

**Canadian Consulting Engineering
Awards 2015**



St. Clair College - SportsPlex



ST. CLAIR
COLLEGE



Glos | **Associates Inc.**
ARCHITECTURAL + ENGINEERING CONSULTANTS



**St. Clair College of Applied Arts & Technology -
Sportsplex**
Windsor, ON

Total Area:	70,000 sf
Total Project Cost:	\$23,000,000
Completion Date:	September 2014

General Project Description:

This new leading edge facility features a triple gymnasium, 10,000 square foot fitness centre, elevated walking track, workout studios, 12 team rooms, classrooms, exercise studios and auxiliary spaces. The design intent was to provide a new sports training facility looking to St. Clair's future athletic achievements while celebrating the College champions of the past. Glos presented a unique organic concept of providing sun scoops to catch free, indirect, natural light throughout the building.

The SportsPlex was designed to provide a unique open connection from the gymnasium to the fitness area eliminating the hard barriers, creating a more open, interactive environment. It was determined from the outset that the interior use and control of day-lighting held a significant role in developing this facility representative of health, fitness and a high level of physical activity in the lives of students. The main entrance rotunda flows into the cavernous connecting link running the length of the building providing access to the triple gymnasium, suspended running track, team rooms, second floor fitness centre and permanent bleachers. This circulation space also serves as the Hall of Fame with planned interactive displays of awards and video highlights of the College's varsity history. This Hall is expressed on the building exterior as a segmented, spine-like form providing indirect day lighting through a series of light "scoop" features, serving to animate the building exterior at night with programmable coloured LED up-lighting providing a visual expression of the excitement within the facility.

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President of St. Clair College, Dr. John Strasser, purposefully set the general location for the new SportsPlex across from the student residence building on campus with the desire to make a connection with the students with the hope the use of the new facility would become a part of their daily routine.

The objectives as set out by the College included:

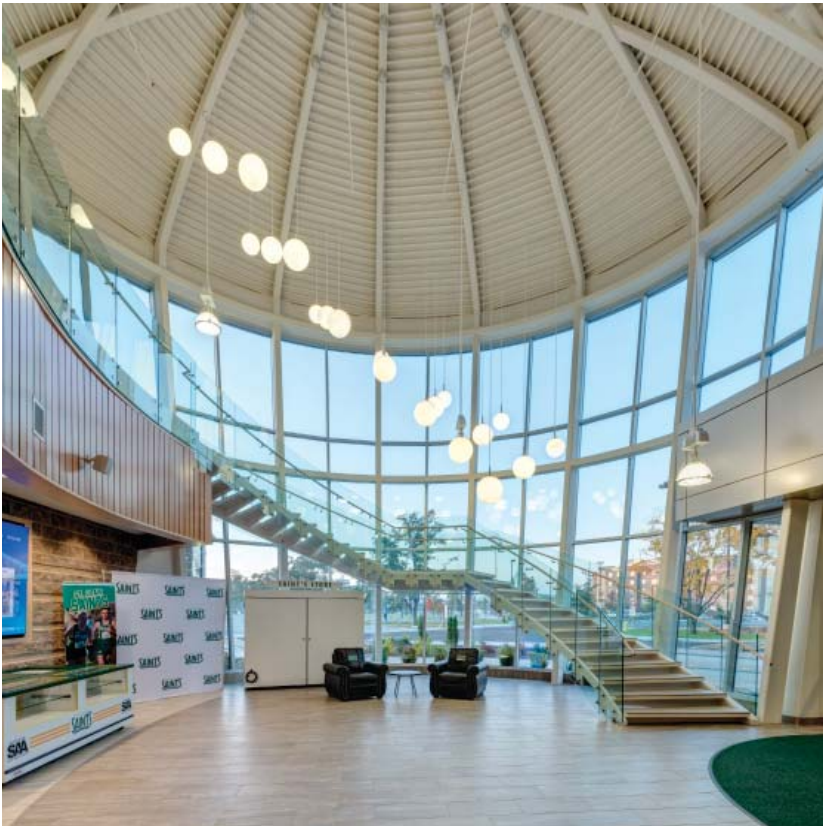
1. Introduce controlled, indirect day lighting in to the facility
2. Energy saving operation of mechanical equipment and systems
3. Design for comfort throughout the “open-air-concept” facility while maintaining temperature and humidity for the hardwood floor system in the challenging Windsor climate.
4. Control the movement of air in the gymnasiums to avoid any impact on badminton play.
5. Provide clear span and height to meet FIBA basketball requirements.

Glos Associates’ structural and mechanical engineering innovative design responses to accommodate unique building forms and functions:

1. The special non-repetitive shaped, structural “scoops” designed to bring in natural light to the multi-level core of the building posed a structural engineering challenge. No one light scoop matches another making the alignment of the shapes, and the Rotunda entrance layout complex. The second floor is cantilevered up to 3 metres over the first floor team rooms’ clerestory windows to control the direct sunlight from entering while allowing the indirect natural light to penetrate the space.
2. The indoor air requirements and heat gains within the Gym had to be considered for extreme limits in that there could be as many as 2,500 spectators in the space. The challenge was also to cool and dehumidify all this outdoor air without excessive energy use and so three energy recovery ventilator units were used and engineered to meet these challenges in an energy efficient manner.
3. The Gym floor requires a strict temperature and humidity controlled environment. The solution was the use a dual-wheel ERV unit which has a second wheel made of desiccant material for improved dehumidification. The beauty of the second wheel is that the desiccant wheel not only takes out moisture, but it also acts as a natural reheat, so not overcool the space.
4. Air-flow delivery within the Gym was a challenge in that the space requires large amount of airflow for proper ventilation. Some sports need very low terminal velocities at the floor level (e.g. badminton). To achieve a proper balance between these two extremes, the supply air registers and airflow direction were systematically selected and precisely located within the room to minimize any airflow disturbances.
5. Hollow Structural Steel trusses span the length of the 3 gymnasiums and beyond the width of the elevated walking track. High-cell acoustic metal deck spans the joists. The clear height of 42’-0” was achieved.



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The **building context** is set in a prime location on the south campus site with the front entrance facing on to the new roundabout on the main access route. The site was previously a parking lot.

The **visual openness** of the entrance rotunda projects an atmosphere of democracy in fitness for everyday students and the promise of a **legacy** of well-being as a reward for physical exercise as young adults. **Good design** promotes **good business** attracting higher caliber athletes and tournaments.

Inside the curved glass lobby

students ascend and descend the sweeping curved stairway experiencing striking views of the main campus to the south. This openness also displays the robust activity within the building. There has always been a strong correlation between natural light and the sense of wellbeing.



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The **creative use of natural lighting and openness** of the new SportsPlex provides a strong visual connection between internal activities and the Campus beyond. The west wall of windows provides an excellent view of the campus and the backdrop of the woodlot. Students passing by on the main campus road immediately recognize the second level as the fitness area.

Internal views and sightlines from one area to another were designed to provide openness and awareness of others and the College's commitment to athletic achievement and physical fitness. This unique leading edge athletic facility will serve and encourage the St. Clair College student-athletes and general students to live healthier lives and support varsity sports teams for many record-breaking years to come. The building was constructed on an existing parking lot. No green or landscape open space was sacrificed for this development. Sustainable building materials were intentionally used in the project. Consideration of materials that can easily be recycled someday, such as steel, glass, aluminum, wood strip flooring, and masonry walls. The building was engineered to include strategic use of LED lighting for energy conservation.

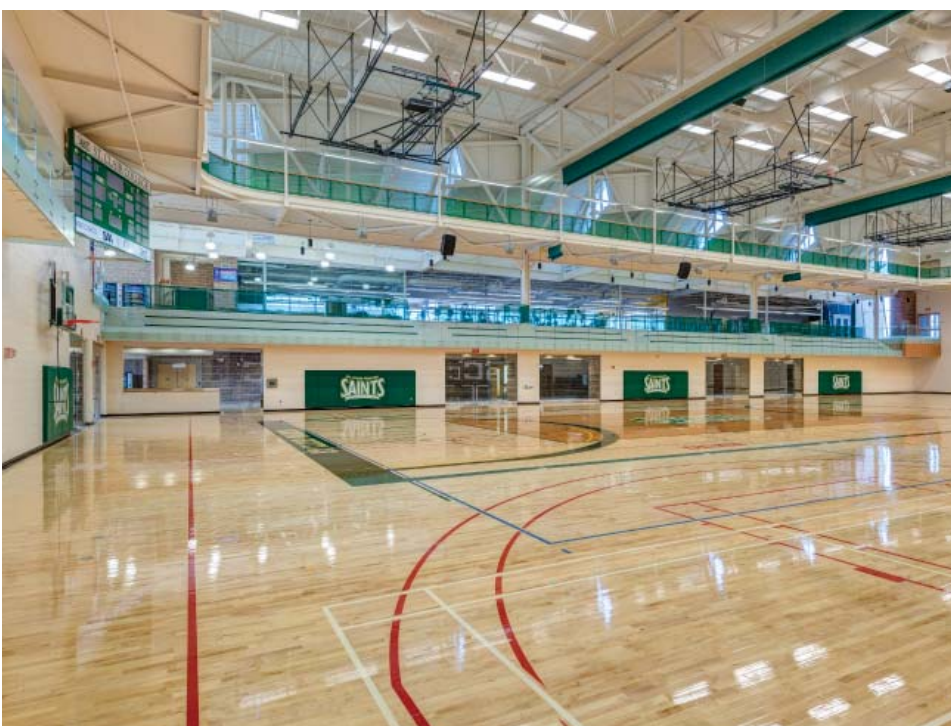


Ten of the twelve team change rooms were located on outside walls to provide each with indirect day lighting, first to continue the directive to maximize the good feeling natural lighting can provide, and secondly to reduce use of energy in these spaces as a **sustainable feature** throughout the facility. These windows into each team room were placed high for privacy and set under the projection of the second floor fitness area to shade these spaces from direct sunlight.

The completed St. Clair College SportsPlex facility is a source of pride for the college, the students and the surrounding community. The new facility will better the position of the College to recruit the best athletes from across the Province and beyond. The new facility will also be an economic engine and resource for the City of Windsor to draw on by hosting numerous sporting events, tournaments and Games to Windsor. These events involve athletes, families, coaches, and officials from visiting contending teams who then spend money in the Windsor – Essex community. No hard statistics are available for this economic benefit with the facility only opening in September 2014. The facility is also strategically placed near the student residence to allow the College to offer its' students the opportunity to train for the "win" whether it is a varsity game or their own health.

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Gymnasiums and natural light are a poor fit if direct sunlight is permitted to spill on the specialized wood floor. An **important part of the design** was to model the path of the sun within the building to ensure no glare was introduced.



One challenge with designing spaces open to one another was the mechanical design and control of a variety of environmental systems meeting the unique environmental needs of a high-end gymnasium wood sports floor is very sensitive to temperature and humidity changes with the dramatically different environmental needs of a 1,000m² fitness centre and other ancillary spaces.

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The main corridor runs the length of the triple gymnasium narrows from the lobby to the northern end, representative of the reduced occupant load at the far north end.

This space also doubles as a Hall of Fame with glass encased trophies/awards introduced intermittently along the west wall of the triple gym through full height structural glass.



470 tons of steel was engineered with little repetition. Structural engineering complexity was experienced in the following:

- The lights “scoops” are cylindrically shaped with the center axis tilted relative to both the surrounding wall and roof lines. This alignment combined with the tapering width of the Hall of Fame portion of the building makes the geometry of each light scoop and barrel shaped truss unique. The complexity of the intersecting shapes was a definite engineering challenge. The use of 3D modeling software enabled the engineers to communicate the required geometry to the contractor and fabricator.
- The main rotunda is a transparent space shaped like an inverted cone. The sloping walls were framed with HSS columns and capped by a spherical roof. The openness of the rotunda space, and connection to the light “scoops, presented a structural engineering challenge. All loads had to be transferred to each side of the rotunda.
- Design of the wide curved staircase up to the second floor is supported by only the outer stringer creating the illusion of floating in the air. The geometry of the curved, sloped glass wall made the curve of the stair and landing a difficult design challenge.

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The third level includes a walking/running track having 3 lanes totaling a circuit of 1.0 kilometer in 6 laps . The track floor is 9.2m above the gymnasium floor below. This perception of height for seniors and younger individuals prone to experiencing vertigo was addressed through design. Beyond the structural design to provide a rock solid floor structure, the architectural design response was to provide a perforated metal screen that expressed the edge as significantly more solid than open pickets.



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The client's goals were to provide a long-overdue facility to benefit all students from varsity athletes to students looking for everyday exercise routines that would engender a lifelong awareness of maintaining general health and fitness. The recognized bonus was that the College would furthermore benefit from having a unique and memorable home for the St. Clair Saints varsity teams by attracting new student-athletes with the supportive high-tech training facility and as well as the exciting venue to train in, play in and host competitions.

A secondary goal was to provide a visible beacon on the Windsor campus. The new facility with the transparent rotunda entrance centered on the north-bound main campus road as an extension of the round-about is an impressive first glimpse of the Saints new home. The south-bound traffic gets a clear view of the organically shaped sun scoops which are most impressive when they are glowing at night.

It was also the client's goal to have a proper exhibit of the St. Clair College Saints varsity history, and provide plenty of room for many anticipated future achievements to be prominently and proudly displayed. These awards and accolades are now displayed in the Great Hall of Fame which serves as the day lit spine of the facility.

