the main floor level Vestibule. However, persons using this stair must travel across the interior main floor before they can access an exterior doorway (considered to be an illegal non-conforming condition). The elevator spills into this stairwell on both floor levels (illegal non-conforming situation). There is no "easy fix" for these problems. Although "grandfathered", it is recommended that the following upgrades be considered as priority #1:

- ensure all exit signs are properly illuminated,
- replace main floor aluminum vestibule doors (ie. existing door between lobby and area at base of stairway) with 45-minute rated hollow metal assemblies c/w gwg glazing, door equipped with closer and self-latching hardware,
- replace (3) Storage Room doors with 45-minute rated door assemblies, equip doors with closer and self-latching hardware,
- area carpet at top landing poses a trip hazard within the stairwell. Remove carpet,
- upper landing railings/guards have vertical pickets spaced wider than the OBC required minimum of 4", and is too low off the landing (36" measured on-site; 42" is OBC Minimum height requirement). Modify or replace accordingly,
- coat racks are not permitted in stairwells,
- handrails need to extend a minimum of 12" beyond the top and the bottom risers;
- ceilings are currently finished with wood (i.e. combustible materials); recommend covering all wood inside the stairwell with 1 layer 5/8" Type 'X' finished drywall,
- several HVAC ducts penetrate thru the stairwell (ie. vertical fire-separation); recommend that 45-minute dampers be installed at all locations where ducts penetrate the perimeter walls,
- a portion of the black fixed steel gate obstructs the path of travel at the bottom of the stairway; recommend removal of a portion of existing gate.
- OBC demands a minimum of 6'-9" to the underside of any structure inside a stairwell; the existing lower bulkhead is only 6'-2". This poses a hazard to persons using the exit; recommend adjusting the clearance height accordingly (not easily accomplished),
- patch as voids in all floor, wall and ceiling planes; fire caulk and fire-stop all other service penetrations,
- the leading edge of each tread (at the nose) must be demarked with a dissimilar material and have non-slip properties. Recommend installing purpose made-coloured, industrial 'grit' tape, minimum 1" wide x entire width of each tread.

### **South Stairway**

This stair leads directly to the exterior at grade (south side of building), and serves the upper Auditorium as an emergency exit only. Therefore, no fire separation is necessary at the top doorway. Although "grandfathered", it is recommended that the following upgrades be considered as priority #1:

- stair riser heights are not consistent (range from 6.5" to 9") and tread lengths are equally inconsistent (range 9.5" to 12"). This poses a trip hazard to users; reconfiguration is recommended,
- the height of the handrails are not consistently at 36" above the nosing line, nor do they extend a minimum of 12" beyond the top and the bottom risers; replacement is recommended;

- ceilings are currently finished with wood (i.e. combustible materials); it is recommended that all wood ceilings within the stairwell be covered with 1 layer 5/8" Type 'X' finished drywall,
- several HVAC ducts penetrate thru the stairwell; recommend that 45-minute dampers be installed at all locations where ducts penetrate the perimeter walls,
- remove deadbolt on exit door at bottom of stairs; this is considered illegal hardware on a required exit door,
- make good the panic release bar hardware (maintenance only),
- OBC demands a minimum of 6'-9" to the underside of any structure inside a stairwell; the existing lower bulkhead is only 6'-0". This poses a hazard to persons using the exit; recommend adjusting the clearance height accordingly,
- exterior exit door swings out over a 16" deep concrete step. Provide a full depth 48" x 48" landing with maximum riser heights of 7 7/8" high (landing to grade & landing to floor level). Refer to Photo 3 below.
- fire alarm pull station is 'hidden' from view by persons leaving the upper floor level; relocate as necessary,
- patch all voids in the floor, wall and ceiling planes; fire caulk and fire-stop all other service penetrations,
- the leading edge of each tread (at the nose) must be demarked with a dissimilar material and have non-slip properties. Recommend installing purpose made, coloured, industrial non-slip 'grit' tape, minimum 1" wide x entire width of each tread.

Photo 3 – Existing Exit Door at South Side of Building



**c) Upper Level Hall / Auditorium:**

Vertical & horizontal fire separations to the floor below, to the North Stairway and to the wall assembly to the adjacent Ice Rink area are non-existent. Although "grandfathered", it is recommended that the following upgrades be considered as priority #2:

- supplement additional emergency lighting to cover the entire floor area,
- the portable single step at the stage area is loose and poses a trip hazard,
- the stage does not provide barrier-free accessibility. An 8' long ramp (c/w railings both sides) is necessary,
- the amount of exposed wood (i.e. combustible wall & ceiling coverings) is in contravention with the OBC rules for combustibility. It is unknown if there is currently any clear coat fire retardant treatment to the wood surfaces. If not, it is recommend that all wood wall and ceiling finishes be treated with a clear intumescent fire-retardant coating,
- no specific problems noticed with the 4 exterior windows; there are no signs of air/water infiltration; caulking / sealant appears in good condition,
- the barrier-free path of travel from the elevator extends thru the 2 small aluminum doors to the Auditorium. The width of either door leaf is not adequate to achieve proper barrier-free accessibility. Recommend replacing both doors with new 36" wide single door c/w smaller fixed-in-place inoperable door leaf (pinned to allow it to open if increased width is necessary for "move-in" procedures,
- width of hallway leading from the lift is only 36" wide; the Ontario Building Code demands all paths of travel for barrier-free accessibility be a minimum of 43.5". It is recommended that the size of the adjacent Storage Room be reduced accordingly,
- similarly, the width of hallway leading to the Ladies Washroom is only 36" wide; OBC demands all paths of travel for barrier-free accessibility be a minimum of 43.5". It is recommended that the stage wall extension be shortened.

**d) Upper Level Kitchen:**

In order to satisfy current OBC and barrier-free design requirements (in accordance with Accessibility for Ontarians with Disabilities Act), the following recommended work items in the Kitchen can be considered as priority #3:

- provide wing-handled trim at the sinks and lavatories,
- provide purpose-made insulated 'boot' protection to exposed piping under sinks and lavatory basins,
- accessory devices (soap dispenser, paper towel dispenser, etc.) are mounted too high. The area of activation on these devices must be no higher than 47" above finish floor.
- counter-tops offer no accessibility for wheelchair users (no leg room space provided).

**e) Upper Level Public Washrooms:****Men's Washroom:**

This room has been recently upgraded (cosmetically). Recommended work items in the Men`s Washroom can be considered as priority #3:

- barrier-free washroom stall does not meet accessible standards; nor do clearances within the stall; nor does the clearance to the stall door. This is not easily corrected given the 'tightness' of available space,
- coat hook in the barrier-free stall is mounted too high,
- provide purpose-made insulated 'boot' protection to exposed piping under lavatory basins,
- provide universal barrier-free signage at the entrance of the Washroom and on the barrier-free stall.

**Women's Washroom:**

Similar to the Men`s Washroom, this room has been recently upgraded (cosmetically).

Recommended work items in the Women's Washroom can be considered as priority #3:

- barrier-free washroom stall does not meet accessible standards; nor do clearances within the stall; nor does the clearance to the stall door. This is not easily corrected given the 'tightness' of available space,
- coat hook in the barrier-free stall is mounted too high,
- provide purpose-made insulated 'boot' protection to exposed piping under lavatory basins,
- provide universal barrier-free signage at the entrance of the Washroom and on the barrier-free stall.

**f) Upper Janitor Room:**

Recommended work items in the Janitor Room (accessed from the Women's barrier-free stall) can be considered as priority #2:

- this is a very 'tired' space with door and hardware problem, fire separation issues, fire stopping issues, exhaust issues and poor access. Consideration should be made to discontinue the use of this small room as a Janitor Space given that the required upgrades will be quite extensive and expensive as well.

**g) Main Entry Vestibule:**

The Main Entrance Vestibule consists of glass walls and lightly insulated spandrel panels. The roof currently experiences ongoing water infiltration (sometimes to the extreme); water has been noticed running down the windows and running down the roof/wall joint over the interior sliding door area. Refer to Photo 4.

Photo 4 – Main Entry Vestibule (West Side of Building)



Recommended work items for the roof replacement can be considered as priority #1, with the balance of work items as priority #3:

- proper barrier-free accessibility needs to be provided thru the exterior door - raise the exterior slab to achieve a maximum 'bump' into the building of 1/2" or less. Slope not to exceed 1:20,
- provide barrier-free signage on both sliding door assemblies,
- telephone and fire alarm pull station device are too high - lower both such that the area of activation is no higher than 47" above finish floor level.
- ceilings are finished with wood (i.e. combustible materials); recommend covering all wood inside the 'Entry' with 2 layers 5/8" Type 'X' finished drywall (under the upper floor), and 1 layer of 5/8" Type 'X' finished drywall (under the roof),
- remove keyed/thumb turn hardware from double swing entry doors leading to the Lobby, and equip both door leaves with panic release hardware for proper exiting procedures,

- remove unrated (abandoned) ticket booth opening, or, provide 45-minute rated shutter door assembly,
- several HVAC mechanical ducts penetrate thru the stairwell area of this Entry space; recommend that 45-minute fire-rated dampers be installed at all locations where ducts penetrate the perimeter walls of this area,
- life span of the flat roof provided over the Main Entry including all related flashing details have been surpassed. In order to properly eliminate water infiltration, it is recommended that the existing rooftop HVAC units be temporarily removed, remove all existing flashings and roofing, provide new flashing, provide a new built-up roof assembly, counter flash, make water-tight, reinstall the RTU assemblies, and make good (priority #1).

#### **h) Referee Room:**

The existing Referees Room is very 'tired', run down and poorly equipped in the washroom area. Recommended work items in the Referee's Room can be considered as priority #3:

- provide 2 layers of 5/8" Type 'X' finished drywall to the underside of the Stairway inside the small Storage Room,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- skate flooring needs full replacement,
- washroom and shower area are currently not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access.

#### **i) Dressing Room No. 1:**

This dressing room is of good size (expanded in 2003), with newer floor and freshly painted walls. All dressing rooms are provided with a washroom / shower area consisting of a single shower fixture, a vanity type lavatory and a water closet. The washroom/shower area in this dressing room is very 'tired', run down, poorly equipped and lacks privacy (especially for girl's teams).

Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- break-away pressure sensitive coat hooks should be considered (potential hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom / shower area is not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access.



**j) Dressing Room No. 2:**

This dressing room is of good size (expanded in 2003), with newer floor and freshly painted walls. However, the washroom/shower area is very 'tired', run down, poorly equipped and lacks privacy (especially for girl's teams). Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom and shower area are not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access.

**k) Dressing Room No. 3:**

This dressing room is quite small in size with freshly painted walls. The washroom/shower area is very 'tired', run down and poorly equipped. Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- this dressing room is too small for minor hockey / competitive teams,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom and shower area are not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access,
- skate flooring needs full replacement.

**l) Dressing Room No. 4:**

This dressing room is quite small in size with freshly painted walls. The washroom/shower area is very 'tired', run down, poorly equipped and lacks privacy (especially for girl's teams). Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- this dressing room is too small for minor hockey / competitive teams,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom and shower area are not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access,
- skate flooring needs full replacement.

**m) Dressing Room No. 5:**

This dressing room is of adequate size with newer floor and freshly painted walls (added to original building in 1986). However, the washroom/shower area is very 'tired', run down, poorly equipped and lacks privacy (especially for girl's teams). Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom and shower area are not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access (easily remedied by shortening adjacent bench),
- this room has an exterior exit door (in good condition); however, the doors swings open directly into the driveway. This is a potential hazard to the facility user and should be remedied by providing exterior protective painted steel bollard units. Replace sill, sweep and weather stripping.

**n) Dressing Room No. 6:**

This dressing room is of adequate size with newer floor and freshly painted walls (added to original building in 1986). However, the washroom/shower area is very 'tired', run down, poorly equipped and lacks privacy (especially for girl's teams). Recommended work items can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- break-away pressure sensitive coat hooks should be considered (potential hanging hazard),
- provide lower hooks to accommodate wheelchair users/visitors,
- washroom and shower area are not barrier-free accessible,
- entry door does not have OBC minimum clearances for barrier-free access (easily remedied by shortening adjacent bench),
- this room has an exterior exit door (in good condition); however, the doors swings open directly into the driveway. This is a potential hazard to the facility user and should be remedied by providing exterior protective painted steel bollard units. Replace sill, sweep and weather stripping.

**o) Viewing Lobby:**

The existing Lobby is newly equipped with T8 light fixtures. Recommended work items can be considered as priority #3:

- provide water fountain at barrier-free height and with clearance minimums for wheelchair users,
- there is no viewing accommodation for wheelchair users - windows overlooking the ice arena area are far too high (sill is 51" above finish floor level); there is no physical room to provide interior ramp and raised platform as a remedy. There is no easy solution for this problem.

**p) Public Washrooms (Lower Level):****Women's Washroom:**

This room is very 'tired', run down and poorly equipped. Recommended work items in the Women's Washroom can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- washroom does not meet barrier-free accessible standards in any way. This is not easily corrected given the 'tightness' of available space,
- entry door does not have OBC minimum clearances for barrier-free access,
- a washroom containing 3 water closets is required to have a minimum of 2 lavatory Basins; this room currently has only 1 lavatory,
- it is strongly recommended that the support capacity for the wall-mounted baby change table assembly be reviewed by a professional engineer (priority #1). Refer to comments in Section 3 – Structural Evaluation / Assessment of Existing Buildings .

**Men's Washroom:**

This room is very 'tired', run down and poorly equipped. Recommended work items in the Men's Washroom can be considered as priority #3:

- there is a "line of sight" privacy issue at the entry door,
- washroom does not meet barrier-free accessible standards in any way. This is not easily corrected given the 'tightness' of available space,
- entry door does not have OBC minimum clearances for barrier-free access,
- a washroom containing 3 water closets is required to have a minimum of 2 lavatory Basins; this room currently has only 1 lavatory.
- it is strongly recommended that the support capacity for the wall-mounted baby change table assembly be reviewed by a professional engineer (priority #1).

**q) Electrical Service Room:**

This room has two (2) entry doors, one from the Washroom hallway and one from the front Entry. Recommended work items can be considered as priority #2:

- patch voids in ceiling drywall, mud exposed joints and screw heads,
- provide fire caulk to perimeter of ceiling/wall joint,
- fire stop all services penetrating the ceiling and the interior walls,
- install fire dampers to all ductwork penetrating the ceiling and the interior walls,
- change out both entry doors with new 45-minute hollow metal rated door and frame; equip doors with closer and self-latching hardware,
- insulate void around perimeter of duct work penetrating the exterior wall.

**r) Office and Snack Bar:**

The Snack Bar area is very underutilized and larger than is required for snack service. The south end of this area could be gutted and renovated to house a new unisex barrier-free washroom with access from the Lobby. Recommended work items can be considered as priority #3:

- provide barrier-free hardware to all doors,
- remove abandoned fume hood system in its entirety - this would clean up a long run of welded metal exhaust duct thru the Janitor Room,
- counter, shelving and other millwork is very 'tired' - consider complete replacement.

**s) Janitor Room:**

This is a multi-storage, workshop, janitor room occupancy. Recommended work items can be considered as priority #2:

- change out entry door with new 45-minute hollow metal rated door and frame; equip door with closer and self-latching hardware,
- correct numerous fire stop deficiencies, missing 5 fire dampers in duct work penetrating walls and ceiling,
- infill void in demising wall to adjacent rated exit stairway,
- ceiling is finished with unrated exposed wood (i.e. combustible materials); recommend covering all wood inside this room with 2 layers of 5/8" Type 'X' finished drywall,
- consider use of rated steel garbage containers for waste disposal in this room.

**t) Ice Rink – Spectator Seating Area:**

The interior of the ice rink area is well kept and clean with newly covered plastic seating benches, and a new barrier-free ramp provided along the South side of the ice to allow for two (2) wheelchair spaces for viewing. The location and design of the steel pipe hand-rail that is provided along both the North & South sides of the ice surface (used to delineate the standing room from the seating area), is very small with little to no room for persons to pass by anyone standing at the rail. In its current condition, there is inadequate aisle width to ensure this is an entirely safe situation. Refer to Photo 5.

Photo 5 – Spectator Seating / Standing Area (North Side)



Recommended work items can be considered as priority #3:

- stairs accessing the tiered seats and the standing room upper railing are not Code Compliant; riser heights are far too high, and without adjacent handrails makes using these steps extremely awkward. This no physical space to allow a remedy for this problem,
- trip hazards exist at some of the 4 available exit doors,
- ensure all 4 exit signs are properly illuminated,
- some exit doors require door sills, new sweeps and weather stripping,
- there is an adequate number of exit doors to serve the maximum calculated occupant load of 512 persons,
- handrails to the steps/stairs on the West end of the spectator seating area require complete replacement in order to meet OBC requirements,

- there is an exit problem from the extreme East end of the ice rink floor space (service/staff only area); there are locked steel gates between the service area and the public seating, which creates an exit problem for any staff in the service area. Remedy by adding a new insulated exit door assembly on the North exterior wall close to the NE building corner, c/w an illuminated exit sign (for location, refer to drawing),
- both Eastern-most exit door on the North and South sides of the rink exit out onto a precast stoop and step. The guards and rails on these stoops/steps must be entirely replaced with Code compliant guards and rails,
- it is strongly recommended that exterior lights be added above the stops/steps to illuminate the exit assembly.

**u) East Storage/Work Room:**

This room is used for general storage, as a workshop, and as a means to access the Olympia Room. Recommended work items can be considered as priority #1:

- replace existing wood entry door with new 45-minute insulated hollow metal rated door and frame; equip door with closer and self-latching hardware,
- there is currently an exit problem from this room. Remedy by adding a new insulated exit door assembly on the North exterior wall c/w an illuminated exit sign (for location, refer to drawing),
- weather seal the perimeter of the overhead door,
- cover existing ceiling with 2 layers of 5/8" finished vapour resistant rated drywall,
- provide proper emergency lights.

**v) Ice-Resurfacer Machine Room (Olympia Room):**

This room is used for storage of the gas-fired Olympia ice cleaning vehicle, and as a means to access the Refrigeration Room. At present, there is no vestibule / air lock between the Refrigeration Room and the adjacent Ice-Resurfacer Machine room. Recommended work items can be considered as priority #1:

- replace both existing interior entry door (wood) with new 90-minute insulated hollow metal rated door and frame; equip door with closer and self-latching hardware,
- there is an exit problem from this room. Remedy by adding a new insulated exit door assembly on the North exterior wall c/w an illuminated exit sign (for location, refer to drawing),
- weather seal the perimeter of the overhead door,
- cover existing ceiling with 2 layers 5/8" finished vapour resistant rated drywall,
- provide proper emergency lights.

**w) Refrigeration Room:**

This room is serviced by a double hollow metal exit door that requires new sill, sweep and weather stripping. It appears that regular maintenance and inspections are carried out successfully. Recommended work items can be considered as priority #1:

- replace existing interior entry door with new 90-minute insulated hollow metal rated door and frame; equip door with closer and self-latching hardware,
- there is a gas-proofing safety issue with this room. There is no rated interior vestibule separating the Refrigeration Room from the Olympia Room space. There is not enough physical space to accommodate the code-mandate vestibule.
- weather seal the perimeter of the exterior door,
- cover existing ceiling with 2 layers 5/8" finished vapour resistant rated drywall,
- provide proper emergency lights.

**x) Building Exterior:**

The Wasaga Stars Arena building consists of 10'-0" high exposed concrete block (8" thick), topped with 10'-0" high pre-finished metal (or vinyl) siding. A number of roof types are present on the single storey additions – built-up tar & gravel roofing over precast concrete roof slabs for Dressing Room Nos. 5 & 6, built-up tar & gravel roofing supported by wood decking and timber glulam support beams for the Main Entry Vestibule, standing seam metal roofing for the expansion of Dressing Room Nos. 1 & 2. The main roof over the Rink Surface and second level Auditorium consists of standing seam metal roofing (galvalume finish), some of which has been covered with a spray-on water-proofing membrane (ie. roof over the 2-storey portion – west end of building). Portions of the sloped standing seam roofing (directly over the arena) is displaying rust at the top seam area. Refer to Photo 6.

Photo 6 – Standing Seam Metal Roofing (North Side of Arena)



The exterior wall assembly of the Wasaga Stars Arena consists of 8" thick concrete block + 15 lb. tar paper (air barrier) + 1" thick white open cell styro-foam board insulation. The building is significantly under-insulated, causing strain on the building's mechanical HVAC system and refrigeration system & equipment. It is expected that the heat gain / loss is significant. The current R-Value for the perimeter / exterior walls of the Arena is estimated at R10. The addition of an R15 prefinished insulated wall panel to the exterior walls of the arena (ie. "Kingspan" Insulated Wall Panels or approved equal) will have a dramatic effect on heat gain / loss through the exterior walls of the building. However, the cost for this work may not prove to have any reasonable payback period whatsoever.

Priority of work items is individually identified (refer to floor plan for location of each item):

1. Re-roof flat roof over Main Entry Vestibule - priority #1,
2. Consider re-roofing Dressing Room Nos. 5 & 6 area within 9-10 years. On-going inspection and regular maintenance needs to be maintained - priority #3,
3. There is evidence that the standing seam metal roofing over Dressing Room Nos. 1 & 2 has been damaged from high roof ice fall. Refer to Photo 7. Adding additional ice guards to the upper sloped roof may alleviate some of this problem - priority #2,
4. There are no ice guards on the sloped metal roof over Dressing Rooms 1 & 2. Consider adding these to reduce potential damage to objects/people below - priority #1,

Photo 7 – Standing Seam Metal Roofing (Dressing Room Nos. 1 & 2)





5. Two of the exit doors on the North and South sides of the rink (ie. east end of rink) exit out onto a precast stoop and step. The guards and rails on these stoops/steps must be entirely replaced with Code compliant guards and rails. Refer to Photo 8. Strongly suggest that exterior lights be added above the stoops/steps to illuminate the exit stair assembly - priority #1,

Photo 8 – Exterior Exit Door (South Side of Arena)



6. There is some flashing damage requiring maintenance at the bottom edge of the upper wall siding. Although mostly cosmetic in nature, left uncorrected could lead to future water infiltration problems - priority #3,

7. Protect exit doors from Dressing Rooms 5 & 6 from passing vehicle damage - remedy with protective painted steel bollard units. Refer to Photo 9. Replace sill, sweep and weather stripping - priority #1,

8. Barrier-free parking spaces are located across the main North-South driving lane across the West side of the Arena. Persons using these parking spaces should not be crossing traffic to access the Main entrance. Although expensive, consider re-organizing/switching the location of the barrier-free parking with the location of the driveway lane - priority #3,

9. Overall illumination of the parking area is poor - priority #3,

10. It appears that the nearest available fire hydrant is too far away from the building entrance(s). It is situated down the lot entry driveway closer to the King's Highway #92. Since this building is currently un-sprinklered, it is strongly recommended that a new on-site fire hydrant be provided - priority #1,

11. There are no signs/demarcations to delineate the required Fire Access Route on the site, c/w no parking areas to ensure emergency vehicles have unencumbered access to the Main building Entrance - priority #1,

12. Structural timber support columns / posts (support of timber roof trusses) are exposed to the elements along the North and South building faces. Some of the timber columns are showing signs of significant deterioration (*refer to Photo 9*). If left exposed, structural damage and deterioration will persist - priority #1.

Photo 9 – Exit Doors for Dressing Room Nos. 5 & 6 (West Side)



Photo 10 – Exposed Timber Columns ( North & South Sides)



**y) Other General Matters:**

In addition to the above noted deficiencies, there are other miscellaneous deficiencies observed by the undersigned that require remedial repair; they are as follows:

- Ensure that all public access building controls are no higher than 47" above finish floor level (in accordance with Accessibility for Ontarians with Disabilities Act regulations).
- Lower all fire extinguishers to maximum 47" above finish floor level.
- Provide barrier-free wing-handled door hardware on all man doors.
- Provide barrier-free wing handled plumbing trim to all basing and lavatories.
- Remove manual foot/door hold-open stops from all rated doors.
- Replace all ABS plastic piping (not permitted in a building of this size and use) with new PVC-XFR designated plastic (rated) piping, or with metal/cast pipe as an alternative.
- Upgrade all required fire separation walls and ceilings. All building services that penetrate the vertical and horizontal fire separations (ie. wall & ceiling assemblies) must be fire-stopped with approved fire-stopping measures. Provide fire damper(s) to all mechanical duct work that penetrates these planes.

### ***3.0 Structural Evaluation / Assessment of Existing Buildings***

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A detailed structural inspection of the arena facility was initially completed by Dan Barill, P.Eng. (Barill Engineering Limited) on April 24, 2013. Follow-up site inspections / reviews were completed by Dan Barill, P.Eng. on May 16, 2013, June 05, 2013 and on July 10, 2013. The purpose of these inspections was to review the current condition of the structural components of the facility including the timber-frame roof structure, the second floor framing (Hall / Auditorium), the foundation sub-structure and the exterior components of the building envelope (exterior block walls, standing seam metal roofing, exterior cladding, etc.) and to identify changes in the condition of the structure, modifications and possible changes in building use, which could have an effect on the structural integrity of the facility.

#### ***3.1 Executive Summary***

Based on our review, it appears that there are two (2) major structural deficiencies that must be addressed in the immediate future. They are summarized as follows:

- a) There is evidence of significant rot and deterioration on some of the exposed timber columns provided along the north and south sides of the building (ie. specifically where the timber columns bear on the perimeter foundation wall). It is important to note that the observed deterioration at the base of these timber columns will eventually result in a reduction in the structural load-carrying capacity of these timber support columns. It is strongly recommended that remedial repairs be completed on those exposed timber columns where the observed deterioration is considered significant.
- b) Based on my structural analysis / evaluation, it is the opinion of the undersigned that the existing roof framing provided over the Main Entry Vestibule is **not** capable of supporting the design roof snow load as specified in the 2006 Ontario Building Code (including the additional weight of the roof top HVAC units). In addition, significant roof leaks have been observed in this roof. Complete removal / demolition and reconstruction of the Main Entry Vestibule is strongly recommended.

#### ***3.2 Wasaga Stars Arena***

As required by the Industrial Health & Safety Branch of the Ministry of Labour (as part of their program which requires arena inspections to be completed at no greater than 5 year intervals), previous structural inspections of the Wasaga Stars Arena was completed in 1999, 2004 & 2009 by Ainley & Associates Limited (Refer to Appendix 'D'). As noted in the structural engineering reports prepared by Ainley & Associates (dated May 21, 1999; September 22, 2004; June 09, 2009), the Wasaga Stars Arena building was found to be structurally sound; maintenance recommendations were provided in each of the above reports.

### **3.2.1 Timber Roof Framing**

The roof structure over the ice surface and second floor Auditorium (ie. 2 storey portion) consists of timber frame roof trusses, spaced every 24'-0" on centre complete with 5"x 14 1/2" Douglas fir roof purlins spaced every 4'-0" on centre. The roof assembly consists of 2 x 6 exposed roof decking (Douglas fir) and standing seam metal roofing (galvalume finish) over. It is unknown where there is any insulation between the wood decking and the standing seam metal roofing. Based on our review of other building components (ie. exterior wall assembly), it is likely that there is no insulation within the roof assembly.

Photo 11 – Existing Timber Roof Trusses (Ice Surface)



A visual inspection was performed by the undersigned on the existing timber frame roof trusses. Based on our visual inspection (no destructive testing performed during this site review), the timber frame trusses, roof purlins and support columns were found to be dry and in good condition throughout. There were no signs or indications of delamination, cracks, splintering or rot; minor checking was noted on some of the timber members but considered to be of no structural significance. The effects of the previous reported moisture problems (ie. water stains, discoloration and adhered dust on the surface of the timber members, as noted in a previous structural inspection report prepared by Ainley & Associates) is still evident.

However, it is noted that a new Desicon dehumidification system was installed within the rink area by Cimco Refrigeration in 2006, replacing the old dehumidifiers. The result is a significant reduction in the moisture content measured in the timber frame trusses over the ice surface. Surface corrosion was observed on the majority of the steel components including most of the exposed fasteners (bolts & washers), connection plates, brackets and beam saddles. This condition was typical on all exposed fasteners and metal components provided on the timber frames over the ice surface. In the previous structural report prepared by Ainley & Associates Limited (report dated June 09, 2009), it was recommended that all corroded structural fasteners and steel plates be cleaned with a wire brush and coated with a rust inhibitive paint. Based on our review, it would appear that this work has not been completed.

Photo 12 - Existing Timber Roof Trusses (Upper Level Hall / Auditorium)



During inspection of the building exterior, it was noted that the timber columns that provide structural support of the timber-frame roof trusses are located within the exterior block walls of the building (ie. north & south sides of the building); it is noted that these support columns are exposed to the weather. Based on comments provided in a previous structural inspection report (prepared by Ainley & Associates Limited, dated September 22, 2004), it was noted that these exposed timber columns were originally covered with metal flashing and it was recommended by Ainley & Associates that this flashing be removed from the base of the



columns, since the metal flashing effectively trapped moisture between the metal flashing and the timber column. In addition, it was recommended that the base of these exposed columns be coated with a creosote based wood preservative.

Based on discussions with Phil Eichler (Facilities Foreman, Town of Wasaga Beach), it is my understanding that this work was completed by arena staff in or around 2005. At the time of our inspection, there is evidence of rot and deterioration at the base of these timber columns (where the timber columns bear on the perimeter foundation wall). It appears that the creosote based wood preservative is no longer present on the timber columns provided on the south side of the building, likely the result of long term UV damage. However, the observed deterioration appears to be worst along the north side of the building where the asphalt pavement extends up tight to the perimeter foundation wall (ie. level with the top of the foundation wall). Based on my review, there are some locations where the observed dry rot and deterioration is of structural significance. It is important to note that the observed deterioration at the base of these timber columns will eventually result in a reduction in the structural load-carrying capacity of these timber support columns.

*Photo 13 – Exposed Timber Columns (South Side)*



Photo 14 – Exposed Timber Columns (South Side)



A structural analysis of the existing timber frame roof structure was performed by the undersigned. Based on my structural analysis / evaluation, it is the opinion of the undersigned that the existing timber frame roof structure (including timber frame roof trusses, roof purlins, roof decking) is structurally sound, with the exception of those timer support columns provided on the north & south sides of the building that show signs of dry rot / deterioration. This analysis takes into account the higher moisture readings that have been historically measured in the timber components provided over the rink surface. However, as noted above, the new Desicon dehumidification system installed by Cimco Refrigeration in 2006 has resulted in a significant reduction in the moisture content measured in the timber frame trusses provided over the ice surface.



### **3.2.2 Building Exterior**

As noted in Section 2 above, the exterior walls of the Wasaga Stars Arena building consists of 10'-0" high exposed concrete block (lower section of wall), topped with 10'-0" high pre-finished metal (or vinyl) siding (upper section of wall). It is unknown whether the exterior block walls contain any vertical and/or horizontal reinforcing. For the ice rink portion of the building, the exterior wall assembly consists of 8" thick concrete block, 15 lb. tar paper (air barrier), 1" thick white open cell Styrofoam board insulation, 2 x 3 SPF No. 2 stud framing plus 7/16" OSB sheathing (interior finish). For all other areas (ie. lobby, dressing rooms), with the exception of the exterior walls of Dressing Room Nos. 1, 2, 5 & 6, there is currently no insulation provided in the exterior wall assembly. The exterior block walls surrounding the building are considered to be non-load bearing since the timber frame roof structure is supported by timber support columns located within the exterior wall assembly (north & south sides of building). However, these block walls are required for structural resistance of the design wind loadings. Overall, the exterior block walls appear to be in good condition; it appears that regular maintenance that includes painting of perimeter block walls has been completed by arena staff. However, there is evidence of block and mortar deterioration at grade level (specifically along the north side of the building) that will require remedial repairs (ie. repointing of mortar joints, removal / replacement of deteriorated block units). In addition, there is evidence of deterioration of the exterior block wall provided along the south side of the Ice-Resurfacer Machine Room (east end of building); it appears that the observed deterioration of the upper block coursing is a result of moisture migration into the block cores. It is recommended that remedial repairs be completed on this load-bearing concrete block wall.

For the two dressing room additions (1986 Addition – New Dressing Room Nos. 5 & 6; 2001 Addition – Expansion of Existing Dressing Room Nos. 1 & 2), the exterior wall assembly consists of 6" concrete block (load-bearing), 2" rigid insulation, 1" air space and 4" concrete block veneer on the exterior face (ie. 12" cavity wall construction). Based on my review, these walls are generally in good condition, with the exception of the north exterior walls of Dressing Room Nos. 1 & 2 where moisture penetration through the exterior block veneer has resulted in deterioration of the mortar joints. Repointing of exterior block walls is recommended.

As noted above, the wall assembly above the 10'-0" level (above concrete block) consists of a combination of pre-finished metal siding and vinyl siding. Again, it is unknown whether any insulation is provided within this exterior wall assembly. The existing vinyl siding provided on the south and east sides of the building is in need of repair / replacement; there are a number of holes in the siding (likely caused by rocks being thrown at the building). The existing pre-finished metal siding provided on the north and west sides appear to be in good condition.

A limited review of the existing standing seam metal roofing was completed by the undersigned. Based on my review, surface corrosion was observed along the north slope of the roof (portion of roof over the rink surface).

Based on discussion with Mr. Phil Eichler – Facilities Foreman (Town of Wasaga Beach), it is my understanding that a portion of the standing seam metal roofing (ie. portion of roof above second level Auditorium) was covered with an elastomeric coating (completed by Weathercote Company Limited in the summer of 2011).

### **3.2.3 Foundation Sub-Structure**

The perimeter foundation walls of the building appear to be concrete block (assumed to be 8" concrete block). In addition, it appears that poured concrete piers are provided at all timber support columns (ie. structural support of timber frame roof trusses). Since design drawings of the original building are not available, we are unable to verify the size of the perimeter / exterior wall footings nor are we able to confirm that sufficiently sized column footing pads are provided at the timber support column locations. In addition, we are unable to determine whether sufficient frost protection is provided along the perimeter foundation walls of the building. However, based on the condition of the perimeter concrete block walls located above grade (ie. no evidence of cracked block or mortar joint that would suggest structural settlement or frost heaving), it is the opinion of the undersigned that the existing foundation sub-structure (including perimeter spread footings, column footing pads, perimeter foundation walls and column piers) is structurally sound and capable of supporting the design floor and roof loads.

### **3.2.4 Interior Concrete Block Walls**

Interior block walls located within the ground floor areas (ie. lobby, dressing rooms, Refrigeration Room, Ice-Resurfacer Machine Room) are typically 6" or 8" concrete block and are considered to be non-load bearing. Overall, these interior block walls appear to be in good condition with no evidence of cracked block or mortar joints; it appears that regular maintenance that includes painting of all interior block walls has been completed by arena staff.

It is assumed that there is no vertical reinforcing in any of the interior concrete block walls. Based on my structural analysis, it is the opinion of the undersigned that the existing concrete block walls provided in the lower level Public Washrooms are **not** capable of supporting the potential design live load from an adult sitting on a wall-mounted baby change table. It is therefore recommended that these baby change tables be removed from the existing Public Washrooms and re-installed in the new Barrier-Free Washroom.

### **3.2.5 Second Level Floor Framing (Auditorium / Kitchen / Bar)**

As indicated on the attached Second Level Floor Framing Plan, the existing second floor framing consists of 3" x 8" Douglas fir glulam floor joists spaced every 4'-0" on centre and are supported by 5" x 24" Douglas fir glulam support beams, spaced every 10'-0" o/c. These glulam support beams are supported by a continuous 8 ½" x 30" glulam support beam that runs the entire length of the main lobby / dressing rooms. This main support beam is located along the interior block wall that separates the main lobby from the adjacent offices / concession booth and is supported by a series of intermediate timber support columns (6 ½" x 6") and 6 ½" x 19" timber support columns located within the north and south exterior walls of the building. The floor decking consists of exposed 2 x 6 Douglas fir decking.

A structural analysis of the existing second floor framing was completed by the undersigned. Based on my structural analysis / evaluation, it is the opinion of the undersigned that the existing second level floor framing **is structurally sound and capable of supporting the design floor loads for Assembly Use, as specified in the 2006 Ontario Building Code (ie. Design Live Load = 100 psf).**

### **3.2.6 Roof Framing – Main Entry Vestibule**

The roof framing over the existing Main Entry Vestibule consists of 3" x 10 ½" glulam beams spaced every 6'-8" centres complete with 2x 6 exposed Douglas fir decking. These glulam beams span approximately 12'-0" and are supported by 3" x 8 ½" timber columns (provided along the exterior walls of the Entry Vestibule) and a continuous 3" x 10 ½" glulam ledger beam that is bolted to the exterior concrete block wall with ½" diameter bolts spaced every 24" o/c. The 3" x 8 ½" support posts are anchored to the perimeter foundation walls of the Entry Vestibule with steel plate saddle brackets. Based on my review, it would appear that these steel plate saddle brackets are exposed to the weather. As a result, significant surface corrosion has occurred on these exposed steel plate saddle brackets. Similar to the exposed timber support columns provided along the north and south exterior walls of the building, these timber columns are also showing signs of deterioration (ie. where the timber columns bear on the perimeter foundation wall). Over time, this observed dry rot / deterioration will become a structural concern. Remedial repairs and/or replacement of these exposed timber columns including the steel plate saddle brackets will ultimately be required.

A structural analysis of the existing Entry Vestibule roof framing was completed by the undersigned. Based on my structural analysis / evaluation, it is the opinion of the undersigned that the existing roof framing provided over the Main Entry Vestibule is **not** capable of supporting the design roof snow load as specified in the 2006 Ontario Building Code (including the additional weight of the roof top HVAC units). Due to the height of the main building in relation to the Entry Vestibule, this lower roof must be designed to accommodate an increase in snow load due to snow accumulation caused by drifting snow from the adjacent high roof.

At the time of this inspection, a significant roof leak was observed within this Main Entry Vestibule. This roof leak is likely the result of inadequate step flashing where the membrane roofing meets the exterior wall of the main building. It is also possible that the roof leak is a result of penetrations made through the roofing membrane at the locations where the railing support posts are anchored to the roof framing members. Either way, complete removal and replacement of the roof assembly including structural roof framing is recommended.

### **3.2.7 Conclusions & Recommendations**

Overall, the facility is in good condition and appears to be structurally sound, with the exception of the roof framing over the Main Entry Vestibule and the deteriorated timber support columns along the north and south sides of the building.

Based on our visual inspection of the facility, we provide the following recommendations regarding remedial repairs and maintenance to the building structure to ensure the ongoing structural integrity of the building's structural components:

1. Clean all corroded fasteners and steel plate components on the timber frame roof trusses with a wire brush and coat with a rust inhibitive paint.
2. Monitor the light surface corrosion found on the standing seam metal roofing (above rink surface).
3. Consideration should be given to replacing the timber-frame roof structure over the Main Entry Vestibule.
4. Complete all necessary remedial repairs to deteriorated timber frame columns (exposed along the north & south sides of building). Repairs may include replacement of dry rot / deteriorated section of timber support column and/or re-application of creosote based wood preservative.

### **3.3 Wasaga Stars Recreation Camp**

As noted above, the Wasaga Stars Recreation Camp is a full operational sports camp, consisting of seven (7) seasonal cabins, one (1) wash-house building and a recreation hall building (capacity for 96 persons). The primary use of the camp buildings is to house overnight guests (typically used in conjunction with sport or instructional camp activity relating to the Wasaga Stars Arena).

The exterior walls of the seasonal cabins / bunk-houses are constructed of 2 x 4 SPF No. 2 studs (spacing unknown), gypsum board and/or wood paneling on the inside face and horizontal wood siding on the exterior; it appears that ½" fibre board sheathing is provided on the exterior side of the wood studs for some of the cabins. The roof assembly for these cabin buildings generally consists of asphalt shingles, wood truss roof framing and gypsum board or wood paneling ceiling finish; it appears that fiberglass batt insulation has been provided in some of the cabins. However, there appears to be no vapour barrier on the warm side of the roof assembly. The foundation sub-structure consist of a poured-in-place concrete slab-on-grade; the interior floor finish is typically VCT flooring. Two (2) entrance doors are provided on each cabin; the doors are steel panel c/w wood frame; the exterior windows are aluminum clad windows and appear to be fairly new. There is no drip flashing above any of the windows or exterior doors. For the most part, the exterior grade is at the same elevation as the entrance door threshold. At many of the cabins, exterior site drainage is allowed to flow into the interior of the cabin (at the door opening). Evidence of rot and deterioration was observed on some of the exterior wood siding as well as the painted fascia boards. The majority of the deteriorated wood siding that we observed occurs at the base of the exterior walls and appears to be the result of the exterior siding extending to grade level (ie. exposed to perimeter drainage).

The exterior walls of the wash-house building are constructed of 8" concrete block. Cement parging is provided on the exterior face; a combination of paint and ceramic tile finish is provided on the interior side. The roof assembly consists of asphalt shingles, wood truss roof framing (assumed) and gypsum board ceiling finish. It is unknown whether insulation is provided in the attic space. Similar to the seasonal cabins, the foundation sub-structure consists of a poured-in-place concrete slab-on-grade; ceramic tile is provided on the majority of the floor areas. An old hot water heater including storage tank (disconnected and no longer operational) is provided in a corner closet (located in the women's washroom / shower area).

The exterior walls of the recreation hall building are constructed of 2 x 4 SPF No. 2 studs (spacing unknown), gypsum board and/or wood paneling on the inside face and horizontal wood siding on the exterior; it appears that ½" fibre board sheathing is provided on the exterior side of the wood studs. The roof assembly for this building consists of asphalt shingles, wood truss roof framing and gypsum board or wood paneling ceiling finish; since there is no attic access, it is unknown whether insulation is provided in the attic space. Similar to the other buildings, the foundation sub-structure consist of a poured-in-place concrete slab-on-grade; the interior floor finish is typically VCT flooring.

Generally, the buildings appear to be in good condition. It appears that arena staff performs routine maintenance (ie. cleaning, painting of interior and exterior finishes, installation of new finish flooring, etc.) on an annual basis.

## ***4.0 Evaluation / Assessment of Existing Mechanical, Electrical & Refrigeration Operating Systems***

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### ***4.1 Mechanical Systems***

Heating of the lower level of the 2 storey portion of the Wasaga Stars Arena facility (ie. lobby, dressing rooms, public washrooms, concession booth, offices) is provided by roof-top gas fired air handling heating only units (no air conditioning provided on the ground level). The second floor level (ie. auditorium, kitchen and public washrooms) is also heated by roof-top gas fired HVAC units complete with cooling module for summer cooling of this area. The above equipment including all associated duct work was installed in 1999, and was installed in accordance with Mechanical Design Drawings prepared by Ainley & Associates Limited. Four (4) air handling units are provided for the above system and were installed on the flat roof areas located at the west end of the building (ie. two roof-top units installed on the roof over the Main Entry Vestibule; two roof-top units installed on the roof over Dressing Room Nos. 5 & 6). Even though these four (4) roof top air handling units are now 14 years old, it appears that they are in good condition and operating adequately. Based on my discussions with Phil Eichler – Facilities Foreman (Town of Wasaga Beach), it is my understanding that regular maintenance has been completed on these roof-top air handling units. At the request of Barill Engineering Limited, Nottawasaga Mechanical completed a detailed review and inspection of all existing roof-top HVAC units at the Wasaga Stars Arena (review was completed on August 02, 2013). Based on their review, it was determined that all units were in good operation, despite the age of these units.

Heating of the spectator seating / viewing area (provided along the north & south sides of the ice rink) is provided by gas-fired infra-red heating units. These units including all associated gas piping was installed in 1999 (in accordance with Mechanical Design Drawings prepared by Ainley & Associates Limited). Heating of the Refrigeration Room is provided by a ceiling mounted electric unit heater. In addition, an approved ventilation system is provided within the Refrigeration Room that includes an exhaust fan and a fresh-air intake louvre c/w motorized damper.

Domestic hot water for the lower level dressing rooms and concession booth is provided via a gas-fired hot water heater including two (2) – 120 gallon storage tanks; this equipment is located in the Electrical / Mechanical Room (ground floor level). Hot water for ice-making purposes is provided by a separate gas-fired hot water heater plus one (1) – 120 gallon storage tank; this equipment is located in the rear Storage Room (adjacent to the Ice-Resurfacers Machine Room). The above noted mechanical plumbing equipment including all associated hot & cold water piping and gas piping was completed in 1999 (in accordance with Mechanical Design Drawings prepared by Ainley & Associates Limited).

Based on my review of the existing mechanical heating, ventilation and air-conditioning system, it is the opinion of the undersigned that the existing roof-top air handling units including associated duct-work that service the 2 storey portion of the facility is in good working order. Further, it is the opinion of the undersigned that the mechanical plumbing systems (including hot-water heating units, storage tanks and associated hot & cold water piping for both the domestic hot water system that supplies hot water to the main level dressing rooms and the hot water system that supplies hot water for ice-making operations) is in good working order.

#### **4.2 Electrical System**

The Wasaga Stars Arena is serviced by a 3 phase/60 hz/600 volt main electrical service, which provides power to the refrigeration plant (east end of building), the roof-top air-handling units (west end of building), the rink lighting (T5 fluorescent fixtures), concession booth equipment as well as all interior and exterior lighting fixtures and electrical receptacles.

As reported in the Energy Assessment Report (prepared for the Town of Wasaga Beach by Cornerstone Hydro Electric Concept, dated March 2013), the monthly energy consumption and electrical demand for the period between 2010 & 2012 revealed that the “electrical baseline consumption averages around 55, 000 KWh / month with higher usage levels during the summer months”. Further, it revealed that the electrical energy use breakdown by major end use equipment was as follows:

- Refrigeration Plant – 56.3%
- Roof-top Air Handling Equipment – 25%
- Interior & Exterior Lighting (including rink lighting) – 18.7%

The Recreation Camp is fed from the main service located in the Wasaga Stars Arena and consists of a 112.5 KVA, 1/60/600 volt service feed. This feed provides power for all exterior lighting as well as to a step-down transformer that provides 120/208 volt power to two (2) – 42 circuit lighting distribution panels; 200 amp disconnect breakers are provided for each distribution panel. These distribution panels provide electrical service to all seven (7) seasonal cabins, the wash-house building as well as the recreation hall building. Emergency & exit lighting is provided throughout the recreation hall building. Ceiling-mounted electric unit heaters (ie. 4 – 5KW heaters) are provided in the main hall / meeting room area, controlled by a thermostat. Due to the noise levels when these heaters are operating, the Town is looking to replace these heaters with a quieter system. Electric base-board heaters are provided in some of the cabins.

During our site investigations, it was noted that the electrical room located within the recreational hall building was quite warm (ie. excess heat produced by the step-down transformer). In addition, it appears that residential type floor fans have been provided in an effort to cool this room down. At the time of this inspection, these fans were not operational.

It is recommended that this room be equipped with a proper mechanical ventilation system (ie. exhaust fan c/w thermostat control) in order to regulate the heat within this electrical room.

### **4.3 Refrigeration System**

The refrigeration plant for the Wasaga Stars Arena consists of 2 – 50 Hp Vilter compressors (original equipment), an evaporative condenser unit (replaced in 2003), a chiller unit (replaced in 2005), 1 - 25 Hp brine pump, 1 – 5 Hp cooling tower pump, 1 – 3 Hp booster pump and 1 – ½ Hp compressor pump. The above equipment produces approximately 65 tons of cooling / refrigeration for the ice surface.

Based on discussions with Phil Eichler – Facilities Foreman (Town of Wasaga Beach), it is my understanding that compressor no. 2 was rebuilt in the fall of 2012 and compressor no. 1 was rebuilt in the spring of 2013 (rebuild work was completed by JL Wilson & Sons Limited). As noted above, the original evaporative condenser tower was replaced in 2003 and the original shell & tube chiller was replaced in 2005.

In 2006, a “Generac” gas-fired back-up generator was installed within the Refrigeration Room for emergency back-up of the refrigeration plant.

Also in 2006, a Desicon dehumidification system was installed over the rink surface by Cimco Refrigeration, thus replacing the original dehumidifiers. As noted above, this new dehumidification system has resulted in significant improvements in the humidity levels within the ice rink.

Based on the above, it would appear that the existing refrigeration equipment has been very well maintained over the years by facility staff. In addition, the capital purchase of new equipment (chiller & evaporative condenser) including the implementation of the back-up generator has resulted in a refrigeration plant that should remain operational for at least the next ten (10) years. However, it is recommended that the existing refrigeration header piping be tested by an approved testing & inspection company to determine whether sufficient pipe thickness is still available.



## ***5.0 Designated Substance & Hazardous Building Materials Audit***

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A copy of the Designated Substance & Hazardous Building Materials Audit (prepared by MTE Consultants Inc., dated June 06, 2013) is provided in Appendix 'B'.

As indicated in this report, the primary "Designated Substances" investigated by MTE for the purpose of this assessment included Asbestos, Lead, Mercury and Silica. In addition, the "Hazardous Building Materials" investigated by MTE for the purpose of this assessment included Polychlorinated Biphenyls (PCB's), Mould Growth and Ozone Depleting Substances.

## 6.0 **Summary – OBC Deficiencies / Violations**

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### 6.1 **Architectural Components**

The following is a summary of all building code deficiencies (based on the 2006 Ontario Building Code) relating to life & fire safety requirements (ie. interior fire separations, exiting), washroom requirements and building envelope requirements as well as accessibility deficiencies within the facility (in accordance with Accessibility for Ontarians with Disabilities):

- 1) **Barrier-Free Lift / Elevator** - the existing lift is not a full service elevator. In accordance with the Accessibility for Ontarians with Disabilities Act (draft regulation), a full-service elevator would be required for disabled access to the upper level Hall / Auditorium.
- 2) **North Exit Stairway** - this exit stair leads directly from the second level Auditorium to the main floor level Entry Vestibule. However, persons using this stair must travel across the interior main floor before they can access an exterior doorway. In accordance with the Ontario Building Code, this condition is considered an illegal non-conforming situation. In addition, the elevator spills into this stairwell on both floor levels which is also considered an illegal non-conforming situation.
- 3) **Upper Level Hall / Auditorium** - vertical & horizontal fire separations (ie. fire-rated wall and ceiling assemblies) to the floor below, to the North Stairway and to the wall assembly to the adjacent Ice Rink area are currently non-existent. In accordance with the OBC, 45 minute vertical & horizontal fire separation are required at the above locations.
- 4) **Public Washrooms (Upper Level)** – at present, the barrier-free washroom stalls provided in both the Men’s & Women’s Washrooms do not meet accessible standards (ie. insufficient clearances at the stall doors and within the stall). In addition, the Women’s Washroom does not have sufficient water closets to support the occupant load of the upper level Hall / Auditorium (one additional water closet is required).
- 5) **Main Entry Vestibule** – *there is a significant* roof leak in the roof assembly over the Main Entry Vestibule. Complete removal and replacement of the existing built-up roof assembly is required.
- 6) **Referee Room** – a 45 minute horizontal fire separation (ie. fire-rated ceiling assembly) is required between the small Storage Room and the North Exit Stairway above. In addition, the washroom / shower area is currently not barrier-free accessible and the entry door opening into this room does not have OBC minimum clearances for barrier-free access.

- 7) **Public Washrooms (Lower Level)** – these washrooms do not currently meet barrier-free accessible standards in any way (the entry doors do not have OBC minimum clearances for barrier-free access). The Ontario Building Code demands the provision of a barrier-free washroom. A single unisex barrier-free washroom is required as a minimum, but separate designated male/female rooms are certainly recommended. There are currently no barrier-free washroom facilities on the Main floor level. In addition, the Women’s Washroom does not have sufficient water closets to support the occupant load of the lower level Arena / lobby (one additional water closet is required). Plus, washrooms containing 3 water closets are required to have a minimum of 2 lavatory basins; these rooms currently have only 1 lavatory in each room.
- 8) **Dressing Rooms** – in all of the dressing rooms, the washroom / shower areas are not barrier-free accessible; in addition, the entry door opening into each dressing room does not have OBC minimum clearances for barrier-free access.
- 9) **Dressing Room No. 5** - this dressing room has an exterior exit door that swings open directly onto the exterior fire route laneway. This is a potential hazard to the facility user and should be remedied by providing exterior protective painted steel bollards.
- 10) **Electrical Service Room** – vertical & horizontal fire separations (ie. fire-rated wall and ceiling assemblies) are currently non-existent. In accordance with the OBC, 45 minute vertical & horizontal fire separation are required on the perimeter walls and ceiling of this room. In addition, fire-rated doors and frames are required on both entry doors.
- 11) **Janitor Room** – vertical & horizontal fire separations (ie. fire-rated wall and ceiling assemblies) are currently non-existent. In accordance with the OBC, 45 minute vertical & horizontal fire separation are required on the perimeter walls and ceiling of this room. In addition, fire-rated doors and frames are required on both entry doors.
- 12) **Ice Rink – Spectator Seating Area** - in its current condition, there is inadequate aisle width to ensure safe exiting from the spectator seating / standing area; the stairs that provide access to the tiered seating are not OBC compliant (riser heights exceed Code allowances; handrails are not provided); the railings for the standing room are also not Code Compliant. In addition, there are trip hazards at some of the 4 available exit doors. Handrails to the steps/stairs on the West end of the spectator seating area require complete replacement in order to meet OBC requirements. In addition, there is an exit problem from the extreme East end of the ice rink floor space (service/staff only area); there are locked steel gates between the service area and the public seating, which creates an exit problem for any staff in the service area. Two of the exit doors on the North and South sides of the rink exit out onto a precast stoop and step; the guards and rails on these stoops/steps must be entirely replaced with Code compliant guards and rails.

- 13) **East Storage/Work Room** – the horizontal fire separation (ie. fire-rated ceiling assembly) is currently non-existent. In accordance with the OBC, a 45 minute horizontal fire separation is required on the ceiling of this room. The existing 8” concrete block provided between this room and the adjacent Olympia Room meets the code requirements for a vertical fire separation. In addition, fire-rated doors and frames are required on the entry door. In addition, a new exit door is required in this room c/w illuminated exit signage.
- 14) **Ice-Resurfacers Machine Room (Olympia Room)** – the horizontal fire separation (ie. fire-rated ceiling assembly) is currently non-existent. In accordance with the OBC, a 45 minute horizontal fire separation is required on the ceiling of this room. The existing 8” concrete block provided between this room and the adjacent Storage / Work Room and Refrigeration Room meets the code requirements for vertical fire separations. However, the existing doors to the adjacent Storage / Work Room and Refrigeration Room need to be replaced with fire-rated doors and frames. In addition, a new exit door is required in this room c/w illuminated exit signage.
- 15) **Refrigeration Room**- there is a gas-proofing safety issue with this room. There is currently no rated interior vestibule / air lock separating the Refrigeration Room from the adjacent Ice Resurfacers machine Room. In addition, the horizontal fire separation (ie. fire-rated ceiling assembly) is currently non-existent. In accordance with the OBC, a 45 minute horizontal fire separation is required on the ceiling of this room.

## 6.2 **Structural Components**

The following is a summary of all structural deficiencies (based on the 2006 Ontario Building Code) relating to the structural components of the building (including the timber-frame roof structure, the second floor framing - Hall / Auditorium, the foundation sub-structure and the exterior components of the building envelope - exterior block walls, standing seam metal roofing, exterior cladding, etc.):

- 1) **Timber Support Columns (Support of Timber Roof Framing)** - there is evidence of significant rot and deterioration on some of the exposed timber columns provided along the north and south sides of the building (ie. specifically where the timber columns bear on the perimeter foundation wall). It is important to note that the observed deterioration at the base of these timber columns will eventually result in a reduction in the structural load-carrying capacity of these timber support columns.

- 2) **Roof Framing - Main Entry Vestibule** - based on my structural analysis, it is the opinion of the undersigned that the existing roof framing provided over the Main Entry Vestibule is **not** capable of supporting the design roof snow load as specified in the 2006 Ontario Building Code. In addition, significant roof leaks have been observed in this roof. Complete removal / demolition and reconstruction of the Main Entry Vestibule is strongly recommended.
  
- 3) **Interior Concrete Block Walls – Public Washrooms** - it is assumed that there is no vertical reinforcing in any of the interior concrete block walls. Based on my structural analysis, it is the opinion of the undersigned that the existing concrete block walls provided in the lower level Public Washrooms are **not** capable of supporting the potential design live load from an adult sitting on a wall-mounted baby change table.

## **7.0 Effective / Remaining Life Span of Existing Arena Facility**

Based on our review, it is the opinion of the undersigned that the Wasaga Stars Arena is near or at the end of its useful life as a full-service community arena. The effective life span of this facility could be 6 - 7 years, and upwards of 10 years if annual upkeep and maintenance continues at its current pace.

It is questionable if any major capital expenditure made to the facility will have any significant payback on value verses the expected remaining life span of the facility. It is also questionable that any large investment to increase wall and roof insulations values will have any payback on value verses the expected remaining life span of the facility.

Although there are numerous problems with the existing facility that are currently 'grandfathered', the right "thing to do" is to establish a budgeted *priority sequence* to slowly bring the building and grounds up to current OBC standards, current OFC safety standards, current energy compliance standards, and to current Accessibility standards (Accessibility for Ontarians with Disabilities Act).

Any "re-purposing" of the existing Arena facility to any other building use (including administration building, public works building, religious facility, curling club, indoor recreation centre), will demand significant capital investment to cover the expenditures for the following building upgrades:

- 1) full monitored sprinkler system including increased water service size to the building,
- 2) upgrades to existing exits,
- 3) demolition / reconstruction of the existing Main Entry vestibule
- 4) upgrades to exterior wall and roof insulation R-values,
- 5) installation of positive fire separation assemblies to upper floor assembly and to the demising wall between upper Hall / Auditorium and adjacent rink area,
- 6) upgrades to fire alarm system,
- 7) new concrete slab-on-grade over the existing sand floor (existing ice surface),
- 8) significant cosmetic and 'image' upgrades to both the interior and exterior finishes.

If the building upgrades and necessary remedial repairs (as outlined in Section 8: Cost Breakdowns - Building Upgrades / Remedial Repairs) are completed (including structural, building envelope, interior, sprinkler, elevator and mechanical / electrical upgrades), it is possible that the effective / remaining life span of the building (assuming change of use) could be an additional 20 – 25 years.

## **8.0 Cost Breakdowns – Building Upgrades / Remedial Repairs**

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### **8.1 Building Upgrades / Remedial Repairs – Architectural Components**

The following construction cost estimates, provided by Paul Jackson – Cal-Con Structures Limited (Stratford, Ontario) are for upgrades / remedial repairs to the architectural components of the building and are based on 2013 construction costing data. The figures below include General Contractor's direct overhead, mark-ups, insurance, bonding and a 10% contingency allowance. Engineering / architectural design fees are not included in these figures. HST is also not included.

- 1) **North Exit Stair** (Remedial Repairs) - \$209,140
- 2) **South Exit Stair** (Remedial Repairs) - \$43,924
- 3) **Upper Level Hall / Auditorium**
  - i) Remedial Repairs to Fire Separation Repairs – \$94,035
  - ii) Removal / Replacement of VCT Flooring - \$33,528
  - iii) Add New Barrier-Free / Family Washroom - \$15,600
- 4) **Upper Level Kitchen** (Barrier-Free Upgrades) - \$5,500
- 5) **Upper Level Men's Washroom** (Barrier-Free Upgrades) - \$345
- 6) **Upper Level Women's Washroom** (Barrier-Free Upgrades) - \$345
- 7) **Upper Level Janitor's Room** (Convert to Storage Room or extension of Existing Women's Washroom) - \$1,985
- 8) **Main Entry Vestibule**
  - i) Roofing Replacement - \$7,000
  - ii) New Barrier-Free Slab-on-Grade - \$1,112
  - iii) Miscellaneous Upgrades / Barrier-Free Improvements - \$11,454
- 9) **Dressing Rooms**
  - i) Concrete Block Privacy Screens at Washroom / Shower Area - \$11,200
  - ii) Replace Existing Hooks with Break-Away Hooks - \$10,690
  - iii) New Barrier-Free Doors & Frames - \$13,685
  - iv) Remove / Replace Skate Flooring (Dressing Room Nos. 3 & 4) - \$13,685
  - v) Provide Exterior Pipe Bollards (Dressing Room No. 5) - \$5,130

- 10) **Referees Room** (Remedial Repairs to Fire Separations) - \$3,072
- 11) **Viewing Lobby** (New Drinking Fountain) - \$1,425
- 12) **Lower Level Men's Washroom** (Barrier-Free Upgrades) – Not Feasible
- 13) **Lower Level Women's Washroom** (Barrier-Free Upgrades) – Not Feasible
- 14) **Electrical Service Room** (Remedial Repairs to Fire Separations) - \$10,931
- 15) **Office / Snack Bar / New Barrier-Free Washroom**
  - i) Barrier-Free Upgrades - \$645
  - ii) Remove / Disposal of Existing Fume Hood & Ductwork - \$1425
  - iii) Interior Finishes (New Counters & Paint) - \$14,040
  - iv) New Unisex Barrier-Free Washroom - \$14,255
- 16) **Lower Level Janitor Room** (Remedial Repairs to Fire Separations) - \$12,710
- 17) **Ice Rink – Spectator Seating Area** (Remedial Repairs to Existing Exits, Addition of One New Exit Door) - \$19,814
- 18) **East Storage / Work Room** (Remedial Repairs to Fire Separations) - \$45,607
- 19) **Ice Resurfacers Machine Room** (Remedial Repairs to Fire Separations) – Included in Item (18) above
- 20) **Refrigeration / Compressor Room** (Remedial Repairs to Fire Separations) – Included in Item (18) above.
- 21) **Building Exterior**
  - i) Main Entry Vestibule - Roofing Replacement – See Item 8(i) above.
  - ii) Dressing Room Nos. 5 & 6 – Roofing Replacement - \$23,264
  - iii) New Ice Guards on Sloping High Roof (Above Dressing Room Nos. 2 & 3) – \$2,851
  - iv) New Ice Guards on Sloped Roof Above Dressing Room Nos. 2 & 3 - \$2,851
  - v) Replacement of Deficient Guards / Railings (Arena Exit Doors) – Included in Item (17) above.
  - vi) Remedial Repairs to Exterior Siding / Flashings - \$2,310
  - vii) Dressing Room No. 5 - Provide Exterior Pipe Bollards – See Item 8(v) above.
  - viii) Reconfiguration of Barrier-Free Parking Stalls (Parking Lot) - \$10,000 (Allowance)
  - ix) Additional Parking Lot Lighting - \$5,700 per fixture
  - x) New Fire Hydrant (including new water service) - \$35,000 (Allowance)
  - xi) Parking Lot Signage / Demarcation for Fire Access Route - \$5,000 (Allowance)



**22) Miscellaneous Repairs / Upgrades**

- i) Barrier-Free Hardware & Controls - \$5,000
- ii) Lower Existing Fire Extinguishers to 47" AFF - \$800
- iii) Provide Barrier-Free Hardware on all Man Doors – Included in Item 22 i) Above
- iv) Provide Barrier-Free Plumbing Trim on all Existing Basins & Lavatories – Included in Item 22 i) Above
- v) Replace All ABS Plastic Piping - \$25,000

23) **New Sprinkler System** (Entire Building) - \$141,125

24) **“Deluge” Sprinkler System** (Between Two Storey Section & Rink Area) - \$30,000

25) **Replacement of Existing Standing Seam Metal Roofing** (with New R30 Insulated Standing Seam Roofing) - \$579,736

26) **New R20 Insulated Metal Wall Panels** (Exterior Walls of Building) - includes removal / disposal of existing metal / vinyl siding)

- i) At location of existing metal / vinyl siding only - \$176,990
- ii) Entire surface area of exterior walls (siding & concrete block) - \$300,496

27) **New Full-Service Elevator** - \$153,000

**8.2 Building Upgrades / Remedial Repairs – Structural Components**

The following construction cost estimates, provided by Paul Jackson – Cal-Con Structures Limited (Stratford, Ontario) are for upgrades / remedial repairs to the structural components of the building and are based on 2013 construction costing data. The figures below include General Contractor’s direct overhead, mark-ups, insurance, bonding and a 10% contingency allowance. Engineering / architectural design fees are not included in these figures. HST is also not included.

- 1) Main Entry Vestibule (Complete Demolition & Reconstruction) - \$20,527
- 2) Remedial Repairs to Deteriorated Timber Support Posts (located along the North & South Sides of Building) - \$13,500 per side (\$27,000).
- 3) Remedial Repairs to existing Timber Roof Trusses over Ice Surface (clean all corroded structural fasteners and steel plates with a wire brush and re-coat with a rust inhibitive paint) - \$18,525.

**The total estimated cost for the above noted Building Upgrades / Remedial Repairs (assuming that the existing facility remains as a year-round ice-based facility) is summarized as follows:**

Architectural Components:

- i) Building Upgrades / Remedial Repairs - \$720,058
- ii) New Sprinkler System - \$141,125
- iii) New R30 Insulated Standing Seam Metal Roofing - \$579,736
- iv) New R20 Insulated Metal Wall Panels (Upper Portion of Wall Only) - \$176,990
- v) New Full-Service Elevator - \$153,000

Structural Components:

- i) Main Entry Vestibule Reconstruction - \$20,527
- ii) Remedial Repairs to Deteriorated Support Posts – \$27,000
- iii) Remedial Repairs to Timber Roof Trusses (Ice Surface) - \$18,525

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**Total Estimated Construction Cost – \$1,836,961**

**8.3 Construction Cost Estimate – New Single Pad Arena**

The following construction cost estimate, provided by Paul Jackson – Jackson Barill Management Inc., is for the construction of a new single pad arena (41,100 square feet) and is based on 2013 construction costing data. The amount below includes General Contractor's direct overhead, mark-ups, insurance, bonding and a 10% contingency allowance. Engineering / architectural design fees are included in these figures. HST is also not included.

**Construction Cost Estimate – Single Pad Arena (41,100 sq. ft)**

	<u>Description of Work</u>	<u>Design / Tender Approach</u>	<u>Design-Build Approach</u>	<u>Project Management</u>
01	Basic Building (41,100 sq. ft)	\$3,370,000	\$3,370,000	\$3,370,000
02	Direct Overhead	\$240,000	\$240,000	\$240,000
03	Architectural / Engineering Design	\$440,000	\$260,000	\$280,000
04	Site Services (to Property Line)	By Owner	By Owner	By Owner
05	Interior Finishes	\$246,600	\$246,600	\$246,600
06	Public Address System	\$46,000	\$46,000	\$46,000

	<u>Description of Work</u>	<u>Design / Tender Approach</u>	<u>Design-Build Approach</u>	<u>Project Management</u>
07	Independent Testing & Inspection (Geotechnical Sub-Consultant)	\$20,000	\$20,000	\$20,000
08	Finish Hardware	\$59,000	\$59,000	\$59,000
09	Finish Millwork	\$45,000	\$45,000	\$45,000
10	Hydro Transformer	\$100,000	\$100,000	\$100,000
11	Scoreboard	\$10,000	\$10,000	\$10,000
12	Building Permit Fees	By Owner	By Owner	By Owner
13	Insurance	\$20,000	\$20,000	\$20,000
14	Bonding	\$50,000	\$50,000	-----
15	Winter Heat	\$40,000	\$40,000	\$40,000
16	Landscaping	\$25,000	\$25,000	\$25,000
17	Rink Dasher Boards (Including Lift Gate)	\$175,000	\$175,000	\$175,000
18	Elevator	\$65,000	\$65,000	\$65,000
19	Toilet Partitions	\$34,000	\$34,000	\$34,000
20	Washroom Accessories	\$5,000	\$5,000	\$5,000
21	Spray-Foam Insulation (Underside of Precast Bleachers)	\$72,000	\$72,000	\$72,000
22	Concrete Rink Slab-on-Grade	\$81,629	\$81,629	\$81,629
23	Spectator Seating (440 Seats)	\$56,450	\$56,450	\$56,450
24	Lockers	\$2,000	\$2,000	\$2,000
25	Mechanical HVAC / Plumbing	\$575,400	\$575,400	\$575,400
26	Sprinkler System	\$123,300	\$123,300	\$123,300
27	Refrigeration System	\$575,425	\$575,425	\$575,425

	<u>Description of Work</u>	<u>Design / Tender Approach</u>	<u>Design-Build Approach</u>	<u>Project Management</u>
28	Electrical	\$369,900	\$369,900	\$369,900
29	Exterior Lighting	\$54,524	\$54,524	\$54,524
30	Design-Build Tender Documents (Specifications / Drawings)	-----	\$18,000	-----
31	General Contractor`s Direct Overhead	\$210,000	\$210,000	\$100,000
32	Construction Manager	\$30,000	\$30,000	-----
33	Project Management	-----	-----	\$50,000
34	Contingency Allowance	\$200,000	\$200,000	\$200,000
	<b>Totals:</b>	<b>\$7,341,228</b>	<b>\$7,179,228</b>	<b>\$7,041,228</b>

- **0100 Basic Building Includes:**
  - Site Work from Property Line to Building
  - Excavation & Backfill
  - Landscaping (Seeding & Sod)
  - Storm Water Management
  - Parking Lots & Driveways
  - Concrete Curbs & Sidewalks
  - Asphalt Pavement
  - Concrete Foundations
  - Concrete Floor Slabs-on-Grade (Interior)
  - Concrete Bases & Pits
  - Masonry
  - Structural Steel
  - Building Systems Building Structure
  - Miscellaneous Metals
  - Roofing (Standing Seam & Built-Up Roofing)
  - Caulking / Fire-stopping
  - Rough Carpentry
  - Hollow Metal Doors & Frames
  - Aluminum Entrance Doors & Windows
  - Glass & Glazing
  - Spray Foam Insulation

- **0200 Direct Overhead Includes:**
  - Site Superintendent
  - Site Foreman
  - OLS Survey Layout
  - Safety Fencing
  - Site Office
  - Site Toilets
  - Temporary Hydro (Power supplied by Owner)
  - Temporary Water (Water supplied by Owner)
  - Dewatering
  - Job Signage
  - Periodic Clean-up Including Waste Bins
- **0300 Architectural / Engineering Design Services Includes:**
  - Architect
  - Structural Engineering
  - Mechanical & Electrical Engineering
  - Civil Engineering
  - 50 Sets of Drawings & Specifications
  - Disbursements
- **0500 Interior Finishes Includes:**
  - Drywall
  - Acoustic Ceilings
  - VCT Flooring
  - Ceramic Tile Flooring
  - Exterior Insulation Finish System (EIFS)
- **Not Included:**
  - Building Permits
  - Furniture (Desks, Chairs, Filing Cabinets)
  - Equipment (Olympia, Ice Planer, Floor Cleaner)
  - Site Services (beyond Property Line)
  - Snow Removal
  - Soil Testing / Inspection
  - Topographic Survey
  - Final Cleaning, Sealing of Finish Flooring
  - Federal Sales Tax (HST)

## 9.0 *Limitations*

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Services performed by **GB Architect Inc.** and **Barill Engineering Limited** were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the architectural and engineering consulting profession. The review completed by the undersigned (GB Architect Inc. & Barill Engineering Limited) was completed based on what was visible at the time of our site inspections, without the aid of any destructive type investigation procedures and is based on accepted good practice, professional opinions and Code interpretation. All findings and conclusions presented in this report are based on site conditions, as they existed during the time period of these investigations / site reviews. That moving forward, these opinions may differ once hidden materials and existing construction details are exposed or due to differing opinions from authorities having jurisdiction.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. **GB Architect Inc. & Barill Engineering Limited** accept no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based on this report. Others with interest in the existing building facilities should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time might affect the views, conclusions and recommendations provided in this report. Should additional or new information become available, GB Architect Inc. / Barill Engineering Limited recommends that it be brought to our attention in order that we may re-assess the contents of this report.

Prepared By:

**GB Architect Inc.**

**Barill Engineering Limited**

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## **APPENDIX 'A'**

### As-Built Floor Plans – Wasaga Stars Arena

## **APPENDIX 'B'**

### Designated Substance & Hazardous Building Materials Audit (MTE Consultants Inc.)



## **Appendix 'C'**

### 2006 Ontario Building Code Requirements (Excerpts)

## **Appendix 'D'**

### Previous Structural Inspection Reports (Ainley & Associates Limited)