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PROJECT CREDITS

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Civil

CUMMING
Cost Estimating

Shoreline Community Recreation and Aquatic Center
1 Introduction

1.1 Executive Summary

This Concept Design booklet was commissioned by the City of Shoreline, Washington to explore and develop the project goals, program, site analysis, systems criteria, sustainability goals, project schedule and cost estimate for the Shoreline Community and Aquatics Center (SCAC). The existing Shoreline Pool facility was constructed in 1971 and requires major health and life safety upgrades and costly reinvestment to remain operational. The existing Spartan Recreation Center is owned by the School District and was formerly a school facility before being adapted for reuse as a recreation center. Its long term future is uncertain due to its adjacency to the planned light rail at 185th street and new development anticipated for that area. If approved by the Shoreline voters on the November 2019 ballot, this project will result in the construction of a new facility for the Shoreline community to gather, play, exercise, learn and socialize. It will unite aquatics and recreation activities under one roof and serve as a new, state-of-the-art flagship facility for the Shoreline community to enjoy.

The new SCAC will be located at 17828 Midvale Avenue North, between North 178th and 180th Streets, a 4.5 acre site that is currently the home of the Storage Court of Shoreline. The site was chosen for its central location, access to public transportation, access to pedestrian and bikers, its availability as publicly owned land and due to its high level of visibility.

The proposed building will be approximately 63,000 gross square feet (GSF), based on approximately 52,000 assignable square feet (ASF). Summary as follows:

- Fitness/Sports: 25,255 ASF
- Aquatics: 13,800 ASF
- Community Spaces: 3,785 ASF
- Support Spaces: 9,385 ASF

Total ASF: 52,225 ASF
Net/Gross Efficiency: .83%
Total GSF: 63,036 GSF

The project includes the demolition of the existing storage units as part of Storage Court.

The project will pursue the equivalency of Gold certification from the Leadership in Energy and Environmental Design (LEED) green building certification program.

The total construction cost estimate for the new building is approximately $42.5 million.

1.2 Program and Process Overview

At the initial stage of the project, a Conceptual Design roadmap was developed with Shoreline team. The roadmap identified stakeholders, meetings, meeting goals, and key milestones/events. Stakeholder groups consisted of a Core group, Working group, Policy committee and Park Funding Advisory Committee (PFAC).

Programming information gathered during the previous feasibility study and confirmed in the early stages of this study was distilled and refined to reflect activity preferences of Shoreline residents and aligned with budget requirements for the proposed Shoreline Community and Aquatics Center.

Public recreation activity preferences were assessed utilizing several means, including surveys, focus groups, public forums and input solicited at public events such as 2018 Swingin Summer Eve and Celebrate Shoreline. In addition, the requirements for continuing current successful programs and the knowledge and experience of Shoreline recreation professionals provided critical programming information. Further, consultant visits to several area recreation centers, including Lynnwood Recreation Center, the Dale Turner Family YMCA and Rainier Beach Community Center, provided important comparative information to maximize the variety and level of service to be provided to Shoreline residents at the proposed new Shoreline facility.
Program Summary

Shoreline Recreation and Aquatics Center
Program of space requirements was developed to reflect the needs and preferences identified throughout the public input process. The primary activity spaces include an indoor walking/jogging track, a recreational activity pool with slide and play structures, a lap pool with deep water, group exercise and fitness spaces, a gymnasium and a flexible use Community Room for receptions, banquets, meetings, as well as activity classes. In addition, recreation administration and other support spaces, such as locker rooms, are included. Importantly, maximizing opportunities for community gathering was integral to the development of the approved program of spaces. The approved program successfully included all the strong preferences of the community and was appropriately aligned with anticipated budget requirements.

### SHORELINE AQUATIC / COMMUNITY CENTER PROGRAM STUDY

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2018 Program
Program Comparison of Existing Shoreline Facilities to New Community and Aquatic Center
Sanitary Sewer

Sanitary sewer for the site is discharged to the existing public sewer main located in N 178\textsuperscript{th} Street, though there do not appear to be any existing side sewer stubs for the existing warehouses.

Gas Service and Dry Utilities

There is an existing gas main located in Midvale Avenue North. We anticipate the new gas service will be tapped from this main.

2.4 EXISTING RIGHTS OF WAY

The project site is adjacent to Midvale Avenue North, North 180\textsuperscript{th} Street, and North 178\textsuperscript{th} Street.

Midvale Avenue North is classified as a Collector Arterial. The existing cross section includes two ten-foot lanes, a 10-foot wide gravel shoulder, a 5.5-foot wide asphalt walk, and a landscape strip.

North 180\textsuperscript{th} Street is classified as a Local Street. The existing cross section includes two ten-foot lanes and a landscape strip.

North 178\textsuperscript{th} Street is also classified as a Local Street. The existing cross section includes approximately 28 feet of asphalt paving and a landscape strip.
2 Existing Conditions Summary

2.1 PROJECT OVERVIEW

The Shoreline Community and Aquatic Center site is located at 17828 Midvale Avenue North in Shoreline, WA. The project site encompasses the entire property and is bounded by an apartment complex and North 180th Street to the north, North 178th Street to the south, Midvale Avenue North to the west, and residential properties along the east. The total site area is approximately 4.1 acres and contains warehouse buildings and asphalt drive aisles.

2.2 Existing Site Conditions

The existing site has approximately 6-feet of fall from the northern to the southern boundaries of the property and is generally level in the east-west plain. Midvale Avenue North and the existing residential areas east of the project site are between 4 and 6 feet higher than the project site.

Geotechnical explorations have not been completed for this site, but there is geotechnical analysis from the site immediately north of this project site. Assuming those geotechnical recommendations are generally consistent between the two properties, the following can be anticipated:

- The native soil is likely suitable for reuse as structural fill provided it is properly compacted and appropriately moisture conditioned. It has a high fines content and is therefore moisture sensitive. Earthwork activities should be conducted during summer months when the weather is reliable dry for extended periods of time in order to reuse the native soil.
- Minimal striping is anticipated; the existing pavement and building foundations will need to be removed. This subgrade should be proof-rolled prior to constructing pavements or foundation on the exposed subgrade.
- Foundations will need to bear on compacted till; there may be isolated pockets of unsuitable fill above glacial till that will need to be excavated and backfilled with imported structural fill.

These assumptions will need to be confirmed or modified by a geotechnical engineer and based on site-specific boring or test pits.

**Existing Site Walls**

There is an existing building butted up against the northern portion of the eastern property line which spans three adjacent neighbors’ properties. This building functions as a retaining wall to elevate the backyard of these residential properties. The height of the grade difference is not known but is estimated between six and eight feet high.

Removing this building will also remove the retaining structure for these backyards, so careful planning will be required to maintain the elevation of the offsite properties. As a temporary measure during construction, the existing wall may need to be braced once the lateral support provided by the building is removed. If the existing wall cannot be kept, either because it has inadequate capacity to support the grade or it can’t be modified for the proposed site design, the existing backyards will require a new vertical element (wall) or a sloped transition.

Constructing a new wall will likely require careful coordination between removal of the existing wall and construction of the new wall, which may require shoring methods.

### 2.3 UTILITIES

**Water Distribution**

Existing domestic water service is provided from an existing 1-inch water meter tapped from an 8-inch cast-iron water main located in Midvale Avenue North. Fire service is provided by two existing fire hydrants tapped from a dead-end water main located at the east side of this property and tapped from an existing water main in North 178th Street. There is no evidence any of the existing warehouses are sprinklered. The existing static pressure is 50 psi. Fire flow information is currently unavailable for this site. Seattle Public Utilities is conducting a fire flow test to provide this information.

**Stormwater Runoff**

Stormwater runoff is currently routed towards the southwest corner of the site to the City’s 24-inch public storm conveyance system located in Midvale Avenue North. The onsite stormwater infrastructure consists of piped conveyance systems, which are routed to a public “piped stream” system consisting of 18 and 24-inch pipes routed through the project site. There are no existing water detention or water quality treatment facilities onsite, though there is a small stormwater pond located at the north edge of North 178th Street.

The location of the new building will require this existing piped-stream to be rerouted onsite. Piped streams are considered Critical Areas and will have specific permitting requirements within the City of Shoreline.
Sanitary Sewer

Sanitary sewer for the site is discharged to the existing public sewer main located in N 178th Street, though there do not appear to be any existing side sewer stubs for the existing warehouses.

Gas Service and Dry Utilities

There is an existing gas main located in Midvale Avenue North. We anticipate the new gas service will be tapped from this main.

2.4 EXISTING RIGHTS OF WAY

The project site is adjacent to Midvale Avenue North, North 180th Street, and North 178th Street.

Midvale Avenue North is classified as a Collector Arterial. The existing cross section includes two ten-foot lanes, a 10-foot wide gravel shoulder, a 5.5-foot wide asphalt walk, and a landscape strip.

North 180th Street is classified as a Local Street. The existing cross section includes two ten-foot lanes and a landscape strip.

North 178th Street is also classified as a Local Street. The existing cross section includes approximately 28 feet of asphalt paving and a landscape strip.
3 Site Analysis and Design

3.1 Water Distribution

New water services will need to be permitted through Seattle Public Utilities and installed for the building.

3.2 Stormwater Runoff

Stormwater mitigation design criterion are set forth by the 2016 City of Shoreline Engineering Development Manual. This project will redevelop an existing site and must address all nine minimum requirements for new and replaced hard surfaces and converted vegetation areas. Following is a summary of how the stormwater system will address these minimum requirements.

1. **Preparation of Stormwater Site Plans**: Full stormwater site plans will be prepared by a Professional Engineer licensed in Washington State and submitted for review and approval to the City of Shoreline.

2. **Construction Stormwater Pollution Prevention (SWPP)**: A Stormwater Pollution Prevention Plan (SWPPP) will be prepared for this project. An erosion and sedimentation control plan shall be implemented during construction to prevent construction storm water from contaminating off-site storm water. Erosion and sedimentation control measures include construction entrances, sediment storage facilities, slope stability measures, perimeter protection and construction runoff monitoring.

3. **Source Control of Pollution**: An oil containment curb will be constructed around the fuel tank for the site’s transformer.

4. **Preservation of Natural Drainage Systems and Outfalls**: The natural drainage patterns of this site will be maintained through the site’s redevelopment. Stormwater will continue to flow from the north to the south through the site to the downstream discharge point. Conveying stormwater runoff to the downstream system will require rerouting an existing piped stream through the site. There is sufficient elevation and space to reroute this piped stream on site, though it is considered a critical area and will require environmental review as part of the permitting process. The duration and complexity of this review process is unknown.

5. **On-site Stormwater Management**: On-site stormwater management BMPs are provided in accordance with the requirements in Table I-2.5.1 of Volume 1 of the 2014 SWMWW. For each surface, the BMPs from List #2 will be considered in the order listed for that type of surface. The first BMP considered feasible will be utilized. Most of the BMP’s will be infeasible due to the nature of the till soils. Each parking stall over the maximum stall number identified in the City of Shoreline code will have porous paving.

6. **Runoff Treatment**: This project will construct more than 5,000 SF of pollution-generating hard surfaces, therefore runoff treatment will be required in accordance with the City of Shoreline Engineering Development Manual and Department of Ecology’s 2014 Stormwater Management Manual for Western Washington. Since this is a commercial project, runoff from pollution generating hard surfaces will be routed to an Enhanced Basic treatment facility approved with a General Use Level Designation by the Department of Ecology.
7. **Flow Control:** This project will construct more than 10,000 SF of effective impervious surface and will therefore require flow control according to Department of Ecology’s 2014 Stormwater Management Manual for Western Washington. A stormwater detention facility will be designed for the proposed site which will match developed discharge durations to pre-developed discharge durations for the range of pre-developed discharge rates from 50 percent of the two-year peak flow up to the full 50-year peak flow. The pre-developed condition will be assumed as forested.

8. **Wetlands Protection:** The project site does not contain any wetlands and is therefore not applicable to this project.

9. **Operation and Maintenance:** Operation and maintenance manuals of all stormwater facilities and BMPs will be provided to the owner.

**Additional Requirements:**
- Basin Plans: Boeing Creek and Middle Puget Sound require Minimum Requirement #7 Flow Control, as previously noted.
- Critical Areas: The location of the proposed building will require an existing piped-stream to be rerouted onsite. Piped streams are considered Critical Areas and will have specific permitting requirements within the City of Shoreline. An environmental review will be required, the duration and complexity of which is unknown. We recommend the application process to begin as soon as possible to avoid project delay.
- The onsite piped stream has a 10-foot diameter buffer at the pipe’s outfall.
- Plat/Short Plat Approvals – N/A; this development is a commercial development.

### 3.3 Sanitary Sewer

The new sewer system will be permitted through Ronald Waste Water District. Kitchens are required to have grease interreceptor vaults.

### 3.4 Frontage Improvements

The project site is adjacent to Midvale Avenue North, North 180th Street, and North 178th Street.

Midvale Avenue North is classified as a Collector Arterial. The existing gravel strip, landscape and asphalt walk will be removed, and the existing asphalt drive lanes will be restriped for a new roadway section consisting of:
- Two 12-foot drive lanes
- 8-foot parking lane
- Curb with a five-foot landscape strip
- 10-foot sidewalk
- six-inch ROW dedication

North 180th is classified as a Local Street. The proposed cross section will consist of two ten-foot lanes, an 8-foot parking lane, curb, five-foot landscape strip, an eight-foot sidewalk and a six-inch ROW dedication.

North 178th is also classified as a Local Street. The proposed cross section will consist of two ten-foot lanes, an 8-foot parking lane, curb, five-foot landscape strip, an eight-foot sidewalk and a six-inch ROW dedication.

In our experience, the City of Shoreline will require a ½-street grind/overlay for adjacent streets.
3.5 Conceptual Landscape Plan

Overall Site Concept

The new Recreation and Aquatics Center is positioned as a critical component to the establishment and growth of a new civic core for Shoreline. The public face of the project is organized around a central courtyard plaza which is also the main entry to the building from Midvale. Reaching past the boundaries of the site, the central courtyard plaza is conceived as both a unique space for the center and simultaneously as the heart to the larger Park at Town Center across Midvale. In support of larger city-wide events the courtyard plaza and park plaza form a connected space to house festivals, farmer's markets, or events driven by use of the Center.

The courtyard plaza extends the usable space of the Center, creating interior to exterior connections. Designed for flexibility the courtyard plaza can be used daily, for private or public events, and for play. Central to the courtyard, a sculptural mound anchors the space to provide bountiful opportunities for kids and adults to climb or wheel to the top. Intergenerational use of the plaza reflects the values of civic identity for the new Center.
To the south, a new forest cradles the natatorium itself and wraps the corner of 178th and Midvale to provide a vegetated edge which disperses as the site opens to the courtyard plaza to create moments of planting with the larger plaza area. The community rooms, sited at the south edge of the plaza, open to the north and south, creating the flexibility of both engaging the more public, central courtyard or opening to the south into an intimate patio set amongst the trees.

3.5.1 Community Spaces

Courtyard Plaza

The courtyard plaza is designed to maintain visual continuity to the interior of the building and provide a variety of spaces to engage small groups to large events.

Hardscape Materiality:
The majority of the plaza will be cast in place concrete, with a medium sandblast finish and sawcut joints in a rectangular north-south configuration. Adjacent the north-south interior corridor, rectangular concrete pavers will carry the sense of indoor-outdoor connectivity in the width of the approximate 20’ space beneath the canopy. The rectangular pavers will also continue at the south patio.

Sculptural Play Mound:
The boldly colored, 5’ high mound is designed to spiral up, to form both steep and gentle slopes to inspire play while maintaining ADA accessibility. The mound is conceived as either artificial turf with a concrete path or as an entirely rubberized play surface, varied in color. The slopes themselves can remain a simple surface or be augmented with additional features such as netting, rock climbing holds, etc. At the base and top, a concrete seat wall wraps the edge, a place to sit, observe, and an optimal location for signage. The play mound is considered an ideal donor opportunity. (Refer to site section for mound and site relationships)

Seating:
Permanent benches are sited throughout the plaza, creating seating opportunities associated with building function and creating zones for smaller groups with vegetated buffers. The benches have a large, rough timber aesthetic, and can be designed as reclaimed timbers or as an off the shelf, timber bench. Moveable tables and chairs are recommended for the zones surrounding the building.

Planting and Irrigation:
Planting within the plaza will be a mix of deciduous and evergreen shrubs with maximum 36” height, with deciduous trees as shown. Drip irrigation will be installed for establishment with the option to decommission after a two-year period, if desired.

Lighting:
Accent LED lighting at seat elements and walls will create dimension and a perception of illumination at night in addition to streetlighting and the building ambient glow.
**South Patio and Aquatic Forest**

The south patio offers an intimately scaled space for smaller groups and special events, associated with the community rooms. The patio is set at the same elevation as the building’s finish floor elevation, while the sidewalk slopes down to the corner, creating a perch, separated from the street and surrounding landscape. (Refer to site section for patio relationship to building and street)

**Hardscape Materiality:**
As mentioned with the courtyard plaza, the concrete rectangular pavers will form the patio hardscape, held by approximately 3’ tall, cast-in-place site walls, and a stainless steel cable guard rail with wood top rail.

**Planting and Irrigation:**
Planting approach will be consistent with the planting at the courtyard plaza with the introduction of some evergreen trees and intermittently space taller, native shrubs – eg. 6-8’ height.

**Stormwater channel (potential):**
Further described in the site sustainability story, the site can take cues from the existing drainage area along 178th by utilizing the slope, running west-east along 178th, in an open naturalistic storm channel. Log weirs, similar in feel to the seating elements within the plaza can reveal and slow down stormwater before it is detained on site to protect the Boeing Creek Watershed.

**Flexible use plaza at parking lot**

An efficient parking lot for approx 180-200 vehicles fully occupies the eastern portion of the site. Because the parking area is significant in scale, there is an opportunity to consider a portion of the area as usable space. The area at the east building entry can be considered both a generous dropoff zone and an overflow area for large events. The concept leverages the space allotted to the parking area and the required planting. Bike racks can also be located at the east entry.

Site Lighting throughout the parking area is essential for user safety.

**3.5.2 Parking Area**

**Landscaping**

Landscaping at the parking lot will follow City of Shoreline development standards.

**Side Yard – East boundary of site and portion of western edge:**
- Full screen, Type I – 10’ Height Trees, per 10 linear feet of strip – maximum 15’ feet apart
- Shrubs – 30” height, 36” on center spacing maximum
- Groundcover – 18” on center spacing maximum
- Mix - 80% evergreen shrubs and trees.

**Front Yard at 178th and 180th Streets**
- Filtered screen, Type II – 1.5” Caliper trees per 25 linear feet of strip, 30’ feet apart maximum
- Shrubs – 24” height, 48” on center spacing maximum
- Groundcover – 18” on center spacing maximum
- Mix – deciduous and evergreen shrubs and trees.

**Internal to parking area:**
- Minimum of 25 square feet of planted area per stall
- Trees throughout parking area, one tree per 10 stalls
3.5.3 Streetscape

Midvale

The project has the opportunity to create a robust pedestrian experience along Midvale, to create a walkable, inviting streetscape that may continue some of the language already established at Shoreline City Hall, indicating that these developments along with future development comprise the civic core. There is an opportunity to consider Midvale in this area as a Festival Street – a zone that can visually and physically connect to the Park at Town Center across the street and be closed to facilitate community, city wide activities.

The Festival Street would be created through an elevated section of roadway, creating a flush condition between either side of the street for pedestrian connectivity, while creating a speed table for vehicles, cueing them to slow down. The elevated connection is proposed the width of the courtyard plaza and will need additional coordination to confirm feasibility. The flush connection will potentially require additional planting and bollards to guide cars and people.

See the civil narrative for the specific Right of Way section. Landscape elements include a 10’ concrete sidewalk, Street trees spaces at 30’ on center, a Continuation of paving patterning from the courtyard to the street, and potential for street furniture – pedestrian scale pole lights and bike racks.

178th

A new sidewalk and planting strip will be installed at 178th, facilitating stronger neighborhood connections. See the civil narrative for the specific Right of Way section.
3.6 Architectural Design

The Shoreline Community Aquatics Center will be a key component to the health, wellness and sense of community place for the residents of Shoreline for years to come. It is important that The Center serve the recreational and community needs for a population diverse in background, age, and interests. To this end a collaborative process between citizens, city stewards, and designers has been undertaken to strategically position a concept for the Center for best success.

The Center has three main program areas joined by a community heart. Aquatics, fitness and sports, and community spaces are all entered from an open lobby and open community space that also joins with an exterior courtyard. The lobby joins the more visible public face of The Center facing Midvale Ave and the parking area to the east between 178th and 180th Streets. The courtyard / community space couple offers and indoor / outdoor space that can be used for events, play and casual leisure. These spaces create the heart of The center.

Aquatics
The Aquatics program consists of a pool deck joining both a leisure pool and separate lap pool. Locker rooms for families, women and men open directly to the pool deck and a party room offers the opportunity for children’s pool parties to be hosted at The Center. The pool deck is pulled back from Midvale Ave and 178th Street and surrounded by landscape to provide a sense of privacy while still providing a connection to nature. One can swim among the trees here.

Fitness and Sports
The main element of fitness and sports programs is a two-court gym placed to the north of the courtyard. The Gym has as much transparency as is practical to both bring natural light into the space and to offer a view of activity to the public face of The Center. Exercise and fitness rooms are stacked to the north of the courts and a running track rings the second floor of the gym / exercise volume. Views from the track will vary from a courtyard overlook to more distant vistas as runners (and socializing walkers!) circle the track.

Community Spaces
The main indoor community space is a flexible 2500 sq. ft. multi purpose room. This room can be used as one large space or subdivided into three smaller spaces for simultaneous use. The Community spaces open directly to the courtyard for joint programming opportunities as well as to a south-facing terrace surrounded by a garden. Both a kitchen and an arts activity room to provide a wide range of meeting and events possibilities flank the community rooms. The community room works in concert with the courtyard to complete the community heart of The Center.
3.6.2 Conceptual Floor Plans

Option 1 Level 1

Shoreline Community Recreation and Aquatic Center

3-9

3-8
3.6.2 Conceptual Renderings

Southwest Bird’s-Eye View

View from Park Town Center

Shoreline Community Recreation and Aquatic Center
PLACE

Entry Courtyard

Lobby/Living room

Shoreline Community Recreation and Aquatic Center
4. Sports Planning

Operational Planning

Planning for the Shoreline Community and Aquatics Center includes a thorough projection of potential revenue and likely expenses to operate the facility over time. Operational costs typically exceed the costs associated with construction within six-to-ten years of opening, making a cost recovery analysis of significant fiscal importance.

The operational cost recovery analysis has been completed concurrently along the conceptual design development of this booklet. The analysis shall be issued as part of a memorandum by the City of Shoreline.

4.1 Goals and Expectations

The goals for the Shoreline facility were initially to maximize cost recovery, however, the convenience, comfort and affordability of the activities and services to be provided were determined to be of greater importance. Understanding of the operational impacts of choices about the spaces to be provided allowed for the development of a space program that would support the stated objectives. The operational plan, based on the space program in addition to desired class sizes, program durations and costs of participation; reflects these objectives, as well.

In addition to coordination of space programming with operational objectives, significant input regarding current program operations, consultant visits to several area facilities and research relating to fees and program offerings in the area, as well as knowledge of national trends were included in the development of an appropriate operational plan for the proposed Shoreline Aquatics and Community Center.

The operational cost recovery analysis has been completed concurrently along the conceptual design development of this booklet. This analysis shall be issued as part of a memorandum by the City of Shoreline.
5 Aquatics

5.1 Evaluation of Existing Aquatics

Visiting other pools in the area helped the design team and Shoreline City staff members visualize different swimming pool design options available. It was evident after the tours of surrounding facilities such as Rainier Beach, Lynnwood Recreation Center and the Dale Turner YMCA, that a multi-use facility design should allow for programming expansion for all ages. Separate lap and activity pools as well as separate spaces for pools with some sort of sound barrier were highly desired. The operators of the other facilities stressed how a properly sized HVAC/dehumidification system is very important to prevent corrosive air. As well as having adequate locker room space for peak times, and appropriate non-slip decking material that is easy to maintain.

5.2 Public Outreach

Compiling the necessary information to provide options for the aquatic design portion of this project was gathered through various means. Communication with the Shoreline City staff via teleconference/telephone, email and electronic meetings occurred frequently. Information was gathered either in person or via electronic means from several community outreach meetings. And, several meetings with the design team occurred via electronic meetings to discuss the different aspects of this project. Water Design, Inc. also participated in a stakeholder workshop in Shoreline with breakout groups specifically to address the aquatic program.

After attending the public outreach meetings offered by the design team, there were some very clear desires expressed from those attending. There is a strong desire for 2 separate pools, one for competition swimming/water polo, lap swimming, competition diving and deep-water fitness; and the other for recreational swimming, swimming lessons and senior programming. The community expressed the need to have each of the pools in their own separate space with an acoustical barrier to allow for simultaneous programming opportunities. Each of the pools should have easy access either by means of a sloped entry or steps. The deck space around the pools should be enough to accommodate the guest’s personal items as well as storage of pool equipment as needed. It is desired that a built-in deck PA/music system and state of the art timing system be installed to allow for programming flexibility. Several programs were discussed including: Senior classes (specifically water walking/fitness), deep water and shallow water fitness classes, competitive swimming and diving, club water polo, swimming lessons, LGT/WSI classes, scout classes, scuba, kayaking and other “high adventure” type classes.

The specific desires as expressed at the stakeholder meeting for the lap pool included; 25-yard pool with 6 lanes (8 lanes preferred), 1-meter diving boards, area for deep water fitness classes, timing system, starting platforms, 4’-0” minimum water depth, ADA accessibility, entry steps or ramp and a built-in deck PA/music system. The specific desires for the activity pool included; sloped entry (zero entry), elevated play structure, ground/deck sprays, current channel, bubble couch feature, ADA accessibility (ramp preferred), 4’-0” maximum water depth, and a built-in deck PA/music system.

Once the results of the outreach meetings were compiled, the overall project budget was agreed upon, and the spaces for the pools within the facility were allocated, the sizes of the pools and the
preliminary designs came to fruition. The specific pool sizes reflect what is possible within the project budget, and facility space while attempting to keep the programming needs/wants in mind.

The pool design components were outlined by attending several public outreach meetings, visiting other area facilities and corresponding with the Shoreline City staff. Other items were considered such as the size of space allocated for the pools within the building and the overall project budget. The pools were maximized within the available space. These items determined which of the desired aquatic components that could be included.

The included pool filtration equipment had several determining factors including; input from Shoreline City and information collected and input from the facility tours. Conservation efforts, efficiency requirements and overall water and air quality requirements topped the list. Specifying equipment such as variable frequency drives for premium efficient pumps, regenerative media filters, heat exchangers and pool covers help with energy and water conservation efforts. With the pools being indoors, experience has taught that in addition to a good HVAC system, supplemental sanitizing systems such as ultra violet technology are imperative for chloramine destruction, helping support superior air quality, and to reduce corrosion. Discussions with the city staff members regarding their current equipment and their likes and dislikes also helped determine the type of filtration system desired. Ensuring the staff is knowledgeable and comfortable operating the equipment is imperative. The type of bathers and expected programming of the pools also had an impact on the filtration decision. Programming and expected bather use has an impact on water turnover rates, water heating requirements, chemical treatment and overall filtering requirements. Lastly, recommending equipment that is not only locally serviceable, but has proven longevity was of the upmost importance.

Moving forward, the conceptual scope of work is intended to provide our clients and design team with relevant information needed for project success. Coordination with the architect, client, and/or owner will assist the design team to receive a full description of the desired pools size, shape, components, effects, and performance.

5.3 Conceptual Pool and Water Features

After the conceptual pool designs have been approved, we will continue to develop concepts with options for providing desired water feature effects and components. We created three conceptual drawing layouts showing the location, design, and sizes of proposed water features, design components, as well as showing the location and layout of the equipment enclosure relative to the other features. Further development of layout and scope will continue to developed in the next phases (Schematic Design and Design Development) with further input from the City of Shoreline and the user groups.
**Option 3**

- **Competition Lap pool:**
  Specifically designed for multiple uses, the ADA accessible lap pool will be designed as a shallow to deep water depth pool to allow for a large range of activities, such as lap swimming conforming to USA Swimming and Diving regulations, competitive water polo, water fitness classes and other programming / classes. The pool will be rectilinear in shape and will be approximately 75'-1" long x 46'-0" wide with an entry step area for ease of access. The pool will have approximately 3,500 sq. ft. in water surface area with water depths of 4'-0" to 12'-3" maximum depth at the drains. The pool will have a deck level gutter system that is highly desirable for competitive swimming, allowing for the very best “wave eating” capability and also providing ease of entry / exit for guests. It will have six, 7'-0" wide x 25-yard-long swim lanes complete with lane line dividers, floor markings and wall targets. The pool will be fully ADA accessible and will have a self-operated lift. There will be multiple sets of grabrails with recessed steps for entry / exit and underwater LED lighting for night swimming. The pool area will also house a state-of-the-art timing system to allow for a myriad of competitive events and PA / music system for programming as desired. The lap pool will be complete with two 1 meter springboard diving boards and towers allowing for competitive and recreational diving.

- **Activity Pool:**
  Separated in its own area by an acoustic barrier, the activity pool will also be designed with multiple uses ages in mind. The pool will be approximately 2,500 sq. ft. in water surface area and have water depths from 0" to 4'-0" maximum depth at the drains. The fully ADA accessible shallow water activity pool will also be designed with a deck level overflow gutter system similar to the lap pool. A planned zero entry design will provide for ease of entry /
exit, safety and aesthetics. The zero entry will slope and step to a deeper area allowing for a large range of programming possibilities as well as accommodating many age groups with fun water features / sprays / activities. The zero-entry area is planned to have an elevated, interactive play structure and multiple deck/ground sprays for guests to enjoy. From the zero entry there will be interior steps with handrails leading to the deeper portion of the pool where a current channel is located allowing for water walking and recreational swimming. The deeper area of the pool also contains a bubble couch feature and potentially a lap lane area perfect for teaching swimming lessons, water fitness classes or simply enjoying the water. Two means of ADA accessibility will be provided utilizing a self-operated lift and either ADA modified pool stairs or entry ramp (with handrails on each side). Grab rails with recessed steps and LED underwater lighting will also be provided. The pool will be complete with a deck PA/music system for programming desires.
6. Basis of Design

6.1 Structural Narrative

Applicable Codes

  - 2019 code will likely be in effect at time of final design and permitting

ACI 318-14 (concrete)
AISC 360-10 (structural steel)
AISC 341-10 (seismic design of structural steel)

Vibration

The second floor exercise area will be designed to limit vibration in accordance with AISC Design Guide 11.

6.1.1 Primary Structural Systems

Project Description

The Shoreline Community and Aquatic Center is anticipated to be an approximately 63,000-square-foot, predominantly one-story facility, housing gymnasium, aquatics and community-use spaces. The north end of the facility will consist of a gymnasium/multipurpose room, flanked by exercise/weight room/cardio areas. A portion of these exercise areas will be on the second floor, east of the high-volume gym; the second floor will also include a jogging track that circumnavigates the gym. The south end of the facility will be the aquatics area, plus a community room off the west side of the aquatics. The two primary areas (gym to the north, aquatics to the south) will be connected via an entrance lobby at the center of the facility.

General

Structural systems have been selected in consideration of each of the following: function of the facility, structural performance (i.e. user-experienced deflections, limiting damage after earthquakes, etc.), aesthetics, constructability, and construction cost. A structural steel-framed building offers the best balance of these criteria.

Gravity

The building will primarily be framed with structural steel. The roof decks will be bare metal deck. The second floor exercise area and jogging rack will be concrete-filled metal deck. Floor and roof decks will be supported by wide-flange beams and girders (for short spans), and by open web steel joists (OWSJ, for long spans over the gymnasium and pools). The beams, girders and OWSJs will be supported by wide flange and/or hollow structural section steel columns, which will carry forces to the foundations.
Lateral

The building footprint features two larger wings (gymnasium and aquatics/community) connected by a narrow lobby area. As such, the seismic response of the building to a large earthquake will be improved by the provision of a seismic joint between these two wings; the joint is anticipated to be located at the south edge of the gymnasium area, where it meets the lobby.

The primary lateral system for each of the two resulting structures will likely be steel buckling-restrained braced frames. The roof and floor decks will function as horizontal diaphragms, which distribute seismic forces to the braced frames.

Foundation

Foundation system selection will be finalized once a geotechnical engineer has been selected, and their investigation/report completed. At this time, it is anticipated that foundations will consist of conventional shallow spread footings (at gravity columns) and combined footings (at braced frames). The first floor is anticipated to be a conventional concrete slab-on-grade.

6.1.2 Alternate Considerations

Glulam Beams

As an alternative to long-span open web steel joists over the gym and pool areas, consideration may be given to the use of glulam beams, which would be exposed/expressed as part of the architecture. Glulams can be provided at similar spacing as the OWSJs. At this time, it is anticipated that all other structural systems would remain the same, i.e. steel roof deck, steel girders and columns, and buckling-restrained braced frames. Thus, the main structural consideration for the glulam beams would be the connection details at the interface with the steel structure.

Glulam beams are under consideration for further design development, but are not included in the current conceptual cost model.

Cross-Laminated Timber (CLT)

As an alternative to steel roof decking, consideration may be given to the use of cross-laminated timber (CLT) roof decking, which would be exposed/expressed as part of the architecture. CLT could be considered at low roof areas, high roof/long-span areas, or both. It can be used in combinations with steel roof framing, and/or with glulam beams. CLT has higher installed costs than steel decking, but savings can be realized by utilizing CLT as the exposed ceiling.

CLT is under consideration for further design development, but is not included in the current conceptual cost model.
6.2 Civil Narrative

Project Overview

The Shoreline Community and Aquatic Center site is located at 17828 Midvale Avenue North in Shoreline, WA. The project site encompasses the entire property and is bounded by North 180th Street to the north, North 178th Street to the south, Midvale Avenue North to the west, and residential properties along the east. The total site area is approximately 4.1 acres and contains warehouse buildings and asphalt drive aisles. The project is proposing to redevelop the entire site with a new 50,000 to 60,000 square-foot building housing an aquatic center and recreation/community facility. New utilities and significant earthwork activities will be required to develop this site for this facility.

6.2.1 Utilities

Water Distribution

Existing water domestic service is provided from an existing 1-inch water meter tapped from an 8-inch cast-iron water main located in Midvale Avenue N. Fire service is provided by two existing fire hydrants tapped from a dead-end water main located at the east side of this property and tapped from an existing water main in North 178th Street. There is no evidence any of the existing warehouses are sprinklered. The existing static pressure is 50 psi. Fire flow information is currently unavailable for this site. Seattle Public Utilities has been requested to conduct a fire flow test before this information is available.

New water services will need to be permitted through Seattle Public Utilities and installed for the building. It is anticipated that a new 4-inch domestic water meter and a new 6-inch fire service connection will be required and are proposed to be tapped from the existing 8-inch public water main in Midvale Avenue North. A new backflow prevention device will be installed, and the new fire service line will be routed to the riser room located inside the building.

We anticipate the existing dead-end water main on the eastern side of the site will be extended to the north and connected to the water main in North 180th Street. New fire hydrants will be tapped from this main to provide coverage for the new building.

Stormwater Runoff

In general, stormwater runoff is currently routed towards the southwest corner of the site to the City’s 24-inch public storm conveyance system located in Midvale Avenue North. The onsite stormwater infrastructure consists of piped conveyance systems, which are routed to a public “piped stream” system consisting of 18 and 24-inch pipes routed through the project site. There are no existing water detention or water quality treatment facilities onsite, though there is a small stormwater pond located at the north edge of North 178th Street.

The location of the new building will require this existing piped-stream to be rerouted onsite. Piped streams are considered Critical Areas and will have specific permitting requirements within the City of Shoreline. Approximately 540 LF of 24” diameter storm pipe will be required to route the piped-stream around the new project.
Stormwater runoff control (detention) and water quality treatment for runoff generated from the new development will be based on the 2016 City of Shoreline Engineering Development Manual. Stormwater runoff from the proposed site will be detained in a below-grade vault and released to match flow durations from the pre-existing (forested) site. Water quality treatment will be required to satisfy Enhanced Basic treatment since it is considered a commercial project.

A water quality facility, sized for the 2-year discharge rate and designed for Enhanced Basic treatment, will be located downstream of the detention vault; the water quality vault is anticipated to be a below-grade media-filled cartridge system. Routine maintenance will be required for this system. Other water quality systems may be evaluated during the design if they are granted approval for this application by Washington State Department of Ecology. We recommend a cartridge system for this site due to space constraints.

**Sanitary Sewer**

Sanitary sewer for the site is discharged to the existing public sewer main located in N 178th Street, though there do not appear to be any existing side sewer stubs for the existing warehouses. The draft survey does not show the elevations of the existing sewer mains.

The new sewer system will be permitted through Ronald Waste Water District. Kitchens are required to have grease interreceptor vaults. Depending on the size of the kitchen, this system may need to be located exterior to the building. We anticipate the pool will have a separate sewer drain from the rest of the recreation center due to its depth. The approximate elevation of the sewer discharging the pool is 17 feet below the building. The sewer connection from the street is approximately 14 feet below the building. Based on conceptual designs, a lift station may be required to drain the pool to the sewer system. Alternatively, the pool could be raised approximately 3 feet to gravity drain to the sanitary sewer.

**Gas Service and Dry Utilities**

There is an existing gas main located in Midvale Avenue North. We anticipate the new gas service will be tapped from this main.

**6.2.2 Site Work**

**Earthwork**

The existing site has approximately 6-feet of fall from the northern to the southern extents of the property and is generally level in the east-west plain. Midvale Avenue North and the existing residential areas east of the project site are between 4 and 6 feet higher than the project site.

Geotechnical explorations have not been completed for this site, but there is geotechnical analysis from the site immediately north of this project site. Assuming those geotechnical recommendations are generally consistent between the two properties, the following can be anticipated:

- The native soil is likely suitable for reuse as structural fill provided it is properly compacted and appropriately moisture conditioned. It has a high fines content and is therefore moisture sensitive. Earthwork activities should be conducted during summer months when the weather is reliable dry for extended periods of time.
- Minimal striping is anticipated; the existing pavement and building foundations will need to be removed. This subgrade should be proof-rolled prior to constructing pavements or foundation on the exposed subgrade.
Foundations will need to bear on compacted till; there may be isolated pockets of unsuitable fill above glacial till that will need to be excavated and backfilled with imported structural fill.

Preliminary grading concepts include setting the gymnasium finished floor elevation at 475 and stepping the pool area down four feet for an elevation of 471. Resulting earthwork analysis yields a cut of approximately 5,000 CY (including excavations for the pools and storm detention system) and 15,000 CY of fill. A finished floor of 475 generally matches Midvale Avenue to the west and the new parking lot to the east without ramps or steps.

Site Circulation and Paving

The existing site access is off North 178th Street. We anticipate the proposed vehicular access will be off both North 180th and 178th Streets and pedestrian access will be from Midvale Avenue North. The proposed parking lot will be along the east side of the site. We anticipate the parking lot will be paved with asphalt and the pedestrian paving will be concrete paving. The parking lot will need to be designed for fire truck access loading. Common asphalt pavement sections for parking lots are 3” of hot mix asphalt (HMA) over 4” of crushed surfacing base course (CSBC). Pavement sections requiring heavier loads typically have 6” of HMA over 6” of CSBC.

Frontage Improvements

The project site is adjacent to Midvale Avenue North, North 180th Street, and North 178th Street.

Midvale Avenue North is classified as a Collector Arterial. The existing cross section includes two ten-foot lanes, a 10-foot wide gravel shoulder, a 5.5-foot wide asphalt walk, and a landscape strip. The existing gravel strip, landscape and asphalt walk will be removed, and the existing asphalt drive lanes will be restriped for a new roadway section consisting of:

- Two 12-foot drive lanes
- 8-foot parking lane
- Curb with a five-foot landscape strip
- 10-foot sidewalk
- six-inch ROW dedication

North 180th is classified as a Local Street. The existing cross section includes two ten-foot lanes and a landscape strip. The proposed cross section will consist of two ten-foot lanes, an 8-foot parking lane, curb, five-foot landscape strip, an eight-foot sidewalk and a six-inch ROW dedication.

North 178th is also classified as a Local Street. The existing cross section includes approximately 28 feet of asphalt paving and a landscape strip. The proposed cross section will consist of two ten-foot lanes, an 8-foot parking lane, curb, five-foot landscape strip, an eight-foot sidewalk and a six-inch ROW dedication.

In our experience, the City of Shoreline will require a ½-street grind/overlay for adjacent streets.

Temporary Erosion and Sediment Control

An erosion and sedimentation control plan shall be implemented during construction to prevent construction storm water from contaminating off-site storm water. Erosion and sedimentation control measures include construction entrances, sediment storage facilities, slope stability measures, perimeter protection and construction runoff monitoring.
Gravel construction entrances will be placed at the main construction entrance off North 178th Street to reduce sediment tracked onto the public roads. Asphalt Treated Base (ATB) surfaces may be utilized as a construction working surface for onsite heavy equipment traffic. Storm water runoff will be conveyed via interceptor swales to an above grade sediment storage tanks (i.e. Baker Tanks) and/or the detention vault, depending on construction sequencing. Silt fence shall be installed at the downstream portions of the project limits to minimize sediment leaving the site. The erosion control plan will be modified throughout the construction sequencing to accommodate the evolving construction site.

Turbidity and pH monitoring and reporting will be required throughout construction in conformance with the City of Shoreline and NPDES requirements. Discharges exceeding turbidity and pH discharge thresholds will require corrective measures prior to further construction.
6.3 Architectural Building Systems

6.3.1 Exterior Finishes

Exterior Wall
- Glass Fiber Reinforced Concrete Wall Panels – Rainscreen
  Basis of Design: OKO Skin
  Color/Finish: Various Colors/Matt & Ferro
  Panel Size: 70.8” x 5.7” x 0.5”
- Polished Concrete masonry anchored block veneer over metal stud rain screen
  Basis of Design: Trenswyth CMU-1
  Product: Trendstone Plus polished ground face masonry.
  Size: 3 9/16” x 3 5/8” x 15 5/8”
  Color: Almond Bark -Midwest Region
  Mortar Joint color: TBD
  Polished Concrete masonry block
- Basis of Design: Trenswyth CMU-2 Site walls adjacent to building
  Product: Trendstone Plus polished ground face masonry.
  Size: 9 9/16” x 3 5/8” x 15 5/8”
  Color: Almond Bark-Midwest Region
  Mortar Joint color: TBD
- Cap: 1 5/8” Monolithic Trendstone plus
- Smooth trawled integral colored exterior cement plaster (CP-1) at penthouse with two piece aluminum expansion joints.
- Aluminum Composite Metal Panel (ACMP-1) rain screen with hidden fasteners.
  Finish: 3 coat Kynar finish.
  Color: Custom TBD
- Metal Panel (MP-1) rain screen with hidden fasteners.
  Finish: High performance coating Tnemec
  Color: Custom TBD

Exterior Window and Doors
- Aluminum entrance doors and windows with champagne anodized aluminum finish.
  Frame Finish: Light Bronze
- Curtain wall systems.
  Basis of Design: Kawneer SSG (CW-1)
  Curtain wall support structure: HSS columns and beams
  Frame Finish: Light Bronze
  Basis of Design: Kawneer SSG with captured vertical caps (CW-2)
  Curtain wall support structure: HSS columns and beams
  Frame Finish: Light Bronze
- Glazing Types (Solarban 70XL):
  1” insulated Low E ¼” clear on ¼” clear. GL-1
  1” insulated Low E ¼” clear on ¼” clear (shadow box). GL-2
- Hollow metal doors (service and exits doors) with high performance coating
- Drainable metal louvers (LVR-1) with custom factory finish painted three coat fluorocarbon Kynar coating.
Roof and Soffits

- Roof level and penthouse roof shall be single-ply membrane meeting Title 24 “cool roof” standards, 6” minimum rigid insulation, and tapered insulation sloping to drain. Main roof structure shall be sloped.
- Smooth trawled integral colored cement plaster at flat horizontal soffits.

6.3.2 Interior Construction

Interior Wall

- Typical interior partitions shall consist of metal stud framed construction with type X gypsum board on both sides. Impact gypsum board exposed at Two Court Gyms.
- Interior storefront/curtain wall shall be extruded aluminum system to match exterior aluminum system with clear anodized aluminum finish and ¼” single clear/spandrel tempered glass or 9/16” laminated glass where adjacent to Mac and Two Court Gyms. Finish to match exterior curtain wall and storefront finish.
- Interior doors shall be flush face wood doors with solid wood stiles, rails, and backing for closers and stained wood veneer in hollow metal door frame. Doors serving non public spaces, such as electrical or storage rooms, shall be painted metal doors in hollow metal door frames. Such doors shall be painted match adjacent wall finish. Door hardware shall meet IBC and ADA requirements as well as Shoreline City hardware specification standards. All restrooms and locker room doors shall have power accessible assisted hardware.
- Where headroom beneath diagonal steel bracing is less than 6’-8” clear, ADA-compliant cane detection shall be provided by a painted steel rail.
- In high traffic areas, wall wainscoting will be considered.

Interior Wall Finishes

- See Sports finishes and Equipment for specific finishes.
- Typical interior partitions shall consist of metal stud framed construction with type X gypsum board on both sides.
- Painted gypsum board walls.
- All exposed gypsum board in Two Court Gym shall be high impact gypsum board.
- Restrooms and locker rooms shall have ceramic tile.
- Aquatic Center wall finishes:
  Wall finish: Ceramic tile Over 3 coat cement plaster system over water proof membrane
  Exterior Grade High Performance paint cost system where exposed structural steel structural.
- Janitor rooms to have FRP panels at wet areas. All other surfaces painted gypsum board.
Interior Floor Finishes

- Polished concrete floors on 4” topping slab with exposed aggregate for level 1 public corridors and lobby areas. Floors shall be sealed against moisture intrusion and meet ADA requirements for slip-resistance.
- Concrete fine broom finish at pool deck.
- Ceramic tile finish at restrooms, and locker rooms.
- Resilient flooring for fitness, jogging, multipurpose rooms, and Two Court Gym spaces per Sports Finish and Equipment BOD
- Carpet in general office spaces, classroom, massage, and conference rooms.
- Concrete fine broom at pool office and life guard office.
- Sealed Concrete in service spaces such as electrical, mechanical, closets, storage, and janitor closet rooms with sealer.
- Epoxy flooring at Pool Chemical Storage rooms
- Fiber Glass bar grating at Pool Filtration Room and Chemical Storage rooms.

Conveying System

- Elevator #01
  Basis of Design: Otis
  Product: Otis Gen 2 Machine room less, belt driven
  Stops: 2
  Size: Freight 5000 lbs
  Speed: FPM 150
  Interior cab finish: No 4 stainless steel
6.4 Aquatics

6.4.1 Lap Pool

Lap Pool Design Intent

Specifically designed for multiple uses, the ADA accessible Lap Pool will be designed as a shallow to deep water depth pool will allow for a large range of activities, such as lap swimming conforming to USA Swimming and Diving regulations, competitive water polo, water fitness classes and other programming / classes.

The lap pool will be designed to meet the requirements of the State of Washington Public Swimming Pool Code and the King County Department of Public Health Swimming Pool and Spa Requirements.

The lap pool dimensions will be approximately 75'-1" X 46'-0" and have approximately 3,450 sq. ft. in water surface area. It will have six 7'-0" wide x 25 yard long swim lane lines and wall targets. The water depths of the pool will be from 4'-0" to 12'-3" maximum depth at the drains.

The design intent for this project is to provide a pool constructed with a steel reinforced shotcrete with a plaster interior finish and deck level overflow gutter system with tile hand hold and parallel grating and a vertical tile band at the waterline. One means of ADA accessibility via a self-operated lift will be provided, along with multiple sets of grabrails with recessed steps for entry / exit. The pool will have a 1 meter springboard diving board and tower.

The lap pool will also contain the following additional list of features:

- 1 meter springboard diving board and tower
- Depth marker tiles, No Diving tiles and No Running tiles on the pool deck
- Depth marker tiles on the pool wall at the water line
- LED underwater lights
- Competitive starting platforms at each lane
- Floating swim lane line dividers with storage reel and safety rope and float line
- Backstroke posts and pennants for the swim lanes
- Timing system with LED color display board
- Electric or battery operated pace clocks
- Deck/wall mounted water polo goals – one set of two goals
- Water polo area deck mounted safety netting
- Water polo floating lines for course and out of bounds demarcation
- Water polo shot clocks
- Floor type pool circulation supply inlets
- Circulation floor suction outlets per code requirements
- Cleaning systems – portable and robotic (one of each system for the entire facility)
- Portable lifeguard chairs
- Safety equipment and test kit as required by code (one set of each for the entire facility)
- Safety signs as required by code
- Floating insulated pool covers and reels
- Reinforced concrete lap pool surge tank in a dedicated room with separate ventilation (one room can accommodate both the lap pool and the activity pool surge tanks)
- Reinforced concrete backwash/water evacuation pit located in the equipment room (one required to accommodate all pools)
Activity Pool Design Intent

The fully ADA accessible shallow water activity pool will also be designed with a deck level overflow gutter system similar to the Lap Pool. A planned beach entry design will provide for ease of entry / exit, safety and aesthetics in mind. The pool will slope to a deeper area allowing for a large range of programming possibilities as well as accommodating many age groups with fun water features / sprays / activities.

The activity pool will be designed to meet the requirements of the State of Washington Public Swimming Pool Code and the King County Department of Public Health Swimming Pool and Spa Requirements.

The activity pool will be approximately 2,500 sq. ft. in water surface area with water depths from 0” to 4’-0” maximum depth at the drains.

The design intent for this project is to provide a pool constructed with a steel reinforced shotcrete with a plaster interior finish and deck level overflow gutter system with tile hand hold and parallel grating and a vertical tile band at the waterline.

Two (2) means of ADA accessibility will be provided utilizing a self-operated lift and either ADA modified pool stairs or entry ramp (with handrails on each side). Grab rails with recessed steps shall also be provided as required by code.

The pool will have a zero depth beach entry with a sloped floor allowing for access into the deeper portion of the pool, along with entry steps in one or more areas of the deep end of the pool.

The pool is intended to contain a current channel feature, bubble couch feature, an in-pool elevated play structure and ground level water sprays. Exact pool toy / water feature types and selections are yet to be determined (to be selected by owner with Water Design’s and WRNS’s input).

The Activity Pool will also contain the following additional list of features:

- Depth marker tiles, No Diving tiles and No Running tiles on the pool deck
- Depth marker tiles on the pool wall at the water line
- LED underwater lights
- Safety ropes and float lines as desired/required
- Floor type pool circulation supply inlets
- Circulation floor suction outlets per code requirements
- Portable lifeguard chairs
- Safety signs as required by code
- Floating insulated pool covers and reels
- Reinforced concrete activity pool surge tank in a dedicated room with separate ventilation (one room can accommodate both the lap pool and the activity pool surge tanks)

Pool Circulation Systems Design Intent

The pools will be mechanically filtered utilizing regenerative media filtration systems complete with automatic filter re-coating and controls.

Each pool’s circulation pumps will have premium efficiency motors and will be controlled via a variable frequency drive for additional energy savings. Any feature pumps provided for the Activity Pool will also be controlled via variable frequency drives. Each pool’s concrete surge
tanks will be located in a separately ventilated room to help decrease the potential for corrosion in the equipment room. Each of the pools will have an automatic water level control system to increase effective pool skimming and to maintain surge capacity with fresh water supplied at the surge tanks.

The pools will be heated utilizing heat exchangers which are fed with heat from the main facility boilers. The lap pool water temperature will be maintained between 78 and 84 degrees Fahrenheit, and the activity pool water temperature will be maintained between 84 and 90 degrees Fahrenheit.

The chemical storage areas will provide the quantities of chemicals as required for each of the pools combined. The water treatment system will utilize liquid chlorine. For pH control, muriatic acid and CO2 will be provided. The pool will be equipped with an automated chemical control system complete with sensors and feed equipment to allow up to the minute display and automatic adjustment of the primary water balance parameters. Each of the pools will also utilize a medium pressure Ultra Violet (UV) disinfection systems which inactivates pathogens as well as enhances the indoor air quality through the reduction of chloramines. Exposed piping in the filter equipment room will be Schedule 80 PVC for strength and resistance to corrosion (heat exchanger by-pass piping will be copper or CPVC). All buried piping will be Schedule 40 P
6.5 Fire Suppression

Codes and Standards

Codes - Systems shall be designed in accordance with the latest edition of the following codes:

- International Plumbing Code with Washington State amendments.
- Local Amendments to above Codes.

Standards - The following reference standards shall be used for the design:

- NFPA #13, Standard for the Installation of Sprinkler Systems.
- ANSI – American National Standards Institute.
- ASCE – American Society of Civil Engineers.
- ASME – American Society of Mechanical Engineers.
- ASSE – American Society of Sanitary Engineering.
- AWS – American Welding Society.
- AWWA – American Water Work Association.
- FM Global Approval Guide.
- ICC-ES AC193 Mechanical Anchors in Concrete Elements.
- ICC-ES AC308, Post-Installed Adhesive Anchors in Concrete Elements.
- NEMA – National Electrical Manufacturer’s Association.
- OSHA – Occupational Safety and Health Administration.
- UL – Underwriters’ Laboratory.
- UL Online Certifications Directory
Scope of Work

Fire Protection System:

- Provided new underground fire sprinkler water supply from exterior main to interior fire sprinkler riser room. Coordinate requirements for double check valve assembly, post indicator valve (PIV), and fire department connection (FDC) with the civil engineer and fire code officials.

- Provide new hydraulically calculated wet pipe automatic fire sprinkler system for the building with floor control valves.

- Provide quick response type sprinklers within the non-combustible interstitial space above the second floor ceilings to meet the requirements of the approved alternate means.

- Provide a fire department connection with two inlet connections at a location approved by the local authority.

- Hydraulically designed system shall be based on an official water flow test conducted within 6-months of the date of shop drawing submittals.

- Add Alternate FP1 - A fire pump and associated jockey pump will be provided within its own fire pump room should the pressure/flow tests show that there is inadequate pressure provided to the project site from the municipal system.

- Fire sprinkler design for chemical storage rooms shall be coordinated with secondary containment requirements.

- Piping will be as follows:
  o Underground piping from 5 ft. outside of building to 6-inch above floor slab: Ductile iron pressure pipe, AWWA c-151 with AWWA-11 Mechanical Joints.
  o Aboveground: Schedule 40 black steel threaded pipe with cast or ductile iron threaded fittings, or schedule 10 black steel grooved pipe with UL listed rubber gasket couplings. Pipe shall meet ASTM A-53 or A-795 standards.
  o Pool, Pool Deck area, Pool Chemical Storage, Pool Mechanical Room (Boiler Room), Pool Storage (Survival Equipment), Additional Pool Storage and Pool Equipment Storage: Type 316 Stainless Steel.

Fire Sprinkler System Equipment:

- Sprinklers, valves, switches, pipe, fittings, backflow preventers, hangers, sway braces and the like will be UL listed or FM Global approved for fire protection.

- Fire sprinkler heads: Quick response, recessed style with corrosion resistant white sprinkler heads and white escutcheons in finished areas. Areas open to structure will utilize upright sprinklers with corrosion resistant white finish.

- Provide concealed type sprinklers at all Linear Metal Ceilings installed with flexible sprinkler connections. Coordinate cover plate colors with architect.
• Sprinklers, fittings and structural attachments suitable for corrosive environments will be used outside and where there is a likelihood of corrosion, including the Pool, Pool Equipment Storage Survival Equipment and Pool Mechanical Room, and Pool Chemical Storage.

• Sprinkler head ASCE 7 seismic requirements: Sprinkler heads installed in acoustic ceiling tiles to be provided with braided stainless steel flexible sprinkler connections.
6.6 Plumbing

Codes and Standards

Codes - Systems shall be designed in accordance with the latest edition of the following codes:

- Washington Electrical Code.
- Washington Mechanical Code.
- Washington Fire Code.

Standards - The following reference standards shall be used for the design:

- ANSI – American National Standards Institute.
- ASME – American Society of Mechanical Engineers.
- AWS – American Welding Society.
- AWWA – American Water Work Association.
- UL – Underwriters’ Laboratory.
- LEED – Leadership in Energy and Environmental Design for New Construction

Plumbing Systems

Sanitary Sewer and Vent System

- The sanitary sewer and vent system will be provided to convey waste from the new plumbing fixtures by gravity through soil, waste, and vent piping connected to the building waste line under the floor slab. Sanitary sewer service exiting the building will be shown up to 5 feet outside the building.

- Sanitary waste piping will be provided to all plumbing fixtures. A separate line will be provided to the swimming pool and boiler area.
Any floor drains or floor sinks that receive intermittent condensate/drain and/or with traps subject to drying will be provided with automatic trap primers. Access panels will be provided for the trap primers. Access panels will be consistent with the architectural specifications.

Area and trench drain will drain from the pool area via a separate sanitary sewer conveyance system sized on the flow rate and evacuation duration for the pool filter backwash pit (see item below).

Pool filter backwash pit will be drained based on evacuation duration for the pool filter backwash system. It is estimated than the drainage system will require an 8” connection.

Add Alternate P1 - Area and trench drains in the pool area will drain to the building greywater system for treatment and reuse.

Add Alternate P1 - The pool filter backwash pit will be pumped to the building greywater system for treatment and reuse.

Piping service below grade will be cast iron, service weight, 10-psi maximum service pressure, 140 degrees F maximum service temperature, with heavy duty couplings. It will be wrapped with 8 mil polyethylene plastic for corrosion protection. Alternate piping material for below ground installations will be thermoplastic PVC, schedule 40.

Storm Drainage System

The building will be provided with storm drainage system sized for 2 inches per hour minimum of rainfall.

Multiple interior storm vertical drains will be provided around the building and will be routed to 5 feet outside the building.

Roof and overflow drains will be routed to site bioretention and treatment areas per the site stormwater mitigation plan.

Secondary (overflow) drainage piping will be provided where required by architectural layout. Overflow leaders with downspout nozzles terminated above grade will be provided as needed.

Domestic Cold-Water System:

There will be a domestic water service to be tied-in to the site domestic water distribution system. The water service will be provided with a code-required backflow preventer. A water pressure regulator will be added should incoming water pressure exceed 80 psi.

The domestic cold-water system will be distributed through branch piping connected to the building mains. Each branch pipe shall be provided with a branch shut-off valve (ball valve). Separate shutoff valves will be provided for men’s and women’s restrooms served from the same branch piping. The water supply to each group of shower stalls will be provided with accessible isolation valve.

Piping exposed to weather will be wrapped with insulation for freeze protection.

Domestic water will be supplied to the Swimming Pool for make-up. Secondary protection against backflow will be provided as required by code.
- Piping mains will be designed to maintain a maximum velocity of 7 fps at design flow conditions. Smaller diameter branch lines will be designed to a maximum of 5 fps.

- Design will ensure that no fixture has a pressure lower than 35 psi or higher than 75 psi.

- The system will be designed to prevent water hammer conditions by providing shock arrestors for all fixtures, and shock arrestors for quick closing valves sized per PDI standards. Shock arrestors shall be Zurn or PPP, Inc. and will be accessible.

- All hose bibs will be provided with vacuum breakers. Weather exposed hose bibs will be provided with freeze protection.

- Domestic water piping will be copper type K (for underground installations) and type L (for aboveground installations) hard drawn copper, 125 psi maximum service pressure, 250 degrees F maximum service temperature.

- Alternate - A domestic water booster pump (dual pumps with VFD control) will be provided within its own booster pump room should the pressure/flow tests show that there is inadequate pressure provided to the project site from the municipal system for domestic water.

Add Alternate p1 - Recycled Water System

- Recycled water design will comply with the Non-Residential Mandatory Green Building Standards: Section 5.303.2 to achieve a minimum 35% potable water reduction, Section 5.303.3 to achieve a 35% waste water reduction, and Table 5.503.3 pertaining to plumbing fixture and fitting requirements.

- Recycled water service will be provided for landscaping irrigation and water closet and urinal flushing.

- A separate meter and backflow preventer will be provided for make-up water to the recycled water system.

- All water closets and urinals with recycled water supply will be provided with signage indicating that fixture is using non-potable recycled water.

- All recycled water piping will be provided with colored coded pipe indicating recycled water.

Add Alternate p1 - Grey Water Treatment System:

- A new grey water treatment system will be provided to treat the pool filter backwash water and shower and lavatory grey water. The system will be connected to the recycled water system to provide non-potable water to the building water closets and urinals as well as the site irrigation. The system will provide water quality per NSF-350 standards.

- The system shall consist of the following:
  
  o Greywater Collection Tank: Grey water from showers, sinks, the pool deck area, and the pool backwash will be collected and conveyed by gravity to a single, below grade, 10,000-gallon, fiberglass collection tank.
Processing: The grey water will be processed in 1,000-gallon batches throughout the day through a grey water system which consists of (3) stages of filtration and sterilization. Two transfer pumps will transfer raw greywater from the holding tank to a 1,000-gallon settling tank. The greywater will then be pumped through the filtration skid which consists of an 80-micron disc filter, a 10 micron self-cleaning multi-media filter, and 1 micron carbon filter. After the water is filtered, it is sanitized using chlorine to maintain a residual level of 0.5 PPM.

Processed Water Holding Tank: After passing through the filtration and sterilization, the treated non-potable water will be held in a below grade, 10,000-gallon fiberglass holding tank to await pressurization to the irrigation and toilets. If the level of the treated water reaches the tank’s capacity, any untreated greywater will be sent to the sewer system from the collection tank. If the water level in the staging tank drops below a preset point and no additional untreated greywater is available, then make-up water will be supplied from the municipal water line.

Duplex variable frequency drive pumps will provide 50 GPM at 60 PSI for the non-potable water distribution.

There is the potential that high levels of residual chlorine may be present from the pool backwash (especially after "super chlorination"). Water exiting the Processed Water Holding Tank and after the pressurization skid will be split to serve recycled water fixtures and irrigation. The irrigation water supply will be sent through a carbon filter to remove any residual chlorine to protect the landscaping from high chlorine levels.

Domestic Hot Water System:

- Domestic hot water will be provided by two double wall, plate & frame heating water heat exchangers with a duplex set of circulating pumps. The domestic hot water system will provide 120°F maximum hot water to all lavatories, shower stalls, and sinks, with scald protection. The hot water system will be supplied from the HVAC boiler or heat pump system.

- Water supply to group of shower stalls will be provided with accessible isolation valves.

- Piping mains and branches will be designed to maintain a maximum velocity of 5 fps at design flow conditions.

Natural Gas System (hvac option 2):

- If HVAC Option 2 is selected and/or if heat pumps cannot be used for pool water heating, then natural gas will be required. The natural gas capacity will be approximately 3,000 MBH for the HVAC system plus the required capacity of the pool heating system.

- A new natural gas service will be provided with an earthquake shutoff valve.

- A pressure regulator and an earthquake valve will be provided before entry to the building.

- Branch piping will be provided to each gas dryer.

Condensate System

- The condensate drain system will drain all clean water drainage from any mechanical cooling equipment. All equipment requiring condensate removal will be equipped with a secondary drain pan and visible overflow piping. The primary condensate will be tied into the sanitary
sewer system as an indirect waste with an air gap fitting. Condensate is required to be insulated as specified.

Plumbing Fixtures and Equipment - The plumbing fixtures will be water conserving fixtures throughout, and meet ADA requirements, as follows:

- The water closets will be low-flow, 1.28 gal per flush.
- The urinals will be low flow, 0.125 gal/flush.
- The shower valves will be low flow, 1.5 gpm or less.
- Drinking fountains will be provided and their location coordinated with architect. Water bottle filling stations will be provided at each drinking fountain location.
- Hose bibs will be provided in the shower and toilet rooms, exterior of building, and swimming pool area. Hose bibs in weather exposed areas will be provided with freeze protection.
- Emergency shower/eyewash stations will be provided adjacent to the Swimming Pool Chemical Storage area and gray water treatment equipment. Locations will be coordinated with Architectural layout.
- Trench drains in the pool area will be corrosion-resistant HDPE construction, suited for pool environment.

Commissioning: All building systems will be commissioned to meet Washington Energy Codes as well as LEED® Fundamental and Enhanced Commissioning.
6.7 HVAC

Codes and Standards

Codes - Systems shall be designed in accordance with the latest edition of the following codes:

- Washington Electrical Code.
- Washington Mechanical Code.
- Washington Fire Code.

Standards - The following reference standards shall be used for the design:

- AMCA – Air Movement and Control Association International, Inc.
- ANSI – American National Standards Institute.
- ARI – Air Conditioning and Refrigeration Institute.
- ASHRAE – American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- SMACNA – Fire and Smoke Damper Installation Guide.
- SMACNA – Standards for Duct Construction.
- EPA – Environmental Protection Agency
- NEMA – National Electrical Manufacturer’s Association
- UL – Underwriters’ Laboratories.
- NFPA - National Fire Protection Association:
  - NFPA 90A – Air Conditioning and Ventilating Systems.
- LEED - Leadership in Energy and Environmental Design for New Construction
Load Calculations

- Outdoor Design Conditions - System load calculations shall be based on the following outdoor design conditions:
  - Summer - 80 degrees F DB / 65 degrees F MCWB (ESTIMATED, FINAL TO BE DETERMINED) for airside system calculations although no mechanical cooling is provided at this time.
  - Winter – 35 degrees F DB (ESTIMATED, FINAL TO BE DETERMINED) for airside system calculations and heating system calculations.

- Indoor Design Conditions - System will be designed to maintain the following temperature and humidity conditions (numbers below are the set-point to which load calculations will be completed and to which the control system will be set):

<table>
<thead>
<tr>
<th>Space</th>
<th>Cooling (degrees F)</th>
<th>Heating (degrees F)</th>
<th>Relative Humidity (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gymnasium</td>
<td>75 ± 2</td>
<td>68 ± 2</td>
<td>No Control</td>
</tr>
<tr>
<td>Pool</td>
<td>86 ± 2</td>
<td>86 ± 2</td>
<td>60% Max</td>
</tr>
<tr>
<td>Multi-Purpose Room</td>
<td>75 ± 2</td>
<td>68 ± 2</td>
<td>No Control</td>
</tr>
<tr>
<td>Corridors**</td>
<td>78 ± 2</td>
<td>68 ± 2</td>
<td>No Control</td>
</tr>
<tr>
<td>Restrooms***</td>
<td>No Control</td>
<td>68 ± 4 (control only provided for Restrooms with perimeter walls)</td>
<td>No Control</td>
</tr>
<tr>
<td>Private Offices / Open Offices / Community Spaces / Small Multipurpose Rooms / Back of House Spaces / Locker Room Spaces</td>
<td>75 ± 2</td>
<td>68 ± 2</td>
<td>No Control</td>
</tr>
<tr>
<td>All Other Occupied Zones</td>
<td>75 ± 2</td>
<td>68 ± 2</td>
<td>No Control</td>
</tr>
<tr>
<td>Elevator Machine Room</td>
<td>95 ± 5</td>
<td>No Heating</td>
<td>No Control</td>
</tr>
<tr>
<td>Telecom, Data</td>
<td>85 ± 5</td>
<td>No Heating</td>
<td>No Control</td>
</tr>
<tr>
<td>Unoccupied Areas (Elec. Closets, Water Heater Rooms, etc.)</td>
<td>85</td>
<td>55</td>
<td>No Control</td>
</tr>
</tbody>
</table>

** Corridors and hallways have relaxed temperature constraints as they are considered transitional spaces.

*** Restrooms use transfer air and are not controlled to a tight temperature specification.
Internal Air Conditioning Loads Assumptions

- Lighting – 0.6 Watts/S.F. for private office space, 0.75 Watt/S.F. for conference rooms, 0.6 Watt/S.F. for open spaces. At Construction Documents stage, we will utilize actual lighting load based on lighting design.

- Miscellaneous Office Equipment – 0.5 Watts/S.F. for Office Areas, 1.0 Watts/S.F. for Conference Rooms, ASHRAE loads for equipment in exercise rooms.

- People
  - 245 BTUH Sensible/155 BTUH Latent for offices, conference rooms, and back of house spaces.
  - 250 BTUH Sensible / 200 BTUH Latent for spectator seating, locker rooms.
  - 710 BUTH Sensible / 1,090 BTUH Latent for Wellness Room occupants and Athletes in Gymnasium.
  - 305 BTUH Sensible / 545 BTUH Latent for Multi-Purpose Room.
  - Number of people shall be based on ASHRAE standard 62.1-2007 and Washington Energy Codes.

- Conference Rooms will account for loads of 20 S.F. per Occupant.


Envelope Load Assumptions:

- Walls: Composite U-Value will be determined based on actual building design conditions. We are recommending an insulation system with R-19 interior batt insulation minimum.

- Glazing: We recommend that the glazing be dual pane low-E glazing similar to Solarban 70 XL with a center of glass U-Value(winter) of 0.25 or lower and Solar Heat Gain Coefficient of 0.28 or lower.

- Roof: Composite U-Value will be determined based on actual building design conditions. An assembly equivalent to or greater than R-28 insulation is recommended.

Methodology: All cooling loads will be completed with industry standard software such as Trace 700, Carrier HAP, etc. Load calculations will meet industry standard as outlined in the most current ASHRAE Fundamental Handbook.

Systems Sizing:

- Block Loads: heating systems and air distribution systems will be sized based on block loads.

- Airside System Sizing: Air handlers, associated coils, associated filters will be sized for an extra 10 percent load capacity than required for calculated loads. An additional extra 4 percent leakage capacity in fan motor horsepower will account for duct leakage.
Heating, Ventilating, and Air Conditioning Systems

Central Plant Option 1:

- This system uses a central heat pump plant for all electric heating and cooling. The heat pump plant will consist of two 120-Ton variable capacity heat pumps (Aermec NRP 1800, typical of 3) or modular heat pumps similar to Multistack VME2 or Clima Cool (two sets of 120-ton plants, i.e. each plant has two 60-ton modules). All heat pumps are air to water heat pumps designed to operate at 120°F discharge water temperature in heating and will be located on the roof. All heat pumps will be designed to operate in simultaneous heating and cooling with 100% heat recovery operation with an estimated simultaneous COP = 7-8.0.

- Heat pumps will be provided with a low sound acoustical package.

- The heat pump plant will include two storage tanks for storing chilled water and heating water. Each storage tank will be a welded 3,000 gallon pre-manufactured and insulated tank.

- The plant is sized to accommodate heating of the building, cooling of the building, domestic hot water for the building, and heating of the pool water. The plant will feed hot water to the pool via a titanium heat exchanger (see pool heating below).

- Appurtenances will include all required valving, expansion tanks for heating and cooling loops, air separators for heating and cooling, industrial make-up water from the plumbing systems, chemical pot feeders.

- Pumping System: Each loop (heating and cooling) will be provided with primary pumps feeding the piping from the heat pump skid to the storage tanks. Each loop will be provided with two (2) variable speed distribution pumps (each sized for 60% of the total flow) from the storage tanks to the building systems (HVAC heating, HVAC cooling, Plumbing Domestic Hot Water, Pool Heating).

  - Pumps Sizing Estimates
    - HWP-1: 180 GPM, 7.5 HP with VFD
    - HWP-2: 180 GPM, 7.5 HP with VFD
    - CHWP-1: 240 GPM, 7.5 HP with VFD
    - CHWP-2: 240 GPM, 7.5 HP with VFD
    - SHWP-1: 180 GPM, 20 HP with VFD
    - SHWP-2: 180 GPM, 20 HP with VFD
    - SCHWP-1: 240 GPM, 20 HP with VFD
    - SCHWP-2: 240 GPM, 20 HP with VFD
Central Plant Option 2:

- This system uses a more traditional plant using variable speed air-cooled chillers and natural gas boilers. The system will be comprised of two (2) 120-Ton air-cooled chillers with variable speed (VFD) compressors and VFD condenser fans, similar to JCI air-cooled chillers. The boiler system will be comprised of three (3) 1,000 MBH condensing boilers, Basis of Design is KN Series.

- Chillers will be provided with a low sound acoustical package.

- Boilers will be installed in a boiler room (approximately 750 sf located on the roof or Ground Floor).

- This option will require natural gas distribution (see Plumbing)

- The plant is sized to accommodate heating of the building, cooling of the building, domestic hot water for the building, and heating of the pool water. The plant will feed hot water to the pool via a titanium heat exchanger (see pool heating below).

- Appurtenances will include all required valving, expansion tanks for heating and cooling loops, air separators for heating and cooling, industrial make-up water from the plumbing systems, chemical pot feeders.

- Pumping System: Each loop (heating and cooling) will be a primary variable pumping system. Each loop will be provided with two (2) variable speed distribution pumps (each sized for 60% of the total flow).
  - Pumps Sizing Estimates
    - HWP-1: 180 GPM, 25 HP with VFD
    - HWP-2: 180 GPM, 25 HP with VFD
    - CHWP-1: 240 GPM, 25 HP with VFD
    - CHWP-2: 240 GPM, 25 HP with VFD

Gymnasium, Fitness, community spaces, Office and Back of House HVAC Systems:

- Mechanical ventilation & Heating system: Variable volume air handling units (typical of 2) with 100% outdoor air economizer and hot water preheating /heating coil and chilled water cooling coil provide mechanical ventilation, cooling, and heating for all spaces. The two air handler will be headered together to deliver air to all spaces.
  - Air Handling Units (AHU-1, 2):
    - Type: Outdoor, Modular, Variable Volume
    - Mfr: Petra, Temtrol, Energy Labs
    - Airflows: 24,000 CFM each
    - Velocity: 400 FPM
Shoreline Community Recreation and Aquatic Center

- Arrangement: Blow Through
- Supply Fans: Two direct drive plenum fans per AHU with individual VFD's
- Return Fans: Two direct drive plenum fans per AHU with individual VFD's
- Vibration: Internal 2” deflection with seismic snubbers on all fans
- Cooling Coil: Copper Coils, Copper Fins, 8-Rows
- Heating Coil: Copper Coils, Copper Fins, 1-Row
- Filters: Merv-8 (removed after construction), MERV-13 final filters
- Economizer: 0-100% modulating with dry-bulb control
- Plenum: Mixing plenum and discharge plenum
- Dampers: Motorized economizer dampers, backdraft damper at supply

- Air distribution will be provided via over-head duct diffusers and ceiling plenum return grilles. All ductwork will be galvanized sheetmetal. Return air will be an unducted return air plenum.

- AHU return fan will provide economizer relief and space pressurization control.

- Acoustical Attenuation: Five-foot sound attenuators in supply duct and return duct. See acoustical reports by others for additional detail.

Pool HVAC Systems:

- Mechanical ventilation system: There will be one air handler with integral modulating hot water coil, exhaust fan heat recovery coil with run around pump and chilled water cooling coil for dehumidification. AHU-3 cooling coil can be used as pre-heating coil during heat recovery operation.
  
  - Air Handling Unit (AHU-3):
    - Type: Outdoor, Modular, Variable Volume
    - Mfr: Petra, Temtrol, Energy Labs
    - Airflows: 24,000 CFM
    - Velocity: 400 FPM
    - Arrangement: Blow Through
    - Supply Fans: Two direct drive plenum fans per AHU with individual VFD's
    - Exhaust Fans: Two direct drive plenum fans per AHU with individual VFD’s
    - Vibration: Internal 2” deflection with seismic snubbers on all fans
    - Cooling Coil: Copper Coils, Copper Fins, 8-Rows
- Heating Coil: Copper Coils, Copper Fins, 1-Row
- Heat Recovery Coil: Copper Coils, Copper Fins, 8-Rows
- Filters: Merv-8 (construction), MERV-13 final filters, Moisture Eliminator and Pre-Filter prior to Heat Recovery Coil
- Economizer: None, 100% outside air
- Plenum: Mixing plenum and discharge planum (exhaust section will be all aluminum)
- Dampers: Motorized outside air and exhaust air dampers

- Air distribution will be provided via over-head duct diffusers and low wall grilles. When in heating mode, actuators will allow the airflow to accommodate heating in lieu of displacement ventilation. AHU exhaust fan will provide economizer relief and space pressurization control.

- Acoustical Attenuation: Five-foot sound attenuators in supply duct and exhaust duct. Attenuators will not be lined on the exhaust system. See acoustical reports by others for additional detail.

- All ductwork and supports will be aluminum or 316 stainless steel within the natatorium, showers, and other wet rooms.

- Following checklist is based on ASHRAE 2015 HVAC Applications Handbook - Chapter-4 summarizing Pool HVAC system and Natatorium design requirements.

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommendation</th>
<th>Yes</th>
<th>No</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Separate ventilation system for showers, toilets, and locker rooms</td>
<td>X</td>
<td></td>
<td>Dedicated exhaust fan for locker rooms is provided.</td>
</tr>
<tr>
<td>2</td>
<td>Pool and spa at negative pressure of 0.05 to 0.15 in. H20 relative to outdoors and adjacent areas of the building</td>
<td>X</td>
<td></td>
<td>Dedicated exhaust fan with discharge capacity equal to 10% of pool AHU supply air is provided.</td>
</tr>
<tr>
<td></td>
<td>• Active pressure balancing (preferred method through control of supply and exhaust fans)</td>
<td>X</td>
<td></td>
<td>Active pressure balancing by variable speed at AHU return fan</td>
</tr>
<tr>
<td>Item</td>
<td>Recommendation</td>
<td>Yes</td>
<td>No</td>
<td>Comment</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>-----</td>
<td>----</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>Static balancing of just balancing dampers and fan balancing (not preferred) Passageways equipped with doors with automatic closers and sweeps to inhibit migration of moisture and air</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Exhaust grilles located as close as possible to warmer body of water Whirlpools provided with exhaust directly above Air Delivery Rates (ACH)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pools with no spectator area (4-6 ACH)</td>
<td>X</td>
<td>6ACH provided</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spectator areas (6-8 ACH)</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Therapeutic pools (4-6 ACH)</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Outdoor Air Delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meets highest of ASHRAE Std. 62.1 and/or Washington Codes</td>
<td>X</td>
<td>0.5 CFM/SF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variable outside air flow or constant.</td>
<td>X</td>
<td>Variable air AHU with OSA station</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Duct Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Galvanized steel (must be protected with epoxy based paint to protect metal surfaces) Galvannealed easier to paint than galvanized but more susceptible to corrosion if bear)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
<td>X</td>
<td>See Spec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>304 Stainless Steel (may still need coating)</td>
<td>X</td>
<td>See Spec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>316 Stainless Steel (may still need coating)</td>
<td>X</td>
<td>See Spec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fabric duct for supply only (specifically designed for natatorium use)</td>
<td>X</td>
<td>Would consider as VE</td>
<td></td>
</tr>
</tbody>
</table>
### ASHRAE 2015 - Applications Handbook - Chapter 4: Indoor pool design checklist

<table>
<thead>
<tr>
<th>Item</th>
<th>Recommendation</th>
<th>Yes</th>
<th>No</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Buried ductwork (fiberglass, PVC coated, PVC or similar)</td>
<td>X</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grilles, Registers, and Diffusers: Fabricate of Aluminum.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply Air: Directed against envelope surfaces prone to condensation (glass and doors). Some supply air should be directed over the water surface to move contaminated air toward an exhaust point and control chloramines released at the water surface. However, air movement over the pool water surface must not exceed 30 fpm [as per the evaporation rate ( w_p ) in Equation (1)].</td>
<td>X</td>
<td></td>
<td>Supply diffusers at High &amp; low elevation. Provide 3-5 cfm/ Sf of glass height to prevent condensation on glass surface.</td>
</tr>
<tr>
<td></td>
<td>Return Air: Return air inlets should be located to recover warm, humid air and return it to the ventilation system for treatment, to prevent supply air from short-circuiting and to minimize recirculation of chloramines.</td>
<td>X</td>
<td></td>
<td>Return Grilles are located at high and low elevation close to Spa</td>
</tr>
<tr>
<td></td>
<td>Exhaust Air: Exhaust air inlets should be located to maximize capture effectiveness and minimize recirculation of chloramines. Exhausting from directly above whirlpools is also desirable. Exhaust air should be taken directly to the outdoors, through heat recovery devices where provided.</td>
<td>X</td>
<td></td>
<td>Dedicated roof Exhaust fan capture exhaust from grilles located above Spa pool.</td>
</tr>
<tr>
<td>Item</td>
<td>Recommendation</td>
<td>Yes</td>
<td>No</td>
<td>Comment</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Filtration: Filtration should be selected to provide 45% to 65% efficiencies (as defined in ASHRAE Standard 52.1) and be installed in locations selected to prevent condensation in the filter bank. Filter media and support materials should be resistant to moisture degradation.</td>
<td>X</td>
<td></td>
<td>Merv-13</td>
</tr>
<tr>
<td>8</td>
<td>Duct liner: Fiberglass duct liner should not be used. Where condensation may occur, the insulation must be applied to the duct exterior.</td>
<td>X</td>
<td></td>
<td>Liner on supply duct only</td>
</tr>
<tr>
<td>9</td>
<td>Acoustics: Air systems should be designed for noise levels listed in Table 42 of Chapter 48 (NC 45 to 50); however the room wall, floor, and ceiling surfaces should be evaluated for their reverberation times and speech intelligibility</td>
<td>TBD</td>
<td></td>
<td>NC level will be provided. Supply duct sound attenuator and exhaust air attenuator (no lining on exhaust attenuator)</td>
</tr>
<tr>
<td>10</td>
<td>Envelope Design:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Glazing in exterior walls becomes susceptible to condensation when the outdoor temperature drops below the pool room dew point.</td>
<td></td>
<td></td>
<td>HVAC to Provide 3-5 cfm/sf supply air to glazing surface. (Where applicable)</td>
</tr>
<tr>
<td></td>
<td>• The design goal is to maintain the surface temperature of the glass and the window frames a minimum of 5°F above the pool room dew point.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IT Rooms and Elevator Machine Room HVAC Systems**

- Mechanical Systems: Elevator Machine Room will be provided with a cooling only ductless split system that will be controlled by a stand-alone wired thermostat and monitored by the BMS. IT room ventilation will be provided by cooling only VAV terminal units supplied by air handling units and exhaust fans controlled by a stand-alone wired thermostat and monitored by the BMS.
Exhaust Systems

- General Exhaust: Restrooms and areas such as the Locker Rooms will be provided with general exhaust fans that can be scheduled based on occupancy. Restrooms and locker rooms will be exhausted at 12 air changes per hour.

- Pool Equipment Room Exhaust: The pool equipment room will be exhausted at 4 ACH continuously to avoid chemical buildup within the room. Discharge of the exhaust system will be located to maintain the code-required distance from the bleacher occupants per ASHRAE 62.1.

- Electrical Room Exhaust: Electrical rooms will be provided with general exhaust fans that will be controlled by a wall mounted thermostat.

- Laundry Room Dryer: Laundry room dryer units vent duct will be extended up to roof exhaust fans. Exhaust fans will be interlocked with dryer power to exhaust vent during dryer operation.

Pool Heating

- Heating will come from the heating plants noted above. Three plate and frame heat exchangers will be provided to heat the pools. One for the lap pool, one for the leisure pool and one for the spa. The heat exchangers will be served by the central plant heating hot water system. Pool pumps (Pool consultant scope of work) will circulate pool water on the other side of the heat exchanger.

Other Criteria

Equipment and Component Selection Criteria

- Corrosion Control: All systems will be designed for corrosion control with Polyshield coating.

- Air Handling Units: See Sections Above.

- Hot water coil: 400 Feet per Minute (FPM) maximum.

- Filters: 400 FPM maximum, design final static pressure as initial pre-filter pressure drop plus final filter pressure drop plus ¾-inch H2O dirty filter loading.

- Fans: Minimum efficiency of 70 percent or better, premium efficiency motors.

- Terminal Units: Terminal units will be sized with a maximum pressure drop of 0.3-inch H2O and will be single duct type with re-heat coil.

- Ductwork Mains: All main ductwork (ductwork upstream of three or more terminal units for supply or three or more registers for return/exhaust) will be sized with extra capacity equal to 10 percent. Constant volume system supply air and return/exhaust air main and branch ductwork will be sized for a friction pressure drop of 0.06-inch H2O per hundred feet of ductwork. Variable volume system supply air main ductwork upstream of terminal units will be sized for a friction pressure drop of 0.06-inch H2O per hundred feet of ductwork. Variable volume system supply air branch ductwork downstream of terminal units and return/exhaust air ductwork mains and branches will be sized for a friction pressure drop of 0.04-inch H2O per hundred feet of ductwork. Main supply air ductwork (ductwork upstream of terminal units)
Main return/exhaust air ductwork will never exceed 1,500 FPM. Main supply air ductwork downstream of terminal units will never exceed 750 FPM. Transfer air will be sized at a velocity not to exceed 250 feet per minute. Balancing dampers will be provided at all diffusers. Exposed ductwork to be round in section. Refer to architectural drawings and specifications for finishes.

- **Diffusers:** Diffusers will be selected at airflows less than 300 CFM each. Where the load is more than 300 CFM in a room, multiple diffusers will be provided. Diffusers will be selected at 5NC lower than Room Maximum NC values noted for the project.

- **Return and Transfer Grilles:** Return air grilles will not exceed more than 500 CFM per grille. Transfer grilles will not exceed 250 FPM in ductwork used for transfer or 250 FPM in face of grille.

- **Duct smoke detectors:** Duct smoke detectors will be provided on all air moving systems over 2000 cfm.

- **Vibration Isolation:** All motor operated equipment will be provided with vibration isolation mounting to prevent transmission of vibration or noise to the building. Heat Pumps / Chillers, Air Handlers will be provided with 2” deflection isolators. Pumps, condensing units, fans will be provided with 1” deflection isolators. Small fan coils will be provided with 0.5” deflection isolators.

- **Seismic Restraints:** Piping, ductwork, and equipment will be provided with adequate restraints conforming to the Washington Building Code.

- **Testing, Adjusting, and Balancing:** An independent testing and balancing contractor will be required (as a sub-contractor to the general contractor), AABC certified to balance all air and water systems and heating and cooling equipment to the required quantities; and to verify the capacity and operating conditions of each piece of equipment. At a minimum, HVAC testing, adjusting and balancing shall comply Washington Energy Codes.

### Acceptable Noise Levels (2011 ASHRAE Handbook – Applications, Chapter 47)

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Maximum NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom and Conference Rooms / Executive Offices</td>
<td>30</td>
</tr>
<tr>
<td>General Offices</td>
<td>35</td>
</tr>
<tr>
<td>Multipurpose / MAC / Open Office (“Cubicles”)</td>
<td>40</td>
</tr>
<tr>
<td>Gym / Pool / Internal and Public Circulation and Lobbies / Locker Rooms / Maintenance</td>
<td>45</td>
</tr>
<tr>
<td>Laundry / Bathrooms / Storage / Mechanical and Electrical Rooms on occupied floors</td>
<td>50</td>
</tr>
</tbody>
</table>
Any additional acoustical criterion will be adhered to as dictated by project acoustical consultant. Refer to acoustical engineering basis of design.

Commissioning

- All building systems will be commissioned to meet Washington Energy Codes as well as LEED® Fundamental and Enhanced Commissioning.

Temperature Controls Systems and Building Management

- Temperature Control Systems: The temperature control system will control all primary equipment (air handlers) as well as all distribution equipment (VAV terminal units, exhaust fans, etc.) Significant energy management strategies will be included such as night setback controls, evening purge sequences, demand limiting, air handler fan optimization and static pressure optimization, etc. All third-party controllers will be provided with BACnet interface to speak directly to the campus BMS system.

- Individual temperature controls will be based on functions, exposure, and Owner request. Final zoning will be discussed with the Owner during future phases of design.

- The system will be designed to be accessible through internet access.

Add alternate m1 - Measurement and Verification Plan

- Metering Systems
  - Metering System Infrastructure: All metered energy shall be monitored trended and archived by the BMS. The BMS shall display the energy and water consumption and related data on a separate graphic screen. Totals are to be displayed on a daily, monthly, and yearly basis.

  - Building Systems Metered:
    - Potable water (CCF)
    - Irrigation water (CCF)
    - Electricity main (KWh)
    - Photovoltaic generation (BMS should trend both total production and instantaneous production) (KWh)
    - Gas main (Therms)

  - Building Level Sub-Metered Equipment and End Uses:
    - HVAC supply fans (KWh)
    - HVAC return and exhaust fans (separate general and specialty exhaust from return and relief fans) (KWh)
    - Pumps (KWh)
    - Heat Pump / Chiller electricity (KWh)
- Boiler Natural Gas (CFH)
- Split system electricity (IT/Electrical closets) (KWh)
- Interior lights (KWh)
- Exterior lights (KWh)
- Receptacle circuits (KWh)
- Domestic hot water (CCF)
- Add Alternate P1 - Recycled water (CCF)

LEED Requirements

- Certification
  - The project will be pursuing LEED Gold Certification. Contractor is to provide the following services as a minimum:
    - All LEED documentation including filling out templates and providing required calculations.
    - Assistance during the commissioning and enhanced commissioning phases

- LEED Credits
  - LEED credits being pursued for LEED Gold Certification are provided on the LEED scorecard accompanying the submittal and as a minimum are:
    - WEc3 – Water Use Reduction: 3 credits for 35% water use reduction
    - EAp1 – Fundamental Commissioning of Building Energy Systems
    - EAp2 – Minimum Energy Performance
    - EAp3 – Fundamental Refrigerant Management
    - EAc1 – Optimize Energy Performance: 10 credits for 30% energy cost savings.
    - EAc3 – Enhanced Commissioning
    - EAc4 – Enhanced Refrigerant Management
    - EAc6 – Green Power
    - IEQp1 – Minimum Indoor Air Quality Performance
    - IEQc1 – Outdoor Air Delivery Monitoring
    - IEQc2 – Increased Ventilation
• IEQc3.1 – Construction IAQ Management Plan – During Construction
• IEQc3.2 - Construction IAQ Management Plan – Before Occupancy
• IEQc5 – Indoor Chemical and Pollutant Source Control
• IEQc6.1 – Controllability of Systems – Lighting

• Add Alternate #1:
  o The project will be pursuing LEED Platinum Certification as an add alternate. In addition to the LEED Gold services, the contractor shall also provide assistance with gathering data from the measurement and verification equipment during the measurement and verification phase of the project. The additional LEED credits to be pursued for LEED Platinum Certification are provided on the LEED scorecard accompanying the submittal and as a minimum are:
    ▪ WEc1 – Water Efficient Landscaping: 4 credits for no potable water use.
    ▪ WEc2 – Innovative Wastewater Technologies
    ▪ EAc1 – Optimize Energy Performance: 19 credits for 48% energy cost savings
    ▪ EAc2 – On-Site Renewable Energy: 7 credits for 13% energy cost savings
    ▪ EAc5 – Measurement and Verification
    ▪ IEQc6.2 – Controllability of Systems – Thermal Comfort
    ▪ IDc1.1 – Innovation in Design: Wastewater Technologies
    ▪ IDc1.2 – Innovation in Design: Onsite Renewable
    ▪ RPC1.1 – Regional Priority: Onsite Renewable
    ▪ RPC1.3 – Wastewater Technologies
  o Add Alternate #1 Strategies for achieving LEED Platinum: The additional mechanical, electrical, and plumbing systems that will be provided to achieve the additional points as outlined above are described in the BOD narrative.
6.8 Electrical

Codes and Standards

Codes - Systems will be designed in accordance with the latest edition of the following codes:

- Washington State Building Code with statewide amendments
- International Building Code with statewide amendments
- International Fire Code with statewide amendments
- National Electrical Code (NFPA 70) with amendments
- Washington State Energy Code-Commercial
- NFPA-72, National Fire Alarm and Signaling Code
- International Swimming Pool and Spa Code
- ANSI Accessible Code - A117.1-09
- Occupational Safety and Health Act (OSHA)

Standards - The following reference standards will be used in design:

- AEIC- Association of Edison Illuminating Companies
- ASTM- American Society of Testing and Materials
- IEEE- Institute of Electrical and Electronic Engineers
- IESNA – Illuminating Engineering Society of North America
- ICEA- Insulated Cable Engineers Association
- NEMA- National Electrical Manufacturers Association
- NFPA- National Fire Protection Association
- LEED- Leadership in Energy and Environmental Design
- Mason Industries (conduit supports only)
- UL- Underwriters Laboratories
- ADA- Americans with Disabilities Act
• ANSI/TIA/EIA-568-C.0 Generic Telecommunications Cabling for Customer Premises
• ANSI/TIA/EIA-568-C.1 Commercial Building Telecommunications Cabling Standard
• ANSI/TIA/EIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standard
• ANSI/TIA-568-C.3 Optical Fiber Cabling Components Standard. Commercial Building Telecommunications Cabling Standard
• ANSI/TIA/EIA-568-B Commercial Building Standard for Telecommunications Pathways and Spaces
• ANSI/TIA/EIA-606-A Administration Standard for commercial Telecommunications Infrastructure
• ANSI/TIA/EIA-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
• ADA Standards for Accessible Design

Electrical Systems

Incoming Electrical Service and Distribution System

• A new 1200A, 277/480V, 3-phase, 4-wire secondary, will be provided to serve the new Recreation and Aquatics Center. The service will be sized to accommodate HVAC, receptacle, and lighting loads for Gym/Multi-purpose Space, Aquatic Center, Community Spaces, Senior Spaces, and Support Spaces.

• Based on Code requirements due to the rating of 480V switchboard section, the Main Electrical Room will have two doors for exiting, located on opposite ends of the room. A minimum of 4’ front working clearance shall be provided for the 480V sections. Main Electrical Room will be located on first floor in Gym/Multipurpose space.

• An 1200A, 277/480V, 3 phase, 4 wire Main Service Board shall be provided in the Main Electrical Room. This Main Service Board will have three 225A, 3pole circuit breakers to feed three 225A, 277/480V, 3 phase, 4 wire panelboards. One Panelboard will be installed in Main Electrical Room to serve Gym/Multi-purpose Building. One 225A Panelboard will be installed on first floor in Mechanical Room of Aquatics/Community Building. One 225A Panelboard will be installed on first floor in Kitchen Storage Room of Community Space. An 225A panelboard will be provided for site lighting and transformer to serve EV charging stations. Two 100A spare spaces will be provided on the Main Switchboard for future use.

• A 112.5kVA, 480V-120/208V, 3 phase, 4-wire step-down transformer will be utilized to feed a 400A, 120/208V, 3-phase, 4-wire distribution panel for Gym/Multi-purpose Building. A 112.5kVA, 480V-120/208V, 3 phase, 4-wire step-down transformer will be utilized to feed a 400A, 120/208V, 3-phase, 4-wire distribution panel for Aquatics spaces. A 75kVA, 480V-120/208V, 3 phase, 4-wire step-down transformer will be utilized to feed a 250A, 120/208V, 3-phase, 4-wire distribution panel for Community Room. The distribution panels will serve 120/208V branch circuit panelboards on all respective floor spaces.
• One 277/480V branch circuit panelboard will be provided on each floor level in the electrical rooms/closets to serve lighting loads for both floors.

• 120/208V branch circuit panelboards will be provided on each floor level in the electrical rooms/closets to serve receptacle and miscellaneous loads.

• All buildings will be provided with a grounding system with maximum dry-ground impedance of no more than 25 ohms.

• All conduits shall be concealed except in Mechanical and Electrical Rooms. Galvanized rigid steel conduit shall be used in concrete slabs and below grade. PVC Schedule 40 direct buried will be used for electrical and telephone service conduits run underground. PVC Schedule 40 will be used for site lighting. Minimum size conduit shall be 3/4 trade size for power system and 1 inch telecommunication system. Minimum 1 inch for power system shall be used below slab, concealed in concrete, or exterior underground. EMT will be used in hung ceilings and non-masonry walls. Provide a non-corrosive paint finish for all exposed raceways installed within the swimming pool and pool equipment areas.

• Grounding conductors will be provided in all feeder and branch circuits.

• All conductors shall be copper with THWN insulation for wet or underground and THHN for dry locations. Type XHHW will be used for sizes larger than #1/0. Conductor sizes shall be No. 12 AWG minimum for power and No. 14 AWG for controls or signal.

• Provide electrical submetering for electrical loads serving Community space, as required by owner.

• Provide plug loads per code requirements, i.e., for office, open office, reception lobby, and conference room. Route circuits to plug load panelboard.

Emergency Distribution System

• A 750kW 277/480V, 3-phase, 4-wire, 60Hz diesel stand-by Generator system will be provided to serve the building including life safety loads for all buildings. The generator will be located in the utility yard to the west of the building and located in a weatherproof enclosure. A sub-base tank rated for 12 hour run time will be provided for full building backup.

• A 100A 277/480V ATS will be provided for life-safety branch distribution. A 1000A 277/480V ATS will be provided for all other building backup. The Life safety ATS will be located in a separate emergency electrical room adjacent to the generator location.

Lighting Systems

System Description

• A complete lighting system for all indoor and outdoor building mounted illumination will be provided. The indoor lighting system will consist primarily of energy-efficient LED sources. Incandescent lighting will be used only as requested by the Owner or where aesthetics is of prime importance or where permitted by code.

  o The outdoor lighting system will consist of LED sources. Fixtures will use optical systems and sources that are in compliance with local lighting ordinances. Light levels between 1.0 to 2.0 foot candles will be maintained at all exterior exit doors to public access way.
In general, indoor lighting controls will consist of a digital lighting control system via room controllers networked to a main control panel capable of demand response and metering tie in. Controls will consist of daylight sensors, dimming switches and local occupancy sensors. Outdoor lighting controls will consist of a lighting control panel with astronomical time clock function.

- Design Lighting Levels -Average Maintained Footcandles:

<table>
<thead>
<tr>
<th>Area</th>
<th>Recommended Lighting Level (Footcandles) At 30” A.F.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipurpose</td>
<td>30</td>
</tr>
<tr>
<td>Fitness</td>
<td>30 (At 36” A.F.F.)</td>
</tr>
<tr>
<td>Gymnasium</td>
<td>50</td>
</tr>
<tr>
<td>Locker Room</td>
<td>10</td>
</tr>
<tr>
<td>Conference Room</td>
<td>30</td>
</tr>
<tr>
<td>Restroom</td>
<td>5-10</td>
</tr>
<tr>
<td>Office</td>
<td>30</td>
</tr>
<tr>
<td>Classroom</td>
<td>50</td>
</tr>
<tr>
<td>Work Areas</td>
<td>30</td>
</tr>
<tr>
<td>Personal Training</td>
<td>40</td>
</tr>
<tr>
<td>Jogging Track</td>
<td>20</td>
</tr>
<tr>
<td>Lobby</td>
<td>10</td>
</tr>
<tr>
<td>Circulation</td>
<td>10 (At Floor)</td>
</tr>
<tr>
<td>Storage</td>
<td>10</td>
</tr>
<tr>
<td>Utility Room</td>
<td>20-30</td>
</tr>
<tr>
<td>Pool (Natatorium)</td>
<td>50 (water surface illuminance); 30 FC at the deck; Coefficient of Variation shall be +/- 0.25; Uniformity Ratio (Emax/Emin) shall be (2.5:1)</td>
</tr>
<tr>
<td>Exterior Lighting &amp; Pedestrian Pathways</td>
<td>1-2 (At Grade)</td>
</tr>
</tbody>
</table>

No point of exit and egress path shall be less than 1 footcandle at the floor.

Equipment and Materials:

- Lighting Fixtures – Indoor
  - Multipurpose: LED lamp 2’x4’ recessed troffer luminaire.
  - Fitness: Recessed LED downlight.
  - Basketball Court / Jogging Track:
    - 3-Module, Linear, High Output LED high bay pendant.
    - 4-inch Square recessed LED downlight.
- Locker Room: 1’ X 4’ recessed vandal resistant LED with acrylic prismatic lens and LED wet listed recessed downlights at showers. Recessed LED wall washers at sink area.

- Conference Room: LED lamp 1’ x 4’ recessed high efficiency lens.

- Restroom: LED recessed perimeter system and LED recessed downlight. Recessed LED wall washers at sink area.

- Office: LED lamp 2’ X 4’ recessed with high efficiency lens.

- Classroom: LED lamp 2’ X 4’ recessed fluorescent with high efficiency lens.

- Work Area: LED lamp 1’ X 4’ recessed fluorescent with high efficiency lens.

- Personal Training: LED-lamp recessed 2’ X 4’ fluorescent with high efficiency lens.

- Lobby: LED linear opal lensed, recessed slotlight and 2-inch or 4-inch aperture LED downlight.

- Circulation: Linear LED slotlight and 4-inch square LED downlight.

- Storage: 2-lamp, surface or pendant mount, open industrial fluorescent or LED equivalent with wire guard.

- Utility Room: LED-lamp, surface or pendant mount, open industrial fluorescent with wire guard.

- Penthouse: LED-lamp 1’ X 4’ recessed fluorescent with acrylic prismatic lens.

- Pool: UL wet listed aircraft cable suspended, 10-inch diameter, metal halide, translucent polycarbonate light pipe, lined with 3M optical lighting film.

- Pool Filtration Room: LED, vaporlume wet location surface mount industrial type.

- Stairs: 8’ long, surface LED-Lamp with integral occupancy sensor for step dimming / energy savings. recessed, opal lensed conditions run LED at main stair.

- Lighting Fixtures – Outdoor: Building Mounted LED or metal halide wall mounted or recess mounted luminaire.

- Lamps and Ballasts: LED lamps will have a color temperature of 4,000 degrees Kelvin with 50,000 plus hours with lamp failure occurring when LED produces 70 percent of initial rated lumens.

Lighting Control

- All lighting will be automatically controlled to meet the mandatory requirements of Washington State Energy Code.

- Lighting in public spaces will be controlled a digital lighting control panel, motion sensors and time switch.

- Occupancy sensors will be provided in all private offices, conference rooms, restrooms, and storage rooms. Occupancy sensors will be of the passive infrared or combination
infrared/ultrasonic type. Manual override of occupancy sensors will be provided in private offices, conference rooms, and storage rooms.

- Daylighting/dimming controls will be provided in areas with skylights or exterior windows, where natural light is available.
- Dimming controls will be provided in special occupancy areas and as required by code.

**Electrical Coordination**

**Energy Management System**

- Provide a raceway system of conduits, pull rope, and outlet boxes in compliance with the requirements and standards of the campus.
- Provide a minimum conduit size of 1-1/4-inch.

**Mechanical Controls**

- The typical voltage source configuration to motor loads will be 480 volt, 3-phase, 3-wire. Motors with a nameplate 75 hp or greater will have VFD controllers or equivalent reduced voltage starting.
- Provide 120 volt Weatherproof GFCI receptacles within 25 feet of mechanical equipment for maintenance use. Provide power to BMS control panels.
- Provide power to new fire-smoke dampers. Duct detector relay base will shut down related fan.
- Provide local disconnect switches at each motor where the control panel does not include an integral switch.

**Photovoltaic Systems (Add Alternate #1)**

**Design Criteria**

- This is a contractor designed photovoltaic system. Design system in compliance with code as interpreted by the AHJ and NEC Article 690.
- Coordinate design layout/locations with Architect and Structural engineer.
- Coordinate design with Electrical consulting engineer for tie-in of utility.
- Provide the services of a structural engineer to provide structural design services and shall be the Engineer-of-Record.

**System Description**

- These specifications cover the design and procurement of equipment, hardware and documentation required for the installation of grid-connected PV systems.
Provide complete system installation, in addition to documentation on the design, configuration, permit acquisition, installation, operation and maintenance of the complete system and individual components.

System designed for installation outdoors. Supplied equipment must be rated and warranted to withstand and operate under normal weather conditions at the site.

Each PV system will be connected to the utility electric grid through a grid-interactive inverter. The design and functional specification of the PV modules, inverter, utility interconnections, PV system electrical design, and PV array mechanical design are described in the following Sections.

Utility Coordination: coordinate with local Utility Company prior to start of work for location of their net metering equipment, including CT enclosure provided under this Contract per the Drawings, and any additional utility required disconnects which will also be provided under this Contract.

Basis of Design: Provide PV system designed to meet or exceed the performance requirements of the equipment, listed in this specification, while staying under the physical size and weight requirements listed. Costs to allow approved alternative manufacturers and models to meet the performance requirements as specified are part of the scope of this Contract.

**PV System Electrical Design**

Provide electrical design and installation instructions a 150 kW photovoltaic system conforming to the NEC. Article 690 of the NEC applies specifically to photovoltaic system safety, protection, control and interface with other sources. Other articles of NEC also apply. Comply with IEEE 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems. PV modules and inverters shall be located on the roof of the Gym/Multi-Purpose Building and Aquatic Center. Sizing of PV system is based on the performance criteria below, assuming the building will achieve an EU of 80 kBTu/SF-yr and 20% cost savings over baseline.

- LEED Gold – 150 KW estimate to provide 32% energy cost savings
- LEED Platinum – 365 KW estimate to provide 50% energy cost savings
- Zero Net Energy (ZNE) – 1,211 KW estimate to provide zero net energy consumption, including offsetting gas consumption (not cost savings)

Photovoltaic module minimum efficiency: 20%.

Inverter Topology: Transformerless, 3-phase, 20kW.

Electrical components, including overcurrent protection, disconnects, surge suppression devices, conduit, wiring and terminals must have UL or equivalent listing and have appropriate voltage, current and temperature ratings for the application. Special attention should be given to appropriate ratings for components used in DC circuits.

String wiring must be type PV Wire and listed for 1000VDC, and a temperature rating of 90C in wet locations. The use of exposed conductors or cabling (excluding grounds) is not acceptable, except MC cable connectors installed under PV modules. Exposed conduit to be painted to match surrounding area. Confirm color with Architect.
Ampacity calculations must take into account appropriate deratings as required. Conductors in the system are subject to a 125 percent NEC derating, and DC source circuit conductors and overcurrent devices must include an additional NEC percent derate for solar radiation enhancements. Appropriate temperature deratings for conductors used in module junction boxes must be considered for peak module operating temperatures, as well as deratings for instances where more than three current-carrying conductors are enclosed in a conduit.

Voltage drop in array DC source circuits should be limited to no more than 2 percent, including losses in conductors, and through all fuses, blocking diodes and termination points.

Overcurrent devices must have trip ratings no greater than the derated ampacity of the conductors that it protects.

Series connected strings of modules (source circuits) must include a series fuse as required by UL and NEC to prevent excessive reverse current flow through modules in source circuits. Parallel connections of modules in individual source circuits are not permitted. Parallel-connected cells within individual modules are allowable as long as the module listing allows for the series fuse required for this configuration.

Series connected strings of modules (source circuits) must also include a blocking diode to minimize overall array losses due to partial shading of source circuits. These diodes should have low voltage drop to meet the requirements above, and have a voltage and current ratings (at temperature) at least twice the open circuit voltage and short-circuit ratings of the source circuits.

Terminations must use listed box terminal or compression type connections. Twist on wire splices, crimped, soldered or taped connections are not permitted for the required field installed wiring. Proper torque specifications should be provided for the required field connections.

Module frames, metal enclosures, panel boards and the grid-interactive inverter (GII) should be provided with connections for bonding to a common grounding conductor and terminating at the ground electrode system at the utility service entrance point. In addition, provide for grounding the neutral of the GII output. The DC negative circuit may be common to the AC neutral in the GII design and under no circumstances should multiple connections to ground be specified for current carrying conductors in the system.

Provide a weathertight, vented, locking, pad mountable enclosure, suitable for housing the GII, AC/DC disconnect devices, and source circuit combiner boxes (as required). Enclosure rating: NEMA 4, 3R or better and have superior strength and corrosion resistance properties based on the project location.

Communications: Provide “Building Dashboard” type monitoring system to allow real time monitoring of total system and individual inverter power and energy production, with logs going back to at least 365 days.
6.9 Communications

Codes and Standards

Codes - Systems shall be designed in accordance with the latest edition of the following codes:

- Washington Building Code, as adopted by AHJ
- Washington Electrical Code, as adopted by AHJ
- National Fire Protection Association (NFPA)
- Washington Fire Code, as adopted by AHJ and Local Fire Marshal

Standards - The following reference standards shall be used for the design:

- BICSI TDMM, Latest Edition
- ANSI/TIA – American National Standards Institute/Telecommunications Industry Association
- ASTM – American Society of Testing and Materials
- IEEE – Institute of Electrical and Electronic Engineers
- NEMA – National Electrical Manufacturers Association
- NFPA – National Fire Protection Association
- UL – Underwriters Laboratories
- ADA – American Disabilities Act

Scope of Work

Voice and Data Systems

- Horizontal Cabling Infrastructure:
  - Provide 4-pair unshielded twisted pair (UTP) Category 6 voice and data network cabling.
  - Each standard telecommunications outlet (TO) will consist of a minimum of two Category 6 ports that can be patched as a data port or a voice port. Terminate all voice and data cables on 8-pin, 8-contact modular RJ45 connectors.
    - Offices will receive two separate telecommunication outlets preferably on opposite walls.
    - Large open office areas where systems furniture is installed one telecommunication outlet will be installed in each individual cubicle
• Conference rooms will have one telecommunication outlet on each wall and two video outlets on opposite walls.

• Wireless access points shall be located throughout the Recreation and Aquatic center for wireless connectivity. Each location shall have a minimum of (1) Category 6 port. Final locations will be determined based on software modeling by owner’s IT representative.

• Additional TOs will be located in the multipurpose, community and weight rooms as required by owner and the needs of the facility.

• Backbone Cabling Infrastructure:
  
  o Voice, data and cable services shall be provided from a communications vault as directed by the local service provider. Cabling requirements and pathways shall be coordinated with local service provider requirements.

  o Intrabuilding Fiber-Optic Backbone: The intrabuilding (within the building) fiber-optic backbone cable will consist of single mode fiber optic cable, and 50/125 um laser-optimized multimode fiber-optic cable, which is capable of 10 gigabit Ethernet transmission up to 300 meters. A 12-strand singlemode/24-strand multimode fiber optic cable will run from the main distribution frame (MDF) to the IDF room on Level 2. Fiber-optic cables will terminate in rack-mounted, fiber-optic distribution units. Fiber-optic connector and bulkhead types are assumed to be LC-style connectors unless otherwise instructed by the owner’s IT requirements.

• Communications Equipment Rooms:
  
  o Telecommunication Racks: Each telecommunication room/equipment room will consist of 7-foot by 19-inch standalone equipment racks to support backbone and horizontal cable installation and the installation of Owner-provided IT network equipment and servers. The MDF will have space allocated for future growth. All racks will be seismically braced with overhead ladder racking and properly anchored floor hardware.

  o Provide 48 port category 6 rack mounted patch panels. Provide enough panels to accommodate each cable plus 20% expansion.

  o Provide a ground bus bar system at each MDF/IDF room. Provide #3/0 ground wire from telecom main ground bus to building grounding system.

  o Wire Management: Equipment racks will have one 6-inch vertical wire manager on each end and in between each equipment rack. Provide one single-unit horizontal wire manager at the top and bottom of each column of patch panels and equipment, and one double-unit horizontal wire manager in between each patch panel.

  o The finish for all telecommunication room racks and wire management is black.

• Provide a wire-basket cable tray system in the main corridors to serve as the raceway infrastructure. J-hooks will be provided by the telecommunications contractor.

• Provide two dedicated electrical circuits per equipment rack.

• Pathways installed per ANSI/TIA/EIA-569-B standards:
- Provide multiple 4-inch conduits from the street to the MDF for connection to local service providers.
- Provide two 4-inch conduit risers from the MDF on Level 1 to IDF on Level 2.
- Provide two 2-inch conduit stubs from Level 2 IDF room to roof for potential future rooftop connections.
- Metallic 2-gang outlet boxes with single gang adapters with 1-inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of low voltage cabling.

Public Announcement System

- System will consist of a centralized public announcement system that will be used to address the public and office areas.
- System will consist of both indoor speakers and headend located in the MDF.
- System will connect to fire alarm system to alert people in the event of an emergency evacuation from the building.

Distributed Antenna System (DAS)

- Distributed Antenna System (DAS): The building system that extends cellular phone service into a building that might otherwise attenuate signal is commonly referred to as a DAS. The MDF for the building shall be sized to accommodate not only incoming land line service providers, but cellular carriers/service providers as well. There shall be a 2-hour rated conduit path from headend location to the roof for connection to DAS antennas. Other systems supported by DAS also include emergency/public radio, and wireless LAN or WiFi coverage.
6.10 Electronic Safety and Security

Codes and Standards

Codes - Systems will be designed in accordance with the latest edition of the following codes:

- International Building Code
- International Fire Code
- National Electrical Code
- International Mechanical Code
- Washington Administrative Code amendments.
- Municipal ordinances and amendments.

Standards - The following reference standards will be used in design:

- UL – Underwriters Laboratories.
- ADA – Americans with Disabilities Act.

Fire Alarm System

Design Criteria

- The fire alarm system will be contractor designed.
- An automatic, addressable, fire alarm system will be provided to meet the requirements of the adopted editions of the referenced codes and standards.
- The fire alarm system will provide system alarm, supervisory and trouble signal monitoring, and alarm notification for the building. Any power supplies will have batteries to provide a secondary power source in case of primary power loss to the control panel or any remote power supply.
• Activation of system smoke detectors, manual pull stations and fire sprinkler water flow switches will initiate alarm signals on the fire alarm control panel (FACP) and fire alarm annunciator (FAA), and activate the audible and visible notification appliances throughout the building. Activation of HVAC duct mounted smoke detectors and fire sprinkler valve tamper switches will initiate supervisory signals, which will annunciate on the FACP and the FAA. Fire alarm, supervisory and trouble signals will be transmitted off site to a remote monitoring station.

• Manual pull stations will be provided at building exits as required by code.

• Automatic smoke detection will be provided for protection of fire alarm control equipment and for activation of fire safety functions.

• Audible and visible alarm notification appliances will be provided throughout the building.

• Control outputs will be provided for actuation of fire safety functions, such as elevator control, air handler shut down, fire smoke damper closure, and fire door release.

Fire Alarm Equipment

• The fire alarm system will be an addressable system with point identification.

• Fire alarm equipment will be UL listed for fire alarm signaling systems.

• Audible alarm appliances will be speakers and will have multi-tap settings for field adjustment to achieve the audibility requirements for the protected spaces.

• Visible alarm appliances will have multi-candela settings for field adjustment to achieve ADA and NFPA 72 visible signaling coverage area requirements for the protected spaces.

• Manual pull stations will be single action type with red finish.

Security System

Security Management System (SMS)

• A key component of occupant safety within a facility today is the ability for the facilities safety and security systems to be centrally managed, controlled, and monitored from one enterprise-level management system. Integrating the Intrusion & Surveillance functions of a facility to a software system that already controls Access and Emergency Management, and granting access is a major building advantage.

• Provide an SMS for controlling access and monitoring of primary and secondary entry points, lobby area, and public spaces including but not limited to: Access controlled doors, Intrusion door contacts, motion detectors, alarm notification devices, and IP Video Surveillance recording system.

• Design intent is to provide a security management system that will integrate all functions of the Access Control system, Intrusion Detection system, and Video Surveillance system. System will minimize both internal and external criminal activity through Intrusion, Access and CCTV monitoring of predetermined high risk areas and spaces. System will be centrally controlled from the main office staff area. System will be capable of integrating selected electrical, HVAC, fire alarm function in an effort to manage occupied areas during unscheduled times.
• Access Control – Control locking and unlocking, and monitoring of selected interior and exterior doors. Access will be obtained by presenting an issued card to a door/gate/elevator card reader system.
  
  o Additional measures can be integrated where required – i.e. biometrics, PIN codes, etc.
  
  - Internet Protocol (IP) Video Surveillance:
    
    o IP cameras will be placed to monitor both interior and exterior spaces and will work in conjunction with the access control and intrusion system to deter and identify theft, vandalism, robberies, arson, and trespassing events.
  
• Intrusion Alarm: Provide external and internal door monitoring for forced entry or door left ajar. During scheduled occupancy all alarms will report to security management command center where appropriate action will be determined by security personnel. System will communicate with CCTV cameras to capture video documentation of events while events are happening.

• Emergency Call Station: Call stations will be strategically placed as to assist the public in an event of threat in areas in the building.

• Provide a raceway system of conduits, pull rope, and outlet boxes in compliance with the requirements and standards of the campus.

• Provide a minimum conduit size of 1-inch.
7 Sustainability

7.1 Sustainability Overview

Our approach to sustainable design is an extension of the way we run all of our projects; it is the reconciliation of goals with the constraints of any given project — place, budget, schedule, program — that truly define the effort. Through Shoreline outreach events, we understand that the value of sustainability is embedded within the City of Shoreline and the community. Per direction from working/policy group meetings, LEED gold certification is the current target goal. As the project develops during the Phase 3, the design team and city of Shoreline will reevaluate opportunities to elevate the LEED goals.

![Projected LEED Gold Certification for Shoreline](Shoreline Community and Aquatic Center)

8 Cost Estimate

8.1 Process

During June and July 2018, Cumming prepared approximately 10 different cost models to test different building and parking configurations. The cost models separately identified construction costs for building, parking and site work. These rough order of magnitude statements of probable construction costs were inclusive of: contractor’s contingency, general conditions/general requirements, bonds & insurance, contractor’s fee, design contingency and escalation to the midpoint of construction. As part of this exercise, a benchmarking analysis of other community aquatic centers and structure parking garages was also provided.

Following the concept design phase, Cumming prepared a detailed construction cost estimate for the preferred scheme. The cost estimate separately identified construction costs for the gymnasium building, aquatic and community center and site work. The concept design cost estimate was inclusive of: general conditions/general requirements, bonds & insurance, contractor’s fee, design contingency and escalation to the midpoint of construction. In addition, 8 additive alternates and 2 options (central plant and water heater) were also estimated as part of the concept design estimate.

See Appendix B for Cumming’s Conceptual Cost Estimate
Appendix A

Project Schedule
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EXECUTIVE SUMMARY

1.1 Introduction
This estimate has been prepared, pursuant to an agreement between WRNS Studio and Cumming, for the purpose of establishing a probable cost of construction at the concept stage.

The project scope encompasses the construction of gymnasium, aquatic center, and a community center.

1.2 Project Schedule (Assumed)

<table>
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<th>Start</th>
<th>Finish</th>
<th>Duration</th>
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<td>Mar-21</td>
<td>Nov-22</td>
<td>21 months</td>
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</table>

1.3 Key Assumptions & Exclusions

Key Assumptions
- Single Phase Construction
- Existing Building Demolition Included
- No sport light Poles At Lap Pool assumed
- Escalation

Key Exclusions
- Project Soft Costs
- AV Equipment
- HAZMAT Abatement
- Lap Pool Competitive Score Boards Excluded
- Soil Contamination
- Construction Contingency

Documents Used:
Design narratives dated X/X/2018 by WRNS
Study drawing option 1 dated X/X/2018 by WRNS

Bid Conditions: This estimate has been based upon competitive bid situations (minimum of 3 bidders) for all items of subcontracted work.

Basis For Quantities: Wherever possible, this estimate has been based upon the actual measurement of different items of work. For the remaining items, parametric measurements were used in conjunction with other projects of a similar nature.

Basis for Unit Costs: Unit costs as contained herein are based on current bid prices in Greater Seattle. Sub overheads and profit are included in each line item unit cost. Their overhead and profit covers each sub's cost for labor burden, materials, and equipment, sales taxes, field overhead, home office overhead, and profit. The general contractor's overhead is shown separately on the master summary.

Sources for Pricing: This estimate was prepared by a team of qualified cost consultants experienced in estimating construction costs at all stages of design. These consultants have used pricing data from Cumming's database.
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<th>Element</th>
<th>Area</th>
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<th>Total Escalated Construction Cost</th>
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**Add Alternates**

**Gym**
- Fire pumps and accessories - if the pressure / flow tests show inadequate
  - LEED Platinum: additional systems and cost to achieve additional points (BOD 3.6.C., page 7-23)
  - Total: $67,723

**Aquatics**
- Booster pump, VFD (BOD 2.3.J, page 7-6) - if the pressure / flow tests show inadequate
  - Total: $64,158
- Recycled water system (BOD 2.4.A-E, page 7-6)
  - Total: $71,287
- Gray water (treatment) system (BOD 2.5.A-B.1-5, page 7-6)
  - Total: $470,494
- 2.1.F (page 7-5) - Area and trench drains to graywater system and reuse
  - Included above
- 2.1.G (page 7-5) - Pool filter backwash pit pumped to the graywater system and reuse
  - Included above
- LEED Platinum: additional systems and cost to achieve additional points (BOD 3.6.C., page 7-23)
  - Total: $242,376

**Site**
- Contemporary play structure
  - Total: $71,287
- Play surface, allow 2,000 sf
  - Total: $43,713

**Options**
- See Appendix
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<td>$1,887,976</td>
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<td>$878,125</td>
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<tr>
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<td>$19,213,705</td>
<td>$648.37</td>
<td>$7,239,082 $39.56</td>
<td>$42,483,593</td>
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## SCHEDULE OF AREAS AND CONTROL QUANTITIES

**Schedule of Areas**

<table>
<thead>
<tr>
<th>Level</th>
<th>Gymnasium Building</th>
<th>Aquatics &amp; Community Center</th>
<th>Site</th>
<th>Total SF</th>
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<tbody>
<tr>
<td></td>
<td>21,481</td>
<td>29,611</td>
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<td>51,092</td>
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<td>Level 2</td>
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<td><strong>Total Enclosed</strong></td>
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| Total Gross Floor Area | 33,425 | 29,611 | 63,036 |

**Control Quantities**

<table>
<thead>
<tr>
<th>Site Area</th>
<th>TOTAL QTY</th>
<th>U/M</th>
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<tr>
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Gymnasium Building
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<tr>
<th>Element</th>
<th>Subtotal</th>
<th>Total</th>
<th>Cost / SF</th>
<th>Cost / SF</th>
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<tr>
<td><strong>A) Shell (1-5)</strong></td>
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<td>1 Foundations</td>
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<td><strong>B) Interiors (6-7)</strong></td>
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<td>6 Interior Partitions, Doors and Glazing</td>
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<td><strong>C) Equipment and Vertical Transportation (8-9)</strong></td>
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<tr>
<td>8 Function Equipment and Specialties</td>
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<td>9 Stairs and Vertical Transportation</td>
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<td><strong>D) Mechanical and Electrical (10-13)</strong></td>
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<tr>
<td>10 Plumbing Systems</td>
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<td>11 Heating, Ventilation and Air Conditioning</td>
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<td>13 Fire Protection Systems</td>
<td>$200,550</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>$14,197,035</td>
<td>$14,197,035</td>
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<tr>
<td>Escalation to MOC, 12/31/21</td>
<td>12.92%</td>
<td>$1,833,771</td>
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<tr>
<td><strong>TOTAL ESTIMATED CONSTRUCTION COST</strong></td>
<td>$16,030,806</td>
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Total Area: 33,425 SF
# DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
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<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Foundations</strong></td>
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</tr>
<tr>
<td>Earthwork</td>
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<tr>
<td>Field staking/layout</td>
<td>21,481</td>
<td>sf</td>
<td>$0.14</td>
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<tr>
<td>Clear and grub site</td>
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<td>sf</td>
<td>$0.12</td>
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<tr>
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<td>4,376</td>
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<td>Haul excess, 10 mile round trip</td>
<td>2,625</td>
<td>cy</td>
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<td>Fine grading</td>
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<tr>
<td>Erosion control</td>
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<td><strong>Total - Foundations</strong></td>
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<td></td>
<td></td>
<td>$566,772</td>
</tr>
</tbody>
</table>

| **2 Vertical Structure** | | | | $1,578,004 |
| Horizontal and vertical structural steel framing, 18# psf, long span | 301 | tn | $4,800.00 | $1,443,960 |
| Buckling restrained braced frame | 4 | tn | $4,800.00 | $16,800 |
| Fireproofing to steelwork, excluding high roofs | 214 | tn | $314.28 | $67,107 |
| **Total - Vertical Structure** | | | | $1,578,004 |

| **3 Floor & Roof Structures** | | | | $301,320 |
| Acoustic roof deck- metal deck, roof 3" 18 GA metal deck | 21,481 | sf | $9.34 | $200,633 |
| Floor deck, Metal deck (non acoustic) with concrete fill at jogging track assumed 1 1/2" 18 GA metal deck with 3 1/2" concrete topping | 11,944 | sf | $8.43 | $100,688 |
| **Total - Floor & Roof Structures** | | | | $301,320 |

| **4 Exterior Cladding** | | | | $2,254,097 |
| Envelope | | | | |
| Kawneer framed curtainwall incl. all support framework, vision glazing, assume 40% of façade, 36' high | 8,539 | sf | $115.00 | $982,008 |
| Solid wall system, assume 60% of façade, 36' high, allow for aluminum panel with 2 coat custom kynar finish, incl. sheathing and metal stud backing | 12,809 | sf | $85.00 | $1,088,748 |
| Rainscreen, assume 6' high allow for metal screen with steel supports | 3,558 | sf | $40.00 | $142,320 |
| Exterior HM door sets, HM frames and hardware, double | 4 | pr | $4,930.27 | $19,721 |
| Exterior sliding door at entrance | 1 | ea | $11,300.00 | $11,300 |
| Vestibule glazing | 1 | ls | $10,000.00 | $10,000 |
| **Total - Exterior Cladding** | | | | $2,254,097 |
### DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 Roofing and Waterproofing</strong></td>
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<tr>
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<tr>
<td>Interior Partitions</td>
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<td>standard partition including framing, insulation, &amp; gyp painted, assume 13’ high</td>
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<td>interior glazing, allowance</td>
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<td>ea</td>
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<tr>
<td><strong>Total - Interior Partitions, Doors and Glazing</strong></td>
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<td></td>
<td></td>
<td><strong>$464,727</strong></td>
</tr>
<tr>
<td><strong>7 Floor, Wall and Ceiling Finishes</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>flooring &amp; base</td>
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<td>$10,100</td>
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<tr>
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<tr>
<td>ceramic tile with backerboard, walls at toilets</td>
<td>768</td>
<td>sf</td>
<td>$24.50</td>
<td>$18,816</td>
</tr>
<tr>
<td>film backed glass mirror, 48” x60” at cardio &amp; studios</td>
<td>102</td>
<td>ea</td>
<td>$517.50</td>
<td>$52,785</td>
</tr>
<tr>
<td>sport wall pads, fire retardant vinyl coat, quantity per sports plan studios</td>
<td>640</td>
<td>sf</td>
<td>$16.00</td>
<td>$10,240</td>
</tr>
<tr>
<td>jogging track guardrail, product tbd</td>
<td>360</td>
<td>lf</td>
<td>$320.00</td>
<td>$115,200</td>
</tr>
</tbody>
</table>

Prepared by Cumming
### DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2&quot; pretapped hand sanded maple bars on studio mirror wall</td>
<td>323</td>
<td>lf</td>
<td>$45.00</td>
<td>$14,535</td>
</tr>
<tr>
<td>Wall mounted metal pipe handrail, at stairs</td>
<td>75</td>
<td>lf</td>
<td>$125.00</td>
<td>$9,375</td>
</tr>
<tr>
<td>Misc. Interior Finishes, allowance</td>
<td>33,425</td>
<td>sf</td>
<td>$0.75</td>
<td>$25,069</td>
</tr>
<tr>
<td>Total - Floor, Wall and Ceiling Finishes</td>
<td></td>
<td></td>
<td></td>
<td>$1,054,837</td>
</tr>
</tbody>
</table>

**8 Function Equipment and Specialties**

**Gym Equipment, products TBD**

- Overhead support basketball backstops with shot clock mounts, adjustable height
- Basketball backstop winch
- Basketball backboard padding
- Gym divider curtain, quantity and unit price per Sports Plane Studios
- Volleyball floor sleeves and cover plates
- Volleyball net system
- Gym control system, allow
- Delay of game timers
- Electronic scoreboards with delay timers, 3’ x 4’6”

**Building Specialties**

- Lockers, allow
- Interior signage, code
- Fire extinguisher and cabinet, allowance
- Exterior signage
- Wayfinding signage
- Marker boards
- Tack boards
- Mobile equipment storage systems
- Projection screen and mount
- Projector
- Video monitors

**Total - Function Equipment and Specialties**

**9 Stairs and Vertical Transportation**

**Stairs**

- Precast stair, 6’ wide, 3 flights

**Elevators - Including Smoke Containment Curtain Assembly**

- Passenger, 5000 lbs, hydraulic, 2-stops

**Total - Stairs and Vertical Transportation**

**10 Plumbing Systems**

- General plumbing
- Local water heaters, electric
- Sanitary fixtures
- Water closet, quantity per mechanical engineer

**Total - Plumbing Systems**

---

Prepared by Cumming
## DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinal, quantity per mechanical engineer</td>
<td>2</td>
<td>ea</td>
<td>$1,670.00</td>
<td>$3,340</td>
</tr>
<tr>
<td>Lavatory, quantity per mechanical engineer</td>
<td>4</td>
<td>ea</td>
<td>$1,588.00</td>
<td>$6,352</td>
</tr>
<tr>
<td>Drinking fountain, with bottle filing stations - allowance, quantity per mechanical engineer</td>
<td>2</td>
<td>ea</td>
<td>$4,280.00</td>
<td>$8,560</td>
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<tr>
<td>Sinks</td>
<td>2</td>
<td>ea</td>
<td>$1,225.00</td>
<td>$2,450</td>
</tr>
<tr>
<td>Hose bibs</td>
<td>4</td>
<td>ea</td>
<td>$372.69</td>
<td>$1,491</td>
</tr>
<tr>
<td>Floor drains, quantity per mechanical engineer</td>
<td>4</td>
<td>ea</td>
<td>$657.00</td>
<td>$2,628</td>
</tr>
<tr>
<td>Rough ins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local rough-in at fixture</td>
<td>16</td>
<td>ea</td>
<td>$917.00</td>
<td>$14,672</td>
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<tr>
<td>Rough-in at floor sink or floor drain</td>
<td>6</td>
<td>ea</td>
<td>$1,086.00</td>
<td>$6,516</td>
</tr>
<tr>
<td>Domestic water piping</td>
<td>33,425</td>
<td>sf</td>
<td>$1.40</td>
<td>$46,795</td>
</tr>
<tr>
<td>Waster / vent piping</td>
<td>33,425</td>
<td>sf</td>
<td>$1.60</td>
<td>$53,480</td>
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<tr>
<td>Roof / storm drainage</td>
<td>33,425</td>
<td>sf</td>
<td>$2.30</td>
<td>$76,878</td>
</tr>
<tr>
<td>Condensate drainage</td>
<td>33,425</td>
<td>sf</td>
<td>$0.40</td>
<td>$13,370</td>
</tr>
<tr>
<td>Natural Gas</td>
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</tr>
<tr>
<td>Excluded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>33,425</td>
<td>sf</td>
<td>$2.00</td>
<td>$66,850</td>
</tr>
</tbody>
</table>

### Total - Plumbing Systems

$322,341

---

11 Heating, Ventilation and Air Conditioning

- Central plant shared portion, see appendix 1 for details
  - Quantity: 1
  - Unit: ls
  - Unit Cost: $878,740.50
  - Total: $878,741
- Chilled water piping distribution
  - Quantity: 33,425
  - Unit: sf
  - Unit Cost: $2.50
  - Total: $83,563
- Hot water piping distribution
  - Quantity: 33,425
  - Unit: sf
  - Unit Cost: $5.00
  - Total: $167,125

### Air-Side Equipment

- AHU-1, Air handling unit, outdoor, vav, modular
  - Quantity: 35,000
  - Unit: cfm
  - Unit Cost: $9.50
  - Total: $332,500
- AHU-2, Air handling unit, outdoor, vav, modular
  - Quantity: 35,000
  - Unit: cfm
  - Unit Cost: $9.50
  - Total: $332,500
- VAV terminal boxes, with reheat coil
  - Quantity: 36
  - Unit: ea
  - Unit Cost: $1,790.00
  - Total: $64,440
- FCU, Fan coil units for IDF / MDF rooms
  - Quantity: 2
  - Unit: ea
  - Unit Cost: $3,851.00
  - Total: $7,702
- EF, Exhaust fan, inline, Greenheck
  - Quantity: 800
  - Unit: cfm
  - Unit Cost: $3.85
  - Total: $3,080

### Air Distribution

- Ductwork, galv
  - Quantity: 27,340
  - Unit: lb
  - Unit Cost: $12.35
  - Total: $337,649
- Duct insulation
  - Quantity: 16,380
  - Unit: sf
  - Unit Cost: $3.86
  - Total: $63,227
- Combination fire / smoke damper
  - Quantity: 14
  - Unit: ea
  - Unit Cost: $1,149.00
  - Total: $16,066
- Grilles, registers and diffusers, including dampers and flex duct
  - Quantity: 35,000
  - Unit: sf
  - Unit Cost: $2.00
  - Total: $70,000
- Acoustical attenuation
  - Quantity: 4
  - Unit: ea
  - Unit Cost: $4,500.00
  - Total: $18,000

### Miscellaneous

- Test / balance HVAC
  - Quantity: 200
  - Unit: hr
  - Unit Cost: $153.14
  - Total: $30,628
- Start-up/check-out
  - Quantity: 160
  - Unit: hr
  - Unit Cost: $121.93
  - Total: $19,509
- Commissioning assist
  - Quantity: 160
  - Unit: hr
  - Unit Cost: $121.93
  - Total: $19,509
- Piping identification: labels, arrows and valve tags
  - Quantity: 300
  - Unit: ea
  - Unit Cost: $27.60
  - Total: $8,280
- Seismic and vibration requirements
  - Quantity: 1
  - Unit: ea
  - Unit Cost: $30,000.00
  - Total: $30,000
- Penetrations, sleeving and firestopping
  - Quantity: 1
  - Unit: ea
  - Unit Cost: $12,000.00
  - Total: $12,000

### HVAC Controls

- DDC controls to plumbing systems: BTU meter etc.
  - Quantity: 1
  - Unit: ls
  - Unit Cost: $10,000.00
  - Total: $10,000
- DDC controls, air handlers
  - Quantity: 2
  - Unit: ea
  - Unit Cost: $24,800.00
  - Total: $49,600
- DDC controls, vav box, reheat coils
  - Quantity: 36
  - Unit: ea
  - Unit Cost: $1,957.00
  - Total: $70,452
- DDC controls, fan coil units
  - Quantity: 2
  - Unit: ea
  - Unit Cost: $3,914.00
  - Total: $7,828
- DDC controls, general exhaust fan
  - Quantity: 2
  - Unit: ea
  - Unit Cost: $1,314.00
  - Total: $2,628
- DDC controls, smoke damper monitor
  - Quantity: 14
  - Unit: ea
  - Unit Cost: $952.00
  - Total: $13,328
### DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDC misc. items, training, integration</td>
<td>1</td>
<td>ls</td>
<td>$30,000.00</td>
<td>$30,000</td>
</tr>
</tbody>
</table>

**Total - Heating, Ventilation and Air Conditioning**  
$2,678,373

#### 12 Electrical Lighting, Power and Communications

##### Service & Distribution Equipment
- **Switchboard, 1200A 480/277v 3ph 4w**  
  Quantity: 1 ea, Unit Cost: $26,400.00, Total: $26,400
- **Distribution Panelboard, 800A 480/277v 3ph 4w**  
  Quantity: 1 ea, Unit Cost: $11,700.00, Total: $11,700
- **Panelboard, 225A 480/277v 3ph 4w**  
  Quantity: 2 ea, Unit Cost: $2,600.00, Total: $5,200
- **Panelboard, 100A 480/277v 3ph 4w**  
  Quantity: 2 ea, Unit Cost: $2,100.00, Total: $4,200
- **Panelboard, 400A 208/120v 3ph 4w**  
  Quantity: 1 ea, Unit Cost: $5,200.00, Total: $5,200
- **Panelboard, 225A 208/120v 3ph 4w**  
  Quantity: 2 ea, Unit Cost: $2,300.00, Total: $4,600
- **Transformer, 112.5kva 480-208/120v**  
  Quantity: 1 ea, Unit Cost: $9,100.00, Total: $9,100
- **Service Grounding System**  
  Quantity: 33,425 sf, Unit Cost: $0.30, Total: $10,028
- **Lighting Inverters, 40kva, 90 minute battery**  
  Not Needed Per Engineer's Comment
- **ATS, 1200A 480v 3ph 4w**  
  Quantity: 1 ea, Unit Cost: $42,400.00, Total: $42,400
- **Feeder, 800A**  
  Quantity: 50 lf, Unit Cost: $190.00, Total: $9,500
- **Feeder, 400A**  
  Quantity: 50 lf, Unit Cost: $95.00, Total: $4,750
- **Feeder, 225A**  
  Quantity: 400 lf, Unit Cost: $52.00, Total: $20,800
- **Feeder, 100A**  
  Quantity: 300 lf, Unit Cost: $29.00, Total: $8,700

##### HVAC & Equipment Connections
- Quantity: 33,425 sf, Unit Cost: $1.75, Total: $58,494

##### Convenience Power
- Quantity: 33,425 sf, Unit Cost: $4.25, Total: $142,056

##### Lighting & Lighting Controls
- **Lighting**  
  Quantity: 33,425 sf, Unit Cost: $8.00, Total: $267,400
- **Lighting Controls**  
  Quantity: 33,425 sf, Unit Cost: $2.00, Total: $66,850

##### Fire Alarm System
- Quantity: 33,425 sf, Unit Cost: $3.00, Total: $100,275

##### Telecommunications System
- Quantity: 33,425 sf, Unit Cost: $4.50, Total: $150,413

##### Public Address System
- Quantity: 33,425 sf, Unit Cost: $1.50, Total: $50,138

##### Distributed Antenna System
- Quantity: 33,425 sf, Unit Cost: $2.00, Total: $66,850

##### Security, Access Control & CCTV Systems
- Quantity: 33,425 sf, Unit Cost: $3.00, Total: $100,275

**Total - Electrical Lighting, Power and Communications**  
$1,165,328

#### 13 Fire Protection Systems
- **New hydraulically calculated wet pipe automatic fire sprinkler system**  
  Quantity: 33,425 sf, Unit Cost: $6.00, Total: $200,550
- **FM 200 preaction systems, Electrical / data rooms - allowance**  
  Not Needed Per Engineer's Comment
- **Dry chemical CO2 / Novec by 3M - special system - not anticipated**  
  Excluded
- **Dry chemical ANSUL - kitchen special system - not anticipated**  
  Excluded

Prepared by Cumming
# DETAIL ELEMENTS - GYMNASIUM BUILDING

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total - Fire Protection Systems</td>
<td></td>
<td></td>
<td></td>
<td>$200,550</td>
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</tbody>
</table>
## SUMMARY - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Subtotal</th>
<th>Total</th>
<th>Cost / SF</th>
<th>Cost / SF</th>
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</thead>
<tbody>
<tr>
<td><strong>A) Shell (1-5)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Foundations</td>
<td>$646,195</td>
<td></td>
<td>$21.82</td>
<td></td>
</tr>
<tr>
<td>2 Vertical Structure</td>
<td>$1,188,992</td>
<td></td>
<td>$40.15</td>
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</tr>
<tr>
<td>3 Floor &amp; Roof Structures</td>
<td>$258,764</td>
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<td>$8.74</td>
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<tr>
<td>4 Exterior Cladding</td>
<td>$3,227,413</td>
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<td>$108.99</td>
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</tr>
<tr>
<td>5 Roofing and Waterproofing</td>
<td>$540,401</td>
<td></td>
<td>$18.25</td>
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<tr>
<td><strong>B) Interiors (6-7)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Interior Partitions, Doors and Glazing</td>
<td>$369,355</td>
<td></td>
<td>$12.47</td>
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</tr>
<tr>
<td>7 Floor, Wall and Ceiling Finishes</td>
<td>$510,654</td>
<td></td>
<td>$17.25</td>
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</tr>
<tr>
<td><strong>C) Equipment and Vertical Transportation (8-9)</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>8 Function Equipment and Specialties</td>
<td>$2,198,580</td>
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<td>$74.25</td>
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</tr>
<tr>
<td>9 Stairs and Vertical Transportation</td>
<td>$34,060</td>
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<td>$1.15</td>
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<tr>
<td><strong>D) Mechanical and Electrical (10-13)</strong></td>
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</tr>
<tr>
<td>10 Plumbing Systems</td>
<td>$715,674</td>
<td></td>
<td>$24.17</td>
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</tr>
<tr>
<td>11 Heating, Ventilation and Air Conditioning</td>
<td>$2,613,061</td>
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<td>$88.25</td>
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<tr>
<td>12 Electrical Lighting, Power and Communications</td>
<td>$933,489</td>
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<td>$31.53</td>
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<tr>
<td>13 Fire Protection Systems</td>
<td>$239,666</td>
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<td>$8.09</td>
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</tr>
</tbody>
</table>

Subtotal:
- **$13,476,303** 
- **$455.11**

General Conditions:
- 5.00% 
- **$673,815** 
- **$22.76**

Subtotal:
- **$14,150,118** 
- **$477.87**

General Requirements:
- 4.00% 
- **$566,005** 
- **$19.11**

Subtotal:
- **$14,716,123** 
- **$496.98**

Bonds & Insurance:
- 2.00% 
- **$294,322** 
- **$9.94**

Subtotal:
- **$15,010,445** 
- **$506.92**

Contractor's Fee:
- 4.00% 
- **$600,418** 
- **$20.28**

Subtotal:
- **$15,610,863** 
- **$527.20**

Design Contingency:
- 9.00% 
- **$1,404,978** 
- **$47.45**

Subtotal:
- **$17,015,841** 
- **$574.65**

Construction Contingency:
- **$17,015,841** 
- **$574.65**

Escalation to MOC, 12/31/21:
- 12.92% 
- **$2,197,864** 
- **$74.22**

**TOTAL ESTIMATED CONSTRUCTION COST**
- **$19,213,705** 
- **$648.87**

Total Area: 29,611 SF
# Detail Elements - Aquatics & Community Center

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Foundations</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Earthwork</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field staking/layout</td>
<td>29,611</td>
<td>sf</td>
<td>$0.14</td>
<td>$4,146</td>
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<tr>
<td>Clear and grub site</td>
<td>29,611</td>
<td>sf</td>
<td>$0.12</td>
<td>$3,553</td>
</tr>
<tr>
<td>Overexcavate and recompress, 5’ below/beyond pads</td>
<td>3,698</td>
<td>cy</td>
<td>$6.24</td>
<td>$23,078</td>
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<tr>
<td>Haul excess, 10 mile round trip</td>
<td>1,924</td>
<td>cy</td>
<td>$18.39</td>
<td>$35,380</td>
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<tr>
<td>Fine grading</td>
<td>29,611</td>
<td>sf</td>
<td>$0.34</td>
<td>$10,068</td>
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<tr>
<td>Erosion control</td>
<td>29,611</td>
<td>sf</td>
<td>$0.06</td>
<td>$1,777</td>
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<tr>
<td>Pools Earthwork</td>
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</tr>
<tr>
<td>Mass Excavation</td>
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<tr>
<td>Swimming pool</td>
<td>1,382</td>
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<td>$10.61</td>
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<tr>
<td>Surge tank</td>
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<tr>
<td>Backfill</td>
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</tr>
<tr>
<td>Swimming pool</td>
<td>Assume Not Required</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Surge tank</td>
<td>237</td>
<td>cy</td>
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<td>$2,845</td>
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<tr>
<td>Haul Excess</td>
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<tr>
<td>Swimming pool</td>
<td>1,382</td>
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<td>$18.39</td>
<td>$25,423</td>
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<tr>
<td>Surge tank</td>
<td>52</td>
<td>cy</td>
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<td>$953</td>
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<tr>
<td>Foundations</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Foundation, conventional, excluding pool areas</td>
<td>23,610</td>
<td>sf</td>
<td>$12.50</td>
<td>$295,125</td>
</tr>
<tr>
<td>Slab on grade, excluding pool areas</td>
<td>23,611</td>
<td>sf</td>
<td>$9.50</td>
<td>$224,305</td>
</tr>
<tr>
<td>Total - Foundations</td>
<td></td>
<td></td>
<td></td>
<td>$646,195</td>
</tr>
<tr>
<td><strong>2 Vertical Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal and vertical structural steel framing, 15# psf, long span</td>
<td>222</td>
<td>tn</td>
<td>$4,800.00</td>
<td>$1,065,996</td>
</tr>
<tr>
<td>Buckling restrained braced frame</td>
<td>8</td>
<td>tn</td>
<td>$4,800.00</td>
<td>$36,960</td>
</tr>
<tr>
<td>Fireproofing to steelwork, excluding high roofs</td>
<td>132</td>
<td>tn</td>
<td>$314.28</td>
<td>$41,619</td>
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<tr>
<td>Miscellaneous metals</td>
<td>29,611</td>
<td>sf</td>
<td>$1.50</td>
<td>$44,417</td>
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<tr>
<td>Total - Vertical Structure</td>
<td></td>
<td></td>
<td></td>
<td>$1,188,992</td>
</tr>
<tr>
<td><strong>3 Floor &amp; Roof Structures</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Acoustic roof deck- metal deck, roof 3” 18 GA metal deck at pools high roof</td>
<td>11,954</td>
<td>sf</td>
<td>$9.34</td>
<td>$111,650</td>
</tr>
<tr>
<td>Non Acoustic roof deck- metal deck, roof 1 1/2” metal deck</td>
<td>17,657</td>
<td>sf</td>
<td>$5.50</td>
<td>$97,114</td>
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<tr>
<td>Hanging suspension system with acoustic batt insulation, design in progress</td>
<td>1</td>
<td>ls</td>
<td>$50,000.00</td>
<td>$50,000</td>
</tr>
<tr>
<td>Total - Floor &amp; Roof Structures</td>
<td></td>
<td></td>
<td></td>
<td>$258,764</td>
</tr>
<tr>
<td><strong>4 Exterior Cladding</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pool Building Envelope</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kawneer framed curtainwall incl. all support framework, vision glazing, assume 40% of façade, 36’ high</td>
<td>9,446</td>
<td>sf</td>
<td>$115.00</td>
<td>$1,086,336</td>
</tr>
</tbody>
</table>

Prepared by [Cumming](#)
### DETAIL ELEMENTS - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid wall system, assume 60% of façade, 36' high, allow for aluminum</td>
<td>3,360 sf</td>
<td>$85.00</td>
<td>$285,600</td>
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<tr>
<td>with 2 coat custom kynar finish, incl. sheathing and metal stud backing</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainscreen, assume 6' high allow for metal screen with steel supports</td>
<td>1,680 sf</td>
<td>$40.00</td>
<td>$67,200</td>
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<tr>
<td>Horizontal soffits, smooth trowled cement plaster, 2' wide</td>
<td>2,240 sf</td>
<td>$115.00</td>
<td>$257,600</td>
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<tr>
<td>Community Building Envelope</td>
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<td></td>
</tr>
<tr>
<td>Kawneer framed curtainwall incl. all support framework, vision glazing,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assume 40% of façade, 20' high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid wall system, assume 60% of façade, 20' high, allow for aluminum</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>with 2 coat custom kynar finish, incl. sheathing and metal stud backing</td>
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<tr>
<td>Rainscreen, assume 6' high allow for metal screen with steel supports</td>
<td></td>
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<tr>
<td>HM door sets, HM frames and hardware, single, allow</td>
<td>4 pr</td>
<td>$2,421.10</td>
<td>$9,684</td>
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<tr>
<td>Exterior HM door sets, HM frames and hardware, double, allow</td>
<td>6 pr</td>
<td>$4,930.27</td>
<td>$29,582</td>
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</tr>
<tr>
<td>Exterior sliding door at entrance</td>
<td>1 ea</td>
<td>$11,300.00</td>
<td>$11,300</td>
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<tr>
<td>Vestibule glazing</td>
<td>1 ls</td>
<td>$10,000.00</td>
<td>$10,000</td>
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<tr>
<td>7' louvered screen at mechanical equipment</td>
<td>1,113 sf</td>
<td>$55.00</td>
<td>$61,215</td>
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<tr>
<td><strong>Total - Exterior Cladding</strong></td>
<td></td>
<td></td>
<td></td>
<td>$3,227,413</td>
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<tr>
<td><strong>5 Roofing and Waterproofing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roofing and waterproofing, single ply with rigid insulation</td>
<td>29,611 sf</td>
<td>$17.00</td>
<td>$503,387</td>
<td></td>
</tr>
<tr>
<td>Roofing coping, flashing, allowance</td>
<td>29,611 sf</td>
<td>$1.25</td>
<td>$37,014</td>
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</tr>
<tr>
<td><strong>Total - Roofing and Waterproofing</strong></td>
<td></td>
<td></td>
<td></td>
<td>$540,401</td>
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<tr>
<td><strong>6 Interior Partitions, Doors and Glazing</strong></td>
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</tr>
<tr>
<td>Interior Partitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard partition including framing, insulation, &amp; gyp painted, assume</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13' high</td>
<td>13,481 sf</td>
<td>$17.00</td>
<td>$229,177</td>
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<tr>
<td>Premium for impact resistant gyp, assume 40% of walls</td>
<td>5,392 sf</td>
<td>$1.75</td>
<td>$9,437</td>
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<tr>
<td>Furred partition including framing, insulation, &amp; gyp, allow</td>
<td>250 sf</td>
<td>$11.50</td>
<td>$2,875</td>
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<tr>
<td>Plumbing partition including framing, insulation, &amp; gyp</td>
<td>624 sf</td>
<td>$28.00</td>
<td>$17,472</td>
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<tr>
<td>Interior Openings</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Interior glazing, allowance</td>
<td>750 sf</td>
<td>$75.00</td>
<td>$56,250</td>
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<tr>
<td>SC wood door incl. AL frame and hardware, single</td>
<td>24 ea</td>
<td>$2,256.02</td>
<td>$54,144</td>
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</tr>
<tr>
<td><strong>Total - Interior Partitions, Doors and Glazing</strong></td>
<td></td>
<td></td>
<td></td>
<td>$369,355</td>
</tr>
<tr>
<td><strong>7 Floor, Wall and Ceiling Finishes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flooring&amp; Base</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Concrete paving, 4&quot; thick, incl. sub base, reinforcement, and broom</td>
<td>9,185 sf</td>
<td>$9.78</td>
<td>$89,829</td>
<td></td>
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<tr>
<td>finish</td>
<td></td>
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<tr>
<td>Carpet tile</td>
<td>3,423 sf</td>
<td>$4.91</td>
<td>$16,807</td>
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<tr>
<td>Sealed concrete</td>
<td>7,227 sf</td>
<td>$1.71</td>
<td>$12,358</td>
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<tr>
<td>Epoxy flooring</td>
<td>1,065 sf</td>
<td>$15.00</td>
<td>$15,975</td>
<td></td>
</tr>
<tr>
<td>Fiber glass bar grating</td>
<td>270 sf</td>
<td>$35.00</td>
<td>$9,450</td>
<td></td>
</tr>
<tr>
<td><strong>Total - Interior Partitions, Doors and Glazing</strong></td>
<td></td>
<td></td>
<td></td>
<td>$369,355</td>
</tr>
<tr>
<td><strong>Total - Interior Partitions, Doors and Glazing</strong></td>
<td></td>
<td></td>
<td></td>
<td>$369,355</td>
</tr>
</tbody>
</table>

Prepared by **Cumming**
## DETAIL ELEMENTS - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic tile, floor</td>
<td>2,250</td>
<td>sf</td>
<td>$21.00</td>
<td>$47,250</td>
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<tr>
<td>Resilient base</td>
<td>1,450</td>
<td>lf</td>
<td>$4.95</td>
<td>$7,178</td>
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<tr>
<td>Ceramic tile, base</td>
<td>560</td>
<td>lf</td>
<td>$20.50</td>
<td>$11,480</td>
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<tr>
<td>Ceiling Finish</td>
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<td></td>
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</tr>
<tr>
<td>Gypsum board ceilings, incl. framing at toilets, locker, and changing rooms</td>
<td>3,426</td>
<td>sf</td>
<td>$10.82</td>
<td>$37,069</td>
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<tr>
<td>ACT ceiling</td>
<td>3,948</td>
<td>sf</td>
<td>$5.50</td>
<td>$21,714</td>
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<tr>
<td>Wall Finish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic tile with backerboard, walls at toilets</td>
<td>4,480</td>
<td>sf</td>
<td>$24.50</td>
<td>$109,760</td>
</tr>
<tr>
<td>Ceramic tile with backerboard, walls at pools, 12' high</td>
<td>3,960</td>
<td>sf</td>
<td>$26.85</td>
<td>$106,326</td>
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<tr>
<td>Wall mounted metal pipe handrail, at stairs</td>
<td>26</td>
<td>lf</td>
<td>$125.00</td>
<td>$3,250</td>
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<tr>
<td>Misc. Interior Finishes, allowance</td>
<td>29,611</td>
<td>sf</td>
<td>$0.75</td>
<td>$22,208</td>
</tr>
</tbody>
</table>

**Total - Floor, Wall and Ceiling Finishes**

$510,654

### 8 Function Equipment and Specialties

**Interior Specialties**

- **Toilet Cubicles**
  - Handicap, solid phenolic
    - 2 ea
    - $1,424.31
    - $2,849
  - Standard, solid phenolic
    - 12 ea
    - $1,318.94
    - $15,827
  - Urinal screen, stainless steel
    - 3 ea
    - $663.26
    - $1,990

- **Toilet / Restroom Specialties**
  - Bathroom mirrors
    - 120 sf
    - $39.91
    - $4,789
  - Coat hook
    - 14 ea
    - $30.16
    - $422
  - Grab bars
    - 4 ea
    - $203.47
    - $814
  - Janitor mop sink rack
    - 1 ea
    - $135.68
    - $136
  - Napkin dispenser / disposal, surface mounted
    - 8 ea
    - $564.74
    - $4,518
  - Paper towel dispenser combo unit, recessed
    - 8 ea
    - $369.05
    - $2,952
  - Sanitary napkin dispenser
    - 9 ea
    - $414.21
    - $3,728
  - Sanitary napkin disposal
    - 9 ea
    - $184.53
    - $1,661
  - Seat cover dispenser
    - 14 ea
    - $139.37
    - $1,951
  - Shower accessories, per stall
    - 16 ea
    - $1,054.74
    - $16,876
  - Soap dispenser
    - 12 ea
    - $98.00
    - $1,176
  - Toilet paper dispenser
    - 14 ea
    - $85.96
    - $1,203

**Building Specialties**

- Lockers, allow
  - 1 ls
  - $75,000.00
  - $75,000
- Storage cabinets
  - 1 ls
  - $15,000.00
  - $15,000
- Kitchen casework
  - 1 ls
  - $10,000.00
  - $10,000
- Kitchen appliance
  - OFOI
- Community room foldable partitions
  - Assumed not needed
- Miscellaneous specialties, allowance
  - 1 ls
  - $35,000.00
  - $35,000
- Interior signage, code
  - 29,611 sf
  - $0.15
  - $4,442
- Fire extinguisher and cabinet, allowance
  - 8 ea
  - $444.31
  - $3,554
- Exterior signage
  - NIC
- Wayfinding signage
  - NIC
- Marker boards
  - NIC
- Tack boards
  - NIC
- Mobile equipment storage systems
  - NIC
- Folding partition
  - NIC
- Folding partition
  - NIC

Prepared by Cumming
### DETAIL ELEMENTS - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green screens, 8'-0&quot; high, at exterior</td>
<td>NIC</td>
<td></td>
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<tr>
<td>Projection screen and mount</td>
<td>NIC</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Projector</td>
<td>NIC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video monitors</td>
<td>NIC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pool Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lap Pool Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming Pool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pool walls - Shotcrete</td>
<td>3,450</td>
<td>sf</td>
<td>$15.14</td>
<td>$52,233</td>
</tr>
<tr>
<td>Pool Floor - CIP SOG varying thickness 6&quot;-12&quot;</td>
<td>3,450</td>
<td>sf</td>
<td>$10.50</td>
<td>$36,225</td>
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<tr>
<td>Surge Tank, CIP floors, walls, and lid including waterproofing, 9'x9'x10' deep</td>
<td>1</td>
<td>ea</td>
<td>$23,000.00</td>
<td>$23,000</td>
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<tr>
<td>Surge chamber access cover</td>
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<td>ea</td>
<td>$6,000.00</td>
<td>$6,000</td>
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<tr>
<td>Surge chamber access ladder</td>
<td>1</td>
<td>ea</td>
<td>$11,500.00</td>
<td>$11,500</td>
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<tr>
<td><strong>Concrete gutter system</strong></td>
<td>3,450</td>
<td>sf</td>
<td>$40.00</td>
<td>$138,000</td>
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<tr>
<td>Concrete gutter, shotcrete</td>
<td>240</td>
<td>lf</td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Waterproofing</td>
<td>1,200</td>
<td>sf</td>
<td>Included Above</td>
<td></td>
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<tr>
<td>Concrete stairs incl. trim tile on steps, allow</td>
<td>270</td>
<td>sf</td>
<td>Included Above</td>
<td></td>
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<tr>
<td>Expansion joint at surge gutter, rubber</td>
<td>240</td>
<td>lf</td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>9&quot; grating, non slip surface</td>
<td>240</td>
<td>lf</td>
<td>Included Above</td>
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</tr>
<tr>
<td><strong>Finishes</strong></td>
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<tr>
<td>White plaster finish, walls and slab</td>
<td>3,450</td>
<td>sf</td>
<td>$50.00</td>
<td>$172,500</td>
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<tr>
<td>Miscellaneous finishes</td>
<td>3,450</td>
<td>sf</td>
<td>$9.00</td>
<td>$31,050</td>
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<tr>
<td>Waterline tile, 6&quot; x 6&quot;</td>
<td>270</td>
<td>if</td>
<td>Included Above</td>
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<tr>
<td>End wall target, non-glazed ceramic mosaic targets, 1&quot;x1&quot;</td>
<td>12</td>
<td>ea</td>
<td>Included Above</td>
<td></td>
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<tr>
<td>Racing lane line, unglazed non-slip ceramic mosaic, 1&quot;x1&quot;</td>
<td>6</td>
<td>ea</td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Depth markers, contrasting non-glazed ceramic mosaic tiles, 1&quot;x1&quot;, allow</td>
<td>18</td>
<td>ea</td>
<td>Included Above</td>
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</tr>
<tr>
<td>Warning markings, allow</td>
<td>12</td>
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<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Contrasting tile at certain height, 4&quot; wide - 75'-1&quot; long</td>
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<td>loc</td>
<td>Included Above</td>
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</tr>
<tr>
<td><strong>Equipment / Specialties</strong></td>
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<tr>
<td>Racing platform</td>
<td>6</td>
<td>ea</td>
<td>$3,304.80</td>
<td>$19,829</td>
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<td>Handrailing, stair</td>
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<td>$752.76</td>
<td>$3,011</td>
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<td>Moveable lifeguard chair</td>
<td>2</td>
<td>ea</td>
<td>$4,131.00</td>
<td>$8,262</td>
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<tr>
<td>Accessible lift</td>
<td>1</td>
<td>ea</td>
<td>$11,934.00</td>
<td>$11,934</td>
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<tr>
<td>Floating water polo goals and anchor</td>
<td>6</td>
<td>ea</td>
<td>$2,220.41</td>
<td>$13,322</td>
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<tr>
<td>Dive stand, one meter</td>
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<td>ea</td>
<td>$13,770.00</td>
<td>$13,770</td>
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<tr>
<td>Stanchion post / anchor</td>
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<td>ea</td>
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<tr>
<td>Backstroke stanchion</td>
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<td>ea</td>
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<td>$4,351</td>
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<td>Rope anchor</td>
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<td>ea</td>
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<tr>
<td>Grabrail with steps, including cycolac step inserts</td>
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<td>pr</td>
<td>$2,430.86</td>
<td>$4,862</td>
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<td>Installation of deck equipment</td>
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<td>$7,500.00</td>
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<tr>
<td><strong>Miscellaneous</strong></td>
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<td>ls</td>
<td>$10,000.00</td>
<td>$10,000</td>
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<tr>
<td>Clean-up</td>
<td></td>
<td></td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Start-up &amp; water</td>
<td></td>
<td></td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Start-up chemicals</td>
<td></td>
<td></td>
<td>Included Above</td>
<td></td>
</tr>
<tr>
<td>Maintenance equipment (Auto vacuum)</td>
<td></td>
<td></td>
<td>Included Above</td>
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</tr>
<tr>
<td><strong>Activity Pool Construction</strong></td>
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<tr>
<td>Element</td>
<td>Quantity</td>
<td>Unit</td>
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</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------</td>
<td>--------</td>
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</tr>
<tr>
<td>Structure</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Swimming Pool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pool walls - Shotcrete, 0'-4' deep</td>
<td>2,550</td>
<td>sf</td>
<td>$12.00</td>
<td>$30,600</td>
</tr>
<tr>
<td>Pool Floor - CIP SOG 6&quot;</td>
<td>2,550</td>
<td>sf</td>
<td>$8.80</td>
<td>$22,440</td>
</tr>
<tr>
<td>Surge Tank, CIP floors, walls, and lid</td>
<td>1</td>
<td>ea</td>
<td>$23,000.00</td>
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<tr>
<td>Surge chamber access cover</td>
<td>1</td>
<td>ea</td>
<td>$6,000.00</td>
<td>$6,000</td>
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<tr>
<td>Surge chamber access ladder</td>
<td>1</td>
<td>ea</td>
<td>$11,500.00</td>
<td>$11,500</td>
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<tr>
<td>Concrete gutter system</td>
<td>2,550</td>
<td>sf</td>
<td>$40.00</td>
<td>$102,000</td>
</tr>
<tr>
<td>Concrete gutter, shotcrete</td>
<td>220</td>
<td>lf</td>
<td></td>
<td>Included Above</td>
</tr>
<tr>
<td>Waterproofing</td>
<td>1,100</td>
<td>sf</td>
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<td>Included Above</td>
</tr>
<tr>
<td>Concrete stairs incl. trim tile on steps</td>
<td>100</td>
<td>lf</td>
<td></td>
<td>Included Above</td>
</tr>
<tr>
<td>Expansion joint at surge gutter, rubber</td>
<td>220</td>
<td>lf</td>
<td></td>
<td>Included Above</td>
</tr>
<tr>
<td>9&quot; grating, non slip surface</td>
<td>220</td>
<td>lf</td>
<td></td>
<td>Included Above</td>
</tr>
<tr>
<td>Finishes</td>
<td></td>
<td></td>
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<tr>
<td>White plaster finish, walls and slab</td>
<td>2,550</td>
<td>sf</td>
<td>$45.00</td>
<td>$114,750</td>
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<tr>
<td>Waterline tile, 6&quot; x 6&quot;</td>
<td>220</td>
<td>lf</td>
<td>$45.90</td>
<td>$10,098</td>
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<tr>
<td>Depth markers, contrasting non-glazed ceramic mosaic tiles, 1&quot;x1&quot;, allow</td>
<td>10</td>
<td>ea</td>
<td>$321.30</td>
<td>$3,213</td>
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<td>Warning markings, allow</td>
<td>6</td>
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<td>Miscellaneous finishes, allowance</td>
<td>2,550</td>
<td>sf</td>
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<td>Equipment / Specialties</td>
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<tr>
<td>Handrailing, stair</td>
<td>4</td>
<td>ea</td>
<td>$752.76</td>
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<td>Moveable lifeguard chair</td>
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<td>$4,131.00</td>
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<td>Accessible lift</td>
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<td>Grabrail with steps, including cycolac step inserts</td>
<td>2</td>
<td>pr</td>
<td>$2,430.86</td>
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<td>Water play structure, multi level allowance</td>
<td>1</td>
<td>ls</td>
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<tr>
<td>Rough Mechanical</td>
<td></td>
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<tr>
<td>10&quot; Pump suction line</td>
<td>6,000</td>
<td>sf</td>
<td>$15.50</td>
<td>$93,000</td>
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<td>Float valve</td>
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<tr>
<td>Gutter manifold</td>
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<tr>
<td>Return lines, 6&quot; - 10&quot;</td>
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<tr>
<td>Return lines, 2&quot; - 6&quot;</td>
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<tr>
<td>Pool Fittings</td>
<td></td>
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<tr>
<td>Main drains</td>
<td></td>
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<td>Included Above</td>
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<td>Floor inlets</td>
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<td>Included Above</td>
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<tr>
<td>Install pool fittings</td>
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<td>Included Above</td>
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<tr>
<td>Mechanical Equipment, pending product specs</td>
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<tr>
<td>VFD pump, Re-circle pump, Filter, Heaters, Chlorine Feed Equipment, PH feed equipment, Chemical controller, Exhaust fan, Emergency eye wash</td>
<td>1</td>
<td>ls</td>
<td>$500,000.00</td>
<td>$500,000</td>
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# DETAIL ELEMENTS - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Rough Electrical</td>
<td>6,000</td>
<td>sf</td>
<td>$14.00</td>
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<td>LED lights</td>
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<td>Conduit &amp; Wiring</td>
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<td>Jboxes</td>
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<td>Electrical connections</td>
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<tr>
<td>Aquatics, electrical provisions to install OFCI items</td>
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<td>OFCI</td>
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<tr>
<td>Colorado Pool Timing systems equipment, allowance</td>
<td>1</td>
<td>ls</td>
<td>$40,000.00</td>
<td>$40,000</td>
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<td>Colorado timing Install equipment allowance</td>
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<tr>
<td>Lap pool, 4' to 12'-6&quot; deep</td>
<td>3,450</td>
<td>sf</td>
<td>$15.00</td>
<td>$51,750</td>
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<td>Activity pool, 0&quot; to 4' deep</td>
<td>2,550</td>
<td>sf</td>
<td>$10.00</td>
<td>$25,500</td>
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<tr>
<td>Pool circulation systems: filtration, heating, chemical treatment etc.</td>
<td>1</td>
<td>ls</td>
<td>$50,000</td>
<td>$50,000</td>
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<tr>
<td><strong>Total - Function Equipment and Specialties</strong></td>
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<td>$2,198,580</td>
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<td>9 Stairs and Vertical Transportation</td>
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<tr>
<td>Entrance Stairs, on grade</td>
<td>524</td>
<td>lf</td>
<td>$65.00</td>
<td>$34,060</td>
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<tr>
<td><strong>Total - Stairs and Vertical Transportation</strong></td>
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<td></td>
<td>$34,060</td>
</tr>
<tr>
<td>10 Plumbing Systems</td>
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<tr>
<td>General plumbing</td>
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<td></td>
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<tr>
<td>Double wall, plate and frame heat exchangers - water heaters</td>
<td>2</td>
<td>ea</td>
<td>$16,800.00</td>
<td>$33,600</td>
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<tr>
<td>Circulating pump, duplex</td>
<td>1</td>
<td>ea</td>
<td>$2,195.89</td>
<td>$2,196</td>
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<td>Expansion tank</td>
<td>1</td>
<td>ea</td>
<td>$884.56</td>
<td>$885</td>
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<tr>
<td>Sewage ejector / Sump pump - allowance</td>
<td>1</td>
<td>ea</td>
<td>$9,760.00</td>
<td>$9,760</td>
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<tr>
<td>Grease / Sand / Oil interceptor, 750 gal</td>
<td>1</td>
<td>ea</td>
<td>$12,000.00</td>
<td>$12,000</td>
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<tr>
<td>Sanitary fixtures</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Water closet, quantity per mechanical engineer</td>
<td>20</td>
<td>ea</td>
<td>$1,640.00</td>
<td>$32,800</td>
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<tr>
<td>Urinal</td>
<td>3</td>
<td>ea</td>
<td>$1,670.00</td>
<td>$5,010</td>
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<tr>
<td>Lavatory, quantity per mechanical engineer</td>
<td>15</td>
<td>ea</td>
<td>$1,588.00</td>
<td>$23,280</td>
</tr>
<tr>
<td>Shower, quantity per mechanical engineer</td>
<td>16</td>
<td>ea</td>
<td>$2,460.00</td>
<td>$39,360</td>
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<tr>
<td>Emergency Shower / Eyewash stations</td>
<td>2</td>
<td>ea</td>
<td>$2,850.00</td>
<td>$5,700</td>
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<tr>
<td>Drinking fountain, with bottle filing stations, quantity per mechanical engineer</td>
<td>4</td>
<td>ea</td>
<td>$4,280.00</td>
<td>$17,120</td>
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<tr>
<td>Sinks</td>
<td>4</td>
<td>ea</td>
<td>$1,225.00</td>
<td>$4,900</td>
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<tr>
<td>Hose bibs</td>
<td>12</td>
<td>ea</td>
<td>$372.69</td>
<td>$4,472</td>
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<tr>
<td>Floor drains</td>
<td>14</td>
<td>ea</td>
<td>$657.00</td>
<td>$9,198</td>
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<tr>
<td>Trench drains for pool area - corrosion resistant HDPE</td>
<td>20</td>
<td>ea</td>
<td>$950.00</td>
<td>$19,000</td>
</tr>
<tr>
<td>Rough ins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local rough-in at fixture</td>
<td>58</td>
<td>ea</td>
<td>$917.00</td>
<td>$53,186</td>
</tr>
<tr>
<td>Rough-in at floor sink or floor drain</td>
<td>30</td>
<td>ea</td>
<td>$1,086.00</td>
<td>$32,580</td>
</tr>
<tr>
<td>Rough-ins to OFCI pantry: cold and hot water, direct and indirect drain</td>
<td>8</td>
<td>ea</td>
<td>$850.00</td>
<td>$6,800</td>
</tr>
<tr>
<td>Make up water for swimming pool</td>
<td>1</td>
<td>ea</td>
<td>$6,500.00</td>
<td>$6,500</td>
</tr>
<tr>
<td>Domestic water piping</td>
<td>29,611</td>
<td>sf</td>
<td>$3.40</td>
<td>$100,677</td>
</tr>
<tr>
<td>Waste / vent piping</td>
<td>29,611</td>
<td>sf</td>
<td>$3.60</td>
<td>$106,600</td>
</tr>
<tr>
<td>Roof / storm drainage</td>
<td>29,611</td>
<td>sf</td>
<td>$2.50</td>
<td>$74,028</td>
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<tr>
<td>Condensate drainage</td>
<td>29,611</td>
<td>sf</td>
<td>$0.40</td>
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</tbody>
</table>

Prepared by Cumming
<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>29,611</td>
<td>sf</td>
<td>$3.50</td>
<td>$103,639</td>
</tr>
</tbody>
</table>

**Total - Plumbing Systems** $715,674

**11 Heating, Ventilation and Air Conditioning**

- **Central plant shared portion, see appendix 1 for details**
  - 1 ls $878,740.50 $878,741
- **Chilled water piping distribution**
  - 29,611 sf $2.50 $74,028
- **Hot water piping distribution**
  - 29,611 sf $5.00 $148,055

**Air-Side Equipment**

- **AHU-3, Air handling unit, outdoor, vav, modular**
  - 40,000 cfm $9.50 $380,000
- **VAV terminal boxes, with reheat coil**
  - 32 ea $1,790.00 $57,280
- **EF, Exhaust fan, inline, Greenheck**
  - 3,200 cfm $3.85 $12,320

**Air Distribution**

- **Ductwork, galv - protected with epoxy based paint**
  - 15,400 lb $16.35 $251,790
- **Ductwork, stainless steel**
  - 12,000 lb $29.14 $349,680
- **Duct insulation**
  - 16,400 sf $3.86 $63,304
- **Combination fire / smoke damper**
  - 12 ea $1,149.00 $13,788
- **Grilles, registers and diffusers, including dampers and flex duct**
  - 29,611 sf $2.50 $74,028
- **Acoustical attenuation**
  - 2 ea $4,500.00 $9,000

**Miscellaneous**

- **Test / balance HVAC**
  - 200 hr $153.14 $30,628
- **Start-up/check-out**
  - 140 hr $121.93 $17,070
- **Commissioning assist**
  - 140 hr $121.93 $17,070
- **Piping identification: labels, arrows and valve tags**
  - 260 ea $27.60 $7,176
- **Seismic and vibration requirements**
  - 1 ea $25,000.00 $25,000
- **Penetrations, sealing and firestopping**
  - 1 ea $10,000.00 $10,000

**HVAC Controls**

- **DDC controls to plumbing systems: BTU meter etc.**
  - 1 ls $10,000.00 $10,000
- **DDC controls, air handlers**
  - 1 ea $24,800.00 $24,800
- **DDC controls, vav box, reheat coils**
  - 32 ea $1,957.00 $62,624
- **DDC controls, general exhaust fan**
  - 4 ea $1,314.00 $5,256
- **DDC controls, smoke damper monitor**
  - 12 ea $952.00 $11,424
- **DDC misc. items, training, integration**
  - 1 ls $30,000.00 $30,000
- **DDC controls for pools**
  - 1 ls $50,000.00 $50,000

**Total - Heating, Ventilation and Air Conditioning** $2,613,061

**12 Electrical Lighting, Power and Communications**

**Service & Distribution Equipment**

- **Panelboard, 225A 480/277v 3ph 4w**
  - 2 ea $2,600.00 $5,200
- **Panelboard, 100A 480/277v 3ph 4w**
  - 3 ea $2,100.00 $6,300
- **Panelboard, 400A 208/120v 3ph 4w**
  - 2 ea $5,200.00 $10,400
- **Panelboard, 225A 208/120v 3ph 4w**
  - 3 ea $2,300.00 $6,900
- **Transformer, 112.5kva 480-208/120v**
  - 1 ea $9,100.00 $9,100
- **Transformer, 75kva 480-208/120v**
  - Not Needed Per Engineer’s Comment
- **Service Grounding System**
  - 29,611 sf $0.30 $8,883
- **Submetering**
  - 1 ls $7,500.00 $7,500
## DETAIL ELEMENTS - AQUATICS & COMMUNITY CENTER

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeder, 400A</td>
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<td>$95.00</td>
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<td>Feeder, 225A</td>
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<td>lf</td>
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<tr>
<td>Feeder, 100A</td>
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<td>HVAC &amp; Equipment Connections</td>
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<td>Convenience Power</td>
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<tr>
<td>Lighting &amp; Lighting Controls</td>
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<tr>
<td>Lighting</td>
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<tr>
<td>Lighting Controls</td>
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<td>Fire Alarm System</td>
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<td>Telecommunications System</td>
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<td>Public Address System</td>
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<tr>
<td>Distributed Antenna System</td>
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<td>Security, Access Control &amp; CCTV Systems</td>
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<td>$59,222</td>
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<tr>
<td><strong>Total - Electrical Lighting, Power and Communications</strong></td>
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<td><strong>$933,489</strong></td>
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</tbody>
</table>

### 13 Fire Protection Systems

- **New hydraulically calculated wet pipe automatic fire sprinkler system**
  - Wet-pipe fire sprinkler, complete 29,611 sf $6.00 $177,666
  - 316 Stainless Steel piping, premium (BOD 2.1.H.3) 1 ea $50,000.00 $50,000
  - FM 200 preaction systems, Electrical / data rooms - allowance Not Needed Per Engineer's Comment
  - Fire sprinkler for chemical storage room, premium 1 ea $12,000.00 $12,000

| **Total - Fire Protection Systems** | **$239,666** |
Site
### SUMMARY - SITE

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<tr>
<th>Element</th>
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<th>Cost / SF</th>
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<td><strong>D) Mechanical and Electrical (10-13)</strong></td>
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<tr>
<td>11 Heating, Ventilation and Air Conditioning</td>
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<td>$684,400</td>
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<tr>
<td>12 Electrical Lighting, Power and Communications</td>
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<td><strong>E) Site Construction (14-16)</strong></td>
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<td>15 Site Paving, Structures &amp; Landscaping</td>
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<td>16 Utilities on Site</td>
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Subtotal  
General Conditions  
5.00%  
$253,871  
$1.39
General Requirements  
4.00%  
$213,252  
$1.17
Subtotal  
Bonds & Insurance  
2.00%  
$110,891  
$0.61
Subtotal  
Contractor's Fee  
4.00%  
$226,217  
$1.24
Subtotal  
Design Contingency  
9.00%  
$529,349  
$2.89
Subtotal  
Construction Contingency  

Subtotal  
Escalation to MOC, 12/31/21  
12.92%  
$828,082  
$4.53

**TOTAL ESTIMATED CONSTRUCTION COST**  
$7,239,082  
$39.56

Total Area:  
183,000 SF
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<td><strong>14 Site Preparation and Demolition</strong></td>
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<td>Demo existing structures</td>
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<td>Haul and dispose of demolished structures</td>
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<td>Remove asphalt paving &amp; base course, including hauling and disposal</td>
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<td>Mass excavation</td>
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<td>Backfill</td>
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<td><strong>15 Site Paving, Structures &amp; Landscaping</strong></td>
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<td>AC Paving</td>
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<td>Parking lot, 3&quot; AC over 8&quot; AB</td>
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<td>Hardscape</td>
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<td>Concrete unit pavers, allow, quantity per WRNS</td>
<td>2,500</td>
<td>sf</td>
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<td>Concrete paving, 4&quot; thick, incl. sub base, reinforcement, and finish</td>
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<td>Concrete paving, 4&quot; thick, incl. sub base, reinforcement, and finish at street sidewalks</td>
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<td>Concrete curbs</td>
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<td>Concrete Ramps</td>
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<td>Curb cut concrete ramps</td>
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<td>$2,726</td>
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<td>Continuous concrete ramps incl. all concrete, reinforcement, sub base, edge forms, grooved finish, allow</td>
<td>400</td>
<td>sf</td>
<td>$33.52</td>
<td>$13,408</td>
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<tr>
<td>Site Walls, allow</td>
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## DETAIL ELEMENTS - SITE

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<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
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<tbody>
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<td>CIP colored concrete seatwalls, 18&quot; high</td>
<td>150</td>
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<td>Retaining walls, 18&quot; average</td>
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<td>Parking Lot Striping / Signage, 200 parking stalls, directional signage, and striping</td>
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<td>ls</td>
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<td>$10,000</td>
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<tr>
<td>Planting</td>
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<td>Shrubbery, allowance</td>
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<td>sf</td>
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<td>Shrub and turf irrigation</td>
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<td>Mulch to shrub area</td>
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<td>sf</td>
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<td>Tree Bubblers, allow 2 per tree</td>
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<td>ea</td>
<td>$150.00</td>
<td>$45,000</td>
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<td>Trees, 24&quot; box</td>
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<td>$650.00</td>
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<td>Tree Guying, all trees</td>
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<td>$175.00</td>
<td>$26,250</td>
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<td>Site Specialties</td>
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<td>Bollards, 8&quot; square steel, allow</td>
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<td>Skate board rack</td>
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<td>Bike rack</td>
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<td>Site Furniture</td>
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<tr>
<td>Trash and recycling receptacles</td>
<td>FF&amp;E</td>
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<td>Chairs</td>
<td>FF&amp;E</td>
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<td>Tables, allow</td>
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<td>Steel framing</td>
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<td>Lighting &amp; fire protection</td>
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<td>Mechanical Equipment Yard</td>
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<td>CMU enclosure</td>
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<td>Concrete pad</td>
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<td>Tube steel gates, double leaf</td>
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<td>pr</td>
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</table>

### Total - Site Paving, Structures & Landscaping

$1,887,976

### 16 Utilities on Site

**Domestic water**

- 4" domestic water meter                                             | 1       | ea   | $21,995.78| $21,996 |
- 4" water line, including trenching and backfill                     | 250     | if   | $68.54    | $17,135 |
- Gate valve, 4"                                                       | 1       | ea   | $776.86   | $776    |
- 4" to 8" water line tap                                             | 1       | ea   | $350.00   | $350    |
- Extend 6" (assumed) water line, including trenching and backfill    | 276     | if   | $77.24    | $21,318 |

**Fire water**

- 6" to 8" fire line tap                                              | 3       | ea   | $500.00   | $1,500  |
- 6" fire department connection                                       | 1       | ea   | $2,816.02 | $2,816  |
- 6" backflow prevention device                                       | 1       | ea   | $14,002.45| $14,002 |
- 6" fire line pipe                                                   | 242     | if   | $105.73   | $25,587 |

Prepared by Cumming
**DETAIL ELEMENTS - SITE**

<table>
<thead>
<tr>
<th>Element</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
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<tbody>
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<td>Gate valve, 6”</td>
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<td>Fire hydrants, qty assumed</td>
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<td>ea</td>
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<td><strong>Sanitary sewer</strong></td>
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<td>Grease interceptor, size TBD, allow</td>
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<td>4” (assumed) lift station</td>
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<td>4” (assumed) sanitary sewer line, including trenching and backfill</td>
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<td><strong>Natural gas</strong></td>
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<td>2” (assumed) gas line, including trenching and backfill</td>
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<td><strong>Storm water</strong></td>
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<td>24” storm water pipe, including trenching and backfill</td>
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<td><strong>Total - Utilities on Site</strong></td>
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Prepared by Cumming
Options
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<td>12.92% Escalation to MOC, 12/31/21</td>
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<td><strong>TOTAL ESTIMATED CONSTRUCTION COST</strong></td>
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## DETAIL ELEMENTS - OPTIONS

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<tr>
<td>Cooling system</td>
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<td>Air cooled chillers</td>
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<td>CHW air separator</td>
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<td>Heating system</td>
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<td>Titanium heat exchanger: lap pool, leisure pool and spa</td>
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<td>Boilers, condensing gas, Aerco</td>
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<td>Hot water pump, 25 hp, 270 gpm</td>
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<td>VFD to pump, 25 hp</td>
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</tbody>
</table>

* doesn't qualify for LEED credit

- Central plant DDC controls - Option 2                               | 1        | ls     | $220,000.00| $220,000 |

**Total - Foundations**                                                 |          |        |            | $1,441,881|

<table>
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<th>2 Water Heater</th>
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<tr>
<td>Water heater, condensing, gas</td>
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<td>$12,700.00</td>
<td>$12,700</td>
</tr>
<tr>
<td>Natural Gas for HVAC option 2 - Boilers</td>
<td>29,600</td>
<td>sf</td>
<td>$3.00</td>
<td>$88,800</td>
</tr>
</tbody>
</table>

**Total - Vertical Structure**                                          |          |        |            | $101,500 |
## APPENDIX 1 - Central Plant Estimate

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air to water heat pumps, Aermec / Multistack / Clima Cool</td>
<td>360</td>
<td>ton</td>
<td>$1,870.00</td>
<td>$673,200</td>
</tr>
<tr>
<td>Chilled water pump, 7-1/2 hp, 360 gpm</td>
<td>2</td>
<td>ea</td>
<td>$8,694.00</td>
<td>$17,388</td>
</tr>
<tr>
<td>SCHWP water pump, 20 hp, 360 gpm</td>
<td>2</td>
<td>ea</td>
<td>$17,320.00</td>
<td>$34,640</td>
</tr>
<tr>
<td>VFD to pump, 7-1/2 hp</td>
<td>2</td>
<td>ea</td>
<td>$5,522.00</td>
<td>$11,044</td>
</tr>
<tr>
<td>VFD to pump, 20 hp</td>
<td>2</td>
<td>ea</td>
<td>$8,721.00</td>
<td>$17,442</td>
</tr>
<tr>
<td>Storage tank, chilled water</td>
<td>3,000</td>
<td>gal</td>
<td>$25.00</td>
<td>$75,000</td>
</tr>
<tr>
<td>CHW air separator</td>
<td>1</td>
<td>ea</td>
<td>$7,851.00</td>
<td>$7,851</td>
</tr>
<tr>
<td>Chemical treatment</td>
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<td>ea</td>
<td>$12,000.00</td>
<td>$12,000</td>
</tr>
<tr>
<td>Low sound acoustic package, premium</td>
<td>1</td>
<td>ls</td>
<td>$50,000.00</td>
<td>$50,000</td>
</tr>
<tr>
<td>Piping, fitting, valves and accessories</td>
<td>1</td>
<td>ls</td>
<td>$120,000.00</td>
<td>$120,000</td>
</tr>
<tr>
<td><strong>Heating system</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Titanium heat exchanger: lap pool, leisure pool and spa</td>
<td>3</td>
<td>ea</td>
<td>$76,050.00</td>
<td>$228,150</td>
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<tr>
<td>Hot water pump, 7-1/2 hp, 270 gpm</td>
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<td>ea</td>
<td>$8,520.00</td>
<td>$17,040</td>
</tr>
<tr>
<td>SHWP water pump, 20 hp, 270 gpm</td>
<td>2</td>
<td>ea</td>
<td>$16,750.00</td>
<td>$33,500</td>
</tr>
<tr>
<td>VFD to pump, 7-1/2 hp</td>
<td>2</td>
<td>ea</td>
<td>$5,522.00</td>
<td>$11,044</td>
</tr>
<tr>
<td>VFD to pump, 20 hp</td>
<td>2</td>
<td>ea</td>
<td>$8,721.00</td>
<td>$17,442</td>
</tr>
<tr>
<td>Storage tank, hot water</td>
<td>3,000</td>
<td>gal</td>
<td>$25.00</td>
<td>$75,000</td>
</tr>
<tr>
<td>HW air separator</td>
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</tr>
<tr>
<td>Piping, fitting, valves and accessories</td>
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<td>ls</td>
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</tr>
<tr>
<td><strong>Central plant DDC controls - Option 1</strong></td>
<td>1</td>
<td>ls</td>
<td>$250,000.00</td>
<td>$250,000</td>
</tr>
</tbody>
</table>

**Total Direct Construction Cost**: $1,757,481
Appendix C

Structural Concept