

CHRIS O'REILLY

CANADA

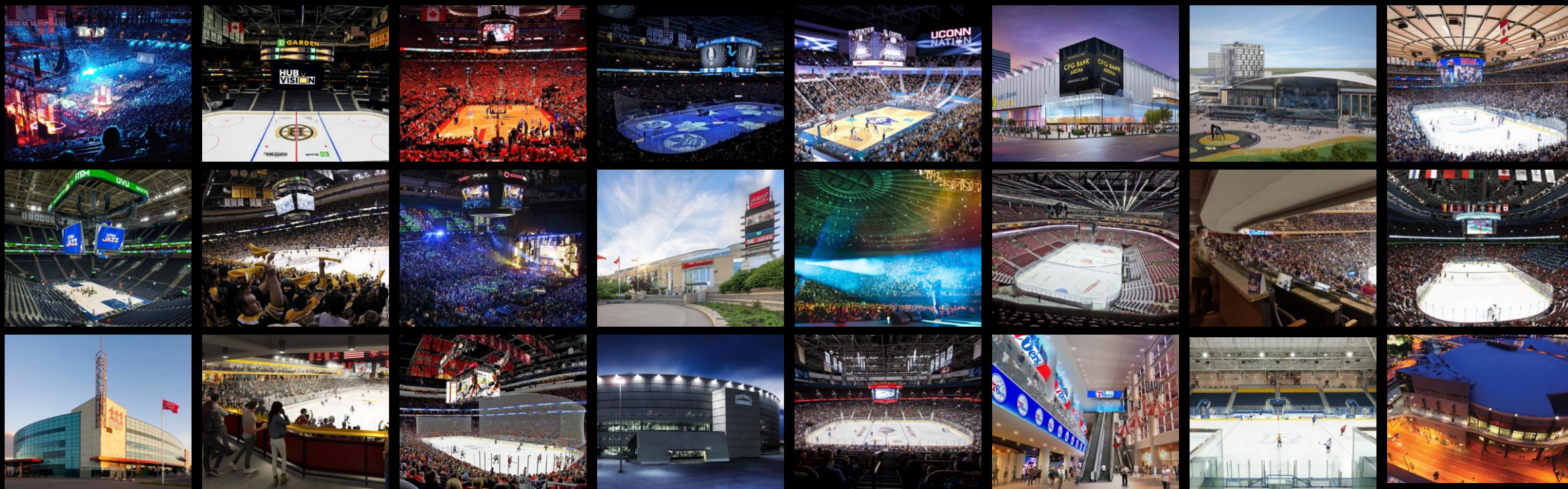
PARTNER AT BRISBIN BROOK BEYNON ARCHITECTS

BBB Worldwide Experience in Building Ice Rinks and Latest Trends in Renovated Arenas (Sustainable Approach) and Carbon Zero Projects



NEW ENERGY FOR ICE RINKS AND ARENAS

September 11, 2024



Experience

STADIUMS, ARENAS,
RECREATION & TRAINING FACILITIES

BRISBIN
BROOK
BEYNON
ARCHITECTS
SC | ARCHITECTS

WE ARE LEADERS IN THE DESIGN OF BIG ARENAS

- Madison Square Garden, New York City
- TD Garden, Boston
- Kia Forum, Los Angeles
- Delta Center, Salt Lake City
- Fishers Event Center, Fishers
- CFG Bank Arena, Baltimore
- XL Center, Hartford
- Moda Center, Portland
- Scotiabank Arena, Toronto
- Rogers Arena, Vancouver
- Coca-Cola Coliseum, Toronto
- Mullett Arena, Tempe
- Wells Fargo Center, Philadelphia
- Charlotte Checkers Arena, Charlotte
- Hamilton Coliseum, Hamilton
- Mattamy Athletic Centre at Maple Leaf Gardens, Toronto
- Budweiser Gardens, London
- Leon's Centre, Kingston
- Kitchener Memorial Auditorium, Kitchener
- Prince Albert Event Centre, Prince Albert
- Peterborough Memorial Centre, Peterborough
- Scotiabank Saddledome, Calgary



...WITH SPORTS + ENTERTAINMENT

EXPERIENCE FOUND ACROSS THE GLOBE

- Allen A. Lamport Stadium – Toronto, ON
- Aquadome – Kunamoto, Japan
- Arena Frankfurt – Germany
- Arena Hungary – Budapest, Hungary
- Arena Riga – Latvia
- AT&T Center Study – San Antonio, TX
- BMO Field – Toronto, ON
- Barclaycard Arena – Hamburg, Germany
- Brampton Centre for Sports Excellence – Brampton, ON
- Charlotte Checkers Locker Rooms – Charlotte, NC
- Chatham-Kent Recreation Centre – Chatham, ON
- Coastal Caroline Arena – Myrtle Beach, SC
- Crydon Centre – England
- Deerhurst Resort Fitness Centre – Huntsville, ON
- Edmonton Ballpark – Edmonton, AB
- Essar Centre – Sault Ste. Marie, ON
- EXPO 2000 - Toronto, ON
- First Arena – Elmira, NY
- Fishers Event Center – Fishers ID
- Florida Panthers Iceden – Coral Springs, FL
- Fukuoka Doma – Fukuoka, Japan
- Gene Polisseni Center – Rochester, NY
- Germain Arena – Ft. Myers FL
- Grossinger Motors Arena – Bloomington, IL
- GTA Centre – Markham, ON
- Hallenstadion Zurich Stadium – Zurich, Switzerland
- Hank Aaron Stadium – Mobile, AL
- Hartwall Arena – Helsinki, Finland
- Khur Arena – Khur, Switzerland
- Kingsbridge National Ice Centre – Bronx, New York
- Kiev Stadium – Ukraine
- Lakewood Forum – Bradenton-Sarasota, FL
- Madison Square Garden Training Center – Tarrytown, NY
- Malmo Arena – Sweden
- Mayadrom – Istanbul, Turkey
- Megasport Arena - Moscow, Russia
- Mehrzweckhalle Berlin – Germany
- Metro Radio Arena – Newcastle, United Kingdom
- Millennium Stadium – Cardiff, Wales
- Miller Park, Brewers Stadium – Milwaukee, WI
- Milton Sports Centre – Milton, ON
- Moose Jaw Multiplex – Moose Jaw, SK
- National Aquatics Centre – Dublin, Ireland
- National Soccer Development Centre – Vancouver, BC
- National Sports Stadium – Toronto, ON
- Oberhausen Arena – Germany
- O’Brien Group Arena – Melbourne, Australia
- Ontario Soccer Centre Stadium – Vaughan, ON
- Oshawa Civic Auditorium – Oshawa, ON
- Pepsi Centre – Corner Brook, NL
- Powerade Centre – Brampton, ON
- RA Centre – Ottawa, ON
- Raptors Training Facility – Toronto, ON
- Rogers Centre – Toronto, ON
- Sarnia Sport + Entertainment Centre – Sarnia, ON
- Saskatchewan Stadium – Regina, SK
- Siemens Arena – Vilnius, Lithuania
- Shenyang Stadium - Shenyang, China
- Sochi Winter Olympics – Sochi, Russia
- State Mutual – Rome, GA
- Sudbury Community Arena – Sudbury, ON
- SUNY Canton Recreation Center – Canton, NY
- TD Stadium / Landsdowne Park – Ottawa, ON
- Terwillegar Recreation Centre – Edmonton, AB
- TFC Training Ground + Academy – Toronto, ON
- The Gathering Event Center – South Forsyth, GA
- The Sports Village – Vaughan, ON
- Thunder Bay Event Centre – Thunder Bay, ON
- Toronto 2008 Summer Olympic Bid – Toronto, ON
- Toronto Blue Jays Club House – Toronto, ON
- Toronto Raptors Locker Room – Toronto, ON
- Valascia – Ambri, Switzerland
- Varsity Centre, University of Toronto – Toronto, ON
- Vilnius Sports – Vilnius, Lithuania
- Webster Bank Arena – Bridgeport, CT
- Whitaker Bank Ballpark – Lexington, KY
- WLU Wellness Centre – Waterloo, ON
- Windsor Credit Union Centre – Windsor, ON
- York University Track + Field – Toronto, ON
- Zions Bank Basketball Campus – Salt Lake City, UT
- Zurich Stadium – Zurich, Switzerland



1. PROJECTS DIFFICULT TO INITIATE

- Unusual building types, with unique financial plans, ie. sports teams and music concerts
- High cost and sometimes lack of expertise at the local level
- Relatively low annual revenues compared to capital cost made it difficult to cover annual debt load
- Rapidly increasing athlete salaries contributed to the revenue problem

2. GOVERNMENTS RELUCTANT TO FINANCE

- Governments prefer to let the private sector develop big arena facilities
- Taxpayers don't want to support wealthy sports team owners/hockey arenas

3. LACK OF STRICT ENERGY STANDARDS/CODES FOR BUILDINGS

- Lower cost of energy precluded energy efficient design
- Impact of climate change lesser known

LESS FOCUS ON ENERGY EFFICIENCY 3 DECADES AGO

4. ENERGY EFFICIENT DESIGN WAS NOT THE FOCUS

- Forward-thinking technology and electrification of arenas was expensive, therefore not mainstream
- Crowd energy was the focus of design, making arenas exciting, loud, getting close to the action

5. MINIMIZING CAPITAL COST WAS EVERYTHING

- Quite often these big projects could not get off the ground if the capital cost was prohibitive
- Attempts at energy efficient design were expensive and typically value engineered

6. RENEWABLE ENERGY TECHNOLOGY WAS NOT IN THE MAINSTREAM

- Lack of funding for renewable start-ups
- No 'buy-in' from the public
- Renewables didn't make financial sense

LESS FOCUS ON ENERGY EFFICIENCY 3 DECADES AGO

ROGERS CENTRE



FUKUOKA DOME



BMO FIELD



TFC KIA TRAINING GROUND



NATIONAL SOCCER DEVELOPMENT CENTRE



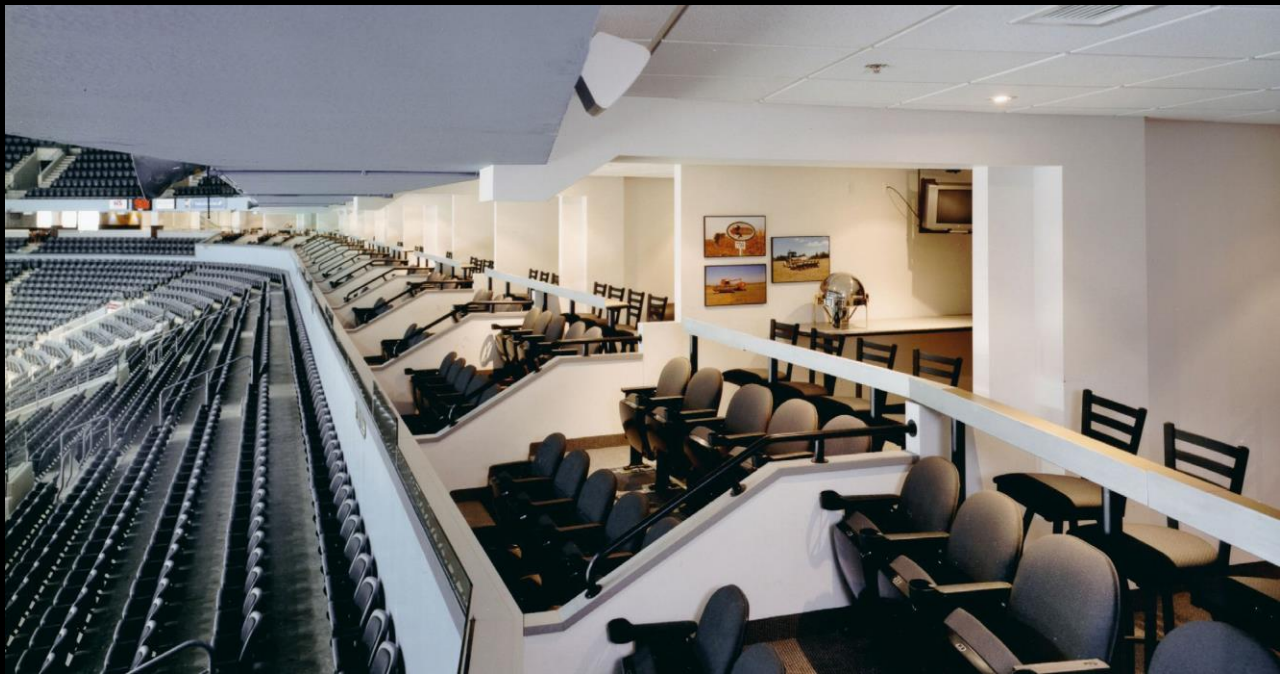


SCOTIABANK ARENA



ROGERS ARENA

BIG ARENAS



BUDWEISER GARDENS











1. COMPACT FOOTPRINT

Making key programming decisions at the earliest design stages to deliver buildings that meet their objectives with less square metres

2. DOWNTOWN LOCATION

Take advantage of existing infrastructure such as parking, transit, commercial and residential developments, hotels, restaurants and retail stores

3. CREATIVE PROGRAMMING

- Designing spaces that have multiple functions, to maximize usage
- Innovative building models to increase usage, ie. multi-pad rinks, combining pro training rinks with community facilities

4. RENOVATIONS INSTEAD OF NEW BUILD

Major renovations have a much lower carbon footprint by re-utilizing major building components such as structure, seating bowls, building envelopes, site infrastructure and services, etc.

5. DESIGN WITH FUTURE-PROOFING IN MIND

Understanding that a renovation of your facility is inevitable, so make smart decisions about structure, materials, constructability, ability to renovate and adapt in future

SUSTAINABLE DESIGN OF SPECTATOR FACILITIES



MADISON SQUARE GARDEN

RENOVATIONS





WELLS FARGO CENTER

RENOVATIONS







HAMILTON ARENA

RENOVATIONS



MATTAMY ATHLETIC CENTRE AT MAPLE LEAF GARDENS

RENOVATIONS

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

LEED provides a framework for healthy, highly efficient, and cost-saving green buildings, which offer environmental, social and governance benefits. LEED Certification is a globally recognized symbol of sustainability achievement.

4 LEVELS OF LEED

Certified (40-49 Points)

Silver (50-59 Points)

Gold (60-79 Points)

Platinum (80+ Points)

LEED-Certified Buildings Achieve HIGH Performance in 6 Areas of Human & Environmental Health



Location &
Transportation



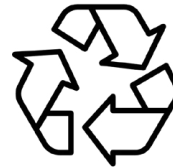
Sustainable Site
Development



Water Savings



Energy Efficiency



Materials Selection



Indoor Environmental
Quality



LEON'S CENTRE

LEED SILVER



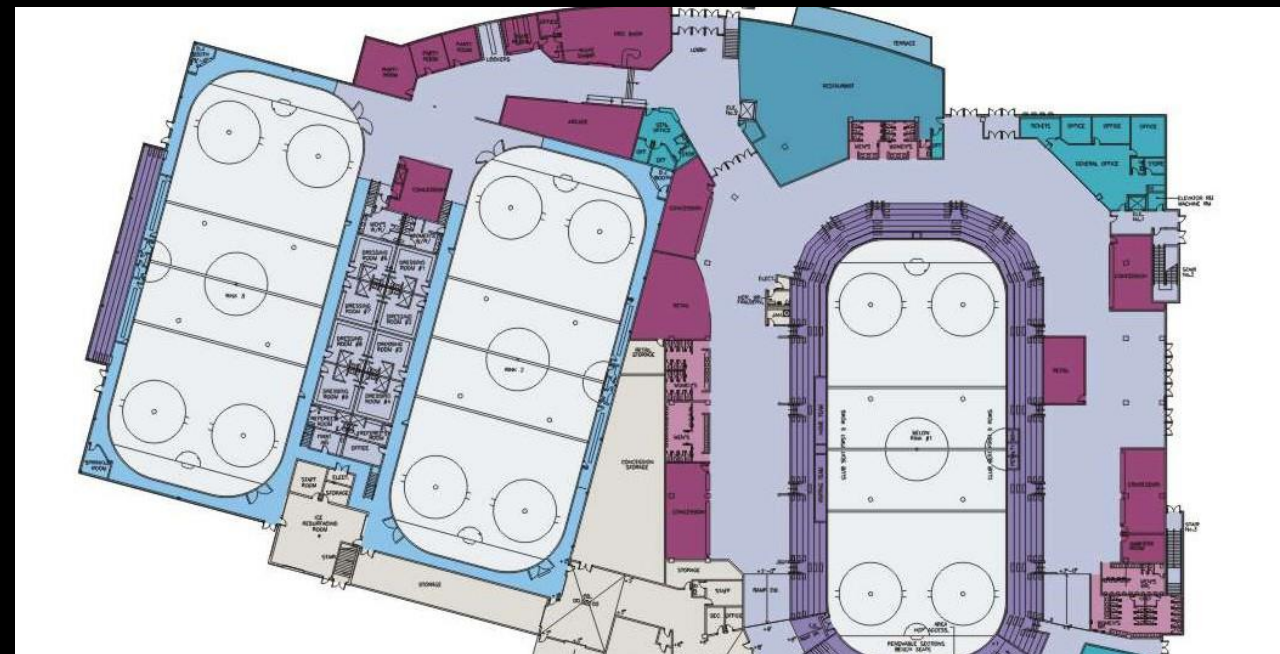
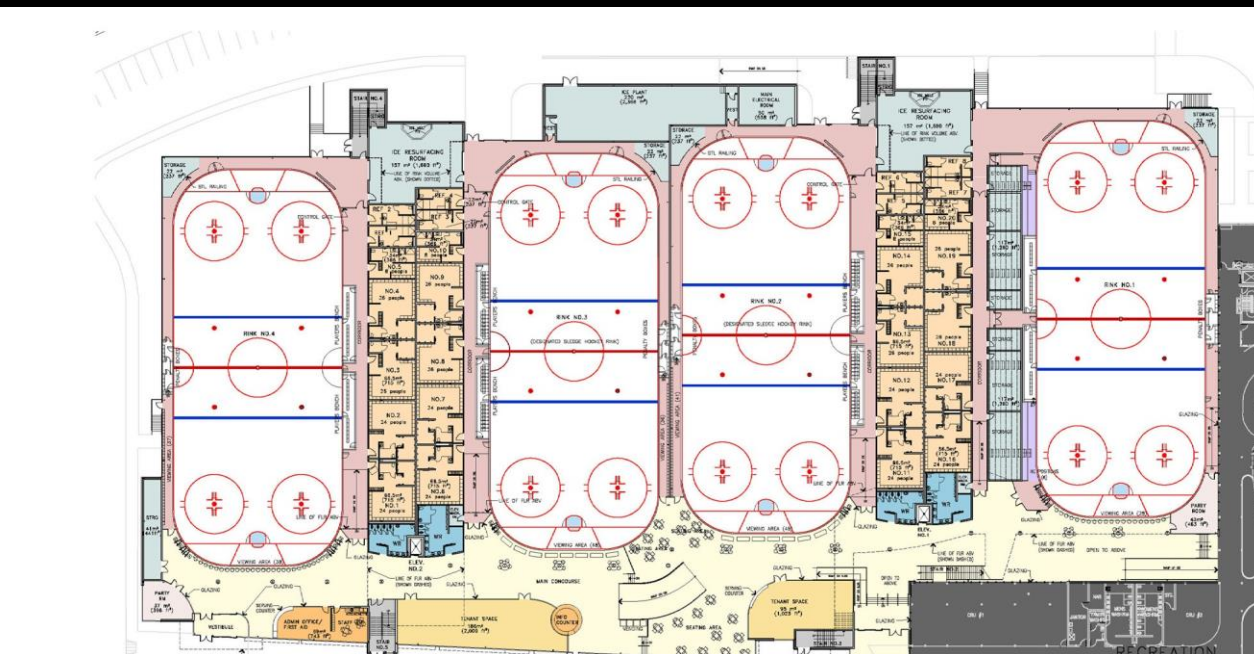
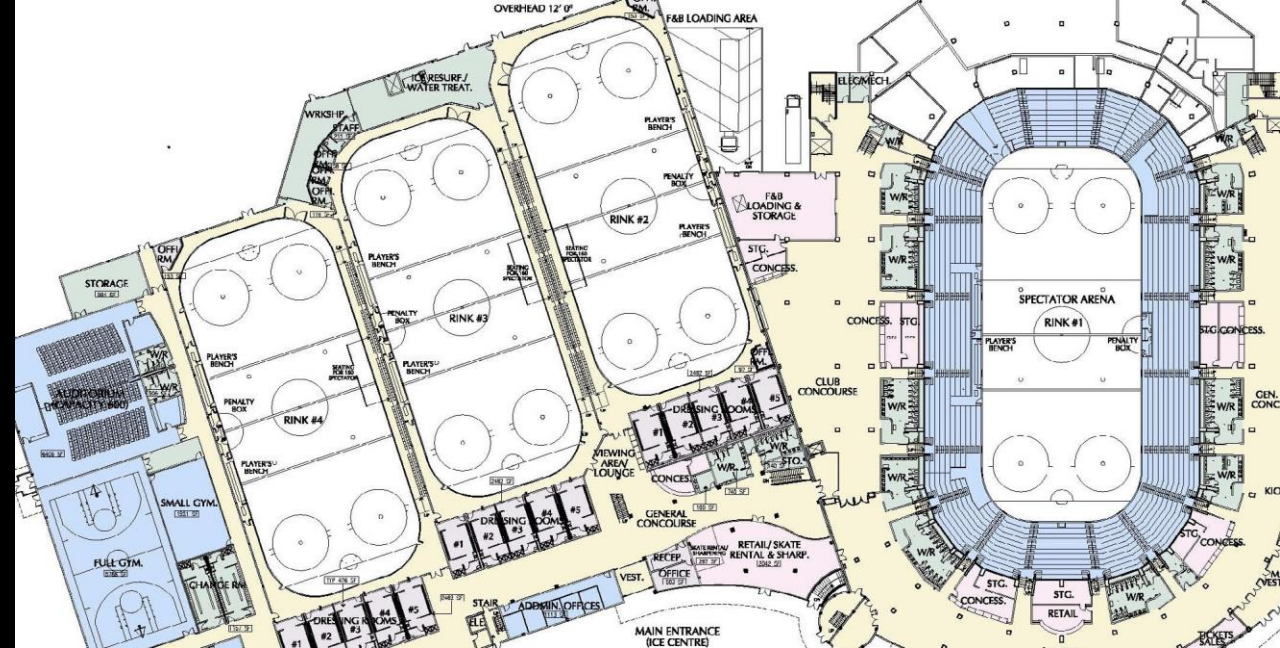
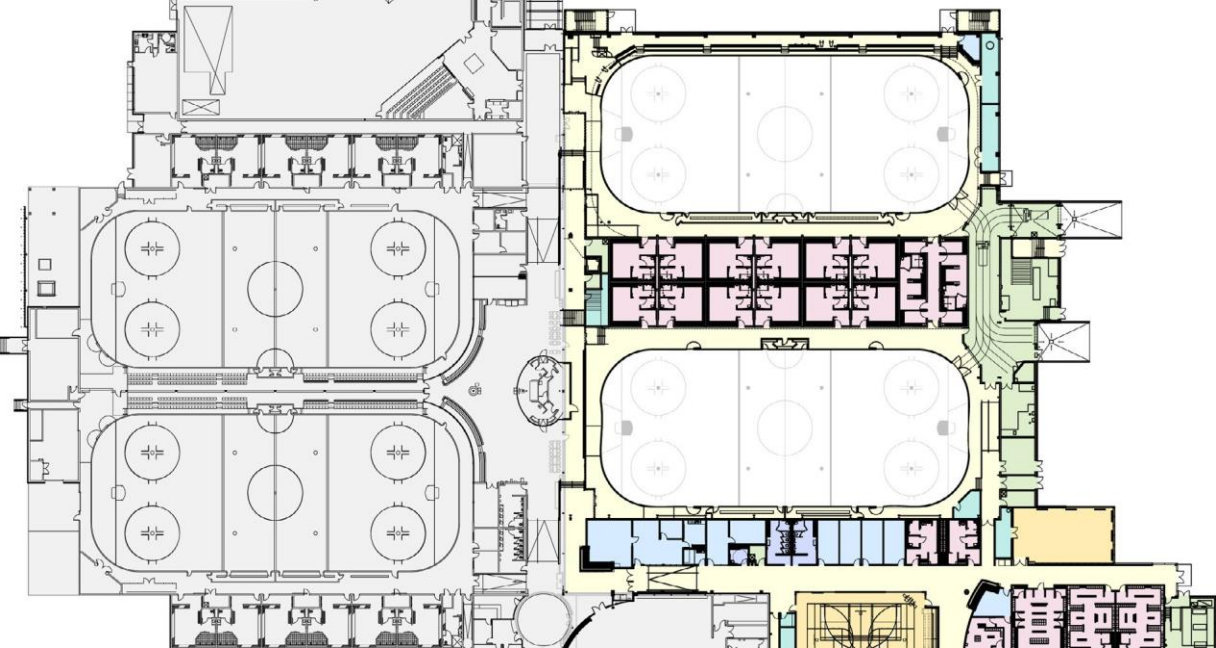
GENE POLISSENI CENTER

LEED SILVER



MULLETT ARENA & COMMUNITY ICEPLEX

LEED SILVER



MULTI-RINK CONCEPTS

RECREATION + TRAINING



O'BRIEN GROUP ICEHOUSE

RECREATION + TRAINING



WINDSOR FAMILY CREDIT UNION CENTRE

RECREATION + TRAINING



TERWILLEGAR RECREATION CENTRE

RECREATION + TRAINING



MILTON SPORTS CENTRE

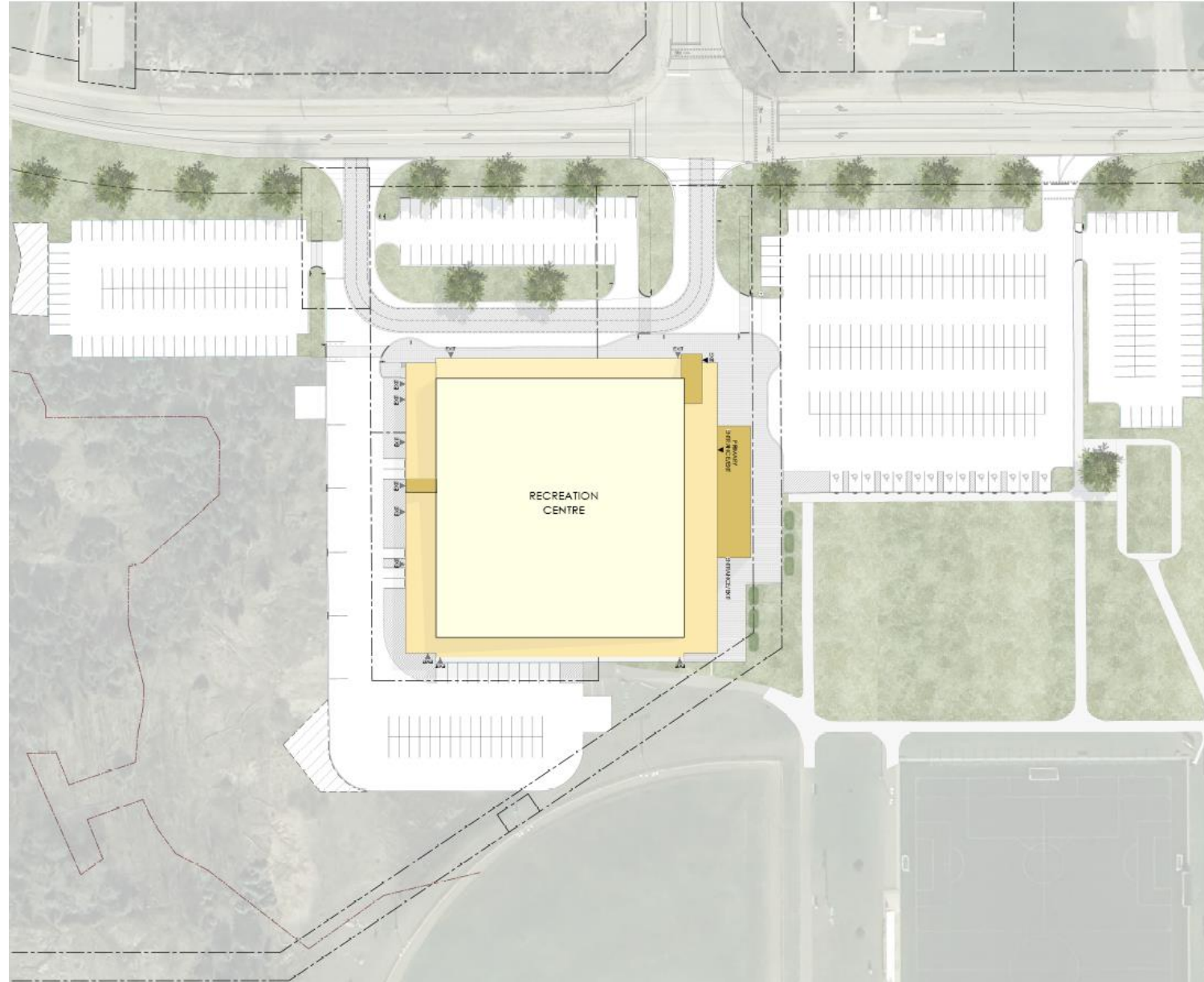
RECREATION + TRAINING (LEED GOLD)



PROJECT HIGHLIGHT
NORTH BAY COMMUNITY + RECREATION CENTRE

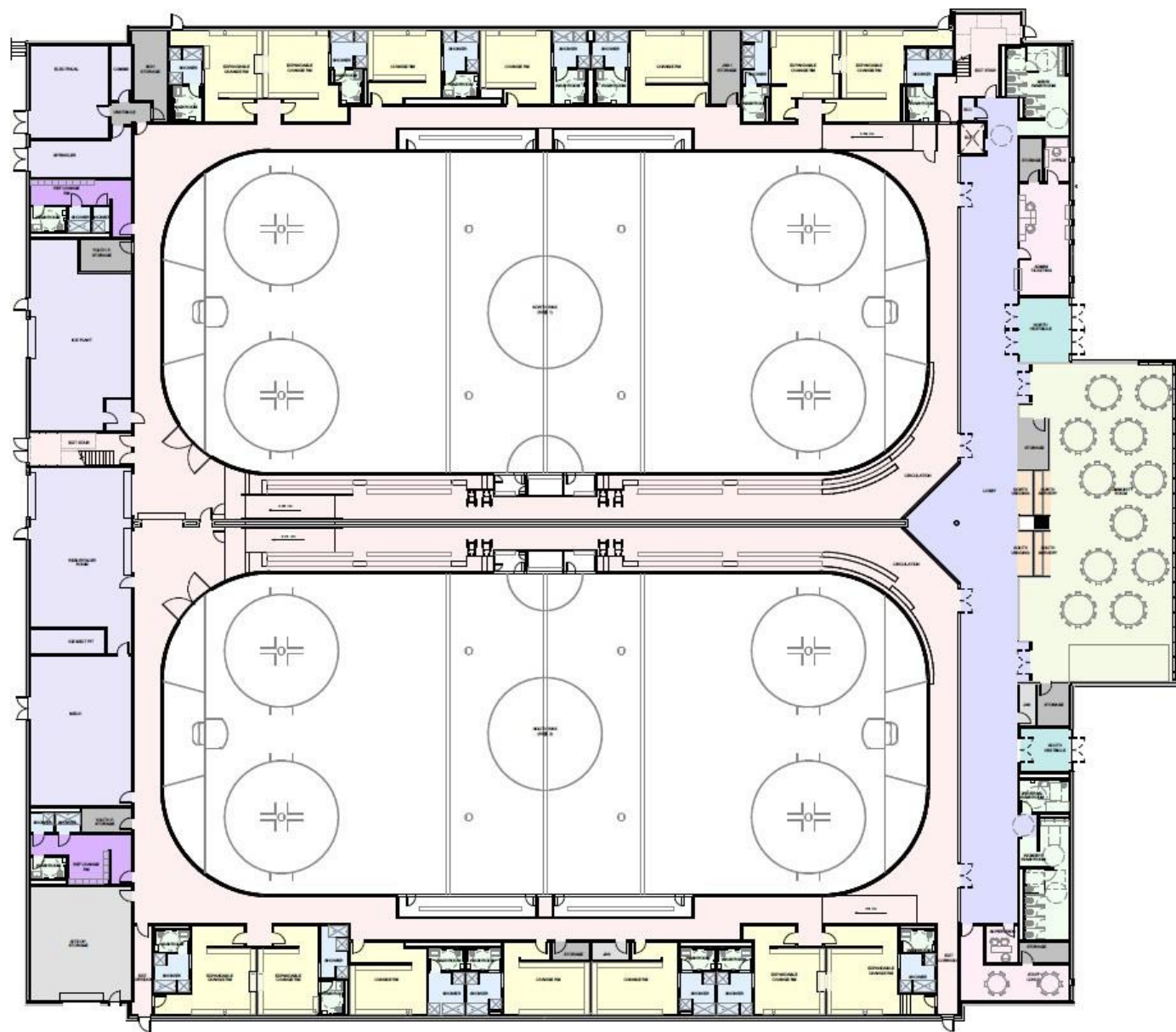
Designed to ZERO CARBON Standards

A ZERO CARBON Building is a highly energy efficient building that produces onsite, or procures, carbon-free renewable energy or high-quality carbon offsets in an amount sufficient to offset the annual carbon emissions associated with building materials and operations.



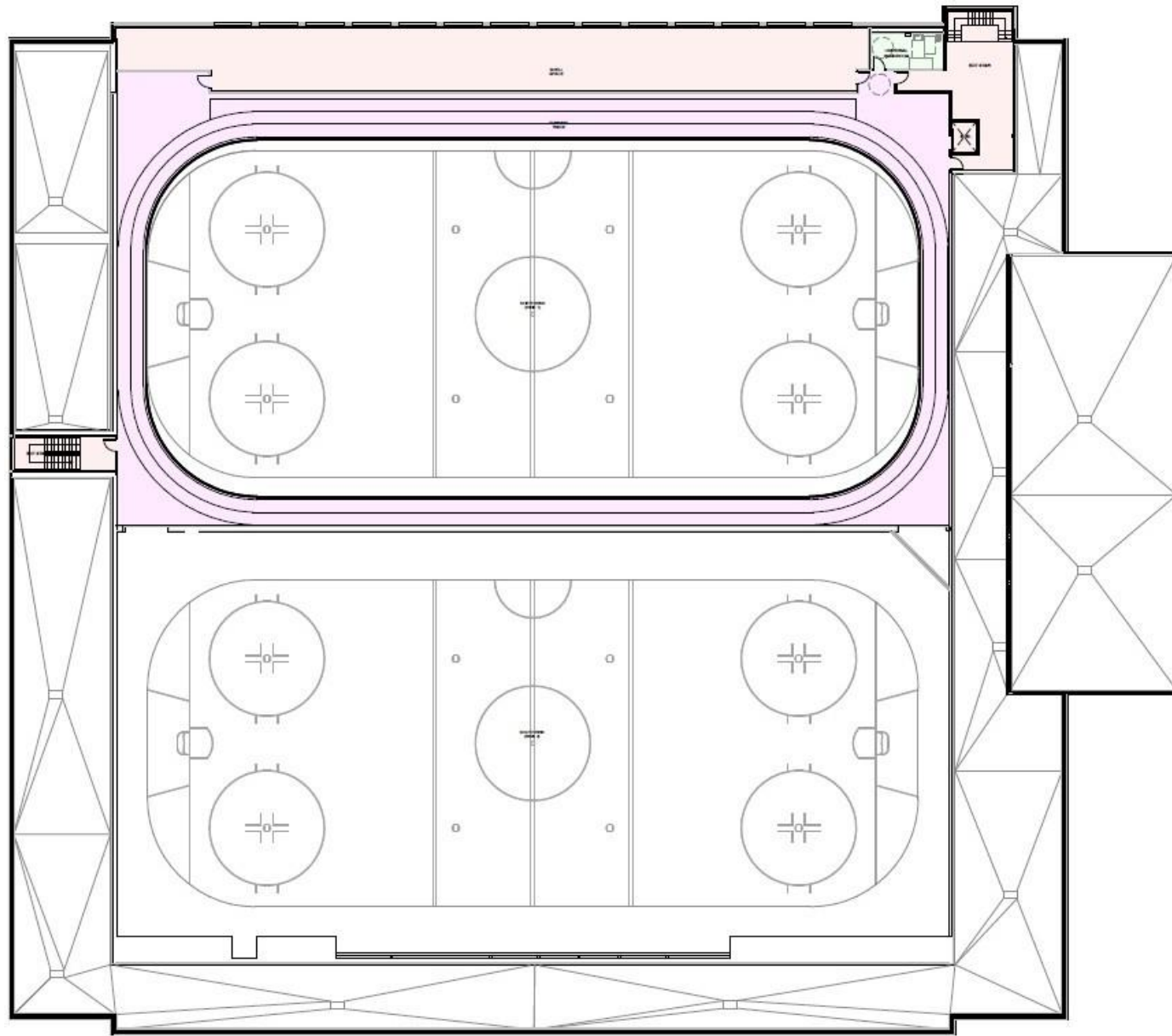
NORTH BAY COMMUNITY + RECREATION CENTRE

SITE PLAN



NORTH BAY COMMUNITY + RECREATION CENTRE

FLOOR PLAN - LEVEL 1



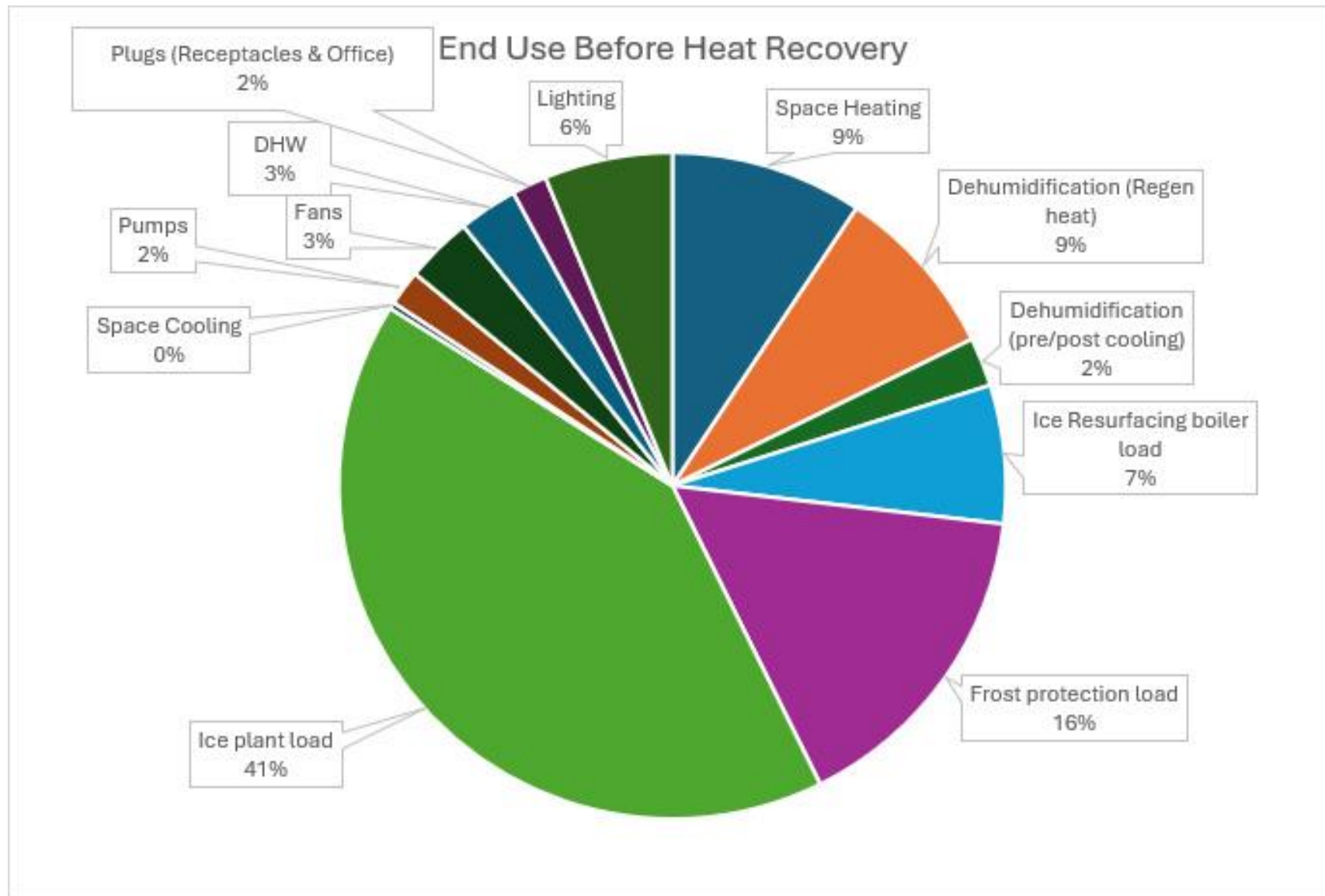
NORTH BAY COMMUNITY + RECREATION CENTRE

FLOOR PLAN - LEVEL 2



NORTH BAY COMMUNITY + RECREATION CENTRE

BUILDING SECTION



PRELIMINARY ENERGY MODEL
NORTH BAY COMMUNITY + RECREATION CENTRE

1. REDUCE COOLING ON ICE PLANT



COLD WATER FLOODING

Reduces energy consumption related to heating water for flooding, freezing hot water vs. cold water, and increased brine temperature to rink.



LOW-E CEILING

Low emissivity ceiling to reduce radiant heat on ice pad.

2. MAXIMIZE HEAT RECOVERY FROM ICE



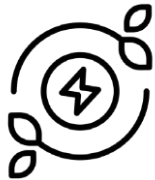
DOMESTIC HOT WATER

High grade heat from ice plant is used for domestic hot water heating.



IN-SLAB RADIANT HEATING

Spectator area is used as a heat dump for ice plant.



ENERGY LOOP

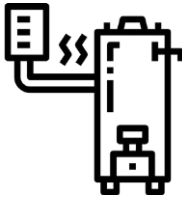
When building is in heating mode excess heat from ice plant is used to pre-heat the energy loop that provides space heating around the building.

3. EFFICIENT SPACE HEATING



INCREASED ENVELOPE INSULATION

Increasing R values for exterior walls beyond code minimums.



EFFICIENT HEAT PUMPS

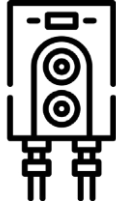
High efficiency cold-weather air-source heat pumps are used to boost the temperature of the energy loop when insufficient heat is recovered by the ice plant.



REDUCE HEATED VOLUME

Tighter building programming and reduced ceiling heights reduce the overall volume of air that needs to be heated.

4. REDUCED GHG EMISSIONS



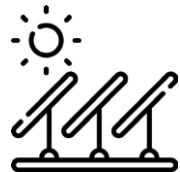
NON-COMBUSTION BASED SPACE HEATING

Clean Ontario grid electricity is the fuel for all space heating from heat recovery at the ice plant, air-source heat pumps and auxiliary electric boilers.



LOW GLOBAL WARMING POTENTIAL REFRIGERANTS

The CO₂ ice plant has the lowest global warming potential of all ice plant designs.



FUTURE RENEWABLE ENERGY

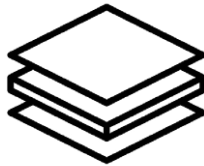
Roof structure is designed to accommodate a future rooftop solar system.

5. REDUCED EMBODIED CARBON



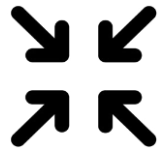
SYSTEM SELECTION

Envelope and Structural design have prioritized inherently lower carbon solutions, such as timber and efficient panelling.



MATERIAL SELECTION

Materials are selected from suppliers that have a lower carbon footprint that stand options without sacrificing functionality.



REDUCED SIZE

Smaller building size results in less materials and less embodied carbon.



PROJECT HIGHLIGHT

NORTH BAY COMMUNITY + RECREATION CENTRE



PROJECT HIGHLIGHT

NORTH BAY COMMUNITY + RECREATION CENTRE



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PROJECT HIGHLIGHT
NORTH BAY COMMUNITY + RECREATION CENTRE

An aerial photograph of a snowy landscape. A road or path runs diagonally across the frame. In the upper right, there is a building with a dark roof and some snow on its roof and surrounding ground. The overall scene is a winter landscape with snow-covered ground and trees.

THANK YOU.
BBB.CA

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