Appendix 1 - Basis of Design

Excerpt from the Crystal Pool and Wellness Centre Feasibility Study Report (2024)

3 - Basis of Design

All three site options investigated in this study share common elements that are based on criteria established through extensive stakeholder and public engagement in earlier phases of this project.

3a. Project Principles
3b. Project Program
3c. Design Principles
3d. Operational Impact
3e. Vehicle and Bicycle Parking
3f. Review of Regulations
3g. Project Visualizations

3a - Project Principles

Five guiding principles guided the siting and design of each site option investigated.

1. **Accessible**
   Ensuring meaningful access to the facility and all its parts.
   - Among key considerations are:
     - fully accessible site circulation
     - front door, drop off and ease of access
     - multiple options to access each pool
     - level transitions throughout the facility
     - clear wayfinding
     - universally designed spaces

2. **Inclusive (All ages, Abilities, Identities and Experiences)**
   Creating a facility that caters to the needs of a range of different users.
   - Key considerations include:
     - spaces that can cater to programming for different age groups
     - large universal change space
     - creating a universal facility (excluding gendered change rooms)
     - culturally inclusive
     - universal design

3. **Efficient and Sustainable**
   Reducing energy usage and minimizing the carbon footprint of the new facility.
   - Strategies employed to achieve this include:
     - creating a high performing building envelope
     - using low carbon building systems for heating and cooling
     - designing an efficient mechanical system that reuses waste heat
     - reducing water consumption
     - considering alternate means of energy generation
     - using low-VOC materials

4. **High Quality Health and Wellness Facility**
   Creating a multi-use facility that accommodates a wide range of health and wellness activities.
   - This has been achieved by:
     - including multipurpose spaces that can accommodate various health and fitness activities
     - creating connection between indoor and outdoor spaces
     - designing a flexible aquatic configuration that can accommodate a range of programming

5. **Place for Community**
   Creating a facility that is welcoming and enables community-building.
   - Key considerations include:
     - creating a public lobby before the control point
     - including community focused multipurpose rooms
     - designing spaces that encourage informal and formal gathering

The Project Principles and Design Strategies diagram *(right)* is a result of extensive stakeholder and public consultation during the 2018 design phase.


COMMUNITY VOICES
PROJECT PRINCIPLES
DESIGN STRATEGIES
Accommodate those with non physical disabilities
Access for those who are aging
Improve security
Increase accessible parking
Consider needs of staff with disabilities
Way finding for those with vision challenges
Inclusive change rooms
Parking close to front door
Encourage sporting activities for girls
Provide privacy where required
Facilities for bicyclists
City of Victoria Climate Leadership Plan
Focus on low carbon building
Healthy materials
Maximize retention of trees
Operational efficiency
Energy efficient building
Water retention and conservation
Include opportunity for indoor sports
Don't lose the basketball court
Adequate space for therapy in leisure pool
Reduce the amount of chlorine
Good water and air quality
Water temperature for different users
Places for therapy and rehabilitation
Flexible programming
Include opportunity for food services
Safety getting across street
Places for gathering
Places for community events
Privacy for adjacent buildings
Carefully consider surface parking
ACCESSIBLE
INCLUSIVE
EFFICIENT and SUSTAINABLE
HIGH QUALITY HEALTH and WELLNESS FACILITY
PLACE FOR COMMUNITY
No split levels at each floor
Fully accessible for all users
Elevator access to upper level
Multiple means to access all pool tanks
Universal change rooms
Universal wayfinding
Crime prevention through environmental design
Universal washrooms
Change rooms exit adjacent to both pool tanks
High performance building envelope
Low carbon building systems
Balance of capital and operational cost
Waste heat transfer from dry land program to pool
Significant retention of mature trees
Natural light
Alternative energy solutions
Low voc materials
Views to the park
Flexible fitness area
Environmental separation of fitness from pool
Two hot tubs that may be kept at different temperatures
25m warm water lanes
Gymnasium style multi-purpose room
Outdoor patio adjacent to pools and fitness area
Movable floor and two bulkheads in main tank
Full lazy river
Expanded lobby and community spaces
Opportunity for future food vendors
Multiple options for pool viewing
Mix of community and active multi-purpose rooms
Landscape buffer to neighbourhoods

3b - Project Program

The project program is a summary of the spaces that will be provided in the new facility. It is a balanced combination of the requirements, uses, spaces, relationships and experiences that are to be included in the new facility for it to meet the Project Principles.

Each option consists of a lobby, administration, 2 multipurpose rooms and aquatic changerooms on level 1 along with a large double height natatorium space for aquatic programs. Level 2 includes a large open fitness studio, 4 additional multipurpose spaces, dryland change rooms and a viewing gallery into the natatorium. The building's basement houses the main service spaces of building and pool mechanical rooms, workshop, storage, and an electrical room. In addition, the lobby for each option has connection to a lower lobby and underground parking lot.

The following is a summary of the program, grouped into aquatic and dryland areas.

Aquatic Area

Important considerations for the aquatic program include the configuration of the pools, the relationships between various aquatic elements, their connection to the exterior and ease of access to each body of water.

Main Pool Tank

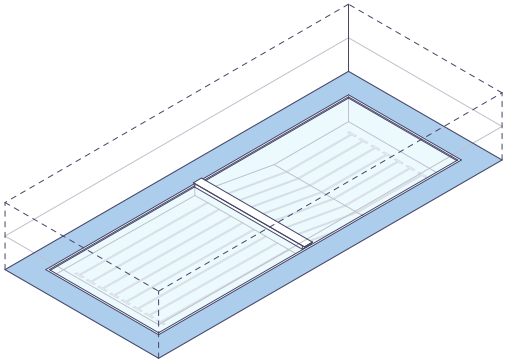
A 50 by 18.5 metre main pool tank with a single movable bulkhead located at the deep end of the main pool tank. The main pool tank includes lifts and a transfer bench for accessibility. Depths at the end of the pool tank have been set to allow diving options up to a 5-metre platform and deep water play features such as a climbing wall and rope swing.

Leisure Pool

The leisure pool area is made up of a 25-metre lane pool plus a leisure and play area. Its position in the corner of the natatorium provides a connection to the surrounding exterior environment.

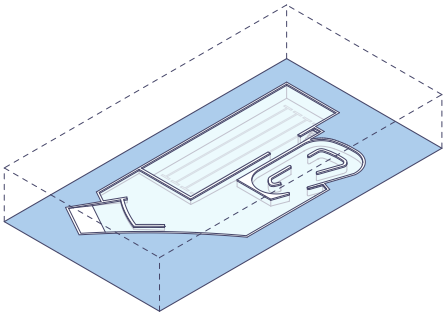
The 25-metre tank has been configured to accommodate a wide range of programming. Its movable floor allows swim lessons for different age groups and a range of therapy functions to be accommodated in this area. A hinged ramp and collapsible stairs provide access to the variable depth area within the warm lanes.

The leisure and play area includes a tot area with zero-depth entry and an enlarged zone for leisure activities that contains a range of water play features. A full lazy river is also included to accommodate play and



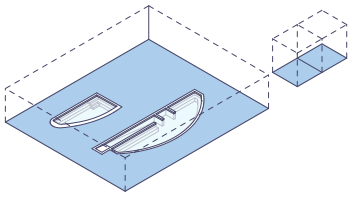
Main Pool Tank

- 18.5m x 50m tank, 8 lanes
- Movable bulkhead
- Deep end allows for up to 5m high dive board
- Double-height space



Leisure Pool Tank

- 8.5m x 25m tank, 4 lanes with movable floor
- Zero entry beach access
- Lazy river
- Water play features
- Double-height space



Wellness Amenities

- Large family hot pool with ramp and lift access
- Small hot pool
- Steam room
- Sauna

therapeutic functions. With the zero-depth entry, integrated ramps and lifts, the leisure pool provides seamless access for a range of abilities.

Hot Pools

The larger and cooler of the two hot pools is intended for a mix of play and therapeutic activities. Ramp and lift access has been provided for this hot pool.

A smaller and warmer hot pool is included for therapeutic and wellness activities. Its location provides separation from the active leisure zone and connection to the park and adjacent trees. A transfer bench and lift access are included for this hot pool.

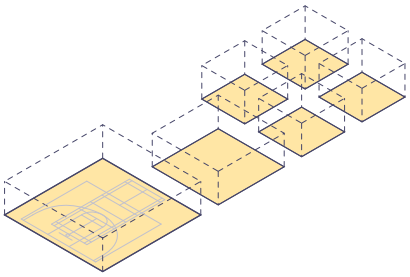
Steam and Sauna

Steam and sauna rooms have been planned with views to the exterior. Their proximity to the hot pools creates a wellness and therapeutic zone in the natatorium.

Other Spaces and Features

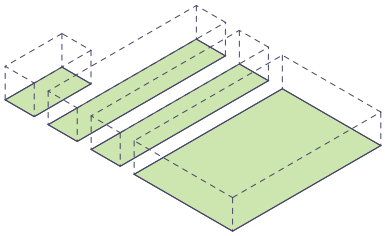
Aquatic storage occupies a large amount of the space within the natatorium. This has been located adjacent to the Main and Leisure pools to provide ease of access for play accessories and pool equipment. Bleacher seating has been integrated along the main pool tank for swim meets and events and a viewing area has been included at the upper level, overlooking the leisure pool.

3b - Project Program



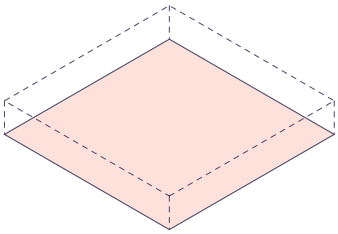
Multipurpose Rooms

- Half gym
- Dance/yoga studio
- Seniors room
- Aquatic multipurpose room
- Child minding room
- Art room



Changerooms

- Universal change
- Women's aquatic change
- Men's aquatic change
- Dryland Change



Fitness

- Cardio machines
- Strength machines
- Stretching / balls
- Fitness open area
- Consultation rooms

Dryland Area

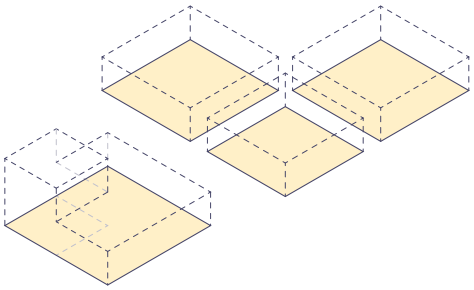
Important considerations for the dryland program areas include connectivity to the exterior, user experience, improving functionality, reducing circulation and simplifying wayfinding.

Reception, Lobby and Control Point

Users entering the lobby have a clear line of sight to both the reception and the pool area, creating a visual connection throughout the facility.

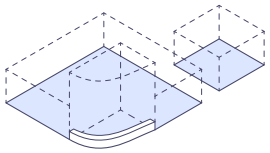
The desire to pull programs away from the exterior wall and enhance visual connection to the street and park resulted in the creation of an interior grouping adjacent to the main entry that includes multipurpose rooms, washrooms and administration areas. The zone between this interior volume and the exterior wall is occupied by the lobby, control point and primary circulation spaces. Beyond enhancing visual connectivity, this interior volume also serves as a significant wayfinding device between the lobby, natatorium, vertical circulation and other spaces at street level.

The lobby is located before the control point, creating a freely accessible gathering space that encourages community members to use the facility for social connection.



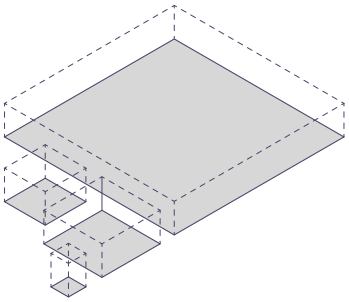
Lobby and Circulation

- Double-height space with visual connection levels 1 and 2
- Visual connection to natatorium
- Community living room
- Control point
- Accessible routes of travel to all building areas
- Tactile wayfinding to aid all users
- Clearly visible vertical circulation



Administration

- Reception
- Lifeguard station
- Admin meeting room
- Admin offices



Service Areas

- Loading Bay
- Pool Mechanical
- Building Mechanical
- Workshop

Change Rooms

Past the control point, a large universal change room and gendered change rooms accommodate the needs of a wide range of users.

The universal change room is a universal space meaning that all washrooms, shower stalls and dry change stalls are independent private units. Privacy measures have also been incorporated within the gendered change rooms to enhance inclusivity.

Fitness Area

The fitness area occupies a majority of the street facade on level 2 to maintain its role as an active beacon to the community and allow users to look out onto activity on the street below. The fitness area layout is designed to improve functionality and long term flexibility.

The fitness area is mostly located above lobby, circulation and changeroom space, mitigating concerns about the transmission of sound and vibrations to level 1 programs. An acoustically isolated floor system has been included to further reduce the passage of sound and vibrations to level 1 spaces.

Multipurpose Rooms

Recreation staff undertook a review of anticipated programming and recommended a series of different multipurpose rooms to accommodate current and projected needs of the community. Based on their recommendations, the following spaces have been included in the current designs.

3b - Project Program

- **Half Gym** - configured as a space for active recreation and large social gatherings with a sprung wood floor for active uses.
- **Dance/Yoga studio** - a smaller room with a sprung floor to accommodate dance and other active programs.
- **Seniors room** - designed to accommodate seniors programming including games, presentations and community lunches, located close to the entry for ease of access.
- **General multipurpose rooms** - located next to the pool area and suitable for wet activities including aquatic training and birthday parties.
- **Child minding room** - a small room that can be used for child minding and programming.
- **Arts room** - designed to accommodate arts programming.

All multipurpose rooms include storage for furniture and equipment required for their range of programs. Additionally, kitchenettes have been provided in the seniors room and the general multipurpose rooms to support anticipated uses.

Administration

The primary administration spaces are located at the corner of the building. This allows the public circulation spaces to occupy the edge of the building, increasing the visibility of activities and enhancing the indoor-outdoor connection.

Circulation Areas

Circulation areas were carefully reviewed through the design development process with the aim of reducing area, simplifying paths of movement and ensuring clear wayfinding. Primary vertical circulation elements including the main stair and elevator have been located at the corner of the building.

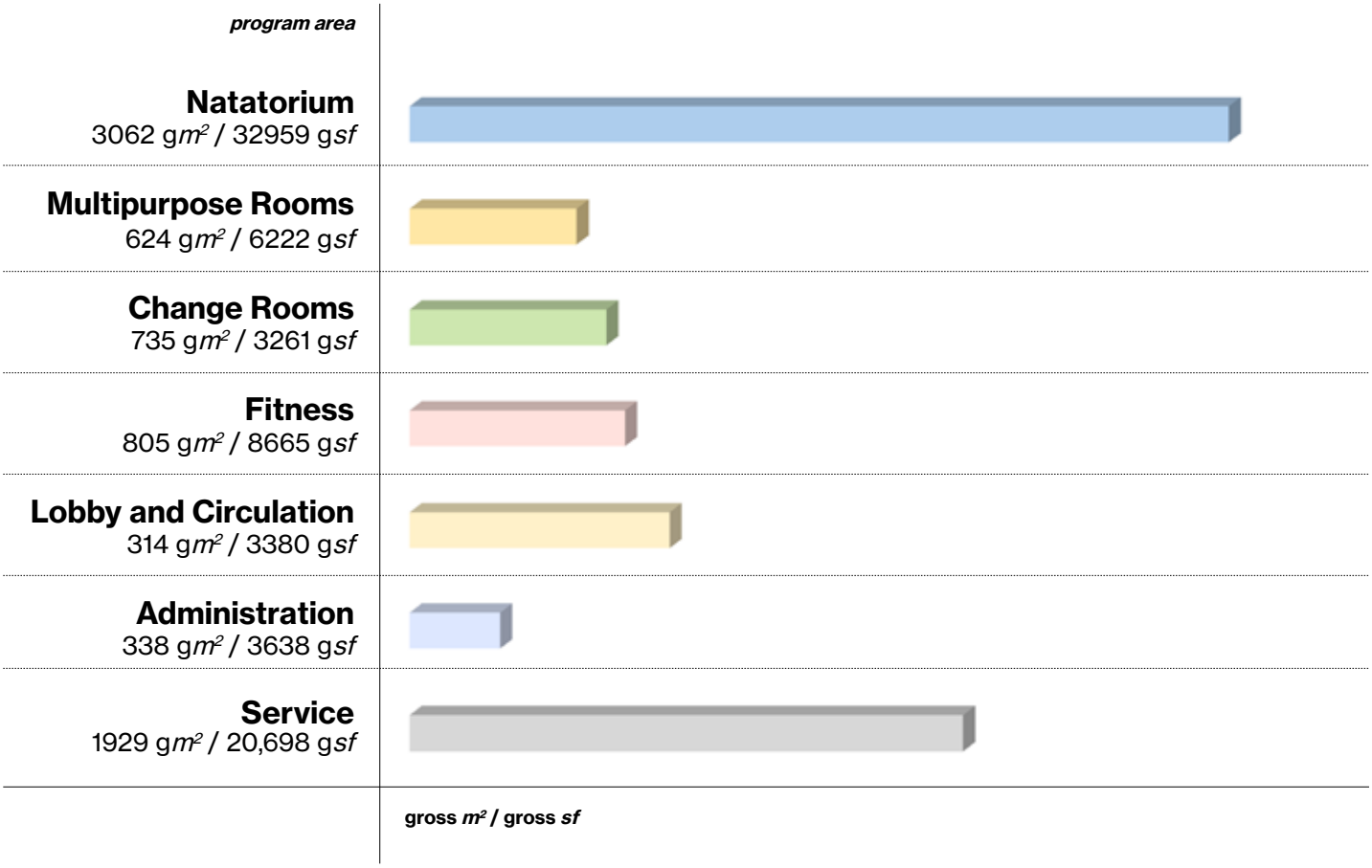
Vertical circulation elements are clearly visible to users moving through the control point at street level. As users arrive at level 2, they are situated at the head of the main circulation path that connects all level 2 programs. There is a simple and clear path through the building that connects all major program elements.

Tactile wayfinding and contrasting colours are being considered at all interior and exterior paths of movement to aid those with limited vision.

Service Areas

The basement contains most of the required service areas including mechanical rooms, electrical rooms, storage areas and a workshop. Additional loading, garbage and chemical storage areas are located at street level. Loading of chemicals and equipment will occur at street level and a mechanical lift or hoist will assist moving these to the basement when required.

An acoustically screened enclosure is also located on the roof that contains major mechanical equipment serving the natatorium and upper-level dry land programs.



Program Composition, This program results in a total gross area of 8520-8600m2.

3c - Design Principles

Design - Architectural

The design for each of option has been developed with the five Project Principles of the project, outlined in section 3a. All options have been designed to meet and exceed certifications from the Rick Hansen Foundation and CaGBC -Zero Carbon Building to meet goals for accessibility and sustainability.

The design for each option is similar with the prominent use of glazed curtain wall for the for the main building envelope material along with solid sections to reduce envelope costs. This creates a pavilion like structure that is characterized by simple and transparent vertical walls supporting a visually bold horizontal surface at the roof. Transparency ensures uninterrupted visual connections between the exterior and interior. The roof plane serves as a visual connector between the dryland and natatorium areas and as a unifying element for the entire design. To reach the goals for an efficient and sustainable building, high performance double glazing along with careful detailing is to be used to minimized thermal bridging. To mitigate unwanted solar gains, vertical fins are integrated into the curtain wall system along the east, south and west elevations. The desire is for a simple and clean building façade, as such the design will be carefully detailed to integrate all building components including structural elements, mechanical elements and solar control shades, along with the termination of finishes and interior elements.

Each option will accommodate an exterior entry plaza that allows for clear legibility of the main entrance and public lobby, with an opportunity for the public lobby to house a coffee shop or vending machines that can cater to both the lobby and the outdoor plaza area.

Each option will employ generous glazed facades surrounding the fitness and pool areas to enhance the user experience, showcase the many activities supported inside and attract the wider public. The glazed exterior also provides eyes on the street and an increased sense of safety for the immediate surrounding.

Design - Structural

The structural scheme for all options includes a concrete raft slab foundation bearing directly on bedrock at portions of the building and at other areas a raft slab supported on caissons depending on subgrade conditions. The pool tanks will be formed with concrete retaining walls supported by the raft slab below and support L1 suspended concrete slab. The cast in place concrete floor slabs of Level 1 and level 2 are supported by concrete columns and walls. The roof is a metal deck over steel beams and trusses.

With the adoption of the new BCBC-2024 in March 2024, the design that was developed during the Design Development phase in 2019 will need to be slightly updated. This is to meet the requirements for increased seismic force resisting systems. Conceptual analysis of future seismic loading requirements has resulted in relatively minor changes to building design and have been incorporated.

Design - Mechanical

The proposed mechanical systems are a crucial aspect in meeting the project principle of efficiency and sustainability. All 3 options will include the same mechanical components to substantially reduce the carbon footprint of the building in comparison to the existing facility and provide a zero-carbon-consuming facility. The mechanical systems will generally be housed indoors, in the basement to serve the building. To mitigate noise from air handling equipment on the roof to the surrounding area, it is proposed that these systems also be located underground and acoustically treated. One of the major components in reaching net-zero carbon impact is by using air-source heat pumps for HVAC and pool heating rather than using gas-fired boilers.

Design - Electrical

The building will only have electric power, allowing for all energy to be renewable and a zero-emissions building. The major component to this is the use of air-source heat pumps for HVAC and pool heating.

The power system is designed to address all anticipated future power requirements of the facility, with minimum 25% spare capacity. A 3-phase 25kV BC Hydro primary service into the property is required with an onsite transformer to step voltage down to 347/600 volts. In addition to the primary electrical service to the building a 250kW diesel generator would be included for emergency and standby power.

In an aim to reduce energy consumption of the building, all interior and exterior lighting will be LED. Occupant sensors will be used to control lighting automatically in all intermittently used areas. Additionally, the design of the building embraces the use of daylight to reduce energy consumption but also as a natural and healthy form of light to enhance the environment. All exterior lighting will meet illumination requirements for creating a safe outdoor space at night for pedestrians and the community. Exterior lighting will also ensure the elimination of light pollution by minimizing light spillage into neighbouring areas and helping local nocturnal wildlife.

One other electrical system to aid in the use of renewable energy is the implementation of a photovoltaic solar panel system. This would be a 216kW array mounted flat to the roof to offset energy cost of the building by approximately $1885 per month and have a payback period of 20-25 years.

3d - Operational Impact

RC Strategies was engaged as part of this study to evaluate the operational financial impacts of a new facility. This assessment builds on their previous work, completed in 2017 during an earlier phase of this project. Their work highlights the significance of the Guiding and Design Principles in the context of financial performance. This section includes assumptions and context outlined in the 2017 report and considers new implications based on what has and has not changed since 2017.

Aquatic Facility Operating Context

Due to their significant community benefits, public aquatic swimming facilities are typically quite highly subsidized. In addition to taxpayers having to contribute to the capital costs of indoor pools, the typical recovery rate for an indoor pool in Canada is between 30% and 60%, with tax revenue subsidizing the remainder of operating costs.

Facility Utilization

The existing facility accommodates an estimated 300,000 swims annually with an annual capacity for about 690,000 swims, using only about 43% of the available swimming capacity. While prime hours were almost fully utilized, there was a significant amount of unused capacity during off-peak periods. Space constraints prevent any significant amount of additional use despite the unmet need for more swimming in the City. In other words, new and different types of aquatic spaces were required to accommodate all current and future outstanding needs.

Capacity and Demand

There was a demonstrated current need for an additional 66,000 swims per year in the City that the existing facility was unable to meet, and that number would grow in the longer term as the City continued to grow.

The outstanding need in Victoria was largely in the areas of recreational and fitness swimming as well as rehabilitation and therapy swims. These aquatic services had been growing in most cities across Canada and are likely to continue growing in the foreseeable future.

In the longer-term, the total number of annual swims was projected at 4.3 swims per capita, a conservative projection which is at the lower end of what is expected in indoor public pools in Canadian urban centres.

Operating Costs

Like all other indoor public pools in Canada, the existing facility was operating at a net deficit of about $4.90 per swim, for a total annual operating deficit of about $2.65 million.

The proposed new facility would be better able to accommodate existing and future demand and would operate more efficiently. Since the 2017 report, improved energy savings, better use of floor space and accelerated population growth have further improved operating efficiencies.

Site Options

Because the three site options considered in this study are functionally identical, their operating impacts, should be similarly identical. Because the Central Park North site option replaces the existing facility, and requires facility closure during construction, additional impacts have been identified:

1. Building services and maintenance opertional cost savings can be realized.
2. It will likely be possible to relocate many of the current swims (mostly in the swim training and program categories) to other pools in the region. However, during the shutdown a large portion of the total annual swims will simply disappear. It could take one or more years once a new pool is open to recapture those swims, gradually rising to the projected swim rates. During that recapture period, the operating deficit will likely be slightly higher than is projected herein as an ongoing savings.

Existing Crystal Pool used largely for recreational and fitness swimming as well as rehabilitation and therapy swims.

3e - Vehicle and Bicycle Parking

WATT Consulting conducted a traffic impact analysis that considered other regional aquatic facilities, industry best practices and the City's bylaws and regulations. Their analysis determined that there would be a parking demand of 1 vehicle per 30m2 of floor area of the new facility which translates to a parking demand of 262 vehicles for each of the site options.

On-site Parking Stalls

For this study, City staff directed the project to include 110 on-site vehicle parking stalls (+/- 5 stalls). In 2018, Council directed staff to explore parking alternatives that ensured no net loss of green space. As such underground parking has been included for all options.

Each of the options also include the following parking types:

- 5 accessible parking stalls plus 2 van-accessible parking stalls (all accessible stalls should be EV ready)
- 6 level-3 EV charging stations
- 6 level-2 EV charging stations
- 4 dedicated car-share stalls with access to level-2 EV charging stations
- All remaining general stalls should be designed as level-2 EV-ready

On-site Bicycle Parking Stalls

Minimum long- and short-term bicycle parking requirements are dictated by the current zoning bylaws and calculated based on the building area. A total of 100 bike stalls are included with each option consisting of 56 short-term covered, 20 short-term open and 24 long-term secure bike parking spaces. This exceeds long-term bicycle parking requirements by 25%.

More specifics on bicycle parking include:

- Long-term bicycle parking to include a minimum of 25% of parking stalls for oversized/cargo bicycles or personal mobility devices
- 10% of stalls with access to electric charging
- Stacked bicycle parking to be limited to no more than 50% of required bicycle parking
- Stacked bicycle parking to include lift assist

Off-site Parking Stalls

The surface parking at Save on Food Memorial Centre and street parking will be used to make up for an expected demand for vehicle parking above and beyond the on-site parking stalls provided. Loading zones are not included in parking counts.

3f - Review of External Regulations and Best Practices

British Columbia Building Code

British Columbia Building Code (BCBC) 2012, was applicable during the schematic and design development phases of the project (2017 – 2019). The current code, BCBC2024, was adopted on March 8th, 2024. Changes that will affect the construction of the planned facility include:

- new seismic and site-specific geotechnical considerations
- new minimum spatial requirements for accessibility embedded into the code
- new energy efficiency standards

Accessibility and energy code changes have limited effects on the planned facility given that the project exceeds those thresholds with a design that seeks to meet the Rick Hansen Foundation Accessibility Certification and the CAGBC - Zero Carbon Building Initiative.

Rick Hansen Foundation Accessibility Certification (RHFAC)

Careful consideration was given to accessibility and inclusivity of the new facility with those factors embedded into the project principles. The accessibility focus extends beyond consideration for those with physical disabilities to also include those with sensory and cognitive disabilities. The pursuit of the Rick Hansen Foundation's Accessibility Certification (RHFAC) means that the new facility will go beyond minimum code compliance for accessibility delivering meaningful access for all.

CaGBC - Zero Carbon Building Initiative

In keeping with the City of Victoria Climate Action Plan, the project includes a low carbon strategy for the new facility using an all-electric system for space and water heating with the intent to obtain design certification under the CaGBC Zero Carbon Building Program.

3g - Visualizations

Lobby

Fitness Centre

Natatorium

Conceptual Visualizations

These artistic conceptual visualizations imagine the new facility as a light-filled, welcoming and universally accessible community facility.