VALIDATION REPORT

Drayton Valley and Brazeau Aquatic Centre

Town of Drayton Valley and Brazeau County

January 15th 2020

Contents

SIGNATORY SHEET

1.0 COUNCIL SUMMARY / PAGE 7
- 1.1 Council Summary
- 1.2 Team Process
  - Tours
- 1.3 Project Schedule

2.0 PROJECT OVERVIEW / PAGE 15
- 2.1 Project Team and Organizational Chart
- 2.2 Drayton Valley and Brazeau Aquatic Centre Concept
- 2.3 Concept of Aquatic Centre Operations
- 2.4 Validation Strategy
- 2.5 Drayton Valley and Brazeau Aquatic Centre Team Values

3.0 DESIGN NARRATIVES /PAGE 31
- 3.1 Architectural
  - Furniture, Fixtures and Equipment
  - Building Code
- 3.2 Pools
- 3.3 Structural
- 3.4 Mechanical
- 3.5 Electrical
- 3.6 Civil and Site
- 3.7 BIMX
- 3.8 Constructibility

4.0 ENERGY OPTIMIZATION AND UTILITY COSTS /PAGE 81
- 4.1 Sustainability Overview
- 4.2 Deep Well Geothermal

5.0 PROJECT AND DEVELOPMENT INFORMATION /PAGE 99
- 5.1 Functional Program / Project Area Summary
- 5.2 Preliminary Milestone Construction Schedule

6.0 RISK REGISTER AND OPPORTUNITY LOG /PAGE 109
- 6.1 Project Risk Register and Opportunity Log

7.0 DECISION MATRIX /PAGE 117
- 7.1 Project Decision Matrix

8.0 TARGET COST /PAGE 121
- 8.1 Target Budget

9.0 WISH LIST /PAGE 127
- 9.1 Wish List Matrix

10.0 DESIGN DOCUMENTS /PAGE 131

Architectural /132
- Drawings
  - Site Plan
  - Floor Plan
  - Six Lane Option 1
  - Six Lane Option 2
  - Eight Lane Option 1
  - Eight Lane Option 2
- Room Data Sheets

Mechanical /150
- Mechanical Room

Structural /151
- Main Floor and Basement Plan
- Low Roof Plan
- High Roof Plan
- Sections and Details

Electrical /155
- Luminaire Schedule
- Single Line Diagram

Decision Matrix- Detail Analysis /159

BIMX /173
- LOD
- Appendices

Purpose of Validation

To be able to state with confidence:
We can build this building,
That does these things,
For this much money,
In this much time

DRAYTON VALLEY
Annette Driessen
Lana Holmes

BRAZEAU COUNTY
Lee Chambers

Group2 Architecture Interior Design Ltd.
Craig Webber
Troy Smith
Doug Ramsey
Dorian Resner
Wanda Melnyk-Harms
Andrea Ruether
James Simpson

Chandos Construction
Colin Rigney
David Owen
Jen Hancock
Harry Hansen
Dominic Ries
Caitlyn Phillips
Vincent Plourd
Hunter Etherington

WSP
Michael Jackson
Arshia Ahmed
Daniel Tyrkalo
Darren Otto

AltaPro Electric Ltd.
Bert De Bruin
Drew Yeoman
Jason Jeglum
Shawn Warren

Read Jones Christoffersen Ltd.
Fran Yungwirth
Josh Herron
Jeff Rabinovitch

Arrow Engineering
Bill Bartelds
Reggie Nicolas
Glen Tichkowsky

Stantec
Jeff Rent
Sam Lane

Spartan Steel
Dale Tam
Daniel Sousa

Priority Mechanical
Michael Henderson
Derek Matter
Rej Boutin
Scott McNeill

Master Pools Alta Ltd.
Blair Dary
Lawrence Dary

XMG Flooring
Chris Uchman

SIGNATORY SHEET

Colin Rigney
Chandos

Craig Webber
Group2 Architecture Interior Design Ltd.

Mike Jackson
WSP

Bert De Bruin
AltaPro Electric Ltd.

Jeff Rabinovitch
Read Jones Christoffersen Ltd.

Bill Bartelds
Arrow Engineering

Michael Henderson
Priority Mechanical

Jeff Rent
Stantec

Blair Dary
Master Pools

Chris Uchman
XMG Flooring

Dale Tam
Spartan Steel

Annette Driessen
Town of Drayton Valley

Date

1.0
COUNCIL SUMMARY

1.1 COUNCIL SUMMARY

This Validation Report is a culmination of efforts from the Integrated Project Delivery (IPD) team to state with confidence that we can build this building, that does these things, for this much money, in this much time. The IPD team was given the mandate from the Drayton Valley Town Council and the Brazeau County Council to develop a Net Zero energy aquatic facility that provides a six lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, provision for a future water slide, as well as support spaces for the pool. The team was also to assess the cost implications to expanding the 25 meter lap pool to eight lanes. The target budget for the project provided by the two councils is $18.5 million.

Early in the process the IPD team assessed the implications of a Net Zero energy aquatic centre. The team reviewed various technologies and systems including ground source heat, photovoltaic panels and heat recovery from the neighbouring Omniplex arenas, to name a few. Aquatic centres require and consume more energy than a typical building and require extensive systems to reach a balance nets out at zero energy consumption over the course of a year. It became evident that meeting Net Zero energy criteria would not be possible with the $18.5 million budget. Instead the team focused on energy optimization to create a facility that would cost less to operate than the existing Park Valley Pool and meet the 2017 National Energy Code for Buildings (NECB). The project has been designed to be ready to accommodate photovoltaic panels on the roof of the Natatorium.

The IPD team also reviewed implications of the possible construction of a deep well geothermal facility in Drayton Valley or Brazeau County that could provide electricity to the facility. Due to the proposed timing of the Aquatic Centre it was concluded by the team to design a project that utilizes natural gas which is currently cheaper than electrical power. If the construction of the Aquatic Centre is delayed and the construction of the deep well geothermal facility proceeds, the Aquatic Centre systems could be revised to be 100% electrical.

The Drayton Valley and Brazeau Aquatic Centre will be located on the north side of the Drayton Valley Omniplex and Holly Trinity Catholic School parking lot in Drayton Valley, Alberta, and will provide aquatic programming for the citizens of Drayton Valley and Brazeau County. The IPD team developed a 'base design' (Option1) for the Aquatic Centre that addresses some of the project budget issues. The 'base design' includes a six lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, community room and support facilities. The base design does not include the provision for a future water slide. Further to the 'base design' (Option 1) the Team developed natatorium plans and costs for 3 other options for the six and eight lane 25 meter lap pool:

SIX LANE POOL

Option 1 (base):
6 lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, community room and support facilities with no provision for a future slide.

Option 2:
6 lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, community room and support facilities with a provision for a future water slide.

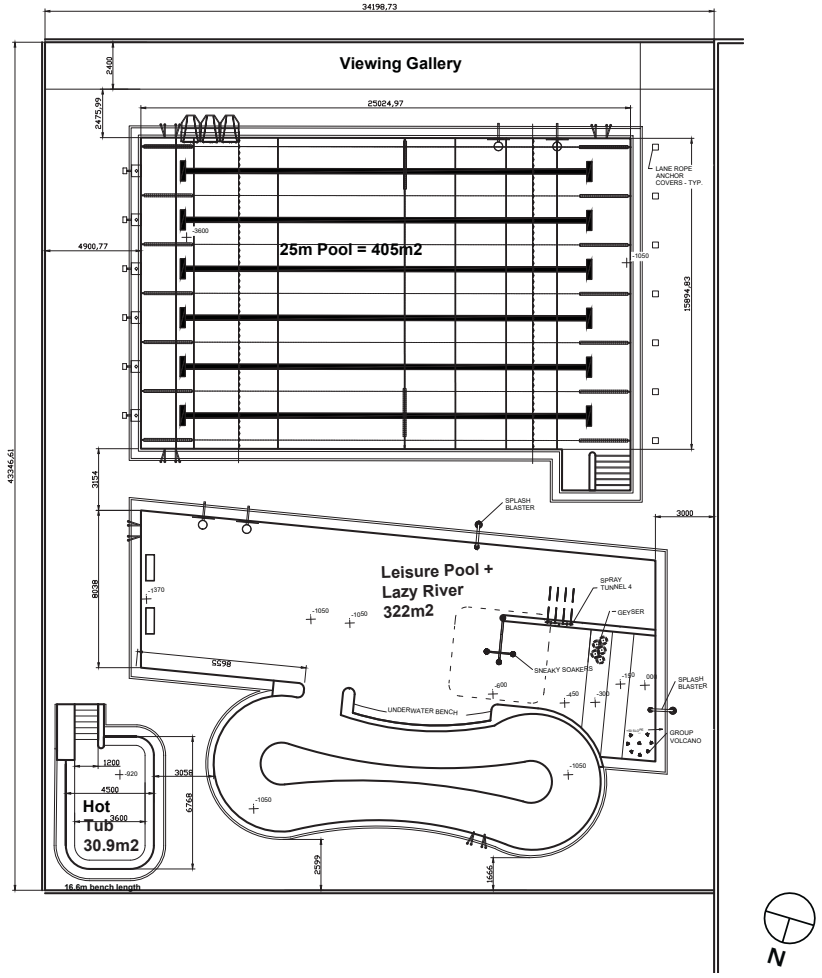
EIGHT LANE POOL

Option 1:
8 lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, community room and support facilities with no provision for a future slide.

Option 2:
8 lane 25 meter lap pool, leisure pool/lazy river, hot tub, steam room, community room and support facilities with a provision for a future water slide.

The work summarized in this Validation Report captures the decisions and assumptions made by the IPD team during the course of the 12 week validation and informs the Drayton Valley Town Council and the Brazeau County Council of the project details and the options available for the Drayton Valley and Brazeau Aquatic Centre. The 'base design' provides the lowest cost option for the Councils while providing the requested aquatic program except for the provision of a future water slide.

DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE
6 LANE OPTION 1



1.2 TEAM PROCESS

PROJECT IMPLEMENTATION TEAMS

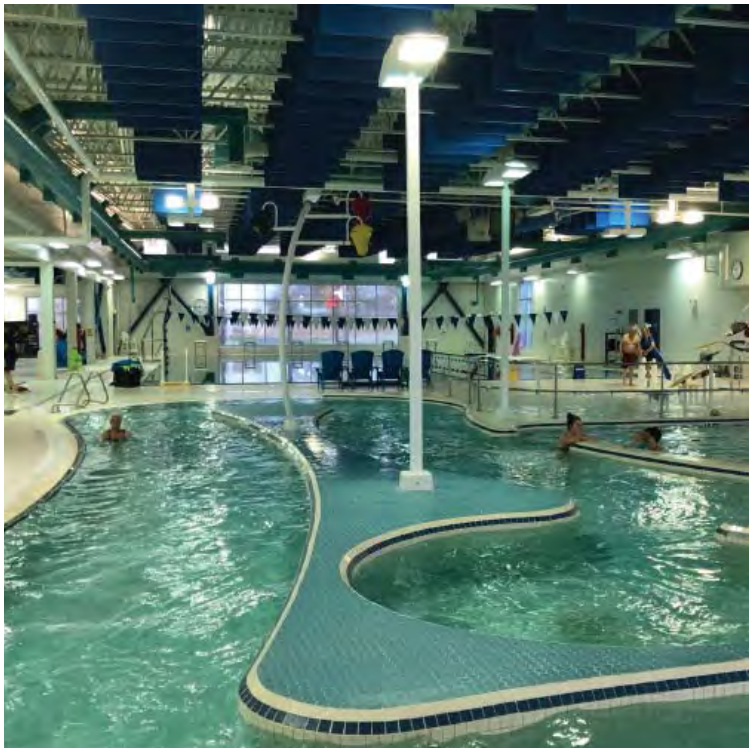
Given the variety of activities, the diverse expertise and skill sets of the team, the project and tasks were organized into twelve (12) Project Implementation Teams (PITs):

- Senior Management Team
- Project Management Team
- Pool Team
- Architectural/Envelope Team
- Mechanical Team
- Electrical Team
- Structural Team
- Site/Civil Team
- Energy Optimization Team
- Constructability/ Estimating Team
- Communication Team
- Building Information Modeling Team

Each team was led by a PIT Captain who managed the tasks undertaken by the team, presented information to the larger Aquatic Centre team as well as developing sprint plans, illustrating the tasks drawn from the overall project pull plan that would be completed in a two-week timeframe. The full team or significant portions of the team worked two days a week in the Big Room where PITs worked collaboratively on the project. When not located in the Big Room, the team members shared ideas and information using Yammer and Share Point.

TOURS

On October 7, 2019 the IPD Team along with Donna Wiltse, County Councillor, Bill Ballas, Town Councillor and Lana Holmes, Park Valley Pool Manager toured the Barrhead Regional Aquatic Centre and the Athabasca Aquatic Centre. The two aquatic centres were chosen as their programming is similar to the program proposed for the Drayton Valley and Brazeau Aquatic Centre. Both were recently built – Barrhead opened in 2017 and Athabasca in 2019. Both aquatic centres accommodate a six-lane lap pool, leisure pool, lazy river, hot tub and spectator area, with the Athabasca Aquatic Centre also including a water slide, sauna, community room and fitness centre. The tours were led by the facility managers and allowed the team to understand what was working well in the facilities, and what did not work well.



Barrhead Regional Aquatic Centre, Barrhead, AB

1.2 TEAM PROCESS

Left: Athabasca Indoor Pool, Athabasca AB
Right: Barrhead Regional Aquatic Centre, Barrhead, AB

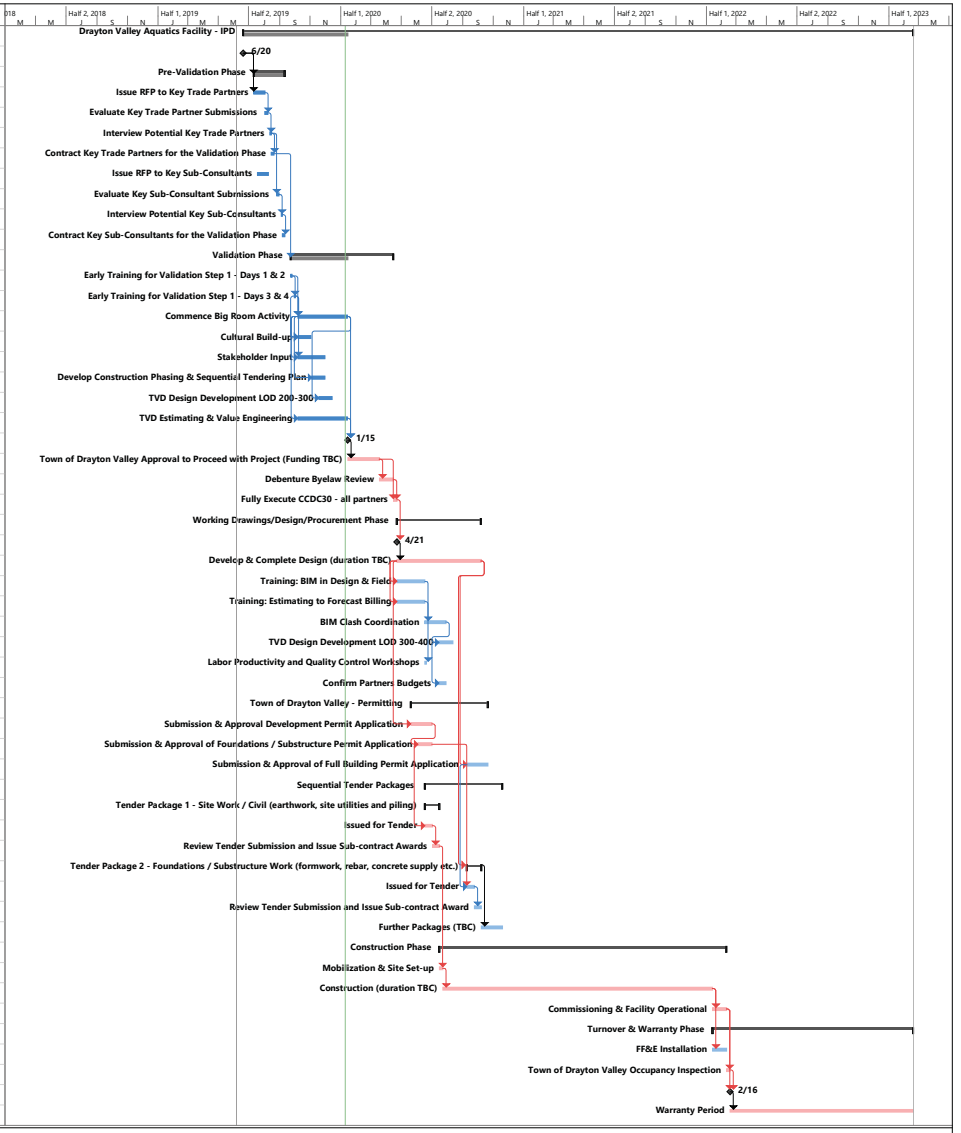
1.3 PROJECT SCHEDULE

The overall project schedule is based on the IPD team receiving a 'Go' / approval to proceed with the project from the Town of Drayton Valley and Brazeau County on **April 15, 2020**. Once this approval is in place, the team will immediately commence with the Design Implementation phase with the intent that all the required development and building permits will be in place so that the construction phase can start on July 16, 2020. The construction phase is 18 months in duration, the facility will be available for operation to the public by February 16, 2022.

**If approval to proceed with the project is received after April 15, 2020 the IPD team reserves the right to review the provided budgets and make any necessary adjustments that could be required due to rising inflation, escalation and seasonal timing impacts.*

Preliminary Master Schedule Option 1

ID	Task Mode	Task Name	Duration	Start
1		**Drayton Valley Aquatics Facility - IPD**	**946 days**	**6/20/2019**
2		Contract Award for General Contractor Services	0 days	6/20/2019
3		**Pre-Validation Phase**	**44 days**	**7/11/2019**
4		Issue RFP to Key Trade Partners	16 days	7/11/2019
5		Evaluate Key Trade Partner Submissions	4 days	8/2/2019
6		Interview Potential Key Trade Partners	3 days	8/12/2019
7		Contract Key Trade Partners for the Validation Phase	3 days	8/15/2019
8		Issue RFP to Key Sub-Consultants	16 days	7/18/2019
9		Evaluate Key Sub-Consultant Submissions	4 days	8/26/2019
10		Interview Potential Key Sub-Consultants	2 days	9/4/2019
11		Contract Key Sub-Consultants for the Validation Phase	3 days	9/6/2019
12		**Validation Phase**	**136 days**	**9/23/2019**
13		Early Training for Validation Step 1 - Days 1 & 2	2 days	9/23/2019
14		Early Training for Validation Step 1 - Days 3 & 4	2 days	9/30/2019
15		Commence Big Room Activity	60 days	10/7/2019
16		Cultural Build-up	20 days	10/7/2019
17		Stakeholder Input	40 days	10/7/2019
18		Develop Construction Phasing & Sequential Tendering Plan	20 days	11/4/2019
19		TVD Design Development LOD 200-300	20 days	11/18/2019
20		TVD Estimating & Value Engineering	60 days	10/7/2019
21		Submit Validation Report to Town of Drayton Valley for Approval	0 days	1/15/2020
22		**Town of Drayton Valley Approval to Proceed with Project (Funding TBC)**	**45 days**	**1/15/2020**
23		**Debenture Byelaw Review**	**20 days**	**3/18/2020**
24		Fully Execute CCDC30 - all partners	5 days	4/15/2020
25		**Working Drawings/Design/Procurement Phase**	**120 days**	**4/21/2020**
26		Co-location and Working Drawings to Commence	0 days	4/21/2020
27		Develop & Complete Design (duration TBC)	120 days	4/22/2020
28		Training: BIM in Design & Field	40 days	4/22/2020
29		Training: Estimating to Forecast Billing	40 days	4/22/2020
30		BIM Clash Coordination	30 days	6/17/2020
31		TVD Design Development LOD 300-400	20 days	7/15/2020
32		Labor Productivity and Quality Control Workshops	3 days	6/17/2020
33		Confirm Partners Budgets	10 days	7/15/2020
34		**Town of Drayton Valley - Permitting**	**110 days**	**5/20/2020**
35		Submission & Approval Development Permit Application	30 days	5/20/2020
36		Submission & Approval of Foundations / Substructure Permit Application	20 days	6/3/2020
37		Submission & Approval of Full Building Permit Application	30 days	9/9/2020
38		**Sequential Tender Packages**	**111 days**	**6/17/2020**
39		**Tender Package 1 - Site Work / Civil (earthwork, site utilities and piling)**	**21 days**	**6/17/2020**
40		Issued for Tender	11 days	6/17/2020
41		Review Tender Submission and Issue Sub-contract Awards	10 days	7/2/2020
42		**Tender Package 2 - Foundations / Substructure Work (formwork, rebar, concrete supply etc.)**	**21 days**	**9/9/2020**
43		Issued for Tender	11 days	9/9/2020
44		Review Tender Submission and Issue Sub-contract Award	10 days	9/24/2020
45		Further Packages (TBC)	30 days	10/8/2020
46		**Construction Phase**	**410 days**	**7/16/2020**
47		Mobilization & Site Set-up	5 days	7/16/2020
48		Construction (duration TBC)	385 days	7/23/2020
49		Commissioning & Facility Operational	20 days	1/13/2022
50		**Turnover & Warranty Phase**	**287 days**	**1/13/2022**
51		FF&E Installation	20 days	1/13/2022
52		Town of Drayton Valley Occupancy Inspection	5 days	2/10/2022
53		Client Occupancy	0 days	2/16/2022
54		Warranty Period	262 days	2/17/2022



Preliminary Master Schedule Option 1

Critical · Critical Split · Critical Progress · Task · Split · Task Progress · Manual Task · Start-only · Finish-only · Duration-only · Baseline · Baseline Split · Baseline Milestone · Milestone · Summary Progress · Summary · Manual Summary · Project Summary · External Tasks · External Milestone · Inactive Task · Inactive Milestone · Inactive Summary · Deadline

2.0
PROJECT OVERVIEW

2.1 PROJECT TEAM

The project team is a multi-disciplinary team for this project, as outlined in the project matrix. We would like to thank the leadership of the following key team members with whom we worked most closely for their vision and dedication to the project:

Town of Drayton Valley
Annette Driessen
Lana Holmes

Brazeau County
Lee Chambers

Chandos Construction
Colin Rigney
David Owen
Jen Hancock
Harry Hansen
Dominic Ries
Caitlyn Phillips
Vincent Plourd
Hunter Etherington

Group2 Architecture Interior Design Ltd.
Craig Webber
Troy Smith
Doug Ramsey
Dorian Reisner
Wanda Melnyk-Harms
Andrea Ruether
James Simpson

Read Jones Christofferen Ltd.
Jeff Rabinovitch
Fran Yungwirth

Arrow Engineering
Bill Bartelds
Reggie Nicolas
Glen Tichkowsky

WSP Engineering
Michael Jackson
Arshia Ahmed
Darren Otto
Daniel Tyrkalo

Master Pools
Blair Dary
Lawrence Dary

Priority Mechanical
Michael Henderson
Derek Matter
Rej Boutin
Scott McNeill

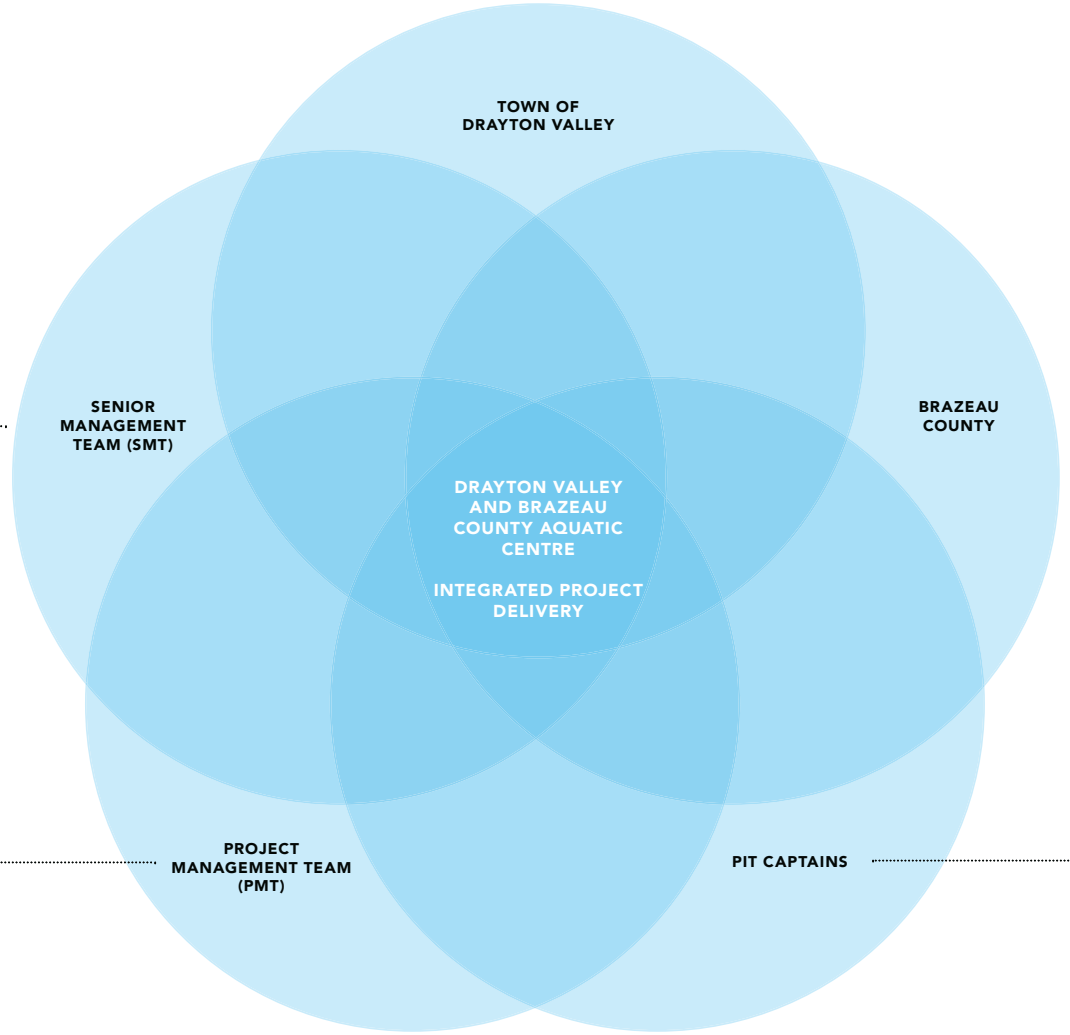
AltaPro Electric Ltd.
Bert De Bruin
Drew Yeoman
Jason Jeglum
Shawn Warren

Stantec
Jeff Rent
Sam Lane

Spartan Steel
Dale Tam
Daniel Sousa

XMG Flooring
Chris Uchman

ORGANIZATIONAL CHART



Colin Rigney
Craig Webber
Mike Jackson
Bert De Bruin
Jeff Rabinovitch
Bill Bartelds
Michael Henderson
Annette Driessen
Jeff Rent
Blair Dary
Chris Uchman
Dale Tam

David Owen
Troy Smith
Annette Driessen
Arshia Ahmed
Michael Henderson

Architectural
Doug Ramsey

Pool
Blair Dary

Mechanical
Michael Henderson

BIM
Vince Plourd

Site/Civil
David Owen

Electrical
Drew Yeoman

Constructibility and Estimating
David Owen

Net Zero Energy
Sam Lane

Lean
Glen Tichkowsky

Communications
Caitlyn Phillips

Structure
Fran Yungwirth

2.2 DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE CONCEPT

The IPD team reviewed two available sites adjacent to the Drayton Valley Omniplex (Omniplex) and Holy Trinity Academy for the new Drayton Valley and Brazeau Aquatic Centre (Aquatic Centre). After completing test fits on the two sites and reviewing the opportunities and challenges of both sites the team concluded that the site located north of the Omniplex was preferred as it is a 'green field' site with area to allow for future expansion. The preferred site is located on a vehicular corner which allows for two access points to the site and provides for a convenient access and fire truck access to the main entrance to the facility.

The Town of Drayton Valley and Brazeau County directed the IPD team to plan a Net Zero energy facility accommodating a six lane 25m lap pool, leisure pool/lazy river, hot tub, steam room, provision for a future water slide and pool support spaces including a community room. The two councils identified a budget of $18.5 million. Over 12 weeks the IPD team worked towards this goal.

The IPD team assessed the viability of achieving net zero energy operations at the aquatic centre. Various technologies and systems were reviewed by the team, including ground source heat exchange, photovoltaic panels, and thermal energy recovery from the nearby Omniplex arena. The high process loads, project budget, available site area, and concerns surrounding operational energy cost proved challenging to the net zero energy target. It became evident that meeting Net Zero energy criteria would not be possible within the $18.5 million budget. Instead, the team focused on energy optimization to create a facility that would cost less to operate than the existing Park Valley Pool and meet the 2017 National Energy Code for Buildings (NECB). The project has been designed to be ready to accommodate photovoltaic panels on the roof of the natatorium.

The IPD team developed a base design that would first address the budget limitations and provide as much of the program elements that were identified by the two Councils. The base design which is titled '6 Lane Option 1' achieves the energy requirements and provides a 6 lane lap pool, leisure pool/lazy river, hot tub, steam room, necessary support spaces including a community room but does not provide area for a future water slide. The total area of the proposed Aquatic Centre is 2,560 square meters or 27,554 square feet. For further detail refer to the functional program section of the report. It was concluded by the team that a reasonable bather load for the facility was 320 bathers. This number was used to size the dressing rooms and support spaces.

The team also explored alternate options for the natatorium space that included a six lane pool option with the provision for the future water slide (6 Lane Option 2), an eight lane pool option without the provision for the future water slide (8 Lane Option 1) and an eight lane pool option with the provision for the future water slide (8 Lane Option 2). The required support spaces did not change as the bather load for the six lane options and the eight lane options remain at 320 bathers. The estimate costs for the options are as follows:

6 LANE POOL

Option 1: $20,317,408

Option 2: $20,620,762

8 LANE POOL

Option 1: 20,923,315

Option 2: $21,241,319

The Aquatic Centre is designed with the natatorium having a higher volume and the support spaces located along the west side of the natatorium having a lower volume. This allowed the natatorium/pool area to have a higher ceiling to accommodate various pool features such as a climbing wall, basket ball hoops, spray features and the future water slide. The differing heights of the natatorium and the support spaces allowed the IPD team to locate the two air handling units on the roof, along with a return air duct. This greatly reduced the area required for the mechanical room resulting in cost savings. The mechanical room accommodates the boilers and pumps. Efficient design of the mechanical room allowed the incorporation of electrical room equipment in the space.

The pool mechanical room will be located in a basement area adjacent to the lap pool and the deck between the lap pool and the leisure pool/lazy river for the efficient location of the surge tanks and distribution of the supply and return water piping from the pools to the UV water treatment and filtration systems. The location under the deck allows for the installation of lane rope baskets which saves space on the pool deck and storage room as well as being a convenient way to store the lane ropes.

2.2 DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE CONCEPT

The team has specified defender filters which utilize perlite material for the filters instead of sand. The perlite material is finer than sand and is more efficient in filtering smaller particulate from the pool water than sand. The perlite material weighs less than sand which is an advantage when switching out the material. The team also included an UV water treatment which further filters the pool water and adds to the clarity of the water.

The Aquatic Centre design provides for a floor hatch and electrical hoist system to move material and equipment in and out of the basement pool mechanical room.

The team was judicious in the selection of materials and finishes recognizing the impact that this can have on the project budget. That being said it is recognized that the finishes need to be durable for easy maintenance so that the facility operations and maintenance budgets are kept down. The IPD team is designing a 30 to 50 year facility. In the natatorium and dressing rooms where there is water and high humidity levels ceramic tile, epoxy paint and corrosion resistant materials are used. In the support spaces materials such as vinyl sheet flooring and painted drywall are used.

The facility will have a concrete slab on grade under the pool support spaces including the entrance, community room, reception, administration, dressing rooms, pool storage and mechanical/electrical room. The natatorium main floor will consist of concrete structural slabs. The geotechnical report indicates the potential for high ground water to be present within the depths of the pool basins. Weeping tile will be installed under the basin slabs in order to eliminate the uplift effects from groundwater and around the perimeter of the pools to avoid the buildup of hydrostatic pressure on the pool walls.

The facility's super structure will be steel columns, beams, open web steel joists with metal decking spanning between the joists. The roof structure of the natatorium has been designed to support photovoltaic panels.

The mechanical system will be designed to maintain comfortable conditions in the pool areas, dressing rooms and other public spaces while taking into consideration the high humidity levels in the natatorium and dressing rooms. The ventilation rates will be adjusted accordingly for the various spaces to ensure patron and staff comfort.

Wherever possible energy saving and water saving devices will be utilized on the mechanical equipment and fixtures. Low flow basins, low flow showers, single flush low flow water closets and low flow sinks will be utilized. Energy conservation measures include heat recovery on the 100% outdoor air system, hydronic heating system with cascading temperatures to maximize condensing and efficiencies, minimum 95% efficient condensing boilers and high efficiency motors.

The building will be sprinklered.

Sustainable strategies also have been implemented in the electrical systems design in the Aquatic Centre. As indicated, the 2017 NECB will be met or exceeded on the project. Electrically this primarily applies to lighting and lighting controls. NEBC limits the allowable energy used for lighting based on the building size and type and requires lighting controls be implemented to ensure lighting is only on when necessary.

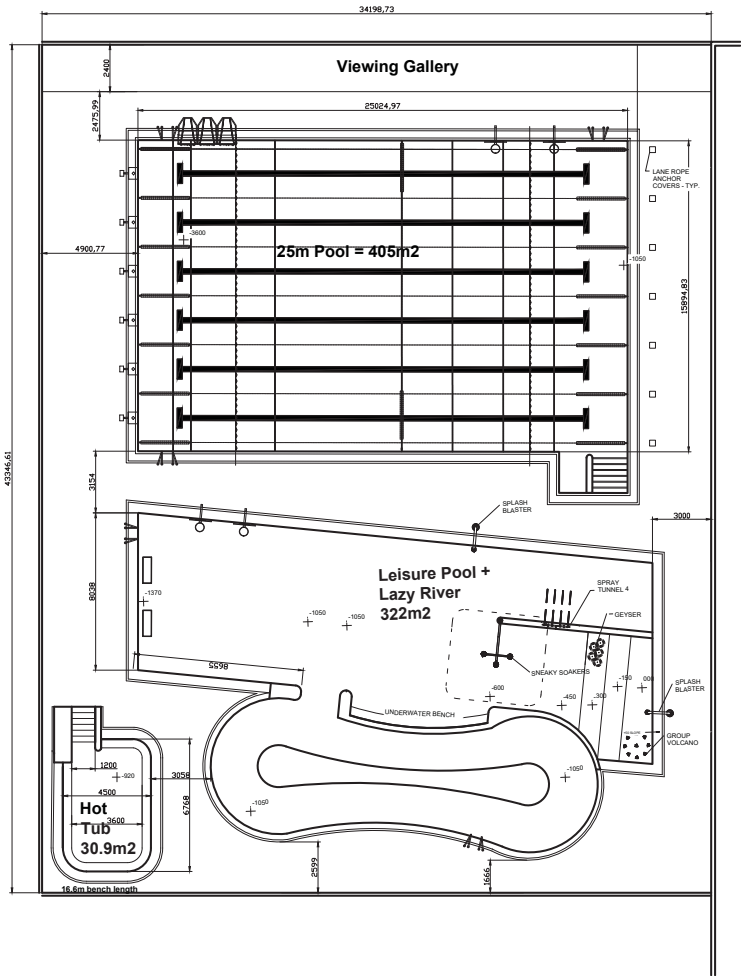
The lighting in the natatorium will meet the requirements of Swim Alberta. LED light fixtures will be utilized throughout the facility which are more energy efficient than fluorescent fixtures. LED light fixtures have the added benefit that they can be dimmed. The interior lighting is to be controlled by occupancy/vacancy sensors and limited timed controls to ensure lighting operates only when required. Daylighting, particularly in the natatorium, will be implemented to dim or turn off lighting where sufficient natural lighting is available to light the space.

The electrical PIT worked with the pool PIT and mechanical PIT to employ measures to assist in minimizing energy consumption. For example, motor and pump operation is to be controlled by the use of variable frequency drives (VFDs) to maximize the efficiency of the system operating the equipment at necessary speeds.

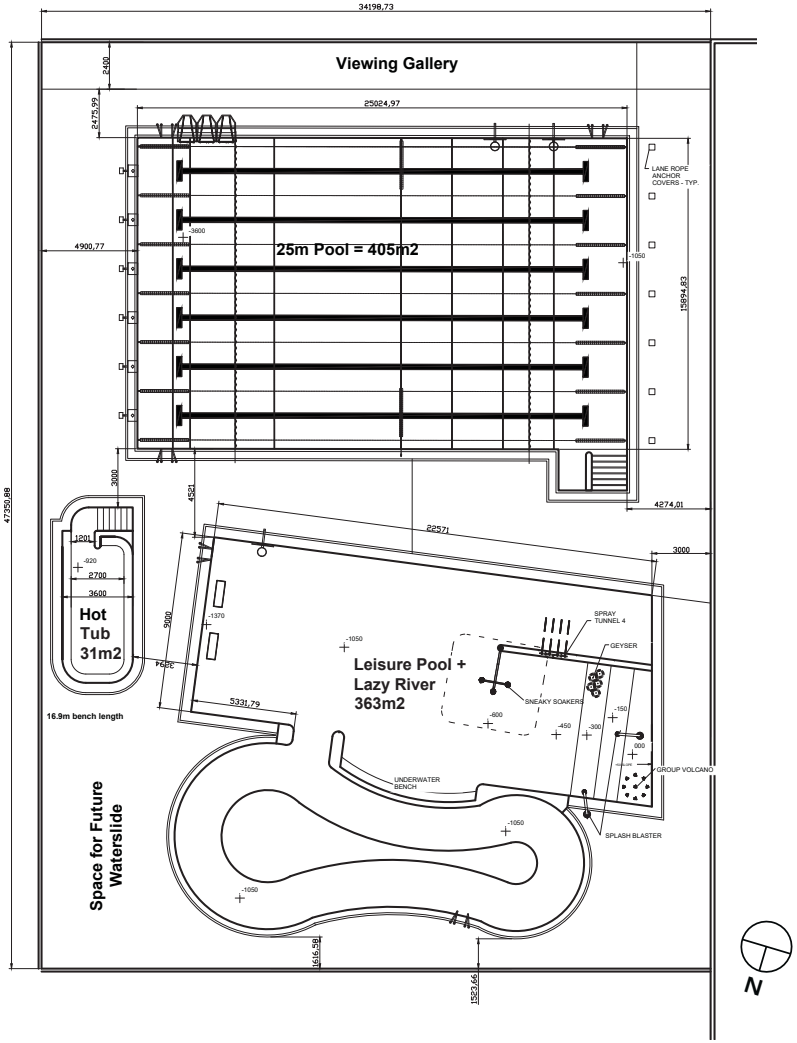
Provisions for a future 300kW photovoltaic system is to be provided as part of the base building and include conduit between the proposed PV cell locations on the roof and the proposed location of the new electrical room. A prepared space in the main distribution panel will be allocated for solar input.

In addition to a public address system a local sound system rough-in will be provided to allow for hi-fidelity music to be played in the pool areas.

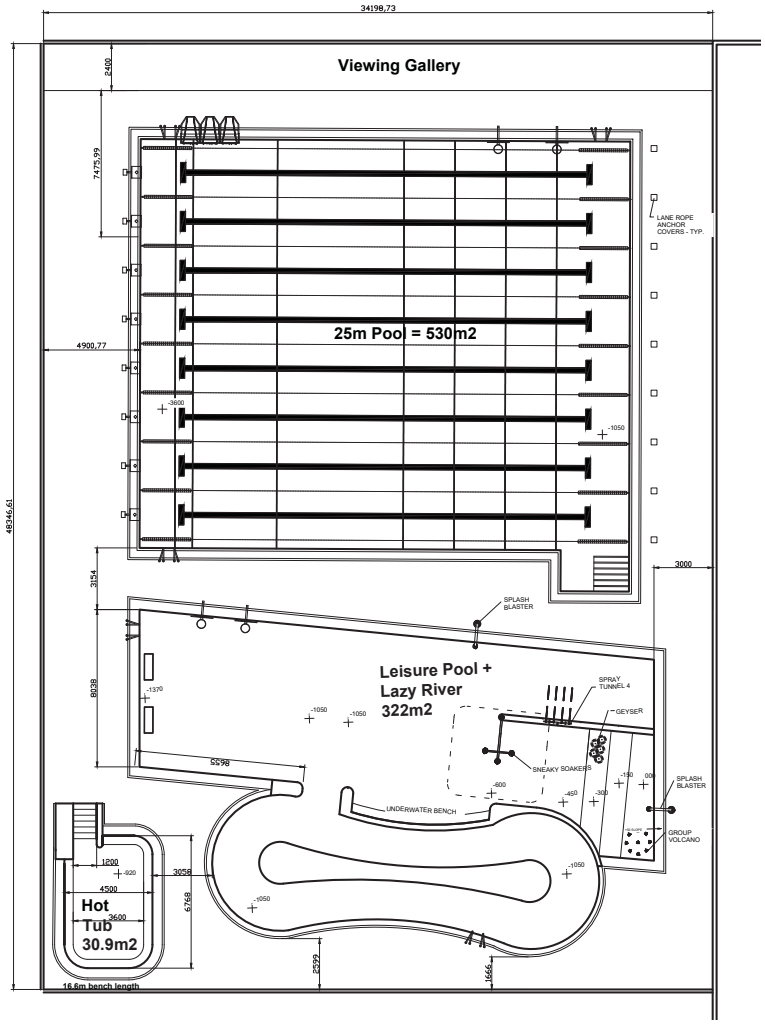
DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE
6 LANE OPTION 1



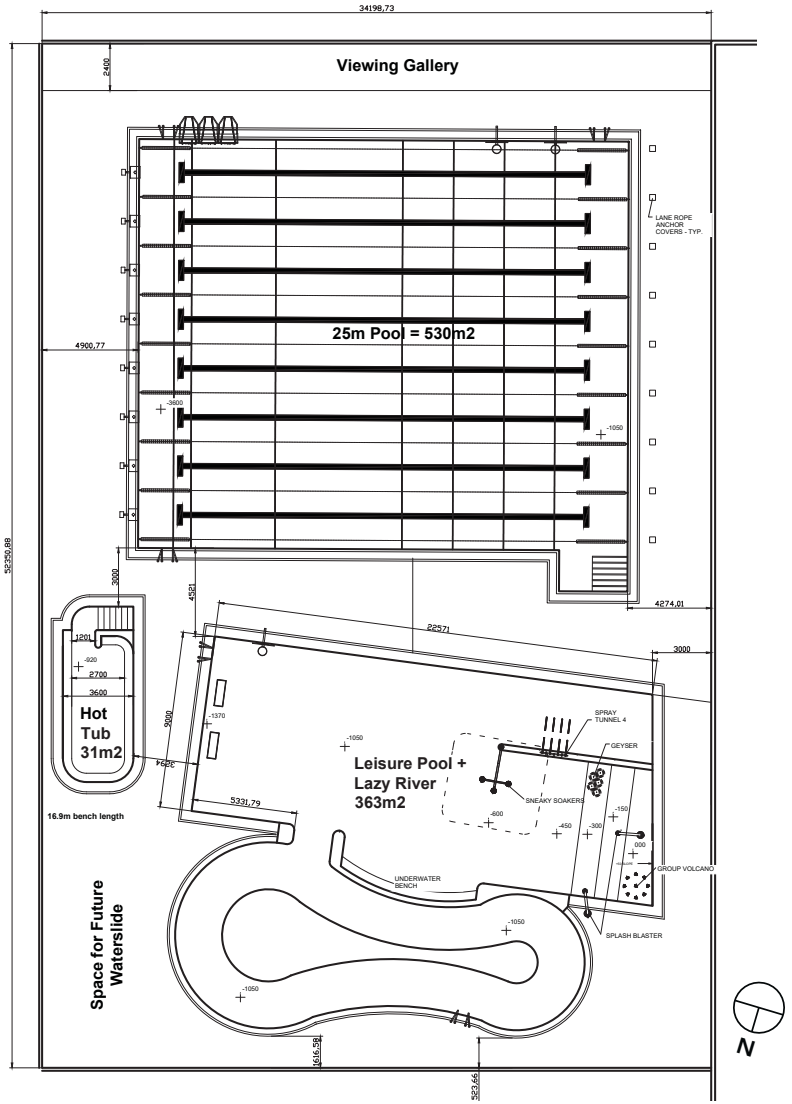
DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE
6 LANE OPTION 2



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE
8 LANE OPTION 1



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE
8 LANE OPTION 2



2.3 CONCEPT OF AQUATIC CENTRE OPERATIONS

NEW AQUATIC FACILITY BUDGET

The current Park Valley Pool in Drayton Valley is in its 35th year of operation and has exceeded its intended lifespan. As the only public swimming pool for the Drayton Valley and Brazeau Community, the facility is an integral component to the sport and recreation needs of the community. The pool provides programming for all segments of the community including young children and families, competitive swimmers, seniors and special needs populations.

With only 5 lanes and a combined lap pool and leisure swim tank, the Park Valley Pool no longer meets the needs of the community. Current demands from the public and community groups require additional space and time that is not offered by the existing facility.

6 LANE

The aquatic programming for a new 6-lane facility will stay relatively the same as the programming in the existing Park Valley Pool. The extra lane would facilitate additional time and space for lane swimmers. The leisure pool and lazy river would complement the current programming outline. An extension of the operational hours would optimize the utilization of a new 6-lane aquatic centre. Remaining operational until 10 pm from Monday to Friday would result in 1.5 to 2 extra hours per day, thereby having minimal impact on the operational budget. For Saturdays and Sundays, an extension of operational hours to 10pm would see an increase of 6 hours per day, generating a significant impact to the operating budget, both on the revenue and expenditure side. Following the first year of operations, these hours would be adjusted as the attendance figures stabilize.

8 LANE

An 8 lane lap pool with separate leisure pool would give result in numerous opportunities for new and exciting programs and multiple programs running simultaneously. Running multiple programs requires additional staff to be on shift to meet programming needs.

Also, this design allows for public entering the facility to swim throughout the day. This would increase the staffing budget significantly. This change requires an additional lifeguard on deck for all operational hours. Additionally, the 8-lane design allows lane-swimmers to have access to the pool throughout the day.

8 LANE REVENUE

The 8-lane design requires additional staffing to cater to the increased volume of patrons at given times in the pool schedule. Offsetting the increase in staffing is the potential for increased revenue generation. The 8-lane design allows the community to host competitive swim meets (almost exclusively the only time an aquatic centre generates a surplus). The hosting of swim meets also benefits the community by providing a source of income to hotels, restaurants, service stations and retail outlets. The 8-lane design presents opportunities to run multiple programs, swim meets, competitions, fitness programs, advanced swimming, lifesaving skills and recreational “fun” programs. Overall, a municipal aquatic centre is a meeting place for the community. It provides a welcoming place for all residents to enjoy.

PARK VALLEY POOL - HISTORICAL OPERATING BUDGET

Account	Description	2017		2018		2019
		Budget	Actual	Budget	YTD - 2018/11/29	Proposed Budget
72	PV Pool					
POOL - REVENUE						
1-1-405-72-20	SALES-VENDING-POOL	(6,000.00)	(7,695.10)	(8,000.00)	(7,997.49)	(8,240.00)
1-1-406-72-20	SALES-COMMODITIES-POOL	(17,360.00)	(13,281.23)	(15,500.00)	(10,887.49)	(15,965.00)
1-1-420-72-20	PROGRAM FEES-POOL	(57,500.00)	(49,894.15)	(50,000.00)	(50,171.33)	(60,000.00)
1-1-421-72-20	PROGRAM FEES-GST EXEMPT-POOL	(118,602.75)	(95,404.95)	(117,500.00)	(93,849.80)	(110,000.00)
1-1-422-72-20	PROGRAM-AQUASIZE-POOL	(18,200.00)	(10,594.50)	(18,000.00)	(9,956.95)	(12,000.00)
1-1-423-72-20	PROGRAM-PUBLIC SWIM-POOL	(58,870.00)	(43,877.26)	(55,000.00)	(47,894.22)	(58,000.00)
1-1-424-72-20	PROGRAM-SCHOOLS-POOL	(45,675.00)	(47,267.30)	(50,000.00)	(45,739.60)	(58,000.00)
1-1-560-72-20	RENTAL REVENUE-POOL	(30,000.00)	(25,004.22)	(30,000.00)	(19,424.27)	(30,000.00)
1-1-830-72-20	FEDERAL COND. GRANTS-POOL	-	(24,087.90)	-	-	-
1-1-840-72-20	PROV GRANTS - POOL	-	(23,412.10)	-	-	-
1-1-850-72-20	LOCAL GOVT COND. GRANTS-POOL	(289,905.69)	(321,401.39)	(296,232.45)	(225,931.08)	(295,000.00)
		(642,113.44)	(661,920.10)	(640,232.45)	(511,852.23)	(647,205.00)
POOL - EXPENSES						
1-2-120-72-20	SALARIES & WAGES-POOL	572,892.44	605,965.58	652,010.56	604,713.64	665,000.00
1-2-121-72-20	BENEFITS-POOL	96,986.20	106,504.78	114,675.02	106,593.64	120,000.00
1-2-240-72-20	PROF & GEN SERV-SUPPORT SERV	5,300.00	87,483.10	20,000.00	13,639.69	20,000.00
1-2-241-72-20	PROF&GEN SERV-LEASE EQUIP-POOL	4,060.00	3,917.43	4,500.00	387.40	4,500.00
1-2-242-72-20	PROF & GEN SERV-COMM SERV-POOL	1,218.00	-	500.00	243.47	500.00
1-2-243-72-20	PROF & GEN SERV-COURIER-POOL	2,000.00	1,285.24	850.00	1,837.22	850.00
1-2-244-72-20	PROF & GEN SERV-ADV/PROMO-POOL	2,000.00	638.15	1,200.00	1,292.30	1,200.00
1-2-245-72-20	PROF & GEN SERV-STAFF TRAINING	12,000.00	7,558.05	15,000.00	7,680.90	10,000.00
1-2-250-72-20	REPAIRS & MAINTENANCE - POOL	-	233.00	-	-	-
1-2-251-72-20	REP & MAINT-ELECTRICAL-POOL	59,700.00	48,386.85	20,000.00	10,578.65	15,000.00
1-2-252-72-20	REP & MAINT-MECHANICAL-POOL	38,295.00	51,796.92	30,000.00	25,084.42	27,500.00
1-2-253-72-20	REP & MAINT-STRUCTURAL-POOL	86,048.40	91,001.37	40,000.00	28,578.37	37,500.00
1-2-270-72-20	INS LIC & CLAIMS -POOL	5,175.00	5,886.38	5,200.00	6,362.80	6,500.00
1-2-510-72-20	GENERAL SUPPLIES-SUPPORT SERV	5,075.00	6,049.55	7,000.00	2,585.44	4,000.00
1-2-511-72-20	SUPPLIES-OFFICE-POOL	14,000.00	8,912.53	5,500.00	3,506.81	5,500.00
1-2-512-72-20	SUPPLIES-JANITORIAL-POOL	9,000.00	8,323.30	9,000.00	5,753.42	8,000.00
1-2-513-72-20	SUPPLIES-OTHER-POOL	5,700.00	3,401.81	5,000.00	4,262.07	5,000.00
1-2-514-72-20	SUPPLIES-VENDING-POOL	3,700.00	5,830.75	5,000.00	4,266.67	5,000.00
1-2-515-72-20	SUPPLIES-MARKET MATERIALS-POOL	2,000.00	2,871.31	1,900.00	2,348.68	1,900.00
1-2-516-72-20	SUPPLIES-CHEMICALS-POOL	8,000.00	4,484.84	8,000.00	10,034.02	10,000.00
1-2-517-72-20	SUPPLIES-COMMODITIES-POOL	10,800.00	6,353.88	11,300.00	8,029.96	11,300.00
1-2-518-72-20	SUPPLIES - PROGRAM - POOL	35,500.00	34,033.49	30,000.00	24,648.22	30,000.00
1-2-540-72-20	UTILITIES - SUPPORT SERVICES	-	-	-	6,226.54	-
1-2-541-72-20	UTILITIES-ELECTRICITY-POOL	40,000.00	31,944.11	38,000.00	37,516.68	40,000.00
1-2-542-72-20	UTILITIES-GAS-POOL	35,000.00	31,588.62	32,000.00	40,215.72	35,000.00
1-2-544-72-20	UTILITIES - WATER - POOL	20,000.00	22,528.39	25,000.00	20,015.84	25,000.00
		1,074,450.04	1,176,979.43	1,081,635.58	976,402.57	1,089,250.00
NET		432,336.60	515,059.33	441,403.13	464,550.34	442,045.00

NEW AQUATIC FACILITY OPERATING BUDGET NUMBERS

REVENUE		6 Lane		8 Lane		Year 3	
Account	Description	First Year	Second Year	First Year	Second Year	6 Lane	8 Lane
1-1-405-72-20	Sales - Vending	$ 18,000.00	$ 16,000.00	$ 21,000.00	$ 19,000.00	$ 15,000.00	$ 18,000.00
1-1-406-72-20	Sales - Commodities	$ 20,000.00	$ 18,000.00	$ 21,000.00	$ 19,000.00	$ 17,000.00	$ 18,000.00
1-1-420-72-20	Program Fees	$ 75,000.00	$ 66,000.00	$ 90,000.00	$ 80,000.00	$ 65,000.00	$ 75,000.00
1-1-421-72-20	Program Fees - GST Exempt	$ 140,000.00	$ 130,000.00	$ 165,000.00	$ 155,000.00	$ 125,000.00	$ 150,000.00
1-1-422-72-20	Program - Aquasize	$ 20,000.00	$ 20,000.00	$ 32,000.00	$ 30,000.00	$ 20,000.00	$ 30,000.00
1-1-423-72-20	Program - Public Swim	$ 75,000.00	$ 75,000.00	$ 100,000.00	$ 85,000.00	$ 70,000.00	$ 80,000.00
1-1-424-72-20	Program - Schools	$ 55,000.00	$ 55,000.00	$ 55,000.00	$ 55,000.00	$ 55,000.00	$ 55,000.00
1-1-560-72-20	Rental Revenue	$ 55,000.00	$ 45,000.00	$ 65,000.00	$ 55,000.00	$ 42,500.00	$ 52,500.00
1-1-730-72-20	Federal Uncond. Grants	$ -	$ -	$ -	$ -	$ -	$ -
1-1-830-72-20	Federal Cond. Grants	$ -	$ -	$ -	$ -	$ -	$ -
1-1-840-72-20	Provincial Grants	$ -	$ -	$ -	$ -	$ -	$ -
1-1-850-72-20	Local Govt Cond. Grants	$ 340,000.00	$ 340,000.00	$ 340,000.00	$ 340,000.00	$ 340,000.00	$ 340,000.00
	TOTAL:	**$ 798,000.00**	**$ 765,000.00**	**$ 889,000.00**	**$ 838,000.00**	**$ 749,500.00**	**$ 818,500.00**
EXPENSES		**6 Lane**		**8 Lane**		**Year 3**	
Account	Description	First Year	Second Year	First Year	Second Year	6 Lane	8 Lane
1-2-120-72-20	Salaries and wages	$ 789,050.00	$ 743,150.00	$ 879,371.00	$ 833,471.00	$ 743,150.00	$ 833,471.00
1-2-121-72-20	Benefits	$ 157,810.00	$ 148,630.00	$ 175,874.00	$ 166,694.00	$ 148,630.00	$ 166,694.00
1-2-240-72-20	Prof & Gen - Support	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00
1-2-241-72-20	Prof & Gen - Lease Equip.	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00
1-2-242-72-20	Prof & Gen - CommServ.	$ 500.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00
1-2-243-72-20	Prof & Gen - Courier	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
1-2-244-72-20	Prof & Gen - Adv/Promo	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
1-2-245-72-20	Prof & Gen - Staff Training	$ 20,000.00	$ 15,000.00	$ 20,000.00	$ 15,000.00	$ 12,000.00	$ 12,000.00
1-2-250-72-20	Repairs & Maintenance	$ -	$ -	$ -	$ -	$ -	$ -
1-2-251-72-20	Rep & Maint - Electrical	$ 10,000.00	$ 13,000.00	$ 10,000.00	$ 13,000.00	$ 10,000.00	$ 13,000.00
1-2-252-72-20	Rep & Maint - Mechanical	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00
1-2-253-72-20	Rep & Maint - Structural	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00
1-2-270-72-20	Ins. Lic. & Claims	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
1-2-510-72-20	General Supplies - Support	$ 7,500.00	$ 7,500.00	$ 7,500.00	$ 7,500.00	$ 7,500.00	$ 7,500.00
1-2-511-72-20	Supplies - Office	$ 6,500.00	$ 6,000.00	$ 7,000.00	$ 6,500.00	$ 6,000.00	$ 6,500.00
1-2-512-72-20	Supplies - Janitorial	$ 13,000.00	$ 13,000.00	$ 13,000.00	$ 13,000.00	$ 13,000.00	$ 13,000.00
1-2-513-72-20	Supplies - Other	$ 6,000.00	$ 5,500.00	$ 7,000.00	$ 6,500.00	$ 5,500.00	$ 6,500.00
1-2-514-72-20	Supplies - Vending	$ 11,250.00	$ 10,000.00	$ 12,500.00	$ 11,250.00	$ 10,000.00	$ 11,250.00
1-2-515-72-20	Supplies - Market Material	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
1-2-516-72-20	Supplies - Chemicals	$ 12,000.00	$ 12,000.00	$ 14,000.00	$ 14,000.00	$ 12,000.00	$ 14,000.00
1-2-517-72-20	Supplies - Commodities	$ 14,285.00	$ 12,600.00	$ 14,285.00	$ 12,600.00	$ 10,625.00	$ 10,625.00
1-2-518-72-20	Supplies - Program	$ 40,000.00	$ 30,000.00	$ 40,000.00	$ 35,000.00	$ 30,000.00	$ 35,000.00
1-2-540-72-20	Utilities - Support Services	$ 2,200.00	$ 2,200.00	$ 2,200.00	$ 2,200.00	$ 2,200.00	$ 2,200.00
1-2-541-72-20	Utilities - Electricity	$ 40,000.00	$ 40,000.00	$ 53,000.00	$ 53,000.00	$ 40,000.00	$ 53,000.00
1-2-542-72-20	Utilities - Gas	$ 35,000.00	$ 35,000.00	$ 47,000.00	$ 47,000.00	$ 35,000.00	$ 47,000.00
1-2-544-72-20	Utilities - Water	$ 25,000.00	$ 25,000.00	$ 33,500.00	$ 33,500.00	$ 25,000.00	$ 33,500.00
	TOTAL:	**$ 1,265,095.00**	**$ 1,194,080.00**	**$ 1,411,730.00**	**$ 1,345,715.00**	**$ 1,186,105.00**	**$ 1,340,740.00**
	TOTAL OVER/UNDER:	**$ (467,095.00)**	**$ (429,080.00)**	**$ (522,730.00)**	**$ (507,715.00)**	**$ (436,605.00)**	**$ (522,240.00)**

Staffing cost lowered second and third year due to anticipated drop in attendance. (Shortened operational hours)

NEW AQUATIC FACILITY SCHEDULE (6 Lane)

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE
6:30am	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	Closed		Closed	Closed
7:00am														
7:30am														
8:00am	Gentle Aqua, 1 Lane Available		Deep Water Fit, 1 Lane Available		Gentle Aqua, 1 Lane Available		Deep Water Fit, 1 Lane Available		Gentle Aqua, 1 Lane Available					
8:30am														
9:00am	Shallow Water Fit, 1 Lane Available	Preschool Lessons	Mommy & Me Aqua	Preschool Lessons	Shallow Water Fit, 1 Lane Available	Preschool Lessons	Mommy & Me Aqua	Preschool Lessons	Shallow Water Fit, 1 Lane Available	Equivilent to Parent Link	Triathlon Club	Baby Triathlon Club	Advanced Classes	Mommy & Me Warm Aqua
9:30am														
10:00am	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	All Lanes Available		Red Cross Lessons	Preschool Lessons		
10:30am														
11:00am													High Intensity Aqua	Warm Yoga
11:30am														
12:00pm	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim
12:30pm														
1:00pm	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	School Lessons	All Lanes Available	Special Groups	Special Event Leisure Swim		Leisure Swim	
1:30pm														
2:00pm														
2:30pm														
3:00pm	Home School	Home School Lessons	Private Lessons	Private Lessons	Home School	Home School	Private Lessons	Private Lessons	Home School	Home School				
3:30pm														
4:00pm	Swim Clubs	Junior Swim Clubs	Swim Clubs	Junior Swim Clubs	Swim Clubs	Junior Swim Clubs	Swim Clubs	Junior Swim Clubs	Synchro and/or Other Pool Programs	Birthday Bash Rental				
4:30pm														
5:00pm														
5:30pm														
6:00pm	Red Cross Lessons	Preschool Lessons	Aqua Zumba	Instructional Walking Class	Aqua Bike	Preschool Lessons	Deep Water Fit	Instructional Walking Class	Open Swim, Sponsored Swim Time, Rentals Available		Dedicated Family Swim		Drop in Kayak	Instructional Walking Class
6:30pm														
7:00pm	Adult Lessons	Recreational Therapist	Step Aerobics	Warm Yoga	Paddle Board Yoga	Recreational Therapist	High Intensity Aqua	Warm Yoga			Lane Pool	Open Swim	Lanes	Open Swim
7:30pm														
8:00pm	Kayak	Open Swim & River Walking	Open Swim	Open Swim & River Walking	Open Swim	Open Swim & River Walking	Open Swim	Open Swim & River Walking			Adults Only		Water Polo	
8:30pm														
9:00pm	Lanes		Lanes		Lanes		Lanes						Lanes	Lazy River Walking
9:30pm														

Hot tub and steam room are open during any lane, leisure or fitness class

NEW AQUATIC FACILITY SCHEDULE (8 Lane)

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE	MAIN	LEISURE
6:30am	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	All Lanes Available	Lazy River Walking	Closed		Closed	Closed
7:00am														
7:30am														
8:00am	Gentle Aqua, Cross Fit Training , 2 Lane available		Gentle Aqua, Cross Fit Training , 2 Lane available		Gentle Aqua, Cross Fit Training , 2 Lane available		Gentle Aqua, Cross Fit Training , 2 Lane available		Gentle Aqua, Cross Fit Training , 2 Lane available					
8:30am														
9:00am	Shallow Water Fit,Deep Water Jog, 2 Lanes Available	Preschool Lessons	Mommy & Me Aqua	Preschool Lessons	Shallow Water Fit,Deep Water Jog, 2 Lanes Available	Preschool Lessons	Mommy & Me Aqua	Preschool Lessons	Shallow Water Fit,Deep Water Jog, 2 Lanes Available	Equivalent to Parent Link	Triathlon Club	Baby Triathlon Club	Advanced Classes	Mommy & Me Warm Aqua
9:30am														
10:00am	School Lessons, 2 Lanes Available	School Lessons, Instructional Walking class	School Lessons, 2 Lanes Available	School Lessons, Instructional Walking class	School Lessons, 2 Lanes Available	School Lessons, Instructional Walking class	School Lessons, 2 Lanes Available	School Lessons, Instructional Walking class	School Lessons, 2 Lanes Available		Red Cross Lessons	Preschool Lessons		
10:30am														
11:00am													High Intensity Aqua	Warm Yoga
11:30am														
12:00pm	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim	Lane Pool	Open Swim
12:30pm														
1:00pm	School Lessons, 2 Lanes Available	School Lessons	School Lessons, 2 Lanes Available	School Lessons	School Lessons, 2 Lanes Available	School Lessons	School Lessons, 2 Lanes Available	School Lessons	All Lanes Available	Special Groups	Inflatable Obstacle Leisure Swim		Leisure Swim	
1:30pm														
2:00pm														
2:30pm														
3:00pm	Home School, 2 Lanes Available	Home School Lessons	Private Lessons, Stroke Correct, 2 lanes	Private Lessons	Home School, 2 Lanes Available	Home School	Private Lessons, Stroke Correct, 2 lanes	Private Lessons	Home School, 2 Lanes Available	Home School				
3:30pm														
4:00pm	Swim Clubs, Red Cross lessons, 2 Lanes Available	Tiny People Swim Clubs	Swim Clubs, Red Cross lessons, 2 Lanes	Tiny People Swim Clubs	Swim Clubs, Red Cross lessons, 2 Lanes Available	Tiny People Swim Clubs	Swim Clubs, Red Cross lessons, 2 Lanes Available	Tiny People Swim Clubs	Synchro and/or Other Pool Programs, 2 Lanes Available	Birthday Bash Rental				
4:30pm														
5:00pm														
5:30pm														
6:00pm	Cross fit, adult lessons, 2 Lanes	Preschool Lessons	Aqua Zumba, 2 Lanes	Instructional Walking Class	Aqua Bike, 2 Lanes	Preschool Lessons	Deep Water Fit, Cross Fit, 2 Lanes	Instructional Walking Class	Open Swim, Sponsored Swim Time, Rentals Available		Dedicated Family Swim		Drop in Kayak, 2 Lanes	Instructional Walking Class
6:30pm														
7:00pm	Paddle board Cardio, 2 Lanes	Recreational Therapist	Step Aerobics, Cross Fit, 2 Lanes	Warm Yoga	Paddle Board Yoga, 2 Lanes	Recreational Therapist	High Intensity Aqua, 2 Lanes	Warm Yoga			Lane Pool	Open Swim	Lanes	Open Swim
7:30pm														
8:00pm	Kayak, 2 Lanes	Open Swim & River Walking	Leisure Swim	Open Swim & River Walking	Leisure Swim	Open Swim & River Walking	Leisure Swim	Open Swim & River Walking			Adults Only		Water Polo	
8:30pm														
9:00pm	Lanes		Lanes		Lanes		Lanes						Lanes	Lazy River Walking
9:30pm														

Hot tub and steam room are open during any lane, leisure or fitness class

2.4 VALIDATION STRATEGY

The Big Room process for Drayton Valley and Brazeau Aquatic Centre IPD.

Once the full project team was assembled and after the results of the sub-consultant and sub-trade RFPs were finalized, the team commenced work on the Validation Phase on September 23, 2019. Four days of training were undertaken to provide team members with the tools required to successfully collaborate throughout the phase. After the training was completed, which included the development of the validation phase schedule / pull-plan, the team agreed on a 12-week duration which detailed all the tasks that were required to be completed in readiness to submit the validation report to the Town of Drayton Valley for the Go / No-go decision to move to the next phase (design implementation). The team decided to co-locate at the Chandos office in Edmonton, where the big room was provided at no cost to the project. The team met in the big room every Monday and Tuesday, usually for full-days (agendas were set weekly for the following week). Based on historical data from previous projects completed of similar size and nature, Chandos developed a validation phase budget that totaled $525,000.00 that was distributed amongst all the team partners – based on the tasks and durations shown in the 12-week pull-plan / schedule. This budget included all team member's costs, overhead and profit per the information that was submitted by each team member in response to the Town of Drayton Valley's RFPs (profit would be off-set from this phase once the project gets the Go to proceed; if the project does not get the Go to proceed then all profit will be paid out to each of the partners).

During the validation phase, the team took all available information and began exploring solutions while following the validation timeline noted. This was a combination of work both in and out of the big-room, performed by both small interdisciplinary teams, such as PITs, and by individual stakeholder contributors in a mix of charrette-like activity and more traditional work. The design evolved and information was organized with an eye toward the end goals of the validation process (i.e., what "done" looks like). Validation is not compressed schematic design; the end goal was certainty for the IPD team members and the Town of Drayton Valley and Brazeau County. The team constantly researched the most effective ways to achieve the necessary certainty with the minimum investment of time and resources at this phase.

The team started out with a Base Target Cost of $22M, as was noted in the Town of Drayton Valley RFP, which was then reduced to $18.5M after meeting with the Town of Drayton Valley and Brazeau County councils on the evening of October 7, 2019.

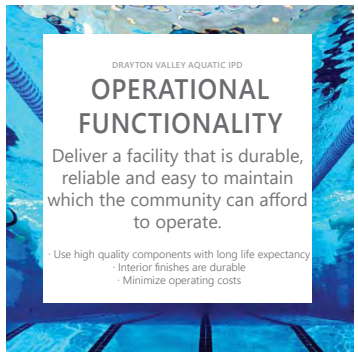
2.5 DRAYTON VALLEY AQUATIC TEAM CORE VALUES

Values were established by the IPD team at the project outset. They are posted on the wall of the Big Room to serve as a constant reminder of the team's agreed values. These values are used to help guide decisions and team behaviours.

DRAYTON VALLEY AQUATIC IPD
FUN
Foster an environment where everyone is excited to work together collaboratively.
· Positive energy in the room
· Celebrate wins
· Positive survey results

DRAYTON VALLEY AQUATIC IPD
COLLABORATION
We create an environment of open and inclusive communication to achieve shared values and obtain an optimal project outcome.
· No break downs in communication
· Meeting project values
· We are being open and transparent

DRAYTON VALLEY AQUATIC IPD
TRUST & RESPECT
Create a team culture that supports an open and honest environment where team members feel safe to engage in productive conflict.
· Always bring a positive attitude
Encourage all team member participation
Active listening

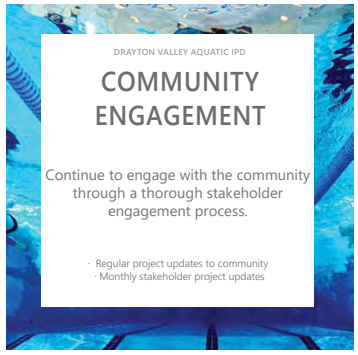

DRAYTON VALLEY AQUATIC IPD
OPERATIONAL FUNCTIONALITY
Deliver a facility that is durable, reliable and easy to maintain which the community can afford to operate.
· Use high quality components with long life expectancy
· Interior finishes are durable
· Minimize operating costs

DRAYTON VALLEY AQUATIC IPD
FIT FOR PURPOSE
We will incorporate the needs of the greater community in the aquatic facility design with consideration of future programming.
· Optimize functionality for both leisure and competitive; increases facility usage
· The design results in user satisfaction

DRAYTON VALLEY AQUATIC IPD
NET ZERO TARGET
The renovation of the DVABAC will be energy efficient and sustainable, promoting longevity and maintainability.
· Percentage of building consumption generated on site
· Net zero using a wholistic approach / integrated systems
· Post-construction performance evaluation

DRAYTON VALLEY AQUATIC IPD
LEGACY
Our project creates a sense of pride within the community and team, and promotes the success of the IPD process.
· Community usage
· Showcase IPD
· Awards

DRAYTON VALLEY AQUATIC IPD
PROJECT FUNDING
Secure funding to ensure project completion


DRAYTON VALLEY AQUATIC IPD
COMMUNITY ENGAGEMENT
Continue to engage with the community through a thorough stakeholder engagement process.
· Regular project updates to community
· Monthly stakeholder project updates

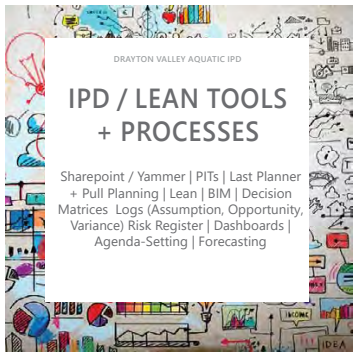
DRAYTON VALLEY AQUATIC IPD
PROFITABILITY
The team meets or exceeds their financial expectations after a thorough validation process and through to warranty.
· Transparent costing, estimation and forecasting
Real time accurate cost updates

DRAYTON VALLEY AQUATIC IPD
SCHEDULE
Project is completed on or ahead of schedule
· Milestones are met
· Identify schedule conflicts and provide resolution
· Identify critical path and use accurate pull planning throughout design and construction
· Accountability to meet deliverables in a timely fashion

DRAYTON VALLEY AQUATIC IPD
QUALITY
We will achieve a high standard of design and construction quality with minimal need for rework.
· Minimize RFIs and COs
· Durable product, suitable material quality for the facility type
· Minimize wasteful rework, both design and construction

DRAYTON VALLEY AQUATIC IPD
SAFETY
Zero lost time incidents.
· Positive regular audits
· Encourage reporting of near misses and incidents

DRAYTON VALLEY AQUATIC IPD
INNOVATION + CONTINUOUS IMPROVEMENT
We will innovate as a team by being open to new ideas and perspectives. We will approach project challenges embracing new ideas in the design and construction of the facility.
· Lean in design and construction
· Create a pathway for aquatic design innovation
· Highest level of creativity from team.
· Learn new and unique ways to build


DRAYTON VALLEY AQUATIC IPD
IPD / LEAN TOOLS + PROCESSES
Sharepoint / Yammer | PITs | Last Planner + Pull Planning | Lean | BIM | Decision Matrices Logs (Assumption, Opportunity, Variance) Risk Register | Dashboards | Agenda-Setting | Forecasting

3.0
DESIGN NARRATIVES

3.1 ARCHITECTURAL

PROJECT GOALS AND OBJECTIVES

The Owner Group, consisting of the Town of Drayton Valley and Brazeau County, formed a crucial part of the IPD Team which met biweekly to ensure decisions made aligned with the project goals. The Town representative kept the Owner Group advised of issues raised and decisions being made in the Big Room. The County representative attended the Big Room as required.

As a group, the IPD Team evaluated two sites for the location of the new Aquatic Centre located near the Drayton Valley Omniplex and Holy Trinity Academy Catholic School. The Town and County requested the IPD Team consider the addition of future recreation venues to the Aquatic Centre when reviewing the potential sites. In addition, the is required to accommodate additional parking to supplement the Omniplex parking.

The Town of Drayton Valley does not have zoning or bylaw requirements for parking associated to recreation facilities. The design team has applied the City of Edmonton Parking requirements to the project and has allowed for 46 additional parking stalls. The site development will also include a passenger drop off and fire truck zone in front of the new Aquatic Centre.

There are two sites under consideration for the new Aquatic Centre. The proposed south site is located between the Omniplex and Holy Trinity Academy. The other proposed site is located on the north side of the Drayton Valley Omniplex parking lot, on the existing baseball diamond adjacent to the rodeo grounds and rugby field. The Team assessed the pros and cons of the two sites to determine the preferred site.

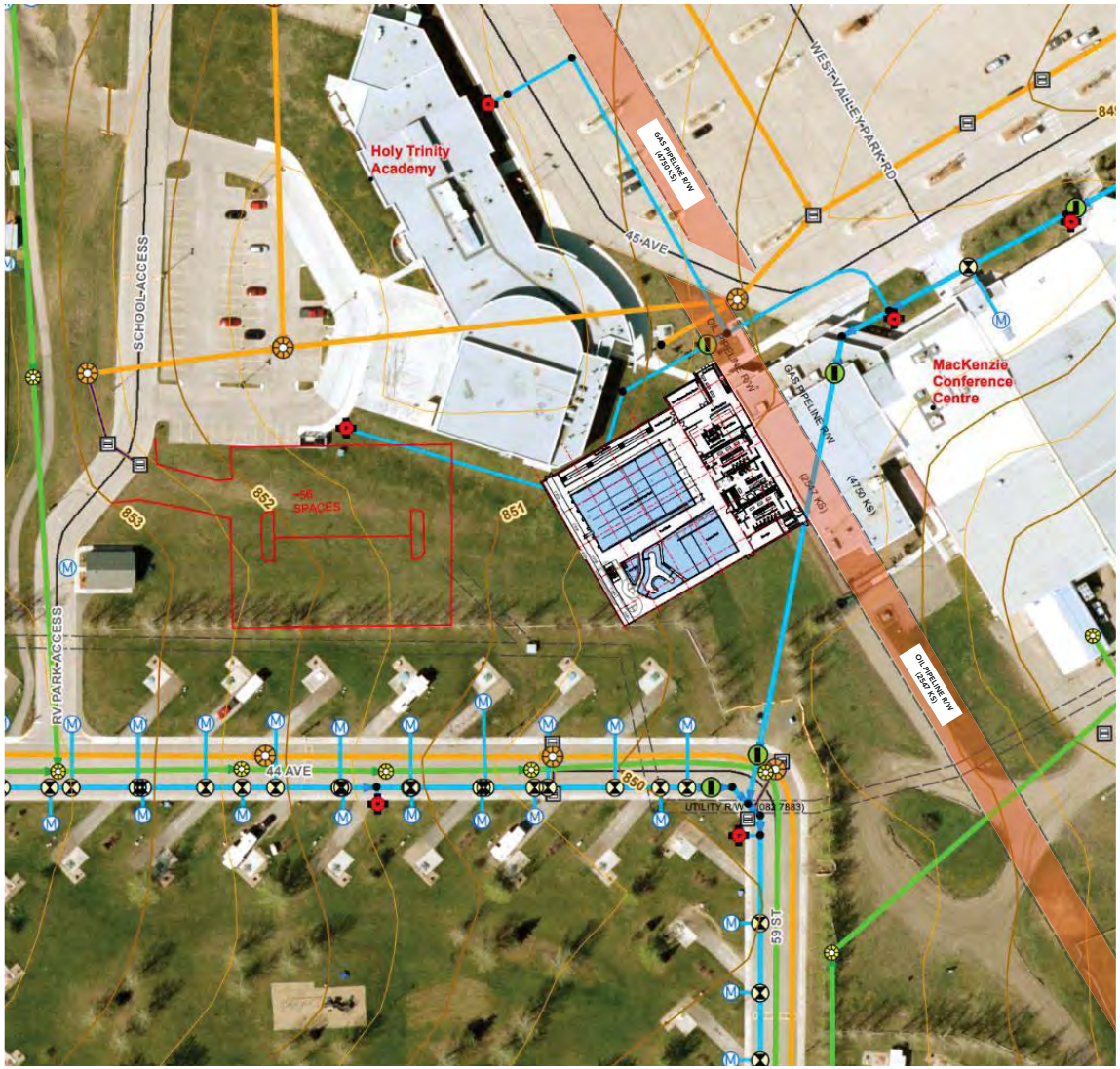
Valley
y Field
NORTH
SITE
49 Ave
45 Ave
45 Ave
Omniplex
Holy Trinity Academy
SOUTH
SITE
Drayton Valley RV Park
Weycan Dr
Weycan Dr

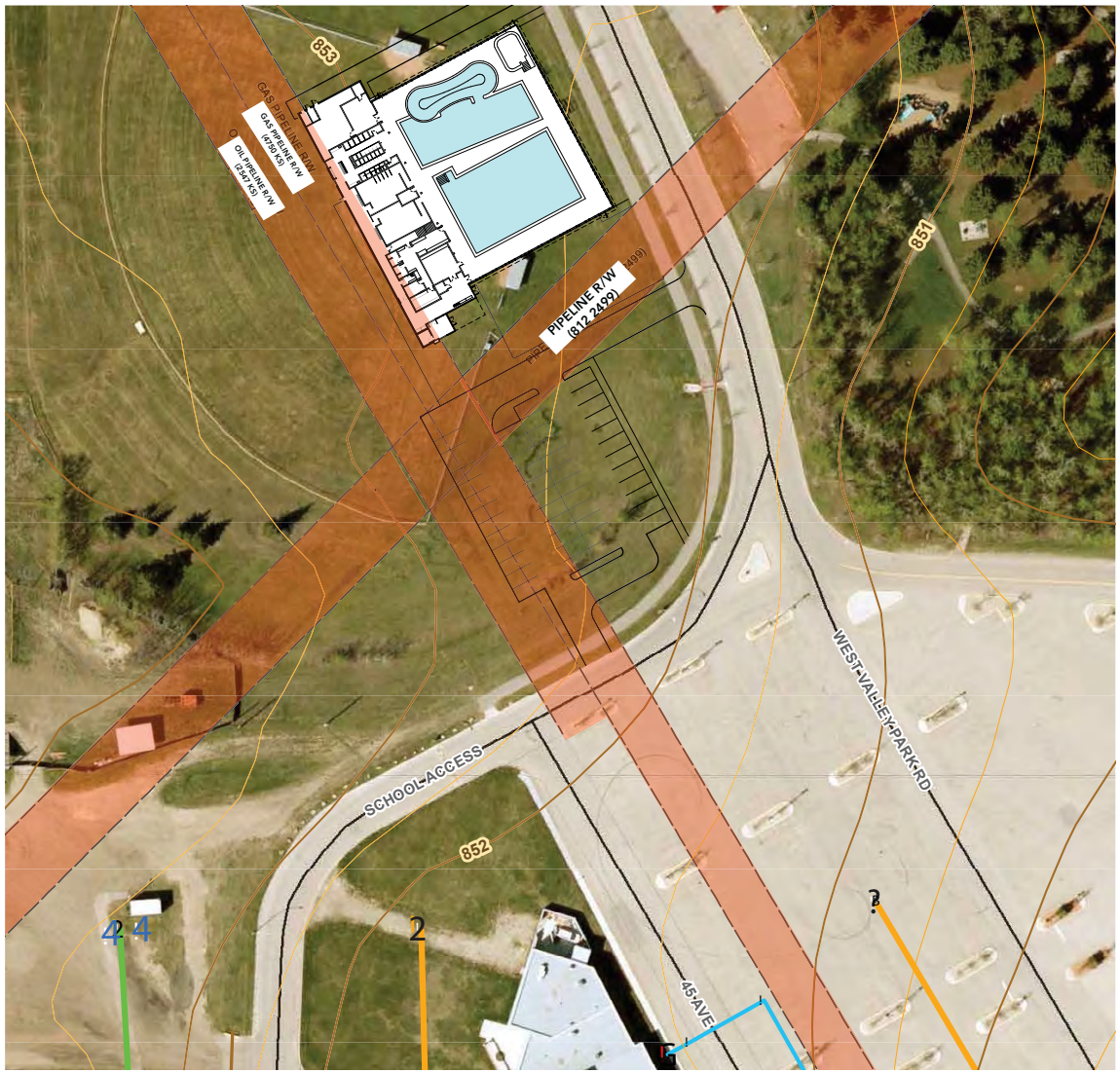
South Site Pros:

- The new Aquatic Centre could physically link the Omniplex/Conference Centre with Holy Trinity Academy.
- The physical adjacency would allow direct programmatic synergies.
- The new Aquatic Centre could utilize and extend the existing service lanes located on the back of the Omniplex.

South Site Cons:

- The constricted site between the two existing buildings would set restrictions on the design of the Aquatic Centre.
- There is insufficient area on the site to accommodate future recreation venues.
- The 47 parking stalls would be located in the playing area/green space on the south side of the school.
- The adjacency to the Conference Centre and school will create issues for the contractor in the construction of the aquatic centre.
- Potential underpinning of existing building foundations.
- Limited swing space for steel erection.
- Limited lay down space for the contractor and trades.
- The construction will present a hazard to pedestrian traffic which the contractor will need to accommodate.
- Location of the Aquatic Centre on the south site will be more expensive.





North Site Pros:

- The site has sufficient area to accommodate future recreation venue additions, 46 parking stalls, passenger drop off and fire truck zone
- The Aquatic Centre could be positioned to face two streets which improves site access for vehicles and fire trucks
- The site is a green field site and is not affected by adjacent buildings which provides laydown space for the contractor
- The majority of the Aquatic Centre can be constructed on undisturbed soil.

North Site Cons:

- There are two abandoned pipelines located on the site. The new Aquatic Centre needs to be located on the site to avoid the pipeline right of ways so that it can be constructed on undisturbed soil
- The site is located across the parking lot from the Omniplex, making direct program synergies and pedestrian access between the facilities more difficult
- The baseball diamond will need to be replaced.

3.1 ARCHITECTURAL

The IPD team was tasked with designing an Aquatic Centre accommodating a six lane 25 meter pool, a leisure pool complete with lazy river, a whirlpool/hot tub, steam room, space for a future water slide and support facilities such as dressing rooms and staff areas. Also the IPD Team is to provide the Town and the County with the optional cost to expand the six lane 25 meter lane pool to eight lanes.

As part of its analysis and design the IPD Team is to explore the possibility that the project could achieve Net Zero energy while respecting the identified budget and schedule. Net Zero energy was to consider ground source heat pumps, photovoltaic panels, upgraded building envelope, mechanical and electrical systems. At minimum the building will need to meet the 2017 National Energy Code for Buildings (NECB) requirements for building envelope and energy consumption as per the National Building Code - Alberta Edition. The design will employ sustainable construction techniques as well as utilization of sustainable materials and finishes. The structure of the natatorium and the electrical systems have been designed to accommodate photovoltaic panels either as a part of this project or in the future.

PLANNING OBJECTIVES

The Aquatic Centre needs to be designed so that future recreation venues could be added to the facility. The building is sited so that other facilities can be added to take advantage of the facility's main entrance, reception area and dressing rooms.

The natatorium is to accommodate a six lane 25 meter lane pool, a leisure pool complete with lazy river, a whirlpool/hot tub, steam room and space for a future water slide. Space for spectators will also be provided in the space. The IPD Team made safety and ease of supervision a design priority. The natatorium will have a steel structure that spans the width of the space eliminating the need for columns which pose barriers to surveillance of the pool by lifeguards. Daylighting of the pool area was carefully considered as windows and direct sunlight can cause glare on the water and blind spots. The design utilizes a fiberglass wall system (Kalwall or equivalent) that allows for diffused natural light and cuts down on glare. The location of the lane pool, leisure pool/lazy river and whirl pool/hot tub take into consideration sightlines for life guarding. The future water slide location also considers sight lines and is located in the back corner so as not to obstruct views of the pools and deck areas. Clear sight lines and ease of surveillance is not only a safety issue but also an operational function as fewer lifeguards are required. The steam room will be located off the pool deck between the male and female dressing rooms. On deck showers will be provided to allow pool patrons to utilize the steam room, shower and return to the pools. The pool storage is located adjacent to the leisure pool/lazy river for convenient access to equipment and toys. The storage room also includes a chemical storage area.

The Lifeguard Room is designed with direct access to the pool deck with large windows providing a second level of supervision. The Lifeguard Room accommodates a first aid area and allows access for first responders through the reception area or pool deck. The Lifeguard Room includes space for 6 lifeguards/instructors to complete lesson plans and paperwork.

It was concluded that the Aquatic Centre would have a posted bather load of 320 bathers. This number is used to calculate dressing room sizes as well as washroom and shower head counts. Due to the number of families utilizing the Aquatic Centre the IPD Team designed the Family Change Area to be larger than the female and male dressing rooms. The project will include a Community Room but will not include a fitness facility. The Community Room located adjacent to the reception area has access to the pool deck so that it can be used for children's parties, community events as well as lifesaving and staff seminars. The Aquatic Centre will follow Swim Alberta requirements so that the facility can host swim meets. This includes consideration for the accommodation of swimmers and officials on the pool deck, and bleacher space for spectator seating.

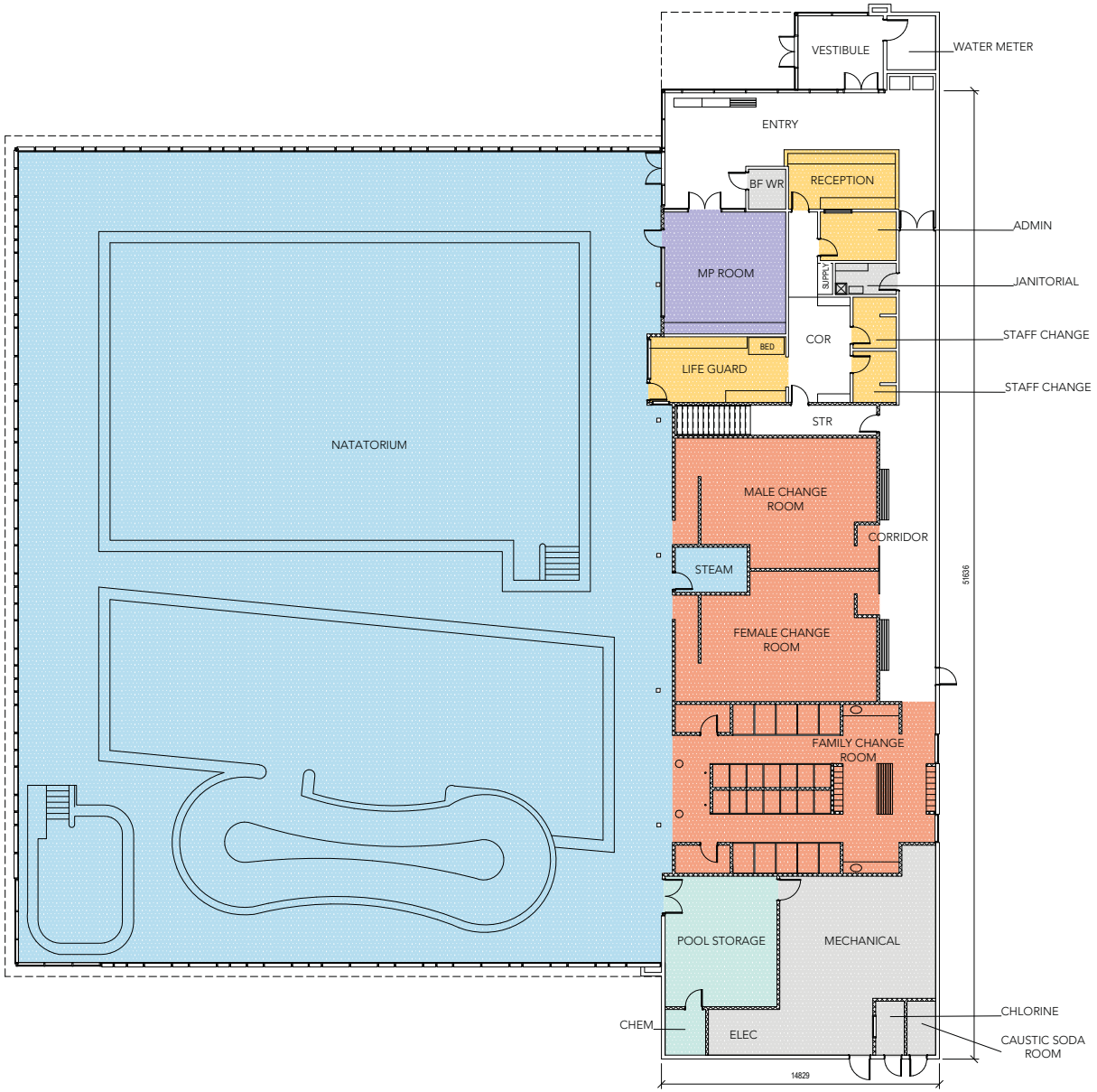
The entrance has adequate area to allow for the removal and storage of boots. The reception desk is designed to provide supervision of the entrance while acting as a control point for access to the dressing rooms, community room, spectator space in the Natatorium, and the back of house administration space, including the staff change rooms. The reception desk will also provide retail services.

The single loaded corridor along the south west side of the facility provides access to the male, female and family dressing areas. Any additional recreation venues would be added on the south west side of the corridor allowing for shared use of the main entrance, reception and dressing rooms.

The mechanical equipment for the pools is located in a basement area located along the south west side of the lane pool. The access to the pool mechanical room is by a staircase which is accessible from the corridor connecting the dressing rooms or from the administration space by a door adjacent to the Lifeguard Room. This allows pool staff convenient access to the pool mechanical room from the staff areas and access for maintenance staff from the corridor. The design includes a floor hatch on the main floor with a mechanical hoist to allow movement of bags of media for the filters and equipment.

The mechanical/electrical room is located on the north west side of the main floor. The mechanical/electrical room accommodates the boilers, water heaters and pumps. In order to keep the floor area efficient the air handling units are located

FLOOR PLAN



Program Legend

- ADMINISTRATION
- CHANGE ROOM
- MULTI PURPOSE
- POOL
- POOL SERVICE
- CIRCULATION
- SERVICE

N

3.1 ARCHITECTURAL

on the lower roof above the administration area, dressing rooms and mechanical/electrical room. Access to the mechanical/electrical room is by a door in the storage room and a door on the exterior.

The chlorine room and caustic chemical storage are also located on the north west side of the building both with exterior door access adjacent to the mechanical/electrical room door. The chlorine room will have a window from the mechanical room so that the lifeguard staff can check chlorine levels without having to go outside into the chlorine room.

ARCHITECTURAL DESIGN ASSUMPTIONS

Architecture

- R28 Knight Wall System MFI D-Series Horizontal, with 6" outboard semi rigid, with cavity insulation
- Fibreglass wall system (Kalwall, Major Industries Guardian 275 or equivalent)
- Double pane glazing, thermally broken curtain wall system (Kawneer 1600 or equivalent)
- Roof
- SPS 2 ply R35
- Sloped structure
- Site works – single sidewalk on the east and south sides of the facility, asphalt on the north side for access to chlorine room and mechanical/electrical room
- Cladding, corrugated metal, standing seam metal (mixed widths), paint, lkme metal panels ("lkme" is a product name), and wood look metal soffit panels similar to a lux panel

Interiors

- Concrete block painted, natatorium
- Concrete block demising walls between the natatorium and the other spaces – paint finish
- Concrete block demising walls in dressing room areas, steam room (complete with pre-manufactured insert) pool storage, chemical storage, mechanical/electrical room, chlorine room and caustic chemical storage room – paint finish
- Steel stud gypsum wall board demising walls in community room, administration, barrier free washroom and janitor – paint finish
- Shower, washrooms (where required) ceramic wall tile
- Metal handrails, powder coat paint finish
- In-wall wood backing will be only in pre-determined locations

Millwork

- Reception desk and lifeguard desk to be millwork desk surface with furniture item rolling drawer units
- Reception area counter with lowers for storage along the west wall
- Reception counter is to include a cooler for ice cream and display for vendor items such as goggles, swim caps etc.
- Lifeguard room uppers for storage along south wall
- Lifeguard room first aid area uppers and lowers counter complete with sink north wall
- Community room lowers with storage complete with sink on west wall
- Dressing rooms, staff change rooms counters with lavatories
- Counters solid surface material

Doors and Hardware

- Doors from reception/entrance into dressing room corridor Kawneer aluminum glazed door
- Community Room Doors, hollow metal frames with metal doors complete with lite and side lite
- Administration area, office, lifeguard room hollow metal frames with lite for transparency/visibility
- Stair to pool mechanical, hollow metal frames with metal doors
- Family Dressing Room hollow metal frames with metal doors
- Pool storage, chemical storage, mechanical/electrical room hollow metal frames with metal doors
- Main entrance, chlorine room, caustic chemical room, mechanical/electrical room will require after hours access
- Doors to pool mechanical room, mechanical/electrical room will require card swipe

Glazing

- No Georgian wired glass

Ceilings

- Natatorium: painted exposed deck and structure complete with suspended acoustic panels
- Mechanical/electrical room and stair to pool mechanical room: exposed deck and structure
- Chlorine room and caustic chemical room: gypsum wall board
- Pool storage room and chemical room: painted exposed deck and structure
- Pool mechanical room: exposed concrete

3.1 ARCHITECTURAL

Athabasca Indoor Pool, Athabasca, AB

- Dressing Rooms, staff change rooms, barrier free washroom: painted gypsum wall board
- Acoustic T Bar Ceilings
  - Entry
  - Reception
  - Community room
  - Administration area
  - Lifeguard room
  - Corridor

Flooring

- Natatorium: ceramic tile and base, pool edge detail and depth indicators pre-manufactured tile
- Steam room, ceramic tile and base
- Storage room, chemical storage: sealed concrete
- Dressing rooms, staff change area: ceramic tile and base
- Front vestibule: vinyl sheet flooring, walk off matt (Tandas or equivalent), rubber base
- Entry, reception, corridor, barrier free washroom, corridor, administration: vinyl sheet flooring, rubber base
- Community room, lifeguard room, administration corridor: vinyl sheet flooring with anti-slip coating, rubber base
- Stair to pool mechanical room, pool mechanical room. Mechanical/electrical room, chlorine room, caustic chemical storage: sealed concrete

Lockers

- Dressing rooms, staff corridor: 180 metal double lockers on 12" base

Blinds

- By owner

3.1 ARCHITECTURAL

FIXTURES, FURNITURE AND EQUIPMENT

By owner, as follows:

Life Guard Room
- First aid cot and first aid cabinet
  - 2'x3' dimension
  - standing or mounted on wall

Staff Lockers
- Vertical lockers - 3 per stack - 24 lockers in total

Staff Change
- Minimum of one change room to have a shower and toilet
- Bench in change areas - wall hooks

Janitorial Room
- Floor sink
- Open shelves

Admin Area
- Desk and chair (alternative is a small table)
- Filing cabinet - lockable

Reception
- Reception counter
  - drawers as furniture item on either side of working area

Multi-Purpose Room
- Tables (x5)
- Chairs (x20)

Deck Bleachers
- 4 - 5 sets of portable stackable bleachers

Entry
- Benches
- Boot racks - enough for 50

Corridor
- 2 benches outside of change rooms

Supply Area in Admin
- Change to house photocopier

3.1 ARCHITECTURAL

BUILDING CODE SUMMARY

The building has been designed in accordance with the National Building Code - Alberta Edition.

Building Description New Aquatic Centre

Major Occupancy
Aquatic Centre Group A, Division 3 (NBC - AE 3.2.2.33)
Building Height One Storey

Building Area
Main Floor 2,415 m^2
Basement 186 m^2
Total **2,601 m^2**
Type of Construction Non Combustible
Sprinklered Yes

3.2.2.33. Group A, Division 3, One Storey, Sprinklered

1) A building classified as Group A, Division 3 is permitted to be of combustible construction or noncombustible construction used singly or in combination provided

- a) except as permitted by Sentences 3.2.2.7.(1) and 3.2.2.18 (2) the building is sprinklered throughout,
- b) it is not more than 1 storey in building height, and
- c) it has a building area not more than 7 200 m2

Fire Separations and Fire Resistance Ratings

Floors and supporting structure (NBC - AE 3.2.2.33)

- No fire separation except for floor assembly immediately above a basement requiring a fire resistance rating not less than 45 minutes.
- (Stairs and shafts penetrating floor separations require same rating as floor)

Roofs (NBC - AE 3.2.2.17)

- Not required (building is sprinklered).

Storage Rooms (NBC - AE 3.3.2.16)

- 1 hour fire separation.

Janitor Rooms (NBC - AE 3.3.1.21)

- Non-rated fire separation (building is sprinklered).

Mechanical Rooms (NBC - AE 3.6.2.1)

- 1 hour fire separation.

Chemical Rooms (NBC - AE 3.3.6.3. (2))

- Gas tight fire separation with a 1 hour fire resistance rating, located on an exterior wall.

Corridors (NBC - AE 3.3.2.6)

- Non-rated fire separation (building is sprinklered)

Main Floor Assembly over a basement (NBC - AE 3.2.1.4.(1))

- Floor assembly immediately above a basement to be constructed as a fire separation having a fire resistance rating not less than 45 minutes.

Aquatic Centre Population
Swimmers: 320 (posted)
Patrons: 24
Staff: 9
Total: 353
Per Sex: 177

Water Closets (NBC - AE 3.7.2.2.(6))

1 WC/45 males = 177/45 = 4 (4*0.66 = 2 could be urinals)
1 WC/25 females = 177/25 = 8

	Male	Female	Unisex	Total
Proposed Water Closets	4 WC & 4 (urinals)	8 WC	8	24
Code Requirement	4	8	--	12

CONCEPT RENDERING - SOUTH WEST FACADE

CONCEPT RENDERING - SOUTH EAST FACADE

3.2 POOLS

INTRODUCTION

This section of the report pertains to the pool mechanical systems and miscellaneous deck equipment, providing a design summary of that scope of work.

A specific project goal is to achieve Net Zero energy or near Net Zero energy usage. Aquatics facilities present challenges to this goal due to high amounts of thermal energy (water use and humidity) and electrical energy (pumping energy). To meet this goal, pool mechanical systems, equipment, and operational strategies have been selected that maximize energy efficiency, without compromising value, water quality, or operability.

CODE REFERENCE

The pool systems will be based on the following Codes, and Standards of Best Practice, at a minimum:

- Alberta Swimming Pool Standard (2017) – Code Reference
- National Building Code - Alberta Edition (OBC 2017) – Code Reference
- Model Aquatic Health Code (2015) – Best Practice Reference

POOLS SUMMARY

The facility is anticipated to contain 3 individual pools:

A **25m Pool** will feature 6 lanes, and be dimensioned and outfitted to suit regional (however not national or international) competition standards. It will feature a 'negative edge' or continuous gutter skimming edge design. It will feature a shallow end suitable for swimming lessons and general play, and deck mounted play accessories including basketball hoops. It will feature a deep end suitable for a climbing wall or diving board installation at a future time. An internal staircase and deck-mounted lift will allow access by those of limited mobility.

A **Leisure Pool** will be of fan-entry, zero-depth design increasing in depth, allowing ease of access and a variety of programming options across its depth cross-section, with a deep end sufficient for swimming lesson and play programming. It will feature a 'negative edge' or continuous gutter skimming edge design. It will feature a number of interchangeable and replaceable water features throughout and along its perimeter, and a prominent lazy river of variable speed for recreational and therapeutic use. The zero-depth entry will allow access by those of limited mobility.

Plumbing provisions will also be made for a future waterslide in 6 Lane Option 2 and 8 Lane Option 2, such that the pool concrete will not require interruption.

A **Whirlpool** will be of a narrow rectangular shape to maximize bench space. It will feature a 'negative edge' or continuous gutter skimming edge design. It will feature numerous hydro-therapy jets as well as a standing area. An internal staircase and mobile lift will allow access by those of limited mobility.

PARAMETER	25M POOL	LEISURE POOL	WHIRLPOOL
VOLUME	231 000 USG	79 000 USG	7200 USG
TURNOVER RATE	228 min / 3.8 hrs 360 min / 6 hrs night turndown	110 min / 1.8 hrs 180 min / 3 hrs night turndown	14 minutes
FLOWRATE	1013 USGPM	720 USGPM	514 USGPM
NIGHT TURNDOWN FLOWRATE	641 USGPM	438 USGPM	N/A
DESIGN BATHER LOAD	200 Bathers	100 Bathers	20 Bathers
TEMPERATURE (F)	72 F	86 F	104 F
HEAT UP TIME	72 hours	36 hours	6 hours

MECHANICAL ROOM AND SYSTEMS

Each pool will feature a separate and dedicated mechanical system with similar components and fundamentally similar principles of operation. The pool equipment will be housed in a basement mechanical space surrounding the pools -i.e. below water level (the exception being the gas chlorine and pH chemical rooms which will be on the main floor at the building exterior). This location improves hydraulic efficiency and ease of system startup and shut down.

3.2 POOLS

The various elements of the pool mechanical systems will be interlinked, controlled, and monitored through a DDC-based 'Pool Supervisory System'. This system will allow for:

- Ease of system startup/shutdown by operational staff
- Automatic detection of, response to, and operator notification for, equipment malfunctions
- Remote control of water features.
- BMS-style digital user interface
- Remote monitoring and some remote troubleshooting of pool equipment

PIPING AND CIRCULATION SYSTEMS

The piping systems will feature NSF 50/CSA Sch 80 PVC/CPVC piping and fittings. Thermoplastic valves selected for long term durability and ease of operation will be used.

Passive (PVC ring) or active (expanding chemical strip) waterstops will be used at all penetrations of watertight concrete structures.

Pipe supports and fasteners will be of stainless steel for all supports underground, and of plated steel for all mechanical room components.

Pool water return will be provided through main drains and gutter systems. All main drains will meet ANSI-7 assembly requirements and be installed to ANSI 7/National Building Code - Alberta Edition 2019 requirements (and be sized for both circulation and water feature flowrate requirements). Gutter systems will accomplish bather surge protection via a dedicated surge tank, or of a 'surge gutter' design. The leisure pool lazy river will also feature a 'rollout' gutter design to absorb any surge effect caused by water flow during river operation.

Pool water supply will be provided via floor and wall inlets distributed to ensure thorough water circulation.

WATER FEATURE CIRCULATION

Water feature and Whirlpool jets will use dedicated pumping systems separate from the pool filtration systems. They will draw water from the main drains of a given pool and supply it under pressure back into the pool, without treatment or heating. The water features will be zoned based on owner programming preference.

POOL CIRCULATION PUMPS

Each pool will feature a single circulation pump to minimize capital, energy, and maintenance cost. Catastrophic pump failures have proven exceedingly rare when properly protected electrically, and the availability of spare motors and rapid-response pump repair in Central Alberta make this a preferred option vs multiple/redundant pumps.

Circulation pumps will be of an end-suction/vertical discharge centrifugal design. All wetted parts including the impellor will be epoxy coated for long term durability. Each pump will be protected by a primary screening hair/lint strainer that minimizes hydraulic losses.

Each pump will also be served by a VFD (variable frequency drive) to maximize both energy efficiency and control integration with automatic filter system control systems, and to facilitate "night turndown" operation. They also provide power spike, high amperage, and phase protection to pump motors, decreasing the likelihood of catastrophic pump damage vs HOA starters.

POOL FILTERS

Pressure/Regenerative D-E Replacement filters have been selected. This type of filter provides superior water filtration ability without the use of supplemental flocculants (+/- 2 microns), and single-pass turbidity reduction of 4 NTU or greater. This will allow them to maintain a consistently high level of water quality even at the end of an operational day, such that a "night turndown" of the circulation rate can be executed at night. The filters also have a small footprint that reduces mechanical room space and provide substantial water and energy savings as their backwash intervals are very long (2-3 weeks) and use very little water to do so (approx. 400 USG only). The perlite media of the filters can also be evacuated by normal sanitary drainage systems.

Each filter also incorporates a built-in automatic control system that assists the operator in daily maintenance, and controls filter, pump, and chemical control operation in a unified manner. It also features a built-in 'website' that is remotely accessible to monitor filter performance via an internet connection.

Each pool will feature a single, dedicated filter. Catastrophic failures have proven extremely rare and have yet to be experienced on any Western Canadian projects and the filters feature few wearable parts, making this a preferred option vs multiple filters. Regular annual maintenance (cleaning of the internal elements) is necessary and can be conducted during an annual shutdown over a 24-36 hour period.

3.2 POOLS

POOL HEATING AND DOMESTIC COLD WATER FILL

Plate and frame heat exchangers connected to the building heating plant will provide pool heating, to maximize overall building energy efficiency. This system will be provided by the project mechanical scope. Each pool will feature a domestic cold water (DCW) supply connected to the influent of the heat exchanger to allow both filling of the pool without use of the circulation equipment (allowing ease of maintenance), and filling with 'tempered' water instead of cold water, allowing an accelerated pool fill process.

Pool heating systems have been sized with specific fill and heat-up intervals to allow predictable facility operation and programming. For example, the Whirlpool system capacity will allow pool drain, refill and heating from 'cold' to operating temperature in a 6-8 hour interval to allow overnight servicing that does not impact bather use, if necessary.

Each pool would feature a dedicated automatic level control and DCW fill system to maintain pool water level. This water supply would also be metered to monitor pool water consumption.

POOL CHEMICAL TREATMENT

- **Chlorine Source:** chlorine gas is proposed as the chlorine source for the facility. It is the most concentrated source of chlorine, and operates in high-pH / high TDS / high Calcium hardness source water, as is found in Drayton Valley. Due to its concentrated form, supply bottle changes are infrequent but do require specialized training and emergency response procedures. The Town of Drayton Valley does already have this training and planning in place.

  It will likely be possible to re-use the chlorine gas feed equipment from the existing pool. Bi-annual inspection and rebuilding of the regulator and ejector equipment is recommended to ensure safe and consistent operation.

  The gas feed equipment will be installed in a dedicated, ground-floor, exterior-access chemical room that is fire rated and ventilated to code requirements, with paved road access for ease of chemical delivery.

- **pH feed:** soda ash will be used for pH control, based on the interaction between the source water and chlorine gas. The Town has requested slurry feed tanks with mixers, and dry-chemical storage space. A dedicated, ground-floor room next to the chlorine room will be provided for this chemical application. Peristaltic feed pumps controlled by a chemical controller will provide chemical feed.

3.2 POOLS

- **Secondary Oxidizer:** UV water treatment is planned as a 'secondary' oxidizer for the pool water in each pool. It will provide both chloramine control and direct destruction of bacterial/viral DNA, with minimal operator intervention or addition of chemicals to the pool water.

- UV systems can now play a larger role in facility fecal incident response plans. Rather than superchlorinating the pool water to establish a given CT value, AHS now allows the use of a 3rd party validated secondary oxidizer for a period of 7 turnovers as a form of fecal incident response. This simplifies the labor and chemical costs involved with fecal incident response.

- UV system use will also likely be a requirement of the "night turndown" pump energy management strategy.

  The UV system can also be disabled automatically to save power, based on combined chlorine readings.

- **Chemical Controllers**: the water parameters of PPM, ORP, and pH will be monitored by the chemical controller. It is possible to provide a PPM based chemical controller that is unaffected by turbidity unlike most ORP-based controllers. The unit will be NSF 50 certified and features an 'app' style control panel interface for ease of use.

- **Turbidimeter:** each pool will feature a dedicated turbidimeter, to verify a critical aspect of water cleanliness. While this is not a code requirement, low turbidity -and monitoring thereof - is important to triggering the "night turndown" pump energy management strategy.

The overall intent is to provide a chemical treatment system that is effective in maintaining sanitary water conditions, is safe, familiar, and simple to operate, and cost effective. It will also provide automatic control system integration (i.e. remote access, trend-logging of measured data).

ASSESSMENT OF OPERATIONAL COSTS – LABOUR COMPARISON

EQUIPMENT CHARACTERISTICS	EXISTING PARK VALLEY POOL	PROPOSED FACILITY
Qty. of Pumps	2	8
Qty. of Filters	2	3
Qty of Chemical Systems	2	2
MAINTENANCE TYPE		
Daily-Weekly Maintenance – Current Facility: -Backwash 1x Whirlpool filter -Add Coagulant to Sand filters -Perform routine equipment checks	Approx 6 hrs / month performed by lifeguard/ admin staff	
Daily-Weekly Maintenance – Proposed Facility: -Pump x 3 filters (15 min/day) -Clean Strainers x 6 -Perform routine equipment checks		Approx 7 hrs / month performed by lifeguard/admin staff
TOTAL HOURS	**6 HOURS**	**7 HOURS**
Filter Backwash – Current Facility: -Drain and Fill of existing D-E media tank -Backwash of main pool filters (actually takes 6 hrs due to refill)	Approx 5-6 hrs / month performed by lifeguard/ admin staff	
Filter Backwash – Proposed Facility: -Media Replacement in filters: Every 4 weeks in 25m pool, every 3 weeks in leisure pool, every 2 weeks in whirlpool		Approx 2-3 hrs / month performed by lifeguard/admin staff
TOTAL HOURS	**6 HOURS**	**3 HOURS**
Chemical Systems – Current Facility: -Soda Ash System maintenance -Chlorine Bottle Changes -Manual Chemical Additions	Approx 10-12 hrs / month performed by lifeguard/admin staff and maintenance staff	
Chemical Systems – Proposed Facility: -Soda Ash System maintenance -Chlorine Bottle Changes -Manual Chemical Additions		Approx. 8 hrs / month performed by lifeguard/admin staff and maintenance staff
TOTAL HOURS	**12 HOURS**	**8 HOURS**
SUMMARY TOTAL	**24 HOURS / MONTH**	**18 HOURS / MONTH**

3.2 POOLS

COMMISSIONING AND POST-CONSTRUCTION

The Pool Mechanical systems will be brought into operation and commissioning by an experienced commissioning agent, in concert with the overall commissioning strategy for the facility, and in particular with mechanical/BMS commissioning processes.

Staff training will be provided by an NSPF-certified individual, and will cover routine system operations and maintenance support, as well as support on an as-needed basis to facilitate a successful start to pool system operations. However, it is expected that the pool staff will have previous training and experience in pool operations.

Ongoing warranty support will be provided throughout the 1-year warranty proposed for the project, in addition to manufacturer warranties.

ASSESSMENT OF OPERATIONAL COSTS

Pool Operational Utility Costs

The Town of Drayton Valley has identified minimizing ongoing operational costs as a key consideration for the design of the proposed mechanical facility.

- Estimates of utility costs: pool equipment power requirements and estimated operating hours/day have been provided to the project energy consultant, and are reflected in the 'Energy Consultant' portion of the Validation Report.

Operational Energy Savings

The Town of Drayton Valley has identified minimizing ongoing operational costs as a key consideration for the design of the proposed mechanical facility. One proposed energy saving measure involves a programmed 'nightly flowrate reduction' in the 25m pool and leisure pool mechanical systems. This would reduce the circulation pump speed (and thus energy use) for a substantial portion of the operational day. The following design measures have been taken to enable this:

- Regenerative- D.E. Replacement filters capable of maintaining water quality at < 0.5 NTU turbidity throughout an operational day.
- Turbidimeters, 'True PPM' chemical controllers, and variable frequency drives capable of continuous monitoring of water chemistry and pump speed
- 'Flowrate Reduction' proposed for pools with temperatures < 32 C (i.e. facility Whirlpool is not considered for this).

Labor Comparison

The City of Drayton Valley has identified minimizing ongoing operational cost as a key consideration for the design of the proposed mechanical facility. Since the labour-maintenance component of these costs has been identified as the largest actual expense, the adjacent assessment of forecasted pool maintenance costs is offered:

Note: 'as needed' and 'annual/exceptional maintenance' tasks such as pump repair/replacement, filter repairs, or annual chlorine system rebuilds have not been part of this assessment as no information from the Town is available regarding these tasks. **However:** it is anticipated that the short term costs for the proposed facility will be less than incurred at the existing facility, given the new condition of equipment and equipment warranties, and that the long-term costs will remain proportional (e.g. the cost of a pump replacement will be the same regardless of the number of pumps in the facility). None of the proposed new pool equipment carries higher 'as needed' and 'annual/exceptional maintenance' costs than the existing pool equipment.

Conclusion: despite the higher number of pools, and larger number of pumps and filters, and larger chemical systems, the routine pool maintenance costs are expected to be **5% - 25%** less than those for the existing facility.

3.3 STRUCTURAL

GENERAL

This section describes the overall structural systems proposed for the Drayton Valley and Brazeau Aquatic Centre. Throughout the design process, the goal will be to develop economical structural solutions, fully integrated with other building disciplines.

DESIGN PARAMETERS

The structural components of the Drayton Valley and Brazeau County Aquatic Centre will be designed in accordance with the requirements of the National Building Code – Alberta Edition and all referenced documents. The structural systems will be capable of sustaining the minimum loading requirements of the Building Code.

The structural systems will be capable of sustaining the following gravity load requirements:

Main Floor

Dead Load=Self-weight + 1.0 kPa (superimposed)

Live Load=4.8 kPa or 9 kN (concentrated)

Natatorium

Dead Load=Self-weight + 1.0 kPa (superimposed)

Live Load=4.8 kPa or 9 kN (concentrated) at deck areas

= Weight of water within pool basins

Mechanical Rooms

Dead Load=Self weight + 1.0 kPa (superimposed) + 1.0 kPa suspended from structure above

Live Load=3.6 kPa

Roof Structure

Dead Load=Self-weight + 0.9 kPa (superimposed) + 0.3 kPa for PV panels

Live Load=1.0 kPa or 1.5 kN (concentrated)

Snow Load=see below

The superimposed dead load for the roof structure also includes an allowance to support the anticipated loads from the proposed rooftop photovoltaic installation. Roof loads will consider the superimposed loads due to snow and rain as prescribed by the National Building Code - Alberta Edition. Where changes in roof elevation occur, snow drifting will be considered in the structural design. Roof structures will be designed for the prescribed one-day rain accumulation of water over the entire roof surface, including the effects of ponding at roof drain locations. Live loads will not be considered to act concurrently with snow or rain loads.

Floor areas over mechanical rooms will be designed for the load from all suspended mechanical equipment, but no less than the additional superimposed dead load allowance noted above. Where rooftop mechanical equipment is to be provided, equipment loads will be included in the structural design.

Lateral resistance to wind and seismic loads will be incorporated into the structural design. Wind loads are prescribed in the building code, including site-specific wind load data. With regard to seismic loads, a geotechnical report has been completed for this project by Hoggan Engineering, dated October 2019, which indicates that the site is Class C in accordance with Table 4.1.8.4.A of the Building Code. Seismic loads applied to the structure will be determined accordingly.

Climatic design parameters for Drayton Valley as prescribed by the National Building Code - Alberta Edition are as follows:

Snow Loads

Ss=2.0 kPa + snow accumulation

Sr=0.1 kPa

One Day Rain

1/50=85 mm

Wind Loads

q 1/10=0.32 kPa

q 1/50=0.42 kPa

3.3 STRUCTURAL

Seismic

Sa(0.2)=0.135

Sa(0.5)=0.089

Sa(1.0)=0.051

Sa(2.0)=0.025

Sa(5.0) =0.007

Sa(10.0)=0.003

PGA=0.079

IMPORTANCE CATEGORY

As required by the Building Code, all buildings shall be assigned an Importance Category. The Drayton Valley and Brazeau Aquatic Centre is assigned a 'Normal' importance category for the purpose of structural design of the building elements. Where appropriate, Building Code prescribed force modification factors will be applied to the structural design loads as follows:

Snow – Is = 1.0 (ULS) / 0.9 (SLS)

Wind – Iw = 1.0 (ULS) / 0.75 (SLS)

Seismic – Ie = 1.0 (ULS)

FOUNDATIONS

The geotechnical report indicates that the near-surface soils include layers of medium plastic clay and a very thick layer of medium plastic clay till. Pool basins will be supported directly on undisturbed near-surface soils using raft foundations. Soil stiffness parameters have been provided in the geotechnical report, which can be used to determine structural demand on the slabs and bearing pressures on the soils. The perimeter of the building will consist of grade beams supported on a regular grid of cast-in-place concrete belled piles founded in accordance with the geotechnical report.

Within the natatorium area the main floor will be concrete structural slab spanning from pool wall to adjacent pool wall or grade beam. Backfill soils will settle over time, and so may not provide adequate support for pool piping. In order to avoid pipes becoming overstressed they will be suspended from the structural slabs.

The geotechnical report indicates the potential for groundwater to be present within the depths of the pool basins. Weeping tile will be installed in order to eliminate uplift effects from groundwater. Similarly weeping tile will be installed around the perimeter of the pools in order to avoid the buildup of hydrostatic pressures on the pool walls.

Within the administration area the main floor will be concrete slab on grade. Slab on grade is considered to be adequate structural substrate for most usages and flooring types, but is expected to demonstrate nominal settlement as soils consolidate over time. Efforts will be made to mitigate cracking of slabs on ground supporting brittle finishes. The perimeter of the area will consist of grade beams on a regular spacing of piles. To minimize the risk of ingress of airborne radon from the ground, all interior main floor concrete slabs will be underlain with a 15 mil polyethylene vapour barrier with fully taped joints.

Exterior concrete apron slabs will be rigidly connected to the grade beams at doorways to prevent issues related to frost heave and slab settlement at doorways.

SUPERSTRUCTURE

The natatorium roof structure will consist of 76mm gauge metal decking spanning to open web steel trusses. Beams will clear-span the short direction of the natatorium to a support line of steel beam and columns. Wall construction will be laterally stabilized by steel wind girts. The administration area will consist of 38 mm deep structural steel roof decking supported by open web steel joists, spanning to steel beams and columns.

To accommodate roof drainage, the roof structure will typically incorporate a sloped to drain steel structure. Built-up tapered rigid insulation will still be required to locally divert water to discrete roof drain locations.

The lateral resistance of the building to wind and seismic loads will be provided with conventional construction steel braced bays located discretely throughout the building. For seismic design, a Ductility-Related Force Modification Factor Rd = 1.5, and an Overstrength-Related Force Modification Factor Ro = 1.3 will be applied.

In addition to the design loads indicated above, the superstructure of the Drayton Valley and Brazeau Aquatic Centre shall be locally reinforced to deal with specific equipment loads. This includes, but is not limited to, additional suspended loads from mechanical rooftop units, ceilings and acoustic panels.

3.4 MECHANICAL

GENERAL

The mechanical systems described within this report are a direct product of the IPD process. All comments from the design team, construction/trades and owner representatives were considered and vetted by the IPD team. This input was very effective in illuminating the owner's needs and helped establish the IPD values. The system design and equipment selections closely align with these values. This process also assisted the IPD team with managing the budget while still satisfying the owner's requirements.

A number of mechanical system options were analyzed through the validation process; the mechanical systems have been selected to provide a high level of occupant comfort and convenience, with consideration being given to operating costs, reliability, maintenance, and good engineering practice. This includes heating, cooling, ventilation, plumbing, fire protection and control systems sufficient for effective and reliable facility operation. Should deviations be required as necessitated by more up-to-date information and/or by design calculations or other factors, such changes will be incorporated into the contract documents. Mechanical systems and components for the project will be of a commercial quality throughout.

The goals and objectives of the mechanical design are:

- To provide a design that meets the Client's needs as defined by the IPD project values.
- The mechanical design will comply with the current National Building Code - Alberta Edition and all applicable Provincial and Municipal Codes. ASHRAE will be referenced as a guide to establish criteria for heating and ventilation systems.
- System design will reflect a prudent blend of life cycle cost considerations including capital costs, utility consumption costs and simple straightforward systems that can be understood and operated in an effective manner. Consideration will be given to providing accessibility for maintenance. Local or Canadian products will be specified wherever possible to facilitate easy replacement of parts.

DESIGN CONDITIONS

The facility will be provided with mechanical systems to maintain the space temperatures as outlined below.

The outside design conditions are:

- Winter:-34°C Dry Bulb (1% variance).
- Summer:+28°C Dry Bulb, +19°C Wet Bulb (2.5% variance)

The inside design conditions for the Natatorium are:

- 30°C to 32°C

The inside design conditions for all other occupied areas are:

- 21°C minimum (winter)
- 24°C maximum (summer)

Relative humidity for the Natatorium will be:

- 50% to 60%

Ventilation rates will be as follows:

- Swimming Pools: 2.5 L/s per square meter
- Locker Rooms: 2.5 L/s per square meter
- Assembly Rooms: 8 L/s per person
- Office Space: 10 L/s per person
- Corridors: 0.25 L/s per square meter

Maximum HVAC-related background noise levels will be as per ASHRAE recommendations (2019 ASHRAE Handbook - HVAC Applications):

- Natatoriums: NC-45
- Offices: NC-30
- Public Areas: NC-30 TO NC-40

SITE UTILITY SERVICES

A water service will be connected to the building from the local water supply. A water meter and sprinkler tree as per code will be provided. A pressure reducing valve will be provided where required by code or the Local Authority.

New sanitary and storm services will be provided based on the generic site plan. Services will be connected to the local sanitary and storm systems.

A new natural gas service will be provided as required to suit the building loads. Natural gas will be metered via an outdoor set provided with a vandal proof enclosure.

3.4 MECHANICAL

Anticipated service requirements are:

- 150 mm water/fire service
- 150 mm sanitary service
- 300 mm storm service
- 1800 kW gas service with line sizes appropriate to the available site connection and pressures

PLUMBING SYSTEMS

All new plumbing systems are to be of the latest design and with high efficiency water consumption. The washroom layout and fixture count will be reviewed for code compliance and adequate to satisfy future space planning. Plumbing fixtures will be selected consistent with program requirements and in close communication with the IPD Team.

Low flow basins, low flow showers, single flush low flow water closets, and low flow sinks will be utilized to optimize water efficiency. Lavatories will be provided with manual metering faucets; water closets and urinals will be equipped with manual flush valves. Barrier free accessible fixtures will be provided as required by code. Showers in public change rooms will consist of individual showerheads with push button operators; temperature control will be provided by a single thermostatic mixing valve controlling each group of showerheads.

A drinking fountain/bottle fill station will be provided in the public area.

Cast iron body floor drains with removable strainers will be provided for the showers, and mechanical rooms. Drains will be cast iron body with removable strainer. Pool deck drains will be polypropylene trench drains.

Key operated non-freeze hose bibs shall be installed at approximately 30m intervals along the building exterior.

Domestic water, sanitary, storm and vent piping will be networked throughout the building back to the service connections and the mechanical plant. All domestic hot, cold and recirculation piping will be thermally insulated for energy conservation. Domestic water piping will be extended to all fixtures. Isolation valves will be installed on branch lines to isolate fixture groups from the mains. Sanitary systems will be designed to ensure positive drainage and provide sufficient cleanouts for maintenance purposes. Storm water will be collected by a system of roof drains. Roof drains will be designed for full flow with cast iron or aluminum domes.

Domestic hot water will be provided by indirect water heaters supplied by the hydronic heating. Domestic hot water will be generated for distribution at 54°C. A domestic hot water recirculation pump will be provided to ensure availability of hot water throughout the facility. A balancing valve shall be provided where the hot water supply line exceeds 15m. Branch piping from a fixture to a recirculation main shall not exceed 8m. A water softener system will serve the domestic hot water supplied to the building plumbing fixtures.

Approved backflow preventer devices will be provided for the fire protection system, as required by the National Plumbing Code of Canada, and as required by the Local Authority.

HEATING SYSTEMS

The primary heating system for the building will include multiple gas fired high-efficiency heating water boilers and a distribution system as required. The configuration of the hydronic heating system will be as follows:

- Four (4) minimum 95% efficient modular condensing heating boilers will be situated in the mechanical room. Boilers will be sized for 25% of the peak heating load.
- For the respective heating loops, hydronic circulation pumps and accessories will be installed locally in the mechanical room. Two (2) main heating circulating pumps will serve the hydronic terminal units. The pumps shall operate as run and standby for 100% redundancy and will be equipped with VFDs.
- A network of insulated heating supply and return lines will distribute heating water to the facility serving all terminal units, heating coils, domestic water heaters and heat exchangers.
- The heating medium will be a 50% propylene glycol mixture.
- The hydronic heating system will be configured in as a cascading system where higher temperature end uses are served first then lower temperature end uses are served with the lower temperature return water to maximum the efficiencies of the boiler plant. The hydronic system will cascade by serving the terminal units first, followed by the air-handling unit heating coils, and then followed by the pool heat exchangers.

Terminal heating for the building will be provided by ceiling mounted radiant panels in the circulation spaces, cabinet heaters in vestibules and entrances, and overhead unit heaters in service areas. Hydronic heating coils will also be provided in each VAV box.

3.4 MECHANICAL

Heating units will be controlled by thermostats and valves with individual zone control.

The hydronic heating system will also serve three plate-and-frame heat exchangers serving the separate pools.

VENTILATION SYSTEMS

The building ventilation systems will consist of two (2) outdoor air-handling units situated on the lower roof. One air-handling unit (AHU-1) will serve the pool and locker rooms; the other unit (AHU-2) will serve the circulation / administration spaces and the multi-purpose room.

AHU-1 will be a custom air-handling unit delivering 100% outside air to the pool and locker rooms as well as exhaust from these spaces. The air-handling unit will consist of the following:

- Supply air fan array with electronically commutated motors and VFD control
- Exhaust air fan array with electronically commutated motors and VFD control
- Glycol heating coil
- Heat recovery heat pipe
- Filter sections

Supply air and exhaust air ductwork will be distributed from AHU-1 to the pool and locker rooms. A series of motorized dampers with integral airflow measurement will be incorporated into the supply air ductwork to allow for suitable zoning and airflow control. Supply air outlets will be double deflection grilles and drum diffusers arranged to direct air flow at the exterior walls/translucent panels. The return air grilles will be louvered face return grilles.

AHU-1 will also provide ventilation for the pool surge tanks.

AHU-2 will be a packaged air-handling unit providing ventilation and space cooling for the circulation and administration spaces, and the multi-purpose room. The air-handling unit will consist of the following:

- Supply air fan with VFD control
- Glycol heating coil
- Packaged direct expansion (DX) cooling – coil and condensers
- Filter sections
- Heat recovery, minimum 75% efficient

Supply air and return air ductwork will be distributed from AHU-2 to the circulation spaces, administration spaces, and the multi-purpose room. A series of variable-air-volume boxes with hydronic heating coil and outlet silencer will be incorporated into the supply air ductwork to allow for suitable zoning and airflow control. Supply air outlets will be either square plaque diffusers or double deflection grilles, depending on ceiling type. Return air grilles will be egg crate type.

Standalone inline exhaust fans will serve the chemical storage room, pool storage, and chlorine storage. A gas detection system will be incorporated into the chlorine storage exhaust system.

An inline exhaust fan will serve the main electrical room; the fan will be interlocked with an outside air intake motorized damper to provide passing cooling and humidity control. This system will be controlled based on space temperature and humidity.

FIRE PROTECTION SYSTEMS

An automatic wet sprinkler fire protection system and specifications designed and engineered by the fire protection contractor will be provided. The fire protection system shall be designed to hazard occupancies in accordance with NFPA 13. All sprinkler drawings and calculations will be issued to the authority having jurisdiction for review and approval.

A fire hydrant will be located within forty-five meters of the main building with a fire department Siamese connection adjacent to the main entrance as per the National Building Code - Alberta Edition.

Acceptance testing of the entire fire protection system will be carried out and certified by the fire protection contractor as per NFPA 13 requirements.

Portable fire extinguishers will be installed in accordance with requirements of the National Building Code - Alberta Edition. Portable fire extinguishers located in finished areas will be housed in cabinets. Portable fire extinguishers in unfinished areas such as Mechanical Rooms will be mounted on brackets.

All piping passing through fire separations will be provided with fire stopping in accordance with the National Building Code - Alberta Edition. Any ducts passing through a fire separation will be provided with an approved fire damper.

3.4 MECHANICAL

THERMAL INSULATION

Thermal insulation will be provided to meet the minimum requirements of the NECB 2017.

Insulation on piping systems will include:

- Heating water.
- Domestic cold, hot and recirculation.
- Roof drains within 3m of roof or exterior wall penetrations.
- Plumbing vents 3m from roof penetration.
- Refrigeration piping.

Insulation on ductwork systems will include:

- Outside air ducts/plenums.
- Supply ducts conveying conditioned air
- Exhaust/relief ducts near outlets/inlets.
- Acoustic treatment where required.

PVC jacketing will be provided on all exposed insulation in the natatorium and mechanical rooms; all other exposed insulation will be canvas wrapped.

HANGERS AND SUPPORTS

Hangers for piping will be adjustable ring or clevis type. Steel for Ferrous piping and copper for copper piping. Trapeze type hangers will be used where several pipes run at the same elevation.

Pipe under the building in the structural slab areas will be supported continuously, by hanging from the underside of the structural slab.

All necessary anchors and guides to permit free expansion and contraction of ducts will be provided. Hangers and supports for covered ducts will not injure or pierce the insulation.

Hangers and supports in the natatorium will be stainless steel.

HUMIDIFICATION SYSTEMS

The steam room will be served by a packaged electric steam generator.

ACOUSTIC MEASURES

All mechanical systems will be provided with acoustic attenuation measures to ensure room noise levels are within ASHRAE recommendations.

Acoustic insulation will be provided on supply air, return air, and exhaust air ducts connecting to the air-handling units as required. The use of in-line passive silencers will be considered to further reduce transmission noise levels.

Air-handling units will have all fans internally isolated on spring isolators. Flexible connections will be installed on all ductwork connections to AHUs and exhaust fans. All suspended, floor and roof mounted fans and unit heaters will be provided with spring isolators. Floor mounted pumps will be mounted on elastomer pads.

CONTROL SYSTEMS

A Direct Digital Control (DDC) system will be provided throughout the facility. The building control systems will be fully software programmable and accessible on site through a local terminal and off site via modem. Individual thermostats will be provided for each of the spaces connecting to the terminal heating units, control valves, damper operators, etc. The system will be BACnet compliant.

The DDC system will control all operable systems including air systems, heating plant, and major equipment, and will provide all monitoring and alarm functions. The mechanical equipment will be controlled by means of a reset controls strategy to vary temperature in response to outdoor temperatures and space demands. State of the art electronic devices will be utilized for control of room temperatures. A standalone processing unit will be located in the mechanical space and linked to an operator's terminal. Full color graphics will be produced for each system and all major equipment.

Control software will allow for the programming of the following:

- Multi-user operation of the system.
- Multi-function operation.
- Dynamic color graphics display of all mechanical systems.
- Historical reviews and point trending/ tracking.
- Dynamic analysis of control loops.
- Production of reports.
- Manual override of controlled points.
- Operation sequences.
- Alarm reporting.

3.4 MECHANICAL

Software to optimize system efficiency shall include:

- Precise control through PID (proportional/integral/derivation) logic.
- Provide start/stop schedule for equipment and systems that do not operate 24 hours per day.
- Reset air and heating/chilled water temperatures using feedback from occupied space demand and ambient temperature.
- Reset humidity from outside air.
- Provide morning warm-up or cool-down using air systems.

Cabinet heaters and unit heaters will be controlled by standalone line voltage thermostats.

ENERGY CONSERVATION

Energy conservation measures will include but not be limited to:

- Heat recovery on the 100% outdoor air system was modelled on both AHU1 and 2.
- Hydronic heating system with cascading temperatures to maximize condensing and efficiencies.
- Minimum 95% efficient condensing boilers.
- High efficiency motors.
- Piping insulation as per NEBC.
- Time of day and holiday scheduling
- Unoccupied space temperature and fan system control.
- High efficiency plumbing fixtures and domestic water heaters.

CONTRACTOR START-UP PROGRAM

The Contractor is required to complete the checking, starting, testing, balancing and final cleaning of equipment, and to ensure that the work is ready for use and purpose intended. All systems will be demonstrated to the Owner. Seasonal Systems are to be identified and start-up will be deferred until the outdoor conditions permit startup operation. Electronic mechanical operating and maintenance manuals, complete with as-built mechanical plans, are to be provided to the Owner at project completion.

DOMESTIC WATER HEATERS

TAG	INPUT (KW)	STORAGE (L)	RECOVERY (LPH)
DWH-1	117	379	1800
DWH-2	117	379	1800

BOILERS

TAG	INPUT (KW)	OUTPUT (KW)	HWT IN/OUT (°C)	ELEC
B-1	400	424	88/50	120/1/60
B-2	400	424	88/50	120/1/60
B-3	400	424	88/50	120/1/60
B-4	400	424	88/50	120/1/60

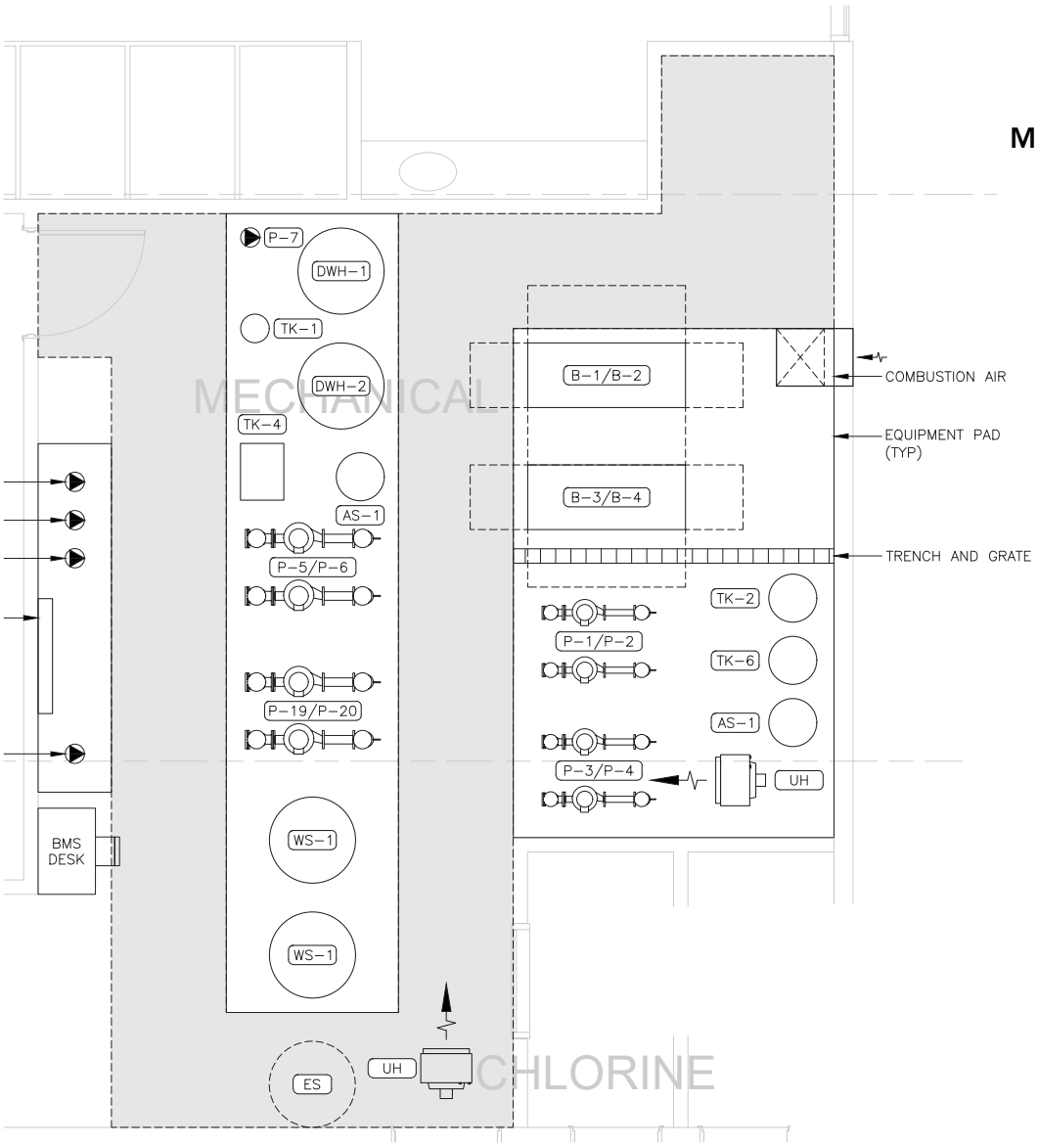
PUMPS

TAG	FUNCTION	FLOW (L/S)	MOTOR (HP)	ELEC
P-1 TO 4	BOILER CIRC	5.0	2.0	600/3/60
P-5 & 6	HEATING SYSTEM	10.0	5.0	600/3/60
P-7 & 8	DOMESTIC HOT WATER RECIRC	0.8	¼	120/1/60

AIR HANDLING UNITS

TAG	SERVICE	S/A (L/S)	O/A (L/S)	E/A (L/S)	ELEC	
AHU-1	POOL	19,000	19,000	19,000	MCA: 125.1 MOCP: 200	600/3/60
AHU-2	CIRCULATION/ ADMIN	1,400	280	400	MCA: 13.5 MOCP: 15	600/3/60

MECHANICAL ROOM



3.5 ELECTRICAL

INTRODUCTION

The following section of the report outlines the electrical system requirements of the Drayton Valley and Brazeau Aquatic Facility and its operations. A description of the intended strategies for electrical distribution, lighting, lighting control, low-tension, communication, and life safety systems for the facility have been included to summarize discussions and concepts developed to date.

The electrical design is to be based on the latest applicable standards and guidelines including, but not limited to the following items:

- Canadian Electrical Code (CSA C22.1)
- National Building Code - Alberta Edition (ABC)
- Alberta Fire Code (AFC)
- National Energy Code (NEC)
- Canadian Electrical Code (CEC)
- Canadian Standards Association (CSA)
- Underwriters Laboratories of Canada (ULC)
- Regulations of the Alberta Electrical Protection Branch – Safety Codes Act
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Illuminating Engineering Society of North America (IESNA)
- Accessible Design for the Built Environment (CSA B651-04)

To facilitate the continued long term facility operation and projected life expectancy, the electrical systems and equipment selection are based on the most recent technologies to reflect the design requirements. Equipment selection shall be based on proven technologies readily available and serviceable in the Drayton Valley area. All material is to be new, specification grade, to conform to Canadian Standards Association (CSA) requirements. System designs are to include, as the basis of the electrical design, the following minimum criteria:

- Safety of all electrical systems and components
- Reliability and continuity of the electrical system
- System flexibility and simplicity of operation
- Provision for maintenance of system components with negligible downtime
- Capacity for future modifications and extensions
- Provision for energy conversation
- Standardization of electrical equipment

It is inherent that all of the above factors need to be integrated into the electrical system to allow for the ongoing operation of the facility.

SUSTAINABILITY

General

The implementation of a formal sustainable design program, such as LEED, is not a requirement of this project. However, sustainable building strategies have been implemented in the electrical system design as good practice. The rationale for engaging in sustainable design is to create a facility that will contribute to reduced demands on the earth resources, reduce operating costs while keeping user comfort and flexibility in place.

The National Energy Code of Canada for Buildings 2017 (NECB) has been implemented to prescribe minimum energy conservation requirements that new buildings must meet. Electrically, this primarily applies to lighting and lighting controls. It limits the allowable energy used for lighting based on the building size and type, and requires lighting controls be implemented to ensure lighting is only on when necessary.

Site luminaires are to be LED and selected to limit light trespass into the night sky. Exterior lighting controls are to be implemented so lighting turns off late in the evening after operating hours. This will reduce the energy consumption and minimize impact on neighboring properties. Select safety and security lighting may remain on, as required.

Interior lighting is to also be LED type, which is more energy efficient than fluorescent sources. Interior lighting is to be controlled by occupancy/vacancy sensors and timed controls to ensure lighting only operates when required. Daylighting controls are to be implemented to dim or turn off lighting when natural daylight is available to light the space.

The Electrical system, in conjunction with the Mechanical and Pool designs, is to employ measures to assist in minimizing energy consumption. Product and equipment selection will be based on meeting the criteria of high efficiency to reduce our carbon foot print keeping in mind the life cycle of the selected products. Motor and pump operation is to be controlled by the use of variable frequency drives (VFDs) to maximize the efficiency of the system by operating the equipment at necessary speeds. Mechanical and Pool trades to provide all required VFD units.

Provisions for a future 300kW photovoltaic system is to be provided as part of the base building and include conduit between the proposed PV cell locations on the roof and the proposed location of the new electrical room. A prepared space in the Main Distribution Panel (MDP) will be allocated for the Solar input.

3.5 ELECTRICAL

SITE UTILITIES

Power Service

The pool facility will be a new build. The electrical power distribution for the new facility is planned as a new feed from the Utilities (Fortis). The new service is anticipated to be 1000A frame with 800A trip unit at 347V/600V 3ph. This preliminary estimate must be updated during detailed design once all building loads are confirmed.
The main feeder and MDP for the pool is to be designed to allow 20% spare capacity for future requirement.

COMMUNICATION SERVICES

The new facility will require new communication services and infrastructure to support data, telephone, television, and security systems. Communication services enter the building at the main electrical room and shall be terminated on a backboard demark point. Low tension backbone conductors are to be placed from this location to the main communication rack for the facility.

POWER SYSTEMS

Power Distribution

Power for the new facility is to be fed at 600V to a new Main Distribution Panel (MDP) located in the new mechanical/electrical room adjacent to the pool. This MDP is to be fed directly from the new outdoor utility transformer. Spaces will be provided in the MDP for future use. There will be a customer digital metering, connected to the line side of the MDP. This will allow facility maintainers to monitor energy data for the facility.

The new 800Amps, 600V MDP is to feed all 347/600V loads, consisting primarily of large mechanical and pool equipment loads. Distribution is to be transformed down to 120/208V to serve local equipment and receptacle loads. 120/208V panelboards will be located as close to the loads they are serving as possible.

Due to the large electrical load for the pool equipment, dedicated 347/600V and 120/208V panels will be located in the basement; in close proximity of the pool equipment. In coordination with the Pool and Mechanical Teams, it is decided to proceed without a Motor Control Centre (MCC).

All major floor-mounted distribution equipment is to have a housekeeping pad or a minimum 4" standoff.

Door-in-door enclosures are to be provided for the entire electrical distribution, from the main electrical room to the sub electrical rooms and all field panel boards for maintenance purposes. The door-in-door enclosure will allow the maintenance worker full access to the entire enclosure without the use of tools, greatly increasing their efficiency. Key locks, utilizing the same key for all panels, are to be provided to allow them to be locked thereby limiting access to maintenance staff.

All wiring throughout the facility is to be installed in conduit systems. All building wiring is to be copper with a minimum 600 V insulation rating. Minimum conductor size is to be #12 AWG for power system wiring requirements.

Home-run conduit is to be grouped together. In public spaces, conduit is to be run concealed in walls and above ceilings. All empty conduits are to be complete with a pull wire. Conductors for motors are to be installed in flexible plastic jacketed raceways with liquid tight connectors. Flexible metallic raceways are to be used for connections to transformers and for connection drops from ceiling junction boxes to luminaires. Raceways and cables passing through floors and fire-rated walls are to have sleeves filled with fire-rated sealing compound.

Raceways installed in humid or corrosive areas are to be rigid or PVC type, resistant to corrosion.

All electrical equipment is to come with a plastic engraved lamicoid for identification. Conduit is to be color-coded by system for easy identification. Circuit numbers are to be written on junction boxes. Each receptacle is to have a lamicoid on its cover-plate indicating the circuit number.

A short circuit, coordination and arc flash study based on the as-built electrical distribution is to be performed. Hazard warning labels are to be affixed to all electrical distribution equipment. Labels are to comply with the latest adopted edition of CSA Z-462, Workplace Electrical Safety, including but not limited to, the available incident energy at each piece of equipment.

Power Exclusions

- No powered parking receptacles will be provided as part of this project.
- Provisions for a scoring system such as a scoreboard, touch pads, buzzers etc have not been provided.
- Electrical provisions for a future Combined Heat and Power (CHP) units or deep well geo-thermal for the facility have not been provided.

Grounding and Bonding

Grounding is to be provided from all pertinent electrical equipment in the respective electrical rooms to the ground bus. All equipment that is capable of carrying electrical

3.5 ELECTRICAL

current is to be bonded to the ground at the electrical room. The equipment to be bonded includes, but is not limited to the following: metal raceways, equipment enclosures, metal structures, low-tension systems and miscellaneous metal systems. As this is a pool, all metal equipment near the pool area is to be bonded together and comply with the CEC Section 68-058.

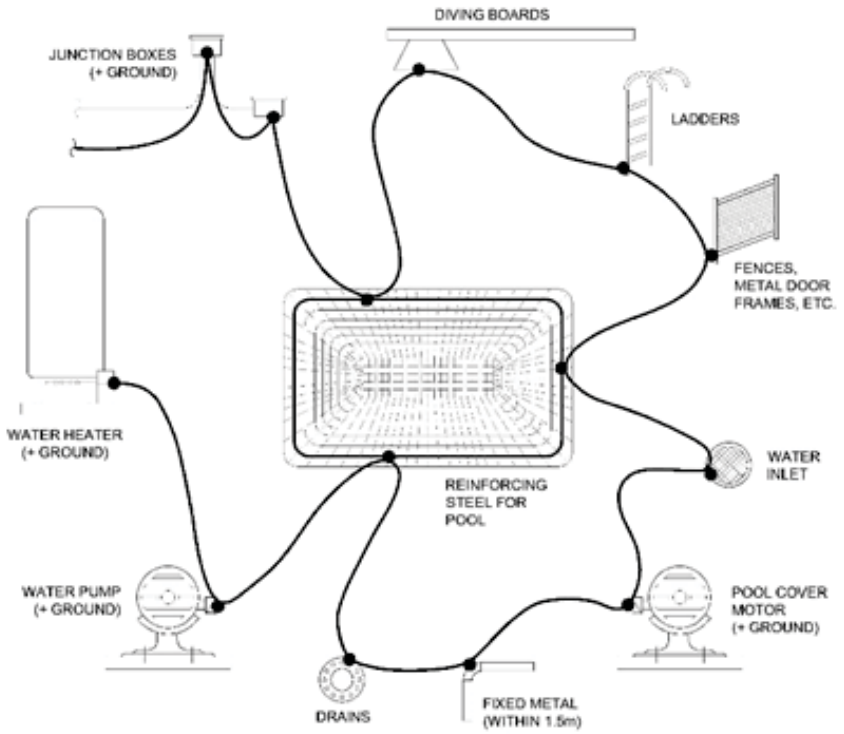
Entire grounding system shall be tested and documented. Ground and bond resistance testing to be performed at substantial completion of the project. Depending on the construction schedule and concrete pouring timelines, a separate test maybe be required to test rebar prior to concealment.

Mechanical System Connections
All mechanical motors for new HVAC and pool systems are to be provided with power service from the main electrical network. Smaller motors that are 0.37 kW and below are intended to be supplied by a 120 V source, while motors that are larger than 0.37 kW would be supplied by a 600 V, three (3) phase source. Each motor is to be provided with all motor protection switches, starters, and disconnect switches necessary for their operation. Local disconnect switches are to be provided at each motor. Stand-alone Variable Frequency Drives (VFDs) are to be utilized where the mechanical load is expected to vary during its operation. Coordination with the Pool and Mechanical Trades will be required so as to coordinate VFD, BMS and starter requirements, supply and install. Data connections to be provided to key pool equipment as per requirements.

Heat tracing for small portions may be required. Heat tracing shall be standard 120V with coils and contactors so it can be controlled from the BMS Panel. Further coordination in detailed design is required to finalize scope.

Refer to the mechanical section in this report for further information on the building automation system. Division 26 to provide all 120V controls. BMS Contractor to provide all low voltage wiring and conduits.

FFE Equipment Connections
All FFE equipment such as bottle fillers, towel dispensers, hand dryers and dry spinners will be provided with hard wired power connections. Further coordination during detailed design is required for locations and quantities.



Bonding For Swimming Pools - CEC 68-058

3.5 ELECTRICAL

LIGHTING

General

The lighting design is to be integrated with the overall architectural design of the facility to meet the functional requirements of the space, while also adhering to the energy utilization goals of sustainable design. The lighting design of the facility is to closely follow the guidelines laid out in the IES (Illuminating Engineering Society) Lighting Handbook.

The project is to comply with the requirements of the NECB. These requirements include, but are not limited to, minimizing lighting power density levels for interior, exterior and façade lighting, exterior lighting efficacy, daylight controls, and programmable/automatic lighting controls.

Interior Lighting

The new facility will be 100% LED light source due to its high efficiency and lower maintenance requirements. Additionally, LED luminaires are easily dimmed and are ideal for daylighting applications. For these reasons, LED lamp sources are to be utilized throughout the facility. Luminaires are to be supplied complete with mounting brackets, drivers and all necessary accessories necessary for their operation.

It is proposed that the lighting be fed from 120V distribution with the natatorium lights at 347V. This is because LED luminaires are most commonly designed for 120V distribution and are safer to maintain than 347V units.

Interior luminaires in the pool area are to be primarily pendant-mounted indirect type, supplemented with wall-mount direct/indirect luminaires on perimeter walls. Indirect lighting is preferred in a pool environment as it helps minimize glare on the water surface, increasing safety and comfort for users. Where possible, luminaires are not to be mounted directly over the water surface and drivers are to be mounted remote, simplifying maintenance requirements.

In-pool luminaires are not being considered for this project. Accent or feature lighting which shall be discussed during detailed design as a wish list item has been noted. However, it shall be understood that any underwater lighting shall have to comply with National Building Code - Alberta Edition Section 7.2.3.19.
Interior luminaires in the non-pool areas are to consist of surface or recessed LED luminaires, dependent on the ceiling type in each area.

The lighting levels provided within the facility is to generally conform to IESNA requirements for the various task areas and take into account the power density requirements identified in the National Energy Code of Canada for Buildings 2017 (NECB). Light levels on the pool deck are to exceed minimum requirements dictated in the National Building Code - Alberta Edition of 215 Lux.

Generally, average light levels in each type of space are to match closely with the below.

Area	Lighting Level (Lux)	Lighting Density as per NECB 2017 (W/m2)	Lighting Control							
			Manual	Restricted to Manual ON	Restricted to Partial Automatic ON	Bi-Level OR Dimmable	Automatic Daylight Responsive Control	Automatic Partial OFF	Automatic Full OFF	Scheduled Shut-Off
Sports Arena - Class III Facility	300	18.3	X	A	A	X	X	-	B	B
Office, < 25m2	300-350	10	X	A	A	X	X	-	X	-
Corridors	150	7.1	X	-	-	-	X	-	B	B
Change Rooms	250-300	5.2	X	A	A	X	X	-	X	-
Multi Purpose Room	300-350	11.5	X	A	A	X	X	-	X	-
Stairwell	150	6.2	X	-	-	X	X	X	B	B
Storage Rooms	250	6.8	X	A	A	-	X	-	X	-
Washrooms	300	9.1	X	-	-	-	X	-	X	-
Service Rooms (Mech & Elec Rooms)	300	4.6	X	-	-	-	X	-	-	-
Reception/Lobby	250	10.8	X	-	-	-	X	X	B	B

3.5 ELECTRICAL

Exterior Lighting
Exterior lighting is to be provided by LED lamp sources. All exterior luminaires are to be full cut-off and night sky compliant. The luminaire styles are to be selected to compliment the building exterior. Exterior lights to be controlled via stand alone astronomical time clock and photo cell control.

Lighting Control
Lighting controls must comply with the requirements of the National Energy Code. Generally, this means that most spaces need some sort of manual or automatic lighting control, such as occupancy/vacancy and daylight sensors.

As per discussions with the Town's Operation Staff, it is preferred to proceed with line voltage controls rather than deploying a low voltage lighting system. This will take away the ability to allow all facility lighting to be swept on/off at a pre-programmed time, as well as allowing integration with the security system so lighting is turned on during an alarm condition or for cleaning crews.

All individual and multi-occupant spaces in the building are to have some form of manual or automatic control.

- Vacancy sensors are be provided in offices, meeting spaces, and individual spaces. Vacancy sensors require the occupant to manually turn the lights on, but will automatically turn lights off if no activity is detected by the sensor for a predetermined time interval.
- Occupancy sensors are to be provided in washrooms, change rooms, storage rooms, and other similar spaces. Luminaires will turn on and off based on the occupancy in the space.
- Manual switching are to be provided in the pool area, service rooms, and any area where the automatic operation of luminaires may be unwanted for safety or security reasons.
- Master controls are to be provided for circulation spaces such as corridors and natatorium in one location away from public space. The master controls are to be located in the Life Guard Office.

Additionally, in areas with significant infiltration of natural light, daylight sensors are to be provided to dim lighting to maintain a constant illumination in the space.
Vacancy, occupancy, and daylight sensors are to be installed on the ceilings to completely cover the space they are sensing. All luminaires are to be programmed to sweep off at the end of the day, regardless of how they are controlled.

Each multi-user space is to have multi-level or multi-scene switching, allowing occupants a high degree of control over their environment.

Emergency Lighting
Stand-alone emergency lighting battery pack units and remote heads are to be provided throughout the facility. These luminaires will provide for the emergency egress requirements of building occupants. These lights are to have a battery pack with the capacity to illuminate for a minimum of 30 minutes.

The pool water surface and change rooms shall also be provided with an average 10 Lux for 30 minutes. A lighting UPS system will be utilized to pick up the lights in the change rooms and some key natatorium fixtures to achieve the National Building Code - Alberta Edition Section 7.2.3.21.

Exit lighting is to be thin profile conforming to ISO standard, installed in accordance with the National Building Code - Alberta Edition. Exit lighting will utilize LED lamp technology.

LOW TENSION SYSTEMS
Integrated Communication Systems
The facility's low tension infrastructure shall consist of a central data rack, located in the main electrical room, with distributed structured wiring throughout the facility, serving telephone and data outlets. All of the horizontal cabling is to be Cat 6. A VOIP telephone system is to be deployed by the Town and is anticipated to be located within the data rack in the main electrical room.

This infrastructure is to consist of data rack, patch panels, cable management, backbone and structured wiring. Space is to be allocated in the rack for equipment supplied by the client. Division 26 Contractor is responsible for all equipment including and up to the patch panels and a two post rack. Switches, UPS units and primary equipment shall be provided by the Town. Power for the Town's equipment will be brought to the rack as required.

The new floor mounted data rack is to be located in the electrical room. All horizontal structured wiring to data outlets in the addition are to be Cat 6, and shall be used for both data and voice applications. All data outlets are to be provided with a minimum of two (2) cable drops. Additional cable is to be provided in high-density locations such as multi-user office spaces. Communication outlets are to be

3.5 ELECTRICAL

provided at workstations, meeting rooms, digital displays, copier locations and fax locations. All owner-supplied equipment identified as requiring a data connection is to have dedicated data drops. All drops shall be within the 90 meter allocation for CAT 6 cables.

Wireless access points, consisting of a single data drop, are to be provided throughout the facility to provide complete wireless coverage in all areas of the facility. It is anticipated for these Wifi Hubs to be PoE and hence receptacles are not required. Communication cabling is to be run in conduit in walls, service rooms, and where concealed. Cabling run above t-bar ceilings is to be run in conduit, or neatly suspended by j-hooks.

All communication cabling is to be terminated and tested to ensure they meet standards for fiber and Category 6 cabling.

Provision of VoIP-compatible handsets will be by the owner.

Public Address and Sound System

The facility has been planned to have a public address system. This system shall have 4 zones, serving the natatorium, change rooms, service rooms and commons space (corridors and office spaces). Speakers are located throughout the building. PA system shall have an all call capability and the ability to be connected to a music system for background music. The main paging microphone is to be located in the Life Guard Office.

A local sound system rough-in is to be provided to allow for hi-fidelity music to be played in the pool areas. Conduits are to be brought back to the Pool Office for a future sound rack. All conduits to be complete with pull strings.

Digital Screens

Cat 6 and a receptacle are to be provided at two (2) key locations; possibly at the pool deck and main reception for future digital TV Screens. Coax will not be distributed in this facility.

Clock System

A central clock system will be deployed throughout the facility. The system shall be non-GPS in order to avoid service charges. Clocks shall be digital face with hours and minutes display.

SAFETY AND SECURITY SYSTEMS

Fire Alarm System

The fire alarm system shall be a fully addressable, microprocessor based, single stage, non-coded, annunciated and supervised system.

Fire alarm signaling devices are to be horns and visual strobe lights, located to meet National Building Code - Alberta Edition and CAN/ULC standards.

Initiating devices such as smoke and heat detectors are to be intelligent type with capability to compensate for changes in environmental and climatic conditions. All devices are to be addressable and include manual pull stations at exits to all floor areas, smoke detectors in stairwells and electrical rooms. Additionally, monitor modules for fire sprinkler flow valves and supervisory valves and monitoring modules for the Chlorine gas detection system will be provided.

The fire alarm panel shall be located in the main vestibule and also acts as an annunciator, as this is the main firefighter access. A passive graphic display adjacent to the panel is to be provided with the floorplan and zone schedule.

A ULC-compliant central station fire alarm dialer is to be provided to remotely annunciate fire alarms. Primary communication is to be via a dedicated copper phone line, independent of the VoIP telephone system. Secondary communication is to be via a cellular antenna, or as directed by the owner.

The fire alarm system is to be fully commissioned, tested and verified as required to meet CSA Standards for Verification of Fire Alarm Systems. Additionally, the fire alarm system is to be commissioned to ensure interconnections with other building systems operate as intended. This will include, but not be limited to, door release, fan shutdown, and dialer operation.

Intrusion Alarm System and Monitoring

A new intrusion system is to be designed and deployed for the facility. This system shall consist of distributed intrusion detection devices, such as door contacts and motion detectors, glass break units etc, fed back to the security panels located through the building. These panels all communicate back to the central panel and dialer, located in the main electrical room.

A security keypad is to be located in the main vestibule by the main entrance to the facility.

3.5 ELECTRICAL

In general, individually-zoned motion sensors shall be located in all main floor corridors and near entry points. All exterior doors are to have door contacts. And glass breaks shall be installed at all glass features below 10'. Glass at high elevations above 10' shall not require glass breaks.

Closed Circuit - Video Monitoring (CCTV)

The facility shall be designed to monitor both the exterior perimeter of the facility and the key interior spaces. Design includes for rough-in of exterior cameras deployed at each corner. Interior cameras have been proposed at the main entrance, reception desk and main corridor. Division 26 Contractor to provide rough-in only. Cameras and recording equipment shall be purchased and installed by the Town. Infrastructure and CAT 6 cabling shall be brought back to the main Electrical room data rack.

POST CONSTRUCTION

Testing and Commissioning

All new systems will be tested to ensure functionality and operations. This includes power and communication cable testing, lighting controls, fire alarm verification, and functional testing of the PA and security systems.

Training and Documentation

Operation and Maintenance manuals incorporating copies of shop drawings, complete schematic diagrams, recommended maintenance schedules and logs, system operation write-ups, test results, and safety procedures will form part of the electrical contractor's scope of work. Demonstration and training sessions will be provided for operations staff for all major equipment and/or systems.

Record drawings will be provided in electronic format to aid in operations and maintenance of the facility.

3.6 CIVIL AND SITE

SITE GRADING

The preliminary site layout has the new aquatic centre north of the proposed parking lot, with the proposed parking located adjacent to the existing site access road. Existing site drainage is southeastward, and this general drainage direction will be maintained for the new site grades. Roof drainage for the new building will tie to the proposed storm system. The main floor elevation of the building is estimated to be 853.00, pending detailed design and the final building layout and placement.

SANITARY SERVICE

Per discussions with the Town, the nearest viable sanitary service tie-in appears to be the existing 200mm man located south of the Omniplex. Per the 'Prelim Deep Utilities" figure, the primary alignment for sanitary service runs between the Omniplex and Holy Trinity Academy. This alignment is contingent on space (both on the surface and underground) between the two buildings, and will require trenching through the existing parking lot. There is opportunity to have a shared trench with the water service, pending final alignments through the parking lot. Per invert data provided by the Town, the sanitary main invert at the tie-in location is ~844.50m. Utilizing a 1.0% slope for the sanitary service, the invert at the building is estimated to be ~849.00.

If the primary alignment is not viable for any reason, a secondary alignment is shown on the figure, that runs around the east side of the Omniplex. This would add additional pipe length and manholes to the system, and would have a greater impact on the existing parking lot operation during construction. This secondary alignment would tie to an existing manhole, which has an existing invert of 841.83. Based on a 1.0% slope, the estimated building invert is ~847.80.

While there is an existing sanitary pipe located along the west side of the school, the Town indicated it services a park washroom, and is potentially too small for use by the new aquatic facility. This pipe run could still be investigated to confirm if it is or is not viable for use (with the Town's approval), perhaps via pipe size upgrades, as it ties to an existing 200mm sanitary main running through the RV Park.

WATER SERVICE

The water service will tie to an existing water main currently servicing a fire hydrant located on the east side of Holy Trinity Academy. As a fire hydrant service, it is assumed this existing main is either 150mm or 200mm diameter. Hydrant pressure testing was completed for this area, and it appears this existing main can support the aquatic facility. The preliminary alignment for water servicing ties to the building at the front main entrance.

Pending detailed building design, a secondary alignment (not shown on the figure) could run along the west side of the facility to tie directly to the mechanical room.

STORM SERVICE

The primary storm design has two catchbasin manholes for the site; one in the parking lot and one in a grassed area. The primary alignment ties to an existing manhole located north of Holy Trinity Academy. At this time, there is no information on the existing manhole's depth nor the existing storm main size, so it is assumed the Aquatic Centre's drainage system can tie to this manhole without any downstream upgrades.

An alternative alignment would be to run the storm system eastward towards the creek. This would likely require a push to minimize impact to the forest in the green space. Depending on overall elevations, it may be possible to daylight the pipe prior to the creek, thereby allowing overland flows through the forest floor versus an outlet directly into the creek.

EXISTING MAIN CAPACITIES

At this time, it is assumed the various existing deep utility systems can support the proposed development. Service (flow) requirements will need to be provided to the Town for review of the existing system capacities.

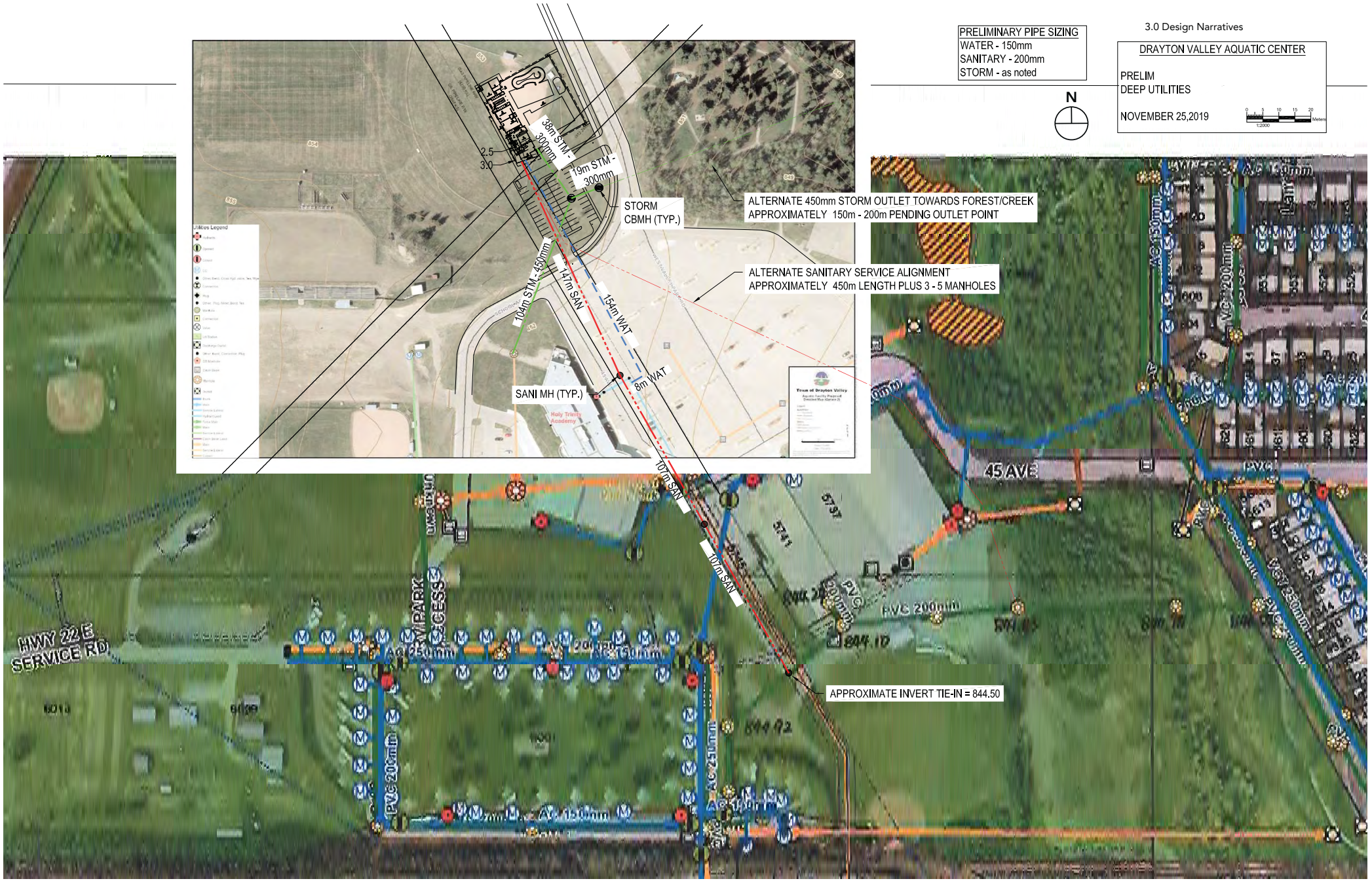
PRELIMINARY PIPE SIZING
WATER - 150mm
SANITARY - 200mm
STORM - as noted

DRAYTON VALLEY AQUATIC CENTER

PRELIM
DEEP UTILITIES

NOVEMBER 25,2019

N



3.7 BIMX

INTRODUCTION

The Drayton Valley and Brazeau Aquatic Centre IPD Team recognizes the municipal commitment to utilizing Building Information Modeling technologies to improve the construction and operation of its facilities. It is with this commitment in mind that this BIM Execution Plan (BIMXP) has been developed for the Drayton Valley and Brazeau Aquatic Centre. This project specific BIM Execution Plan shall serve as a road map for the integration of collaborative technologies by outlining standard procedures and aligning expectations between all key project stakeholders. When approved by Drayton Valley and Brazeau Aquatic Centre IPD Team, this BIMXP will become part of the Contract Documents for the Project and govern over other Contract Documents with regard to its subject matter.

The primary objective of the BIMXP is to outline project specific collaboration procedures and provide a clear understanding of the project deliverables. Our plan identifies the goals of the project, defines uses for BIM on the project to help achieve those goals (e.g. Design Authoring and 3D Coordination), provides a detailed design of the processes for executing BIM throughout the project, and outlines some of the technical guidelines for maintaining and storing the data created.

PROJECT APPROACH

The Drayton Valley and Brazeau Aquatic Centre IPD Team integrates applicable BIM techniques within construction processes, where through its application improvements in design, planning, safety, quality, and construction efficiency can be realized and client expectations met or exceeded.

The use of BIM allows the project team to streamline the design and document workflows that ultimately result in a better building. By implementing these techniques in the design phase, unnecessary rework can be eliminated. This lean design process helps control the cost and schedule of the project while cultivating a collaborative team environment.

Current technology allows design development to take place within a virtual 3D environment. These design models, when coordinated with the additional building system models, become the basis for the installers' and fabricators' shop drawings. Those drawings are used in the field, ensuring that the system is installed as planned. This approach relies on close team collaboration early in the design phase and allows designs to be finalized earlier than traditional methods, ultimately minimizing system interferences during construction.

BIM EXECUTION PLAN, A LIVING DOCUMENT

The BIMXP is intended to be maintained by the Project team through all phases of the project. Drayton Valley and Brazeau Aquatic Centre IPD Team recognizes that technology is constantly improving and that during the course of design and construction, project needs may surpass their current requirements. Key team members should review the BIMXP on a regular basis to determine cohesion with current project needs and propose modifications as needed for approval by the Owner. Drayton Valley and Brazeau Aquatic Centre IPD Team will maintain the current, approved version of the BIMXP and any updates approved by the Owner will be distributed to all applicable Project team members.

3.7 BIMX

KEY PROJECT CONTACTS

The list provided in this section contains the contact information for those individuals from the project team who are directly involved with management, facilitation, and/or production of models for the project. Please refer to the project directory for an extensive list of project personnel.

ROLE	ORGANIZATION	CONTACT NAME	E-MAIL	PHONE
ARCHITECTURAL LEAD	Group2	Dorian Resener	dorian.resener@group2.ca	306.262.5388
STRUCTURAL LEAD	Read Jones Christoffersen	Joshua Herron	Jherron@rjc.ca	587.745.0283
MECHANICAL LEAD	Arrow Engineering	Winston Wan	winston.wan@arrowonline.ca	780.801.6196
ELECTRICAL LEAD	WSP	Daniel Tyrkalo	Daniel.tyrkalo@wsp.com	780.410.6812
CONSTRUCTION BIM COORDINATOR/ MANAGER	Chandos Construction	Hunter Etherington	hetherington@chandos.com	780.641.0957
CONSTRUCTION PROJECT MANAGER	Chandos Construction	David Owen	dowen@chandos.com	780.229.0716

PROJECT GOALS / BIM USES

PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE	X
Programming	X	Design Authoring	X	Site Utilization Planning	X	Building Maintenance Scheduling	
Site Analysis		Design Reviews	X	Construction System Design		Building System Analysis	
		3D Coordination	X	3D Coordination	X	Asset Management	
		Structural Analysis		Digital Fabrication		Space Management/Tracking	
		Lighting Analysis		3D Control and Planning	X	Disaster Planning	
		Energy Analysis		Record Modeling	X	Record Modeling	
		Mechanical Analysis					
		Other Eng. Analysis					
		LEED Evaluation					
		Code Validation					
4D Modeling		4D Modeling		4D Modeling		4D Modeling	
Cost Estimation	X	Cost Estimation	X	Cost Estimation	X	Cost Estimation	
Existing Condition Modeling		Existing Condition Modeling		Existing Condition Modeling		Existing Condition Modeling	

3.7 BIMX

BIM PROCESS DESIGN

After each BIM Use is identified, it is necessary to understand the implementation process for each BIM Use and the implementation process of the project as a whole. The process map developed in this step allows the team to understand the overall BIM process, identify the information exchanges that will be shared between multiple parties, and clearly define the various processes to be performed for the identified BIM Uses. The use of process mapping techniques allows the team to effectively perform this step. These process maps will also serve as the basis for identifying other important implementation topics including contract structure, BIM deliverable requirements, information technology infrastructure, and selection criteria for future team members.

Mapping the BIM Process for the project requires the project team to first develop an overview map which shows how the different BIM Uses will be performed. Then, detailed BIM Use Process Maps are developed to define the specific BIM implementation at an increased level of detail.

Level 1: BIM Overview Map

The Overview Map shall show the relationship of BIM Uses which will be employed on the project. This process map should also contain the high-level information exchanges that occur throughout the project lifecycle.

Level 2: Detailed BIM Use Process Maps

Detailed BIM Use Process Maps are created for each identified BIM Use on the project to clearly define the sequence of various processes to be performed. These maps should identify the responsible parties for each process, reference information content, and the information exchanges which will be created and shared with other processes.

Examples of such maps have been included in Appendix C: Template Process Maps.

LOD MATRIX

The LOD Matrix is to aid the team in understanding what information needs to be produced at specific points along the project. This document is to be treated as a live document and to be appended as the team sees fit. The LOD descriptions and terms should follow the BIM Forum 2015 Level of Development Specification and supporting documents.

BIM - DELIVERABLES & LEVEL OF DEVELOPMENT

Project: Drayton Valley Aquatic Centre
Date: 09/12/2019

Group2
Architecture
Interior Design

LEVEL OF DEVELOPMENT (LOD SPECIFICATION 2016)

100	Symbolic or Generic Representation: No geometric representation is present.
200	Generic Element: Generic placeholder for approximate quantities, size, shape, location, and orientation.
300	Specific Element: Accurate graphic representation of quantity, size, shape, location, and orientation.
350	Coordination of Element: Parts necessary for coordination and interfacing with nearby or attached elements are modeled.
400	Detailed Element: Sufficient detail for fabrication, assembly, and installation is modeled.
500	Built Element: Field verified or "As-Built" representation in terms of size, shape, location, quantity, and orientation.
NA	Not Applicable to this Project

MODEL ELEMENTS				MODEL PRODUCTION & DELIVERY - BY PHASE								
				SD			DD			CD		
Level 1	Level 2	Level 3	Level 4	LOD	MEA	Comments	LOD	MEA	Comments	LOD	MEA	Comments
Major Group	Group Elements	Individual Elements	Sub Elements									
A: SUBSTRUCTURE												
	A10 - Foundations											
		A1010 - Standard Foundations		100	S		200	S		300	S	
		A1020 - Special Foundations		100	S		200	S		300	S	
	A40 - Slabs-on-Grade											
		A4010 - Standard Slabs-on-Grade		100	S		200	S		300	S	
		A4020 - Structural Slabs-on-Grade		100	S		200	S		300	S	
	A60 - Water and Gas Mitigation											
	A90 - Substructure Related Activities											
B: SHELL												
	B10 - Super Structure											
		B1010 - Floor Construction		100	S		200	S		400	S	
		B1020 - Roof Construction		100	S		200	S		400	S	
		B1080 - Stairs		100	S		200	S		400	S	
	B20 - Exterior Vertical Enclosures											
		B2010 - Exterior Walls		100	A		200	A		300	A	
		B2020 - Exterior Windows		100	A		200	A		300	A	
		B2050 - Exterior Doors and Grilles		100	A		200	A		300	A	
	B30 - Exterior Horizontal Enclosures											
		B3010 - Roofing		100	A		200	A		300	A	
		B3020 - Roof Appurtenances		100	A		200	A		300	A	
		B3040 - Traffic Bearing Horizontal Enclosures		100	A		200	A		300	A	
		B3060 - Horizontal Openings		100	A		200	A		300	A	
		B3080 - Overhead Exterior Enclosures		100	A		200	A		300	A	
C: INTERIORS												
	C10 - Interior Construction											
		C1010 - Interior Partitions		100	A		200	A		300	A	
		C1020 - Interior Windows		100	A		200	A		300	A	
		C1030 - Interior Doors		100	A		200	A		300	A	
		C1040 - Interior Grilles		100	A		200	A		300	A	
		C1070 - Suspended Ceiling		100	A		200	A		300	A	
		C1090 - Interior Specialties		100	A		200	A		300	A	
	C20 - Interior Finishes											
		C2010 - Wall Finishes		100	A		200	A		300	A	
		C2030 - Floor Finishes		100	A		200	A		300	A	
		C2040 - Stair Finishes		100	A		200	A		300	A	
		C2050 - Ceiling Finishes		100	A		200	A		300	A	
		C2090 - Interior Finish Schedules		100	A		200	A		300	A	
D: SERVICES												
	D10 - Conveying											
		D1010 - Elevators & Lifts		100	A		200	A		300	A	
	D20 - Plumbing											
		D2010 - Domestic Water Distribution		100	M		200	M		300	M	
		D2020 - Sanitary Drainage		100	M		200	M		300	M	

Partial example of LOD Matrix : For a full breakdown of the LOD Matrix, refer to Design Documents.

3.7 BIMX

COLLABORATION PROCEDURES

Collaboration Strategy

Drayton Valley and Brazeau Aquatic Centre IPD Team and the model content authors should agree to basic rules at the onset of the project so that the sharing of electronic models is efficient and benefits the entire team.

- Each team member is responsible for coordinating with and supporting the Drayton Valley and Brazeau Aquatic Centre IPD Team BIM Administrator regarding the utilization of BIM on the Project.
- Model files are shared and worked on BIM 360 Design provided by Group 2. Each discipline and trade working within a model shall provide their own BIM 360 Design licenses for their respective teams.
- All models on BIM 360 site shall have the same location for origin in order to align their models.
- Anything not intended for construction is to be removed before Tender/ issued documents.
- For AutoCAD based Models:
  - Use only standard AutoCAD fonts in the model space; do not use true type fonts or custom AutoCAD fonts.
  - For all AutoCAD based models each trade will use XREF command to bring in any drawings needed into the “background”.
  - XREF’s are not to be bound or inserted.
  - Borders and titles blocks are not transmitted with the drawings.
  - Nothing is drawn in paper space.
  - No models will have anything on layer zero (0) or Defpoints.
  - Drawings are to be purged (AutoCAD purge command) and audited (AutoCAD audit command) prior to being uploaded to get rid of any errors or garbage value in the drawing file.
  - Text is on separate layers from the modeled objects so that text can be turned off without turning off objects.
  - All layers are to be turned on and thawed.
  - All entities are to be delivered with colors, line types, and line weights set to BY LAYER.

Interactive Workspace

The team will dedicate conference room space capable of supporting the high-tech needs of a BIM intensive project. At minimum this BIM colocation facility will provide means to host web meetings, LAN or WAN internet connectivity, a projector and screen and/or large format monitor, and working space for modelers/detailers.

Providing a BIM Theater such as this will foster a collaborative environment where productive meetings can be held. It will also give the project team confidence in knowing that the latest design/coordination progress can be viewed in the field, at any time. Trades participating in the 3D coordination effort will be required to provide a project exclusive, on-site modeler/detailer who will work in the BIM Room on a full time basis.

3.7 BIMX

Meeting Schedule

MEETING TYPE	PROJECT STATE	FREQUENCY	PARTICIPANTS	LOCATION
KICK-OFF/ BIMXP REVIEW	Award Contract	Once	Owner and Team	Drayton Valley and Brazeau Aquatic Centre IPD Team
3D MEP & BUILDING SYSTEM COORDINATION	Pre-Construction	Bi-Weekly	Team – Owner Optional	Drayton Valley and Brazeau Aquatic Centre IPD Team
VIRTUAL MOCK-UP REVIEW	As Needed	As Needed per QA/QC Plan	Team – Owner Optional	TBD

Electronic File Folder Structure:

The team has deployed the use of BIM360 and BIM 360 Design to store and access 3D model files. All the 3D Model files will be stored in the main page and not within a specified folder. All model files shall be in accordance with the agreed upon naming convention described in the Appendix.

Coordination Sign-Off Drawings

Once all conflicts have been resolved and the structural, architectural and MEP systems have been fully coordinated, each specialty contractor is to provide fully annotated drawings of their respective systems with the control lines in PDF format for submission to the Architect / Engineer of Record for review and approval. Upon final review and approval, a copy of the fully coordinated submittal drawings is to be signed by each participant and will become the official "Coordination Sign-off Drawings." These drawings will be stored by the author on the SharePoint site in an IFC/Truth folder and will form the basis for resolution of any future field installation conflicts.

Other General Terms

- In preparing, developing or using the BIM models and data, the team will comply with this BIM Execution Plan, as same may be amended from time to time.
- Nothing in this BIM Execution Plan will relieve a design professional from its professional obligations with regard to design of the project, nor diminish the roles or responsibilities of any design professionals as the persons being primarily responsible for the Project's design, nor be construed to make a design professional responsible for a contractor's means and methods of construction.
- If any team member becomes aware of a discrepancy or conflict between any part of the BIM and another part of the BIM or another Contract Document, it will promptly notify the responsible designer(s) affected by such discrepancy or conflict and the Drayton Valley and Brazeau Aquatic Centre IPD Team BIM Administrator. Similarly, if any team member becomes aware of an error, omission or problem in the BIM, it will promptly notify the responsible designer(s) affected by such error, omission or problem and the Drayton Valley and Brazeau Aquatic Centre IPD Team BIM Administrator.
- A team member will not assume liability to any member of the project team to which that team member is not already contractually liable by reason of any error, omission, or inaccuracy in data provided by such team member to a BIM. Moreover, any liability of a project team member to the other members of the team with respect to contributions to or use of the BIM will be governed by the agreements and professional relationships between and among those project team members, and this BIM Execution Plan does not abrogate any such allocations of liability. Also, this BIM Execution Plan will not be construed to create any professional obligations or legal duties of care between or among any of the team members.
- A project team member may only rely on the substantive information contained within any data in the BIM to the extent appropriate to the level of detail required of such BIM data at that point in time.
- Accuracy of any information contained within transmitted BIM data is the responsibility of the transmitting team member, subject to the relevant standards of any professional obligations or legal duties of care to the recipient or other intended users and the applicable requirements for accuracy in this BIM Execution Plan.

3.7 BIMX

QUALITY CONTROL

Quality Control Strategy

The quality of the finished product depends greatly on the quality of the design. In a BIM/IPD environment, the quality of the design depends on the quality of the models and the documents produced from those models. In order to produce quality models the team is committed to performing focused and scheduled quality checks throughout the design process.

Conforming to our Quality Control Plan, our BIMXP will be executed supporting the additional design phase quality control measures of constructability and independent peer reviews. Our designers will work closely with one another and log major changes in each discipline model to ensure that each system is constructible, meets code, and maintains the design intent. Each model represents a part of the finished product; therefore, the sum of the parts will represent the whole, which we will execute during construction. All of these issues will be captured by utilization of our Constructability Report.

The team will be creating virtual mock-ups for certain definable features. A virtual mock-up is a highly detailed 3D representation of a small portion of the project or building which provides a highly visual way to review the area and resolve any coordination concerns. The virtual mock-ups will be reviewed and revised as-needed at the pre-installation meetings to ensure that the work put in place meets or exceeds the expectations of the team.

Quality Control Schedule

CHECKS	DEFINITION	RESPONSIBLE PARTY	SOFTWARE PROGRAM(S)	FREQUENCY
VISUAL CONSTRUCTABILITY CHECKS	Assure there are no unintended model components, the design intent has been followed, and model reflects constructible building elements.	Consultants, trades and Drayton Valley and Brazeau Aquatic Centre IPD Team	Revit	As-needed
COLLISION CHECK	Detect problems in the model where two building components are clashing including soft and hard clashes.	Drayton Valley and Brazeau Aquatic Centre IPD Team w/ Consultants and Trades	Navisworks	Weekly Typically Monday As-Needed
MODEL INTEGRITY CHECKS	Check the models for duplicate elements; assure that models reflect the current design; assure that systems models illustrate the as-built conditions.	Consultants and Drayton Valley and Brazeau Aquatic Centre IPD Team	Miscellaneous	Monthly

3.7 BIMX

SOFTWARE APPLICATIONS

Software

The following chart lists the software approved and planned for use on this Project:

BIM USE	DISCIPLINE (IF APPLICABLE)	SOFTWARE	VERSION
DESIGN AUTHORING	Architectural, Structural, Mechanical, Elecctrical, and Pool	Revit	2020
DESIGN REVIEW	All	Revit / Navisworks	2020
3D COORDINATION	All	Navisworks Manage	2017 & Newer
4D PHASE PLANNING	Selective	Fuzor	2020
RECORD MODELING	All	Revit	2020
VIRTUAL MOCK-UPS	Selective	Revit / Archicad / Sketchup / Enscape / Fuzor	as needed
5D MODEL BASED ESTIMATING	Selective	Assemble	N/A
5D MODEL BASED ESTIMATING	Selective	Vico OfficeAssemble	R5.0 & NewerN/A

Each project team member is responsible for (a) acquiring and maintaining all computer and network hardware, software, infrastructure, services and other computer technology necessary for its role in the Project and (b) for complying with the software requirements set forth in this BIMXP. If a team member desires to acquire and use systems, software, hardware, services or other computer technology that would not be compatible with the technology required in this BIMXP, that team member will obtain the consent of the Drayton Valley and Brazeau Aquatic Centre team prior to its acquisition and use for the Project. If a team member utilizes any incompatible technology without such prior consent, that team member will bear all costs resulting from damages or losses to any other team member caused by the use of any incompatible technology.

MODEL STRUCTURE

File Naming Convention: Attachment

To promote organization and consistency for compiling the large amounts of data inherent to BIM processes the Drayton Valley and Brazeau Aquatic Centre IPD Team Team has developed a File Naming Convention. Each entity responsible for developing 3D model files will adhere to this convention.

Each file shall have the project, building, and discipline identification as shown in the convention chart. This provides the viewer with “at a glance” information to easily identify the file contents prior without opening the file to view its contents. The floor and area designations are optional as some systems and building/project components need not be separated into these smaller areas, such as site improvements.

Example of current file: 19046-DVAC-ARCH-360.rvt

PROJECT NUMBER 19046	PROJECT DVAC	DISCIPLINE INITIAL ARCH	AREAFILE TYPE B360
19046	DVAC = ArchitecturalDrayton Valley and Brazeau Aquatic Centre	ARCH = Architectural STR = Structural MECH = Mechanical EL = Electrical ST = Steel CCL = Chandos Construction Ltd.	BIM 360

Measurement and Coordinate Systems:

(ConsensusDOC 301)

THE FOLLOWING REPRESENTATION IS APPLICABLE TO THE DIMENSIONAL ACCURACY OF ANY CONTRIBUTION OF OR TO A MODEL

Notwithstanding anything to the contrary in the other Contract Documents, each Contributor represents that the dimensions in its contribution to a model are accurate to the extent that the BIM Execution Plan specifies dimensions to be accurate at that stage of the Project. Models and drawings are complementary; dimensions retrieved from the drawings should match those found in the models.

3.7 BIMX

BIM and CAD Standards:
The purpose of this section is to have a unified naming convention across models. This will facilitate several BIM functions including cost analysis, specification writing, material list generation, quantity takeoff and quality control/assurance among others. The basis for extracting the required information listed above is by locating the relevant Master format 2014 code in a consistent and predictable location in model content across platforms and companies. The basis of this naming convention is to provide the Master format 2014 code for extraction, if required, to the project team, while simultaneously providing the model builders enough name data to find the objects they are seeking.

PHASE	DISCIPLINE	TOLERANCE
EXISTING CONDITIONS MODELS	Civil (Underground)	Accurate to +/- (50mm) of actual size Accurate to +/- (300mm) of actual location
EXISTING CONDITION MODELS (ACCESSIBLE ITEMS)	Architectural Structural M/E/P/FP	Accurate to +/- (3mm) of design intent size Accurate to +/- (50mm) of design intent location
DESIGN DOCUMENT MODELS	Civil Architectural Structural M/E/P/FP	Accurate to +/- (3mm) of design intent size Accurate to +/- (50mm) of design intent location
SHOP DRAWING MODELS	Civil Architectural Structural M/E/P/FP	Accurate to +/- (2mm) of design intent size Accurate to +/- (25mm) of design intent location
AS BUILT MODELS	Interiors not related to code	Accurate to +/- (3mm) of design intent size Accurate to +/- (50mm) of design intent location
AS BUILT MODELS	Interiors related to code	Accurate to +/- (3mm) of design intent size Accurate to +/- (6mm) of design intent location
AS BUILT MODELS	Civil Envelope Structural M/E/P/FP	Accurate to +/- (2mm) of design intent size Accurate to +/- (50mm) of design intent location

3.8 CONSTRUCTIBILITY

SITE UTILIZATION/LOGISTICAL PLAN

During validation, the constructability PIT developed a logistics plan to implement when construction begins. The plan accounts for areas to accommodate laydown and storage, a prefabrication yard, site trailers and parking for the workers. With a plan drafted, it allows the construction team to adjust as necessary and ensure that a high productivity will be maintained. Please see the attached plan.

QA/QC Plan

Our quality program is built from the foundation of ISO 9001 standards and will be tailored to satisfy the needs of the Town of Drayton Valley and Brazeau County. Using this mindset, we can achieve a high-quality product the first time. We have learned from experience that the success of the project lies in the early integration of both QA/QC Plans and the expectations for the ultimate commissioning of the project. However, we cannot leave it to planning only. There must be periodic check points throughout the project to ensure we are on point with the established plans. As part of the team, we have experts for this project who have extensive experience and knowledge regarding similar Mechanical and Electrical systems and facilities.

Setting expectations early, while clearly defining the quality roles, has shown us great success on-site. This is to ensure that our trade partners have proper knowledge of plans and specifications, work area, and change management. Presenting this process at both pre-award and pre-mobilization reinforces the preparation component required from our trade partners and suppliers.

Inspection Test Plans or (ITP) are used on all of our projects. In-depth specification review will be conducted with the Aquatic Centre project team along with the trade team to develop specific ITP for each discipline. We engage our contractor expertise to assist in this planning and building of each ITP so it may be tailored specifically for each scope and easier to apply on the Aquatic Centre site for each activity. The ITP itemizes a step-by-step procedure to follow on site pertaining to preparation, installation and final inspection. ITPs capture required mock-ups, hold-points, third-party inspections, and specifications criteria that cannot be deviated from. Utilization of ITPs in the pre-planning stage allows on-site execution to proceed with clarity, resulting in reduced error and re-work.

Our project team will conduct final quality walkthroughs with all sub-trades prior to demobilization from site to ensure all contractual commitments and desired level of quality is achieved. During this walkthrough, we can provide a level of confidence to the Town of Drayton and Brazeau County to ensure that 'done means done'. Prior to this walk through, our trade partners are to provide our site teams with internal trade specific punch lists with comments to provide us with the comfort that a thorough

DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE CONCEPT SITE PLAN

3.8 CONSTRUCTIBILITY

review and final fit-out has been conducted. The project management team collects these lists and ensures that all noted items are indeed completed to our level of satisfaction prior to conducting a final review with clients and stakeholders.

PROCUREMENT PLAN

Major trades on the Aquatic Centre project are part of the poly-party agreement and we do not require to procure them any further (mechanical, electrical, tiling and pool). Other trades that will be required, including but not limited to steel stud and drywall, glazing, painting, masonry, scaffolding etc., will be procured publicly following industry standards.

A request for proposal will be issued rather than a traditional tender when the requirements for goods and services and construction services needed cannot be definitively specified or where innovative solutions to a problem are sought. The selection of the successful proponent will be based on the effectiveness of the proposed solution rather than on price alone. Each request for proposal document shall include a list of evaluation criteria and shall be evaluated by the Project Management Team (PMT). Evaluation criteria may include but is not limited to, price, experience and qualifications, methodology, references, schedules and project approach. RFPs will be based upon 50% quantitative (pricing) and 50% qualitative (qualifications) criteria.

For construction costing more than $10,000.01 but not more than $200,000.00, a minimum of three written proposals will be obtained. Having reviewed the proposals, the PMT team may make the purchase from such supplier or contractor and upon such terms and conditions that in their opinion are most appropriate for the project. When the lowest quotation cannot be recommended, a report shall be made by the PMT for approval by the Senior Management Team (SMT), the Town of Drayton Valley Council and Brazeau County Council prior to making the purchase. In appropriate circumstances, a formal sealed request for quotation, tender or request for proposal may be utilized in this dollar range.

For construction costing $200,000.01 or more, a request for proposal posted through an electronic tendering system such as but not limited to Alberta Purchasing Connection (APC), will be issued and awarded with the approval of the PMT and potentially the SMT.

Following is a summary of the tender and procurement process the Aquatic Centre project will follow:

- The PMT will assemble the tender documents and distribute an RFP to the market .
- The RFP package will include the most up to date schedule/s agreed to by the PMT which the successful sub-trades are expected to adhere to.
- Receive the sub- trade proposals in a manner that complies with the Town of Drayton Valley and Brazeau County requirements.
- The PMT will analyze the tenders and perform due diligence on the sub trade responses to ferret out scope gaps, scope overlaps, exclusions, and inclusions.
- Assemble a tender proposal summary of the results.
- Meet with the Town of Drayton Valley and Brazeau County and the SMT to review the tender summary on a fully open book basis with the goal to agree on which sub trades scopes could be awarded to.
- Conduct further due diligence with sub trades where necessary. This could include meetings with the sub trades and consultants to cover any loose ends in the proposals.
- Explore cost savings suggestions with the sub trades and report such to the PMT for consideration.
- Provide a final recommendation to the Town of Drayton Valley and Brazeau County and SMT.
- Receive authorization from the SMT and the Town of Drayton Valley and Brazeau County.
- Award contracts to successful sub trades upon receipt of the authorization to proceed.

OPEN BOOK TENDERING

The results of the sub trade tender are open book. Recommendations for selected sub trades are made by Chandos and reviewed and confirmed with the client. In a scenario where a project needs to be fast tracked due to schedule requirements, sequential tendering can be implemented to get foundations under construction prior to the final design of the interior being completed.

PURCHASING

When possible, we encourage purchasing from and support of local suppliers, manufacturers and businesses. A large percentage of our current subtrade list is comprised of local businesses. Further to that, there are also materials that are procured, manufactured and extracted locally. While following the specifications on our projects, we will encourage the design team to use local materials and suppliers whenever the option is viable.

3.8 CONSTRUCTIBILITY

COMMISSIONING

Commissioning and closeout of the project will be key performance targets throughout the Aquatic Centre project design, construction, turnover and facility operation. The attention to detail will result in a space that performs as designed at time of delivery. Chandos is committed from design and installation through to the post occupancy period to ensure proper planning, installation, testing and operations for each assembly to meet the intended project requirements of the Town and County. We have a very rigorous and detailed QA/QC process that includes the following:

- Pre and Post-construction review
- Operations and maintenance seminars (video recorded for reference if requested)
- Close out materials (as built drawings; operations and maintenance manuals)
- Warranty administration
- Understand and coordinate and third-party inspections and commissioning agents

The Town and County facility operators should co-develop the commissioning plan for the Aquatic Centre project including the conditions of satisfaction for facility turnover prior to occupancy. As part of our standard operating procedure, the commissioning plan is developed during the preconstruction phase. We have rigorous procedures in place to ensure the metrics and gauges of success for design, specification and performance are met during construction and at handover. Our QA/QC program will match with our commissioning vision and master plan to identify critical tolerances and commissioning protocols.

BASE TARGET COST ESTIMATE

Please see the attached base target cost estimate. There are two estimates provided, one for a 6-lane facility and the other for an 8-lane facility.

4.0
ENERGY OPTIMIZATION AND UTILITY COSTS

4.1 SUSTAINABILITY OVERVIEW

Energy efficiency was identified as a key project goal from the outset of the validation phase. In 2017, The Town of Drayton Valley commissioned a report titled Drayton Valley and Brazeau Aquatic Centre Net Zero Study. This study was completed by Revolve Engineering and formed a starting point for the Validation Phase design. The target of Net Zero energy has evolved through validation phase in light of available budget, the goal to keep operating costs and maintenance low, and further analysis of technically feasible strategies for a cold-climate aquatic facility.

The IPD process lends itself wonderfully to design for energy performance. By working collaboratively and iteratively, input from the client, the architectural team, mechanical team, electrical team, and pool consultants were used to form the conclusions presented in this section. By applying parametric analysis, the optimal design options to meet the project's energy targets were selected, balancing performance with impact on capital and operational cost.

ENERGY PERFORMANCE TARGETS

The Drayton Valley and Brazeau Aquatic Centre Net Zero Study served as a starting point for the project's energy performance target. This target has evolved through the IPD process to satisfy the owner's requirements and meet the project budget. The current target includes three goals:

- Comfortably meet the National Energy Code of Canada for Buildings (NECB) 2017
- Do not exceed the operational energy charges of the existing pool facility
- Include additional energy conservation measures (ECMs) and renewable generation systems where they offer improved lifecycle benefits such as reduced operational cost, improved durability or ease of operations and maintenance, and lower capital cost

CHALLENGES OF THE ORIGINALLY PROPOSED HVAC SYSTEM

The Drayton Valley and Brazeau Aquatic Centre Net Zero Study proposed an electric fueled ground source heat pump system with heat injected from the neighboring arena. While this system is the most theoretically efficient HVAC system available, several concerns were identified by the IPD team.

Unbalanced Loads

A ground source heat pump system acts as a thermal storage system, pumping heat from the ground during the heating season and pumping heat into the ground during the cooling season. The IPD team expressed concern at the potential for field drift (or over-cooling of the ground) using this system at the new aquatic facility. Because the facility's heating loads are significantly larger than the cooling loads, additional sources of heat are required to balance the system. This additional heat could be provided in part by the heat rejected from the nearby Omniplex arena, or by a boiler heating plant. The challenges with the rejected heat are outlined below, and the additional heat provided by a boiler plant would not come with the high-efficient coefficient of performance (COP) that could be obtained from a heat pump system.

Complexity of Operations

The mechanical consultant indicated that balancing these loads would require a more complex controls system and careful operation, both in contradiction with the goal to provide an easy to maintain and operate system. The IPD team identified that this was not desirable for the project.

Capital and Operational Cost

The mechanical team also indicated that because the cooling loads are so relatively low and the heating requirements are so relatively high, the heating plant was likely to require almost fully redundant capacity. This means that including the ground source heat exchange system would present as an added cost, resulting in no significant savings on the boiler plant capacity. The IPD team identified that this was not desirable, given the project budget. It should be noted that the Drayton Valley and Brazeau Aquatic Centre Net Zero Study indicated that a construction budget of $24,052,000 was required to construct the design including a ground source heat pump and rooftop solar PV, achieving 30% onsite generation. The current budget for the project is $18,500,000, or $5,552,000 less than that amount. Removal of the ground source heat pump system represents a necessary cost savings to the project.

The Town of Drayton Valley pays both consumption and demand charges for their energy. At the existing fuel-fired pool, these charges amount to blended rates of 11.2 c/kWh for electricity and 2.1 c/kWh for natural gas. A heat pump system, though very energy efficient, would increase electrical demand significantly as it results in the electrification of heating loads. At current demand rates, electricity is already 5.3x more expensive than natural gas. This spread is likely to increase unfavorably as heating loads are electrified, or as electricity becomes more expensive in the province as coal is removed from the electric generation mix. The IPD team identified that this was not desirable, given the project target of reduced operational energy costs.

4.1 SUSTAINABILITY OVERVIEW

Challenges of Incorporating Rejected Heat

The original study relied on waste heat recovered from the neighboring Omniplex arena. This heat was fed into the ground source heat pump system for later use in the aquatic facility. The IPD team identified several challenges with this plan. First, this design links the two facilities together, making the aquatic facility fully dependent on the ice arena to meet the majority of its heating needs. As the arena is an older facility, this is a potentially significant risk. Second, physically recovering the heat would likely require directional drilling to connect the heat from the arena to the aquatic facility. This would require additional cost and result in further heat loss of the already low-grade rejected heat. Scheduling presents another challenge – the arena is not operational year-round. While the ground source heat pump system would store heat from the arena's operational period which could be used during the non-operational months, this does not align well with the aquatic facility's year-round need for pool heat.

The above concerns pushed the project to consider a more traditional natural gas fired hydronic heating system rather than an electric heat pump system. It should be noted that even with the electric heat pump system, the Drayton Valley and Brazeau Aquatic Centre Net Zero Study indicated that rooftop solar PV was only able to meet approximately 30% of the project's energy demand – significantly far from Net Zero energy operations.

NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS (NECB) 2017 COMPLIANCE

The project must be designed to comply with the National Energy Code of Canada for Buildings 2017. The NECB includes criteria for energy performance of building envelope, HVAC, and electrical systems. This new iteration of the energy code involves increasingly stringent requirements for the building envelope, including a strict method of calculating performance reduction due to thermal bridging. There are three means which the new aquatic facility could pursue to demonstrate compliance with the energy code.

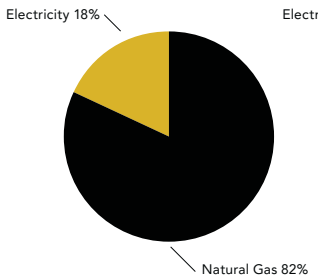
- **Prescriptive Path** – while this appears to be the simplest route, the rigid list of mandatory items offers very little flexibility in design approach or material selection to meet the project needs. In particular, the building envelope requirements are deemed overly stringent in climate zones 7 and 8. With 5400 heating degree days, Drayton Valley falls into climate zone 7 and therefore the prescriptive building envelope requirements are deemed too costly and too challenging to construct.
- **Trade-off Path** – this path allows more flexibility than the prescriptive path as trade-offs can be made between similar building features. Generally, construction costs can be reduced compared with the prescriptive path though it still does not offer the design flexibility of the performance path (energy modelling). This method is recommended for simple projects when a large allocation of both construction budget and design consideration is placed on the envelope.
- **Performance Path** - this path uses whole building energy simulation to tradeoff between mandatory requirements while still demonstrating that the overall energy efficiency of the system has not been compromised. This path offers the designer the most flexibility in meeting the energy code requirements and allows for optimal design innovation and integration of energy-efficient technologies.

The Performance Path is recommended as it provides the best value to the project by allowing the design team to evaluate various combinations of design strategies, components, and technologies, until they reach a solution that provides the greatest energy savings for the lowest overall cost. This path aligns best with the IPD approach, leveraging the energy model as a design support tool to weigh the various approaches to demonstrate compliance in the most constructible and cost-efficient manner.

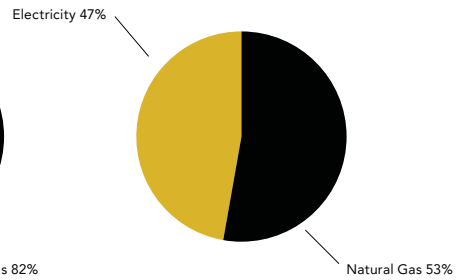
OPERATIONAL ENERGY COST

One of the identified IPD project values was that the new facility should not exceed the annual energy cost of the town's existing pool facility. The Town of Drayton Valley provided the annual energy and cost breakdown for years 2014 through 2019. The latest complete year was 2018, which is represented below in graphs showing both the energy consumption and energy cost breakdown by fuel type.

Park Valley Pool Energy Consumption



Park Valley Pool Energy Cost



4.1 SUSTAINABILITY OVERVIEW

As is expected given the relative cost of electricity and natural gas, while electricity only accounts for 18% of the existing facility's energy use, it results in almost half of the facility's annual energy cost. The annual energy cost by fuel type and total is presented below:

	ELECTRICITY	NATURAL GAS	TOTAL
2014	$ 44,531.22	$ 31,531.54	$ 76,063
2015	$ 39,405.99	$ 32,982.88	$ 72,389
2016	$ 35,679.42	$ 34,080.21	$ 69,760
2017	$ 37,378.64	$ 40,609.52	$ 77,988
2018	$ 43,960.56	$ 49,452.62	$ 93,413

As a target, the new aquatic facility is using the 2018 total energy cost of $93,413 as the maximum annual operational energy cost.

It should be noted that the energy consumption of the existing Park Valley Pool facility equates to an annual energy utilization intensity (EUI) of 1,479 kWh/m^2. This is approximately double what would be expected for the facility, with most of the overages in natural gas. An energy audit completed by 3D Energy in 2017 indicates that while the facility does have a very poor building envelope, the ventilation system is equipped with heat recovery and the boiler plant is reasonably efficient. This may indicate operational inefficiencies leading to a higher-than expected natural gas consumption. Care should be taken to educate facility operators on new HVAC operations procedures and systems to ensure optimized performance measures are utilized.

PARAMETRIC ENERGY ANALYSIS

A whole building energy simulation was conducted to leverage the energy model as a design support tool, weighing the various approaches to achieving the targets of NECB 2017 compliance and minimized operational energy cost. The following section describes the parameters that were analyzed, with system and technology descriptions.

Roof Constructions

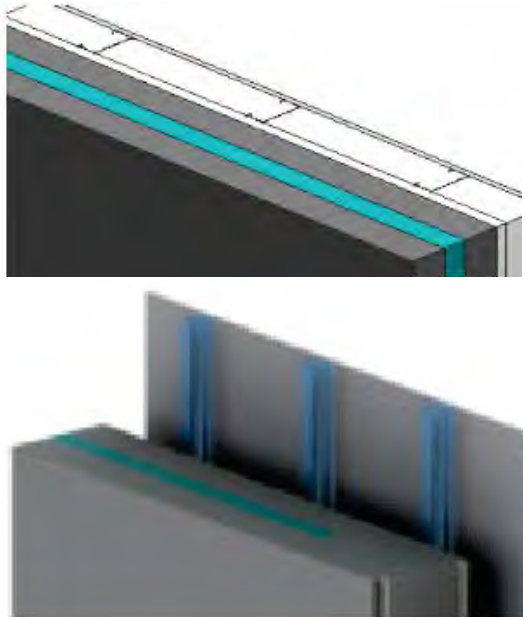
The following roof constructions were tested parametrically in the energy model.

PERFORMANCE	DESCRIPTION	
R_{eff} -30	Polyisocyanurate insulation, 5"	Poor
R_{eff} -35	Polyisocyanurate insulation, 6" Compliant with NECB 2011 prescriptive roof value	Typical
R_{eff} -41	Polyisocyanurate insulation, 7.5" Compliant with NECB 2017 prescriptive roof value	Efficient
R_{eff} -60	Polyisocyanurate insulation, 10.5"	High Performance

4.1 SUSTAINABILITY OVERVIEW

Wall Constructions

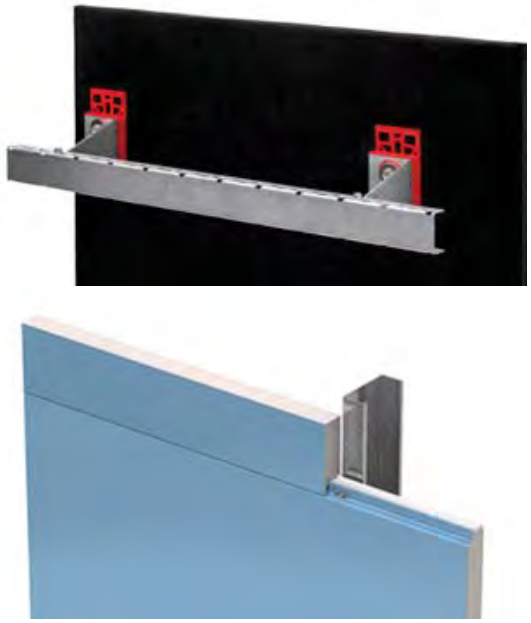
The following wall constructions were tested parametrically in the energy model. The first iteration of modeling included the four assemblies with performance ranges of R_{eff}-23 and up. A second round of modeling following the Energy Workshop tested additional constructions for R_{eff}-15 and 20.

R_{EFF}	SAMPLE WALL DESCRIPTION	SAMPLE IMAGE	
REFF -15	Reff -15 R-20 precast concrete panel, including de-rate for perimeter panels		Poor

4.1 SUSTAINABILITY OVERVIEW

R_{EFF}	SAMPLE WALL DESCRIPTION	SAMPLE IMAGE	
R_{EFF} -20	Typical commercial steel stud wall with 4" exterior insulation with thermally broken clips		Poor

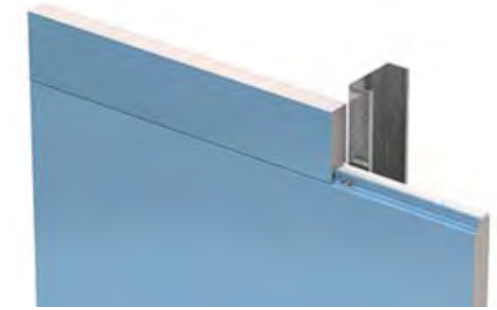
4.1 SUSTAINABILITY OVERVIEW

R_{EFF}	SAMPLE WALL DESCRIPTION	SAMPLE IMAGE	
R_{EFF} -23	Knight Wall System MFI D-Series Horizontal, 6" exterior insulation Kingspan Quadcore Optimo insulated metal panel, 3"		Typical

4.1 SUSTAINABILITY OVERVIEW

R_{EFF}	SAMPLE WALL DESCRIPTION	SAMPLE IMAGE	
R_{EFF} -28	Knight Wall System MFI D-Series Horizontal, 6" exterior insulation with cavity insulation Kingspan Quadcore Optimo insulated metal panel, 3.5"		Efficient

4.1 SUSTAINABILITY OVERVIEW

R_{EFF}	SAMPLE WALL DESCRIPTION	SAMPLE IMAGE	
R_{EFF}-40	Kingspan Quadcore Optimo insulated metal panel, 5” 8” exterior insulation with thermally broken clips and 4” SIP panel	 	High Performance

4.1 SUSTAINABILITY OVERVIEW

The NECB 2017 differs from previous versions of the energy code in its accounting of thermal bridging of the building envelope. The code requires that performance reduction from closely spaced repetitive structural members and ancillary members, structural elements which penetrate or intersect the building envelope, and the junction between glazing assemblies, spandrels, parapets, roof-to-wall junctions, corners, and edges of walls or floors be considered. Given the current stage of concept design, a derating factor of 30% was applied to the above effective R-values to estimate the impact of the above calculations. This value represents a reasonable reduction for a design which thoughtfully limits thermal bridging.

Glazing Performance

The following glazing performance values were analyzed parametrically:

PERFORMANCE	DESCRIPTION	
USI 2.1	Double pane low-e aluminum frames, thermally broken (ie. Solarban 60 in Kawneer 1600 UT)	Typical
USI 1.4	Triple pane low-e aluminum frames, fiberglass pressure plate (ie. Solarban 60 in Kawneer 1600 UT)	Efficient
USI 0.85	Triple pane low-e fiberglass frames (ie. Solarban 60 in Glascurtain)	High Perf.

Translucent Panel Performance

The design includes translucent panel products. The following panel performances were analyzed parametrically:

PERFORMANCE	DESCRIPTION	
U-0.23	Batt Kalwall, VLT 14-30% depending on colour of exterior face sheet.	Typical
U-0.14	Batt Kalwall, VLT 5-15% depending on colour of exterior face sheet	Efficient
U-0.05	Aerogel Kalwall, VLT 14-21% depending on colour of exterior face sheet	High Perf.

Overall Glazing Percentage

The glazing percentage of the current design is approximately 15%. This value includes all glazing and translucent panel products. Glazing ratios of 15%, 20%, and 25% were tested parametrically for their impact on energy performance.

Boiler Performance

Based on feedback from the mechanical team, boiler efficiencies of 88%, 90%, and 92% were analyzed. All three performance values are related to the same high-efficiency natural gas condensing boiler equipment. The changes in efficiency are related to the return water temperature. The cooler the return water temperature is, the more condensing the boiler achieves, resulting in higher efficiency. Cascading of equipment and loop design impact the return water temperature.

Ventilation Heat Recovery

Three scenarios of ventilation heat recovery were analyzed. As the natatorium ventilation rate is quite high (4-6 ACH) to maintain desired humidity levels, heat recovery has a large potential to impact energy performance. Due to the desire to supply dry incoming air for dehumidification, only sensible heat recovery and not latent energy recovery was analyzed.

HEAT RECOVERY EFFECTIVENESS	DESCRIPTION	
65%	Typical commercial heat recovery unit	Typical
75%	Improved commercial heat recovery unit	Efficient
90%	High performance commercial heat recovery unit	High Perf.

Lighting Power Density

Three lighting power density options were tested – equal to NECB 2017, 10% better (lower lighting power density) than NECB 2017, and 15% better than NECB 2017.

Rooftop Solar PV Generation by Month

4.1 SUSTAINABILITY OVERVIEW

Lap Pool Size

The project team is considering the implications of a six versus eight lane lap pool. Based on conversations with the pool mechanical team and preliminary pumping and heating calculations, the following pump and heating scenarios have been modeled:

6 lane lap pool	Pool pump (electricity): 338 MWh Pool heating (natural gas) 345 MWh
8 lane lap pool	Pool pump (electricity): 371 MWh Pool heating (natural gas) 375 MWh

The loads above do not include a difference in conditioned space volume to accommodate a larger pool, which may be required. For the NECB 2017, the above loads are modeled as process loads and present in both the reference and proposed simulations. While the consumption is the same in both models, this increases overall energy consumption, impacting the relative savings that can be obtained via other measures.

Parameters Assumed Code Compliant

At this concept level of design, several parameters were modeled as code compliant. These parameters either will not greatly impact construction cost and building performance or require other variables to be set before they can be optimized. The following variables were modeled as NECB 2017 code compliant:

- Slab insulation – R-7.5 for 1.2 m of perimeter insulation
- Door performance – USI 1.9
- Vestibules – per NECB 2017
- Fan Power – per NECB 2017
- Daylighting and occupancy sensors – per NECB 2017

Nighttime Reduction Variance

Based on conversations with the pool mechanical team and preliminary pumping energy calculations, a savings of 110,979 kWh/year on pool pump energy was modeled when the nighttime reduction variance was applied.

On-Site Solar PV Generation

Potential solar generation was modeled using the Helioscope program. Using the designed rooftop area, assuming 75% is available for solar panel generation, and typical panel spacing, a maximum rooftop system size of 207 kW was calculated. Assuming an installation cost of approximately $2.90/watt, this maximum rooftop system investment equates to approximately $600,000.

4.1 SUSTAINABILITY OVERVIEW

The parametric model included options for no solar generation, maximum rooftop solar generation investment of $600,000, and a mid-range option of a $300,000 solar PV investment. The solar investment could be increased if other areas are made available as generation surfaces, including vertical cladding, ground-mounted PV, parking lot shading, and the roof surfaces of neighboring facilities.

PARAMETRIC ENERGY RESULTS

Without the incorporation of on-site solar generation, the parametric analysis yielded a range of performance outputs:

- Energy Use Intensity (kWh/m2): ~490 – 900 kWh
- Savings relative to the NECB 2017: ~-6% – 36%
- Annual energy cost: ~$65,000 – $100,000 per year
- Greenhouse gas emissions: 525 – 800 tons CO2eq/year

ENERGY PERFORMANCE TARGET 1: OPERATIONAL ENERGY COST

One of the identified IPD project values was that the new facility should not exceed the annual energy cost of the town's existing pool facility. As a target, the new aquatic facility is using the 2018 total energy cost of $93,413 as the maximum annual operational energy cost. The parametric analysis demonstrated that many options exist to keep utility costs below those of the existing pool.

The operational energy cost is particularly sensitive to the following design variables:

- ventilation heat recovery,
- night turndown,
- onsite solar generation.

While options exist to keep costs below those of the existing pool without the premium options for those three variables, all options which exceed $93,413 in annual energy cost include no solar generation, no night turndown, and 65-75% efficient heat recovery.

ENERGY PERFORMANCE TARGET 2: (NECB) 2017 COMPLIANCE

The project must be designed to comply with the National Energy Code of Canada for Buildings 2017. The NECB includes criteria for energy performance of building envelope, HVAC, and electrical systems. By using the performance modeling path, the project team has the most design flexibility, with the ability to tradeoff between all building systems to demonstrate compliance in the most cost effective and constructible manner. At the concept level of design, a buffer of 10-15% over the NECB is considered best practice for targeting compliance. The parametric analysis demonstrated that many options exist to demonstrate compliance with the NECB 2017.

The NECB 2017 compliance is particularly sensitive to the following design variables:

- glazing ratios over 20%
- wall R-values
- translucent panel performance
- ventilation heat recovery

While options exist to comply with the NECB 2017 without the premium options for those four variables, all options that are not compliant with the NECB include glazing ratios 20%+, effective wall performance of R-28 or less, translucent panel performance of U-0.23, and ventilation heat recovery efficiency of 65%.

OTHER OBSERVATIONS

The following other observations were noted during the parametric analysis:

- night turndown results in approximately $15,000 in annual energy savings
- the six-lane pool option results in approximately $6,000 in annual pumping and water heating savings versus the eight-lane pool

4.1 SUSTAINABILITY OVERVIEW

COGENERATION

Extensive analysis eliminated geo-exchange from the project due to low return on investment. The team then investigated alternative sources of reducing energy consumption, cost, and emissions. Combined heat and power technology was one investigated option. Cogen or CHP has no impact on energy consumption, but by using natural gas fuel can provide baseline heat and electricity, with the electricity supply at sometimes significantly reduced cost. Cogen is typically well suited to pool facilities as the electricity required for pool pumping and natural gas consumption for pool heating are relatively constant and equal loads. Many similar recreation facilities in Alberta are retrofitting to include cogeneration technology to reduce operational costs, supported by available funding from the Municipal Climate Change Action Centre (MCCAC) for existing buildings.

Pricing was sourced from two trades (ATCO and Custom Power Generation) to supply and install a cogeneration system ($250,000-275,000 for a 35kW-60kW system). Maintenance costs were quoted as $0.02/kWh from ATCO and $18.75 per operating hour by Custom Power. The ATCO quote estimated a payback of ~14 years. The system is estimated to provide an annual energy cost savings of $23,202 per year and an emissions reduction of 108 t_{CO2eq}/year.

The mechanical team indicated that while a CHP system would be able to supplement heating loads for a favorable price, it is unlikely building heating systems (ie. boilers) could be undersized to compensate for the additional CHP capital cost, given that redundancy is required for reliability and CHP down-times. While cogeneration does represent an interesting opportunity for the community to reduce energy costs and greenhouse gas emissions, given the additional capital cost, the PMT decided not to pursue cogeneration at the facility as part of the base design.

4.1 SUSTAINABILITY OVERVIEW

RECOMMENDATIONS

Based on the project energy targets and the results of the parametric analysis, the two options in the adjacent table are recommended for the design.

The performance option offers a larger buffer over the NECB 2017 which may be helpful as the design progresses and equipment and constructions are selected.

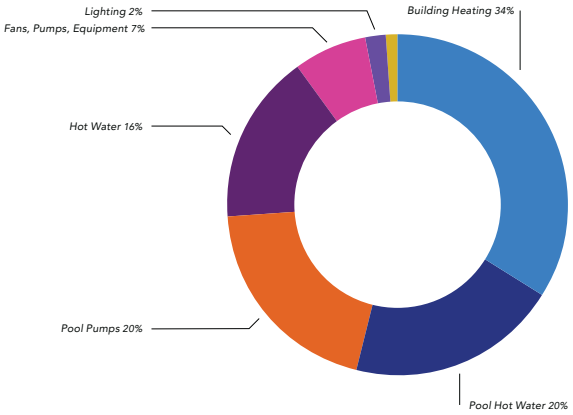
The value option offers a smaller buffer, but some notable capital cost savings measures including roof and wall performance. Should the project team choose the value option, extra care should be taken to ensure all other performance metrics are met or exceeded, particularly ventilation heat recovery.

	PERFORMANCE OPTION	VALUE OPTION
Roof Performance	Reff -41	Reff -30
Wall Performance	Reff -23	Reff -20
Glazing Performance	Double glazed, USI 2.1	Double glazed, USI 2.1
Translucent Panel Performance	U-0.14	U-0.23
Glazing Percentage	15%	15%
Slab/Foundation Insulation	R-7.5 for 1.2m perimeter	R-7.5 for 1.2m perimeter
Door Performance	USI-1.9	USI-1.9
Boiler Performance	90%	90%
Ventilation Heat Recovery	75%+	75%+
Fan Power	Per NECB 2017	Per NECB 2017
Lighting Power Density	Per NECB 2017	Per NECB 2017
Lighting Sensors	Per NECB 2017	Per NECB 2017
Lap Pool Size	six or eight lanes	six or eight lanes
Nighttime Reduction Variance	apply if possible	apply if possible
Onsite Solar PV Generation	install if possible	install if possible
Savings relative to NECB 2017	14%	9%
Annual Energy Cost	$33,500-$74,500 Varies based on solar PV capacity, turndown, and pool size	$34,500-$75,250 Varies based on solar PV capacity, turndown, and pool size

4.1 SUSTAINABILITY OVERVIEW

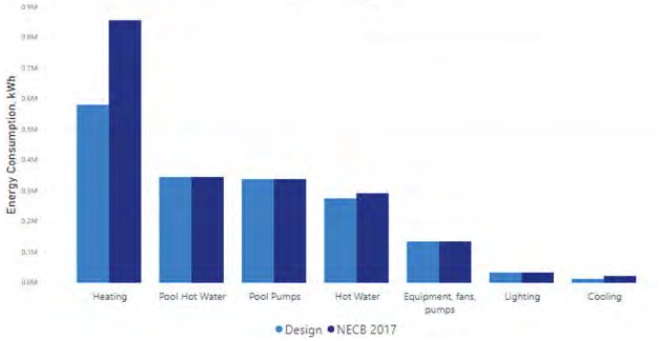
The energy use breakdown for the performance option is shown below.

Performance Option, Energy Use Breakdown



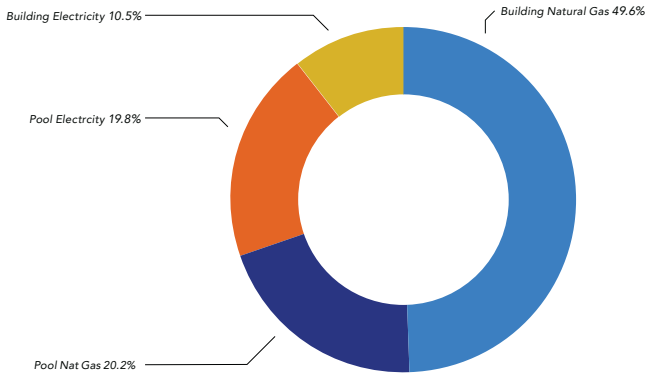
Compared to the NECB 2017 simulation, it can be noted that the majority of savings come from space heating, with ventilation heat recovery and a low glazing ratio responsible for most of the savings:

Performance Option Design vs NECB 2017



The below energy use breakdown by fuel type is provided for the performance option.

Performance Option, Energy Use By Fuel



4.2 DEEP WELL GEOTHERMAL

During the IPD validation process, the potential for using a deep well geothermal system to power the building was identified as an innovative feature that could be used to reduce the operational energy costs of the building. The deep well geothermal system harvests heat from several kilometers below the surface that could be used for direct heating or converted to electricity to power the building systems. This geothermal technology would create a closed loop system that thermosiphons a benign working fluid from the wellbore site to directly heat a building or to a heat engine that would generate electricity. However, at the time of validation there are still many unknowns about this technology:

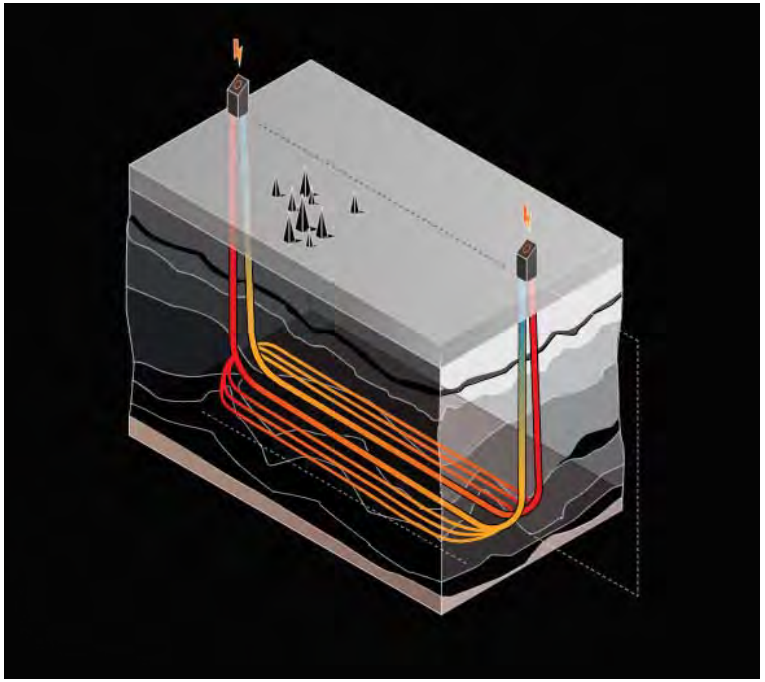
- The project team does not know the costs for the installation of the wells required to utilize this technology. There is no current funding or cost model for this technology which makes it difficult to evaluate the viability of installation within the project budget.

- Schedule impacts to the project are not known because the companies involved with this technology have not set a timeline for when they plan to set up the deep well geothermal facility. It is anticipated that more information will become available in the summer of 2020, but this may be too late for this project depending on when the pre-construction/design phase is started.

- Since the team does not have enough available information about the technology or the location of the wellsite, we cannot make a determination whether to use direct heat or electrical generation. If the location of the wellsite is too far away from the building, the direct heat scenario may not be viable. If the electrical generation system is used, it would require the team to design all the mechanical systems to be electrical-based (instead of the natural gas-fired units currently being considered), but this would need to be known before the pre-construction phase starts.

- The cost required to maintain the system once running is also still unknown. In the case of direct heating, there may be operational costs for the facility operators to maintain the system parts. For a heat engine/power generation scenario, an entire separate facility may be required, and this would have its own operation and maintenance cost impacts.

If more information becomes available, this may be a viable technology to include as part of this project, but at this time, not enough information is available to properly assess the schedule, cost, and operational impacts. If information becomes available by the beginning of design, there is the possibility of incorporating deep well geothermal into the facility.



Eavor.com

5.0
PROJECT AND DEVELOPMENT INFORMATION

5.1 FUNCTIONAL PROGRAM / PROJECT AREA SUMMARY

A functional program was developed for a Natatorium accommodating a six (6) lane 25 metre pool, leisure pool with a lazy river, and whirlpool/hot tub. The program includes support spaces for a posted bather load of 320.

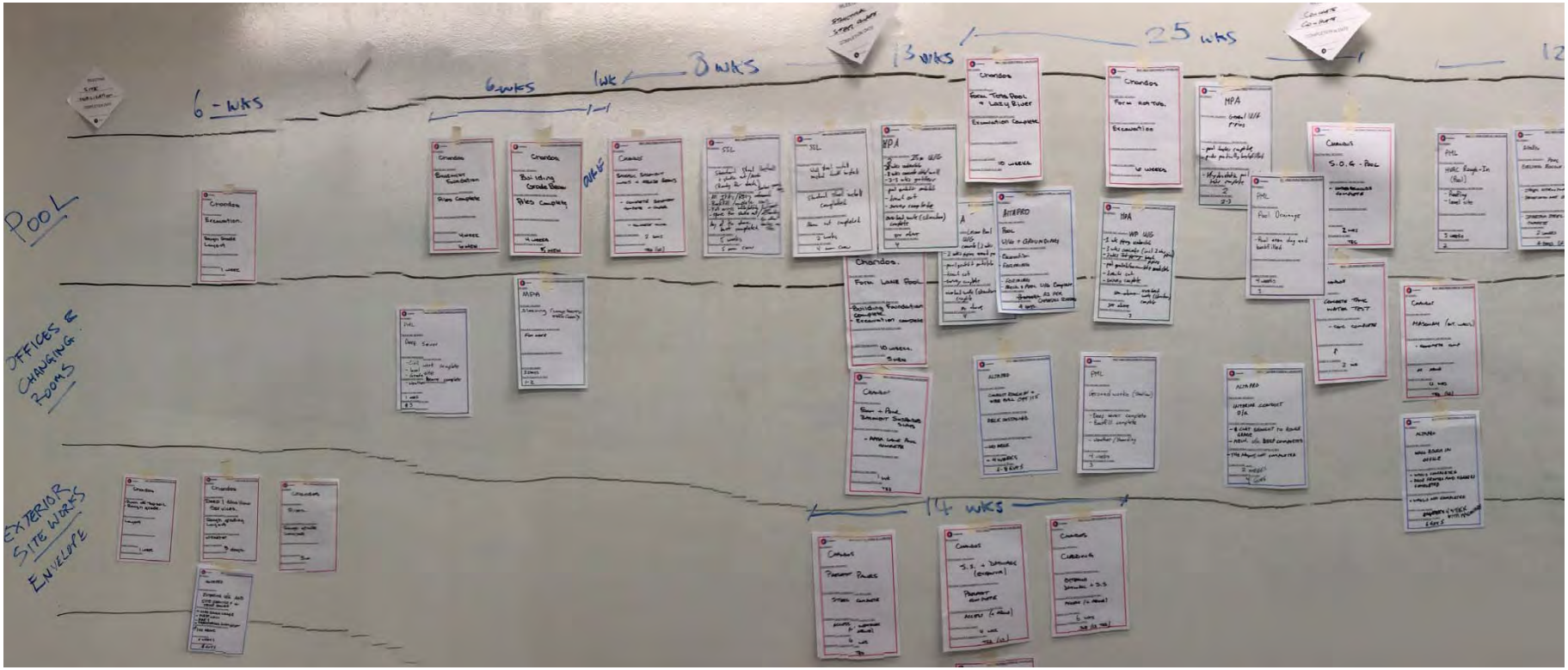
Drayton Valley and Brazeau Aquatic Centre		SPACE PROGRAM									
Division / Space Type		Space #	No.	ASM/Unit (sq. m)	*ASF/Unit (sq.ft)*	ASM (sq. m)	*ASF (sq.ft)*	*sm/person*	*Occup.*	Comments	Additional Information
Aquatic Centre											
Public Space	Lane Pool/6 Lanes		1	405.0	*4,359*	405.0	*4,359.4*				200 bather capacity
	Leisure Pool/Lazy River		1	322.0	*3,466*	322.0	*3,466.0*				100 bather capacity
	Whirlpool/Hot Tub		1	31.0	*334*	31.0	*333.7*				20 bather capacity
	Slide (Future) - Part of Pool Deck Area		1		*0*	0.0	*0.0*				Part of Pool Deck area
	Steam Room/Sauna		1	9.0	*97*	9.0	*96.9*				
	Pool Deck Area		1	753.0	*8,105*	753.0	*8,105.2*	*a*			
	On Deck Bleacher Area (Pool Deck Area)		1	0.0	*0*	0.0	*0.0*				115 person viewing gallery (Swim Alberta Option A 150 spectators)
	Multi Purpose/Party Room		1	43.0	*463*	43.0	*462.8*				
	Parents Viewing Area (Pool Deck Area)		1	0.0	*0*	0.0	*0.0*				
	Exterior Patio (No)		1	0.0	*0*	0.0	*0.0*				
	Aquatic Room Sub total		1			***1,511.0***	***16,264.3***				
	Pool Storage Area		1	42.0	*42*	42.0	*452.1*				
	Above Grade Subtotal					**1,553.0**	***16,716.3***				
	Pool Water Treatment		1	186.0	*2,002*	186.0	*2,002.1*				
	Chlorine Room (Main Floor)		1	5.0	*54*	5.0	*53.8*				
	Caustic Soda Storage Room		1	4.0	*43*	4.0	*43.1*				
	Chemical Storage Room (Main Floor)		1	5.0	*54*	5.0	*53.8*				
	Pool Tunnels/Crawl Space		1		*0*	0.0	*0.0*				
	Below Grade Subtotal					**200.0**	***2,152.8***				
	Assigned Area Sub-Total					**1,753.0**	***18,869.1***				
	Component Circulation & Walls, HVAC, Structural Allowance				**10%**	**155.3**	***1,671.6***				
	Gross Area Total					**1,908.3**	***20,540.8***				

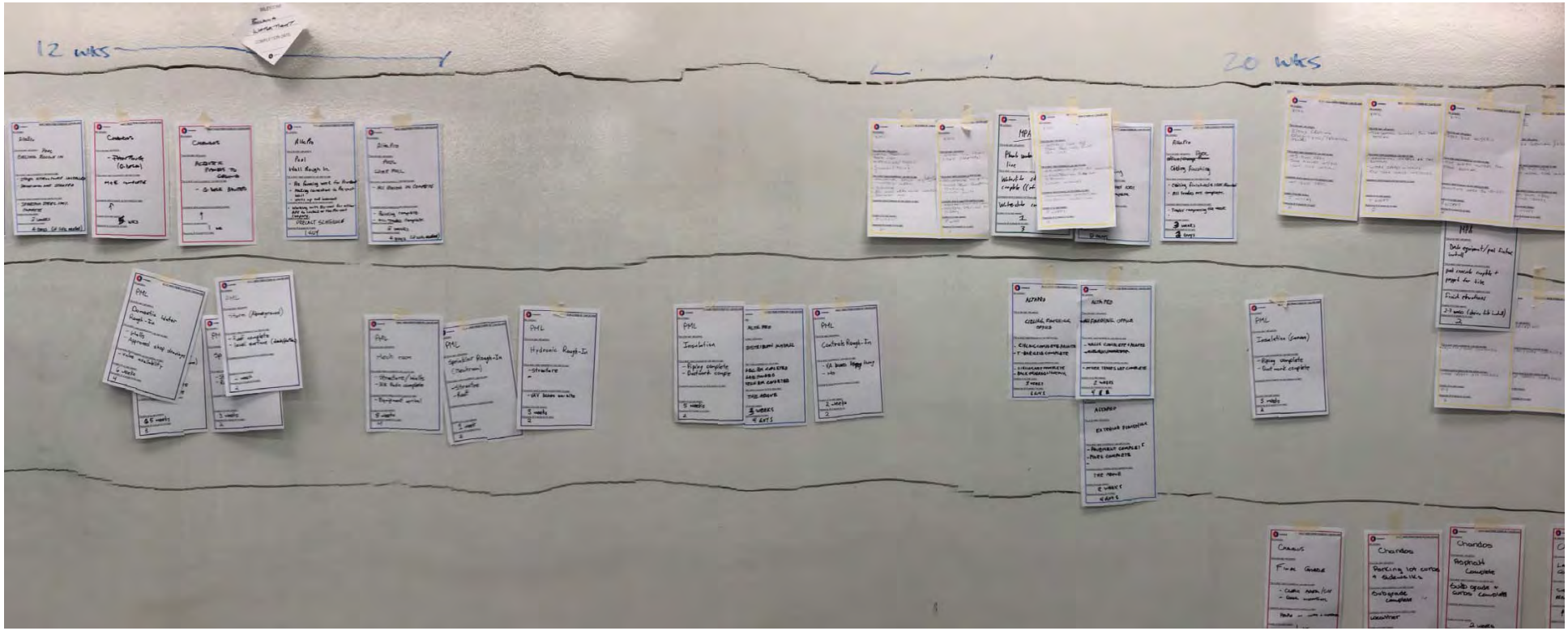
Division / Space Type		SPACE PROGRAM									
		Space #	No.	ASM/Unit (sq. m)	*ASF/Unit (sq.ft)*	ASM (sq. m)	*ASF (sq.ft)*	*sm/person*	*Occup.*	Comments	Additional Information
Facility Support and Amenity Spaces											
Public Space	Front Vestibule		1	0.0	*0*	0.0	*0.0*				
	Reception		1	19.0	*205*	19.0	*204.5*				
	Pool Entry		1	77.0	*829*	77.0	*828.8*				
	Pulbic Barrier Fee Washroom		1	4.0	*43*	4.0	*43.1*				
	Life Guard Area (includes first aid)		1	26.0	*280*	26.0	*279.9*				
	Admin Office: Aquatic Manager		1	10.0	*108*	10.0	*107.6*				
	Admin Corridor		1	27.0	*291*	27.0	*290.6*				
	Locker Room Corridor		1	73.0	*786*	73.0	*785.8*				
	Janitor Room		1	5.0	*54*	5.0	*53.8*				
	Stair to Pool Mechanical		1	17.0	*183*	17.0	*183.0*				
	Electrical Room (on grade)		1	9.0	*97*	9.0	*96.9*				
	Mechanical (on grade)		1	72.0	*775*	72.0	*775.0*				
	Water Meter Room (on grade)		1	10.0	*108*	10.0	*107.6*				
	Assigned Area Sub-Total					**349.0**	***3,756.6***				
	Component Circulation & Walls, HVAC, Structural Allowance				**10%**	**17.5**	***187.8***				
	Gross Area Total					**366.5**	***3,944.4***				

Division / Space Type		SPACE PROGRAM									
		Space #	No.	ASM/Unit (sq. m)	*ASF/Unit (sq.ft)*	ASM (sq. m)	*ASF (sq.ft)*	*sm/person*	*Occup.*	Comments	Additional Information
Change Rooms											
Public Space	Family Change		1	120.0	*1,292*	120.0	*1,291.7*				
	Family Change Room Common		1		*0*	0.0	*0.0*				
	Aquatic Men's Locker and Change Areas		1	70.0	*753*	70.0	*753.5*				
	Aquatic Men's Showers and WC		1		*0*	0.0	*0.0*				
	Aquatic Women's Locker/Change Areas		1	70.0	*753*	70.0	*753.5*				
	Aquatic Women's Showers and WC		1		*0*	0.0	*0.0*				
	Male Staff Locker		1	6.0	*65*	6.0	*64.6*				
	Female Staff Locker		1	6.0	*65*	6.0	*64.6*				
	Assigned Area Sub-Total					**272.0**	***2,927.8***				
	Component Circulation & Walls, HVAC, Structural Allowance				**20%**	**54.4**	***585.6***				
	Gross Area Total					**326.4**	***3,513.3***				
	TOTAL GROSS AREA					**2,601.2**	***27,998.5***				

5.2 PRELIMINARY MILESTONE CONSTRUCTION SCHEDULE

Throughout validation process, the constructability PIT developed a preliminary milestone construction schedule. Once the overall design concept was established the PIT hosted a pull planning session with various trade partners to develop an overall construction timeline.



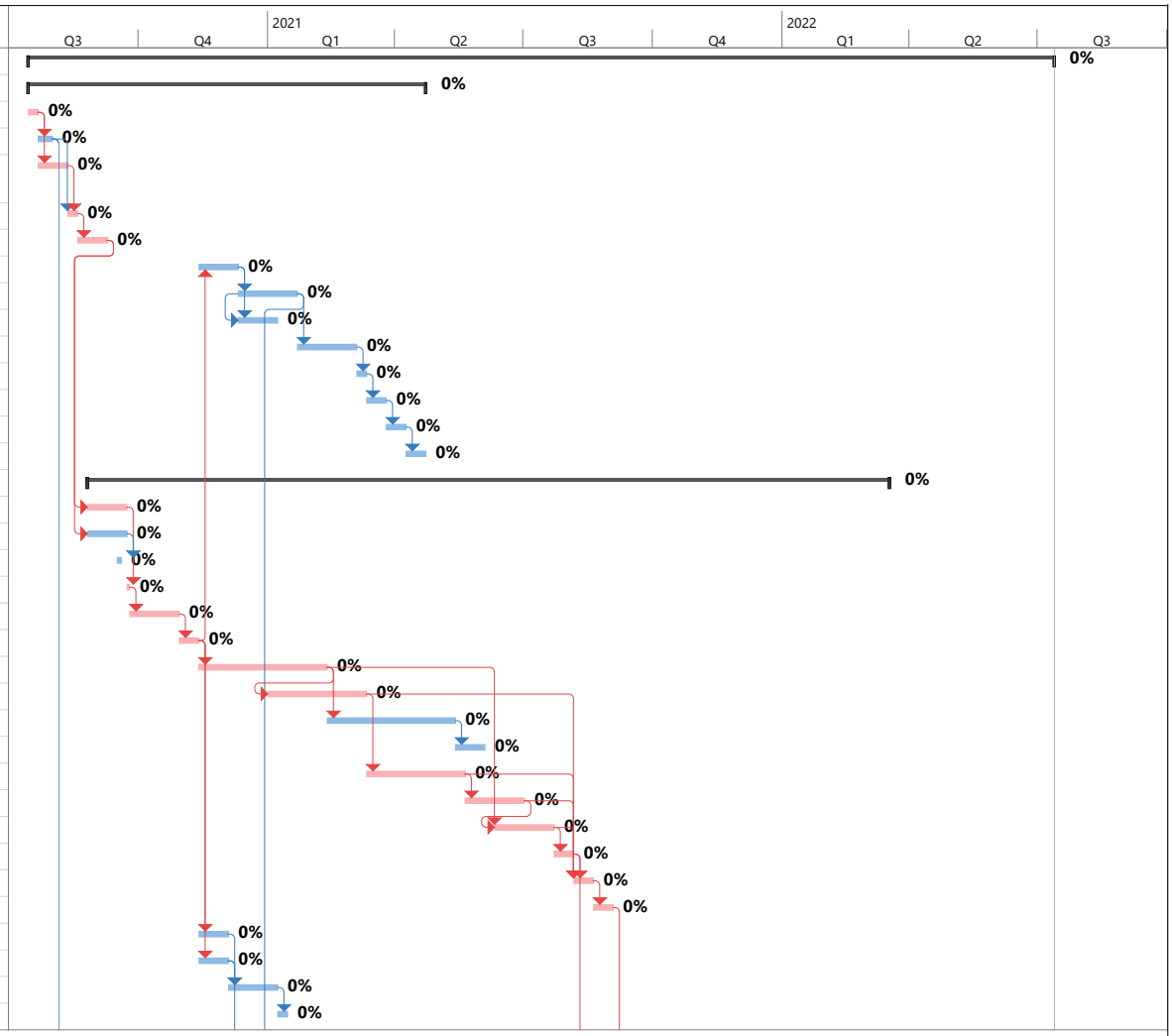

12 WKS
20 WKS

5.2 PRELIMINARY MILESTONE CONSTRUCTION SCHEDULE

The following preliminary milestone construction schedule is based on the pull plan session held with the trade partners.

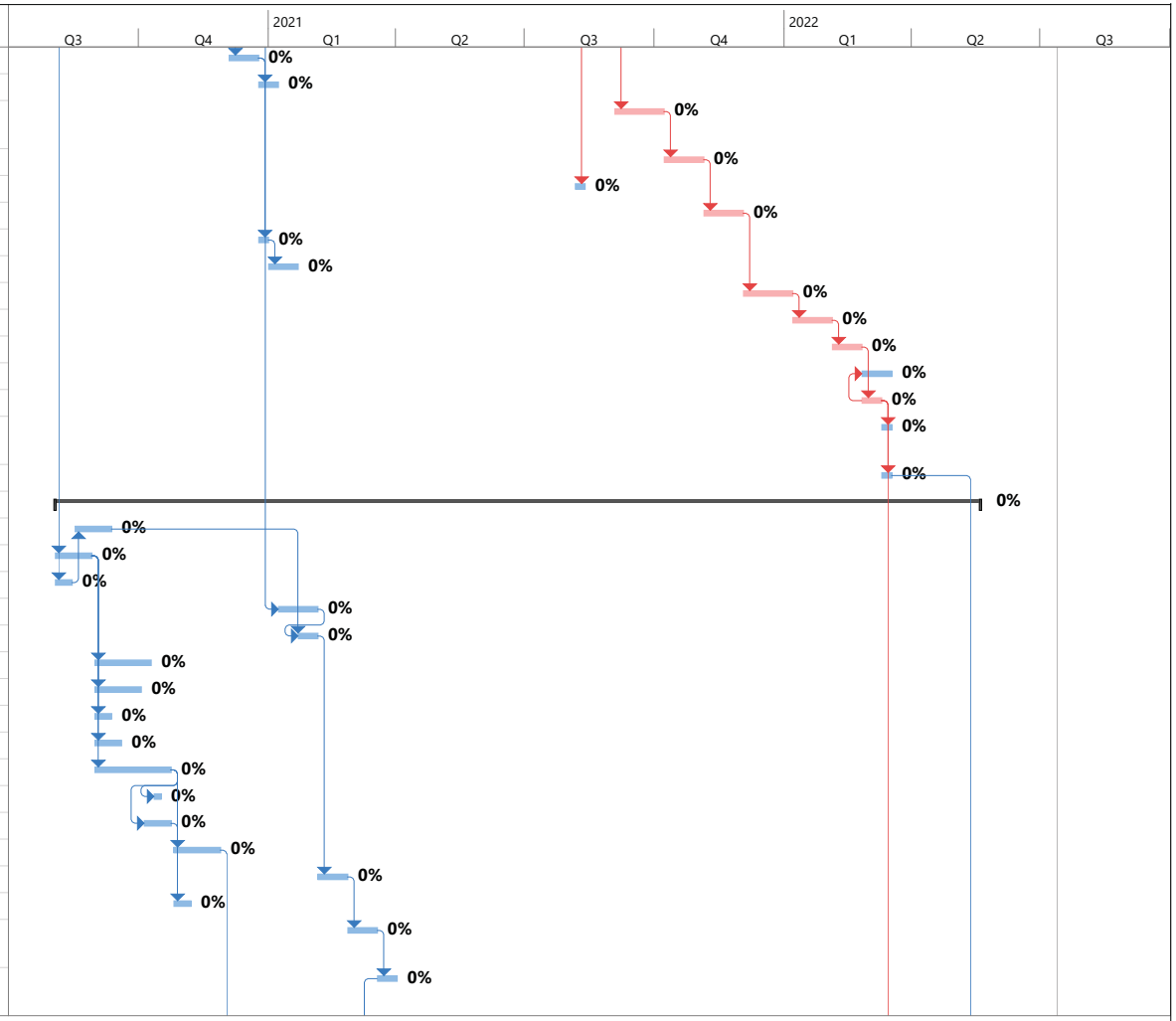
The start date for construction on site is critical. In order to minimize winter conditions, starting construction earlier is better as this reduces the amount of winter heat to concrete required. Due to concrete durations some winter concrete is inevitable, but starting construction in July reduces the amount scheduled.

ID	Task Mode	Task Name	Duration	Start
1		**Drayton Valley and Brazeau Aquatic Centre**	**520 days**	**7/15/2020**
2		**Exterior Works & Envelope**	**202 days**	**7/15/2020**
3		Site Clearing & Rough Grade	5 days	7/15/2020
4		Deep/Shallow Services	8 days	7/22/2020
5		Exterior U/G & Site Services & Temp Power	15 days	7/22/2020
6		Excavation	5 days	8/12/2020
7		Piles	15 days	8/19/2020
8		Precast Panels	20 days	11/13/2020
9		Roofing (Full Assembly)	30 days	12/11/2020
10		Steel Stud & Drywall (Exterior)	20 days	12/11/2020
11		Cladding	30 days	1/22/2021
12		Final Grade	5 days	3/5/2021
13		Parking Lot Curbs & Sidewalks	10 days	3/12/2021
14		Asphalt Complete	10 days	3/26/2021
15		Landscape Complete	10 days	4/9/2021
16		**Natatorium**	**407 days**	**8/26/2020**
17		Basement Foundation	20 days	8/26/2020
18		Building Grade Beam	20 days	8/26/2020
19		Pool Sleeving	3 days	9/16/2020
20		Backfill Basement Walls & Grade Beams	2 days	9/23/2020
21		Structural Steel Install	25 days	9/25/2020
22		Wall Steel Install, Metal Deck Install	10 days	10/30/2020
23		Pool U/G	65 days	11/13/2020
24		Form Lane Pool	50 days	1/1/2021
25		Leisure Pool U/G	65 days	2/12/2021
26		Electrical Pool U/G & Grounding	15 days	5/14/2021
27		Form Lazy River	50 days	3/12/2021
28		Form Whirlpool	30 days	5/21/2021
29		Whirlpool U/G Pool	30 days	6/11/2021
30		General U/G Pool Piping	10 days	7/23/2021
31		Slab on Grade	10 days	8/6/2021
32		Concrete Water Test	10 days	8/20/2021
33		HVAC Rough In	15 days	11/13/2020
34		Electrical Ceiling Rough In	15 days	11/13/2020
35		Painting Q Deck	25 days	12/4/2020
36		Acoustic Panels to Ceiling	5 days	1/8/2021



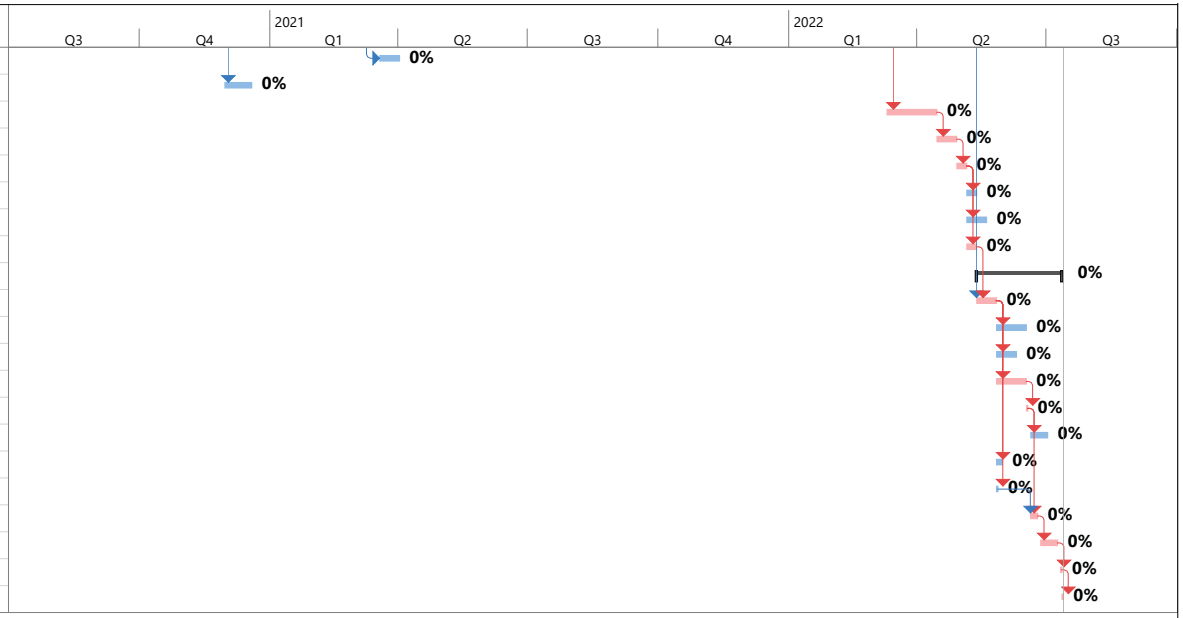
Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Manual Task
Start-only
Finish-only
Duration-only
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Manual Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Deadline

ID	Task Mode	Task Name	Duration	Start
37		Electrical Wall Rough In	15 days	12/4/2020
38		Wire Pull	10 days	12/25/2020
39		Waterproofing, Bond Coat, Screeding/Slopes	25 days	9/3/2021
40		Competition Pool Tile Install	20 days	10/8/2021
41		Plumb Waterslide Line	5 days	8/6/2021
42		Lazy River etc. Tile Install	20 days	11/5/2021
43		Electrical Natatorium Wall Finishing	5 days	12/25/2020
44		Electrical Natatorium Ceiling Finishing	15 days	1/1/2021
45		Epoxy Grouting Pool	25 days	12/3/2021
46		Gutter, Pool Edge, Nosing Tile Install	20 days	1/7/2022
47		Deck Tile Install	15 days	2/4/2022
48		Deck Equipment/Pool Fixture Install	15 days	2/25/2022
49		Deck Grouting	10 days	2/25/2022
50		Final Clean & Inspection of Pool & Deck Tile	5 days	3/11/2022
51		Confirm Finishes in Pool Area (MPA)	5 days	3/11/2022
52		**Office/Change Room**	**469 days**	**8/3/2020**
53		Conduit Rough In & Wire Pull	20 days	8/17/2020
54		Mechanical Shallow Groundworks	20 days	8/3/2020
55		Interior Conduit U/G	10 days	8/3/2020
56		Masonry Interior Walls	20 days	1/8/2021
57		Electrical Wall Rough In	10 days	1/22/2021
58		Domestic Water Rough In	30 days	8/31/2020
59		HVAC Rough In	25 days	8/31/2020
60		Storm Above Ground	10 days	8/31/2020
61		Sprinkler Room Rough In	15 days	8/31/2020
62		Mechanical Room	40 days	8/31/2020
63		Sprinkler Rough In (Mech Rm)	5 days	10/12/2020
64		Hydronic Rough In	15 days	10/5/2020
65		Mechanical Insulation	25 days	10/26/2020
66		Distribution Install	15 days	2/5/2021
67		Controls Rough In	10 days	10/26/2020
68		Electrical Office/Change Room Wall Finishing	15 days	2/26/2021
69		Electrical Office/Change Room Ceiling Finishing	10 days	3/19/2021



Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Manual Task
Start-only
Finish-only
Duration-only
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Manual Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Deadline

ID	Task Mode	Task Name	Duration	Start
70		Electrical Exterior Finishing	10 days	3/19/2021
71		Mechanical Insulation (Canvas)	15 days	11/30/2020
72		Change Room Tile Install	25 days	3/11/2022
73		Entry/Corridor Tile Install	10 days	4/15/2022
74		Reception/Admin/ MP Room Tile Install	5 days	4/29/2022
75		HVAC Finishes	5 days	5/6/2022
76		Plumbing Finishes	10 days	5/6/2022
77		Sprinkler Finishes	5 days	5/6/2022
78		**Commissioning**	**42 days**	**5/13/2022**
79		Final Clean Natatorium & Offices	10 days	5/13/2022
80		Mechanical Equipment Commissioning	15 days	5/27/2022
81		Electrical Power Checking/Programming	10 days	5/27/2022
82		Controls Commissioning & Programming	15 days	5/27/2022
83		Final Mechanical Inspection	1 day	6/17/2022
84		AHS/Consultant Review	10 days	6/20/2022
85		Life Safety	2 days	5/27/2022
86		Final Electrical Inspection	1 day	5/27/2022
87		Staff Training/Handover	5 days	6/20/2022
88		Deficiency Free	10 days	6/27/2022
89		Occupancy Inspection	1 day	7/11/2022
90		Substantial Completion	1 day	7/12/2022



Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Manual Task
Start-only
Finish-only
Duration-only
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Manual Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Deadline

6.0
RISK REGISTER
AND OPPORTUNITY LOG

6.1 PROJECT RISK REGISTER AND OPPORTUNITY LOG

Implementing a risk register and opportunity log to transparently identify, share and disclose risks allows the team to be collaborative and manage, mitigate, avoid or eliminate risk which enhances opportunities that normally go unnoticed.

The purpose of the risk register is to identify potential risks with countermeasures and logic. The register will address design, procurement, subtrade performance, existing operations, quality, material handling and other issues as design and construction evolves. This document will become a living entity that evolves throughout the project.

In contrast, we use the opportunity log to identify the areas in which there could be a cost savings or an opportunity to add value to the end user.

The opportunities will be further explored through the next phases of the project.

PROJECT RISK REGISTER

Project: Drayton Valley Aquatics Facility
Location: Drayton Valley
Client: Town of Drayton Valley & Brazeau County
Date: 10-Dec-19

RISK ITEM #	STATUS: Active Dormant Retired	DATE POSTED	POTENTIAL RISK	DETAILED DESCRIPTION	RISK TRIGGER	AFFECTS (Environmental, Health, Safety, Costs / Schedule, Relationships, Tendering, Logistics)	PROBABILITY Low = <33% Medium <66% High >66%	IMPACT Low = <1%, Medium <2%, High >2%	Risk Matrix	POTENTIAL COST RANGE	RISK AMOUNT CARRIED	RISK STRATEGY: Avoidance, Transfer, Mitigation, Acceptance	RISK OWNER	RISK STRATEGY DESCRIPTION	RISK MITIGATION PLAN: MILESTONE CHECKS	RISK MITIGATION PLAN: DATE UPDATED
1	Retired	11-Oct-19	Pipelines Relocation	2 seperate oil emulsion lines running north-south and east-west through the proposed site	Coordination with ARC Resources confirming that one of the lines is already abandoned but another is classified as discontinued (meaning they do not know if there is a potential of using it again in the future).	Cost, Location, Schedule	Medium	Medium	PROB. / IMPACT	$ -	$ -	Transfer	Owner	ARC Resources have provided a ROM of $70k to remove the existing pipelines - this is included within the budget. Any further costs outside of this from ARC are not included within the budget and will not be the responsibility of the IPD team (inc. any contaminetd soils requiring removal).		08-Nov-19
2	Retired	15-Oct-19	Town has hard water and a water softener system will be required in the facility	If required, a water softener will assist in extending the lifecycle of HVAC and Plumbing Systems	Water quality test comes back with hard water	Costs / Schedule	Medium	Medium	PROB. / IMPACT	$ 30,000	$ -	Avoidance	IPD Team	TODV confirmed water hardness is 160 - this is satisfactory so no further risk.		02-Dec-19
3	Active	15-Oct-19	The main pool mechanical air handling unit does not show up as per originally designed (i.e. power, weight, sizes, etc.) is larger	Careful attention on the design, selection of vendor and monitoring the QA/QC process during the construction of the unit by the vendor	*Shop drawings may need to be submitted and reviewed early to pre-order equipment but units show up on site months later so we will need to select a reputable supplier	Costs / Schedule	Low	High	PROB. / IMPACT	$ 100,000	$ 5,000	Avoidance	IPD Team	Cost is to account for any changes need to be made to the AHUs once on site. Can be avoided by proper coordination with the manufacturer.		18-Nov-19
4	Active	15-Oct-19	Heat Recovery System fails requiring the affect air systems to turn down in airflow or shut down completely	Major design decision from Owner on how the system is designed. If required, the heating system will be sized to the full load (i.e. failure of Heat Recovery System)	We need feedback from facilities group to discuss what their desired contingency plans are during a major AHU failure	Costs / Schedule	Medium	Medium	PROB. / IMPACT	$ 75,000	$ -	Transfer	Owner	Potential wish-list item		18-Nov-19
5	Retired	15-Oct-19	Building Glazing is not sufficient enough to maintain a 50% RH during winter months	The mechanical systems may need to reset the space RH% setpoints to lower it towards 40%RH in order to mitigate the condensation of air on glazing surfaces.	R2.5 Win ~ RH 40% During Winter W/O cond. R3.0 Win ~ RH 50% During Winter W/O cond.*(Barely) R3.5 Win ~ RH 50% During Winter W/O cond. (Recommended)	Costs / Schedule	High	High	PROB. / IMPACT	$ 1,000,000	$ -	Avoidance	IPD Team	Mitigate this item through design - in conjunction with the building energy workshop.		18-Nov-19
6	Active	15-Oct-19	Mechanical controls contingency	Costs to cover additional work required by mechanical controls subtrade for programming/sequence/wiring changes at the end of the project	Owner or project desire to modify the controls at building turnover	Costs	Medium	Medium	PROB. / IMPACT	$ 30,000	$ 20,000	Acceptance	IPD Team	Lump sum trade involvement, always issues at the end once all systems are started-up in conjunction with facility management/operators		18-Nov-19
7	Active	15-Oct-19	Mechanical HVAC contingency	Costs to cover additional work required by mechanical HVAC subtrade for site changes throughout the project	Design issues/poor site coordination	Costs	Medium	High	PROB. / IMPACT	$ 50,000	$ 40,000	Acceptance	IPD Team	Lump sum trade; high probability of needing to issue a CO if we make design changes after tender.		18-Nov-19
8	Active	15-Oct-19	Delay of temporary gas (winter conditions)	Delay in startup of temporary gas system causes the project to require some other form of temp heat (eg. propane)	Slow processing by utility or delay in submitting application	Costs	Medium	Medium	PROB. / IMPACT	$ 50,000	$ 25,000	Acceptance	IPD Team	Work with the gas supplier early to get a gas line and meter on site before winter. Sometimes the gas company gets behind on installs and requires the team to heat with propane for a month or two into winter.		18-Nov-19
9	Active	15-Oct-19	Delay of equipment delivery	Unforeseen circumstances that cause a delay in delivery equipment	Equipment delivery date	Costs / Schedule	Low	Medium	PROB. / IMPACT	$ 5,000	$ 2,500	Acceptance	IPD Team	Cost for extra trips for startup reps if equipment is delayed and they need to make another trip. Can be avoided by managing delivery dates.		18-Nov-19
10	Retired	15-Oct-19	Overly complex design	The mechanical/electrical systems are overly complex and take additional time/materials to install (as well as increased costs to operate)	Poor design choices	Costs / Schedule	Low	High	PROB. / IMPACT	$ -	$ -	Avoidance	IPD Team	This items was created while the geo-field and waste heat from Omniplex were still in play. Retired.		18-Nov-19
11	Active	15-Oct-19	Mechanical sprinkler contingency	Costs to cover additional work required by mechanical spinkler subtrade for site changes throughout the project	Design issues/poor site coordination	Costs	Medium	Medium	PROB. / IMPACT	$ 30,000	$ 20,000	Acceptance	IPD Team	Lump sum trade; high probability of needing to issue a CO if we make design changes after tender. Placing head locations in the model should help to mitigate this.		18-Nov-19
12	Retired	21-Oct-19	Location of the fire hydrant. Flow rate on the fire hydrant.	Building code requires the hydrant to be within 45 metres of the main fire fighting access point - the front entrance. Verify there is sufficient flow for the fire hydrant.	Location of the existing hydrant and flow rate	Cost / Schedule	Medium	Medium	PROB. / IMPACT	$ -	$ -	Avoidance	IPD Team	Water flow tests have determined that we have suffient flow to meet the 45 meter retirement. No risk needs to be carried for this item.		03-Dec-19
13	Retired	21-Oct-19	Number of parking stalls required.	The zoning by-law does not include parking requirements for recreation facilities. Currently showing 46 parking stalls. if additional parking is required will impact pool facility budget.	Design issue in coordination with the town.	Cost	Low	High	PROB. / IMPACT	$ -	$ -	Mitigation	Owner / Budget	The Town of Drayton Valley does not have zoning or bylaw requirements for parking associated to recreation facilities. The design team has applied the City of Edmonton Parking requirements to the project and have allowed for 46 additional parking stalls.		03-Dec-19
14	Retired	21-Oct-19	Fire truck access to front entrance.	The fire truck/fire fighting needs to able to pull up within 3 - 15 metres of the fire fighting access point - the front entrance. Fire access requires heavy duty paving and preferably pull through access as opposed to a turn around.	Design of site access and parking.	Cost	Low	Low	PROB. / IMPACT	$ -	$ -	Mitigation	Owner / Budget	The site development will also include a fire truck zone in front of the new Aquatic Centre.		03-Dec-19
15	Retired	21-Oct-19	Air movement in the locker rooms.	Warm moist air from the nanatorium moving into the locker rooms. Rusting of lockers and high humidity levels in the areas outside of the nanatorium.	Design and coordination between Architectural and Mechanical	Parton comfort.	Low	Low	PROB. / IMPACT	$ -	$ -	Mitigation	IPD Team	Doors will be added to seperate these areas so that this issue does not occur.		19-Nov-19

16	Retired	21-Oct-19	Sight lines into the locker rooms from the public corridor and pool deck.	Sight lines not ideal with the Mens Change Room and the public corridor.	Architectural design.	Parton comfort.	Low	Low		$ -	$ -	Mitigation	IPD Team	This will be managed through the design phase and be avoided.		19-Nov-19
17	Active	21-Oct-19	Utility Costs from Fortis & Telus are estimates as per present situation	If the build is happening in 2021, Utility conditions could change potentially change causing cost uncertainty	Electrical Design	Cost/Schedule	High	Medium		$ 20,000	$ 10,000	Acceptance	IPD Team	Pricing is for 2019, Utilities do not give out future pricing.		19-Nov-19
18	Retired	21-Oct-19	Uncertainty with Net Zero Components on Electrical Switchgear	Netzero elements (Solar, CHP, Geo-Thermal etc) need to be nailed down with potential sizing so that the Electrical Switchgear is sized adequately. Even if the items are for future install.	Electrical Design	Cost/Schedule, Real Estate	Low	High		$ -	$ -	Mitigation	IPD Team	Early design decisions need to be made to avoid late changes		02-Dec-19
19	Retired	21-Oct-19	Redesign to 8 Lanes	Change in building size and pool size to 8 lanes coming later than last responsible moment	Electrical Design	Cost/Schedule, Real Estate,	Low	Medium		$ -	$ -	Transfer	Owner	Figure out last responsible moment and make it clear to the team as to the direction picked. This will be an owner 'wish-list' item.		19-Nov-19
20	Retired	21-Oct-19	Project Funding Guarentees & Timing	DV and Brazeau are both committed to $5M each. Overall budget is set at $18.5M. What level of guarantees are available for the remaining $8.5M.	Entire Project	Project Viability	High	High		$ -	$ -	Transfer	Owner	IPD team can not control this		08-Nov-19
21	Retired	21-Oct-19	Late responses from parties	Late or slow responses on critical items will slow down overall flow and schedule. May result in re-work	Late or slow responses	Costs, schedule, relationships	Medium	Low		$ -	$ -	Mitigation	IPD Team	Proper collaboration during design phase - colocation		19-Nov-19
22	Active	21-Oct-19	Cost Escalation	Unknown market conditions that could increase the cost of materials, labour or equipment	Market indicators	Costs	High	High		$ 12,400,000	$ 248,000	Acceptance	IPD Team	2% added to total direct construction costs only		02-Dec-19
23	Active	21-Oct-19	Tariffs Triggered by Political and Government Policies	Unknown future political policies that could affect the cost of materials, labour or equipment	Market indicators	Costs	Medium	High		$ 100,000	$ -	Acceptance	IPD Team	Carried in cost escalation above		02-Dec-19
24	Retired	21-Oct-19	Late subtrade commitments	Trade procurement and award at a later stage than desired may result in funding commitment milestone issues and phased impacts	Market indicators	Costs	Low	Medium		$ -	$ -	Mitigation	IPD Team	Phased tender packages can be used as the design progresses to ensure ample time for procurement.		18-Nov-19
25	Retired	21-Oct-19	IPD Team Design-Build effort	Inadequate effort by IPD team members could delay completion of the validation report	Inadequate information flow of information will impact completion and delay the approval to proceed	Costs, schedule	Low	High		$ -	$ -	Mitigation	IPD Team	Close working relations with design team to establish construction schedule requirements. Proactive execution in conjunction with potential phased tender packages.		18-Nov-19
26	Retired	21-Oct-19	Communication	Lack of communication and clear understanding within IPD Team & client group will lead to inaccurate cost estimates and planning schedules	Misalignment of understanding, lack of communication	All	High	Low		$ -	$ -	Mitigation	IPD Team	All stakeholders to commit to a culture of great communication.		18-Nov-19
27	Retired	21-Oct-19	Adequacy of budget	Inadequate budget to build all of the scope which outlines assumptions and basis will lead to confusion, disappointment and possibly incorrect end results	Lack of clarity within budget due to no clearly defined list of allowable cost inclusions & exclusions	All	High	High		$ -	$ -	Mitigation	IPD Team	Chandos will provide timely and accurate budget based on the information at the time. Where information is not available, Chandos will identify assumptions and appropriate cost allowances. Owner will be advised of these assumptions and risks.		18-Nov-19
28	Active	21-Oct-19	Unforeseen scope	Unforeseen scope identified during construction	Lack of thorough follow through and communication. Change orders required by commodity trades	All	High	High		$ 3,800,000	$ 152,000	Mitigation	IPD Team	Assume 4% of commodity trades only		03-Dec-19
30	Active	21-Oct-19	Incremental weather	Out of season or excessive weather conditions that may negatively impact the schedule	Schedule slippage due to unforeseen weather, such as excessive rainfall while trying to excavate or do any work within the excavation until concrete is in place.		Medium	High		$ 100,000	$ 100,000	Acceptance	IPD Team	Re-sequence schedule temporarily if weather conditions are excessive to avoid deviance from the critical path. Protect working areas from the elements during excessive weather conditions.		03-Dec-19
31	Retired	21-Oct-19	IPD time over-runs during the design / implementation phase	The estimated hours by the IPD required during design 'may' be insufficient		Cost	Medium	High		$ -	$ -	Mitigation	IPD Team	All IPD team members to review the current estimate and confirm the adequacy of the hours provided already. Additional BIM requirements added which needs to be allowed for.		18-Nov-19
32	Retired	21-Oct-19	Non-performance of Lump Sum / Commodity trades - may negatively impact the schedule	Commodity trades could impact the project negatively by non-performance such as lack of manpower, missing deadline dates, delivery delays, change order delays, etc.	Schedule slippage, failure to perform identified early	Cost/ Schedule, Relationships, Logistics, Safety	Medium	Medium		$ -	$ -	Mitigation	IPD Team	Tender commodity trades selectively and vet previous projects and reputation. Potentially include LDs into their subcontract to motivate performance. Utilize pull-planning so commodity trades are committed to the schedule.		18-Nov-19
33	Active	21-Oct-19	Overrun on construction schedule	The team could go over the allotted schedule time due to a host of reasons typically seen on construction projects.	Missed milestone dates on schedule	Cost, Schedule	Medium	Medium		$ 200,000	$ 100,000	Mitigation	IPD Team	Utilize pull planning, lookaheads, weekly work plans, tracking, measuring, and course correction if the schedule is delayed. Calculating our PPC will determine if course-correction is required during the project.		02-Dec-19
34	Retired	21-Oct-19	Soil Contamination from Pipeline	Possible soil contamination from the existing pipeline running through the site.	Schedule slippage due to remediation work. Major cost impact related to remediation work.	Cost, Schedule	Medium	Medium		$ -	$ -	Transfer	Owner / ARC Resources	Linked to item #1 - if there is contaminated ground discovered when the pipelines are being removed then all direct costs to remediate and any schedule delays are not a part of this budget and will not be the responsibility of the IPD team.	08-Nov-19	18-Nov-19

35	Active	02-Nov-19	Heating and Hoarding costs	Heating and Hoarding in excess of project allowance could be required depending on unknown factors (beginning or length of preconstruction process or amount of construction conducted during non-winter months)	Start of construction late in summer/fall, lack of structural element/roof erection prior to onset of cold temperatures	Cost, Schedule	Medium	High	PROB. / IMPACT	$ 207,000	$ 20,000	Acceptance	IPD Team, Owner	Award project early in Calendar year, expedite structural design + fabrication		02-Dec-19
36	Retired	12-Nov-19	Design / Construction contingency	carry 5% (2.5 + 2.5) of the direct construction cost - =/- 14,000,000 x 5% = $700,000		Cost	Medium	Medium	PROB. / IMPACT	$ 700,000	$ -	Acceptance	IPD Team	Carried in risk register and contingency items.		02-Dec-19
37	Retired		Structural slab required to certain areas due to high water table and soil conditions	The soils report details the water table to be ~1m below grade - prompting concerns that there may be issues with the foundations & slabs.	Review of geotechnical report with structural engineer, GC and trades	Cost, Schedule	Medium	Medium	PROB. / IMPACT	$ -	$ -	Acceptance	IPD Team	Design and costs included in base target cost		02-Dec-19
38	Retired		Additional dewatering based on high water table	The soils report details the water table to be ~1m below grade - prompting concerns that there may be issues with the foundations & slabs.	The water slowly entered the bore hole to ~1m around 7-days after drilling (geotech consultant)	Cost, Schedule	Medium	Medium	PROB. / IMPACT	$ -	$ -	Acceptance	IPD Team	Costs for dewatering included in base target cost		02-Dec-19
39	Active		Roof top unit screening	The town may require that we provide an architectural screen to hide the rooftop units from being seen from the street level. This is a often a requirement in municipalities.	Decision from BP SCO that we need a roof screen.	Cost, Schedule	Low	Medium	PROB. / IMPACT	$ 50,000	$ 5,000	Avoidance	IPD Team	Current Drayton Valley design guides do not suggest we will need a screen. Going to carry a small amount for painting of the rooftop units in case the town would like to have them blend in better with the sturcture.		03-Dec-19
										$ 18,897,000	$ 747,500					

PROJECT OPPORTUNITY LOG

Project: Drayton Valley Aquatic Centre

Total Potential Cost Range	Total Amount Carried
$ 1,400,000	$ 481,700

Date Updated:

OPP. ITEM #	STATUS: Active Dormant Retired	DATE POSTED	Champion	OPPORTUNITY	DETAILED DESCRIPTION	AFFECTS (Environmental, Health, Safety, Costs / Schedule, Relationships, Tendering, Logistics)	PROBABILITY Low = <33% Medium <66% High >66%	IMPACT Low = <1%, Medium <2%, High >2%	Opp Matrix	POTENTIAL COST RANGE	AMOUNT CARRIED	OPPORTUNITY STRATEGY DESCRIPTION	OPPORTUNITY PLAN	
													MILESTONE CHECKS	DATE UPDATED
1	Active	15-Oct-19	ARROW-PRIORITY	Utilize (Pre) Skid Manufactured Boiler Plant	Minimizes waste on site, improves on quality and simplifies overall installation	Costs / Schedule	Medium	Medium		$ 20,000	$ 10,000	Have the boiler plan come pre-assembled on a skid instead of having to assemble on site. Will cost more to purchase the boiler, but save on labour costs.		03-Dec-19
2	Retired	15-Oct-19	ARROW-PRIORITY	Use Gas Fired Air Systems instead of Hydronic Air Systems	Going with gas fired air systems will dramatically reduce the overall boiler plant size and significantly reduce the costs of running hot water piping in the building	Costs / Schedule	Medium	High		$ 40,000	$ -			03-Dec-19
3	Active	15-Oct-19	ARROW-PRIORITY	Pre-Order Complex Air Systems	Avoid potential cost increases 1-2 years down the road. May need to consider extended warranties if applicable.	Costs / Schedule	Medium	Low		$ 10,000	$ 3,000	During design we will specify the major AHU equipment early and get it out for tender to 'lock-in' pricing. This will avoid any price increases that may occur over the life of the project.		03-Dec-19
4	Active	15-Oct-19	ARROW-PRIORITY	Consolidate Controls Contract for BMS, Pool Controls, Electrical ETC.	A single contractor can potentially streamline the installation costs as well as simplify owner access to the control systems	Costs / Schedule	Low	Medium		$ 10,000	$ 5,000	AltaPro to run some of the controls contractor wiring. Currently the full controls install is carried in the Mechanical budget. Scope and savings will need to be determined once the controls contractor is on board.		03-Dec-19
5	Retired	15-Oct-19	ARROW-PRIORITY	Design Backwash Sump Heat Recovery / Preheat of domestic water makeup systems	Opportunity to save some operational costs of domestic water makeup when performing a backwash but will need a temporary holding tank to store ~300-400 gallons	Costs / Schedule	Low	Low		$ 5,000	$ -	Determined during validation that the cost to install this system will not likely create enough operational savings to make the install worth the cost.		03-Dec-19
6	Retired	15-Oct-19	ARROW-PRIORITY	Run Gas Service upwards of 20 PSI to keep pipe sizes as small as possible	Gets the pipe sizes as small as possible to reduce distribution costs of gas piping.	Costs / Schedule	Medium	High		$ 5,000	$ -	Gas pressure to the building is too low (5 psi) to reduce the pipe size any more than usual. No cost savings available.		03-Dec-19
7	Active	15-Oct-19	ARROW-PRIORITY	Use Temporary gas meter as permanent meter	Potentially will save on service costs. Gas service may come installed as a skid package	Costs / Schedule	High	Medium		$ 5,000	$ 1,000	Engaging the gas utiliyusupplier early to provide our permanent meter as a temporary meter. Will save the utility provider costs of bringing us another meter, and eliminate any schedule impact of waiting for a permanent meter.		03-Dec-19
9	Active	15-Oct-19	ARROW-PRIORITY	Preorder of mechanical equipment	Avoid price increases; narrow down structural requirements	Costs / Schedule	High	Medium		$ 20,000	$ 7,500	Similar to item 3, but for other mechanical equipment.		03-Dec-19
11	Active	15-Oct-19	Chandos	Sharing of lifts/cranes for piping/equipment installation	Sharing of lifts/cranes for piping/equipment installation	Costs / Schedule	High	Low		$ 20,000	$ 7,200	Instead of every trade bringing thier own lifts and booms on site, GC keep general lifts that all trades can use and the cost is shared with the team. Currently $7,200 in Mech Budget, nothing in Elec.		03-Dec-19
12	Active	15-Oct-19	Chandos	Sharing of job shacks amoung GC/trades	Sharing of job shacks amoung GC/trades	Costs / Schedule	Medium	Low		$ 10,000	$ -	Already in General Conditions for all.		03-Dec-19
13	Active	21-Oct-19	WSP/AltaPro	Common supports for Mechanical and Electrical Systems	In common areas such as corridors and open areas, see if Mech and Elec can be mounted on a common support. Example; Cable tray on top rung and Mech piping on bottom rung.	Costs / Schedule	Medium	Low		$4000 AltaPro $3000 PML	$ 7,000	If we are to share common supports / racks, this will lower the cost for both APE & PM as we won't both have to supply material and labor to install separate support / racking when both parties are going to the same areas.		03-Dec-19
14	Retired	21-Oct-19	WSP/AltaPro	Shared M&E service space rather than two separate rooms.	Main Electrical room and Mechanical space can be within one larger room	Costs / Schedule	High	Low		$ 20,000	$ -	Architectural savings to have the mechanical and electrical spaces within one room. This is the design budgeted during validation.		03-Dec-19
15	Active	21-Oct-19	WSP/AltaPro	VFD's mounted right on the Pumps	VFDs mounted right on pumps to avoid remote VFDs and local disconnects. Also reduces length of VFD cable that is more expensive.	Costs / Schedule	High	Low		-$6500 (PML --> Extra Cost to build VFD mounts) $10,000 (AltaPro savings)	$ 3,500	With the VFDs Mounted right to the motor it will reduces the cost in VFD rated cables. As well as additional space needed to mount all of the VFDs which expands the building space.		03-Dec-19

16	Active	12-Nov-19	Chandos	Employ general laborers to clean-up for all partners	More cost-effective to pay a general laborer than having qualified trades men/women cleaning up rather than being productove	Costs / Schedule	Medium	High		$ 25,000	$ 10,000	All trade partners to agree on the amount of hours and the rate of the nominated general clean-up crew		03-Dec-19
17	Active	03-Dec-19	Chandos	Schedule Savings	The current schedule is 18-months long with an additonal 2-months on the risk register for unforeseen weather and lump-sum trade delays	Costs / Schedule	Medium	High		$ 200,000	$ 200,000	Fast-track the schedule where possible and utilize CPS and pull-planning to its fullest to maximize efficiencies		03-Dec-19
18	Active	03-Dec-19	Trade Partners	Pre-purchasing Equipment & Material	The early ordering of equipment can result in avoidance of cost escalation - that is identified on the risk register	Costs / Schedule	Medium	Medium		$ 420,000	$ 200,000	Issue POs to all suppliers and vendors ASAP after contract signing - in conjunction with design team concurrence		03-Dec-19
19	Active	03-Dec-19	TODV	Arc will pay to remove the oil lines??	We are carrying $70k in the budget for Arc to remove these existing lines - they provided the estimate and told us that they have to be the ones to do the removals. Suggested that Arc should remove these at thier own cost?	Costs / Schedule	Low	Medium		$ 70,000	$ -	The IPD PMT and the TODV to approach Arc and have the discussion with them about the responsible party for payment.		03-Dec-19
20	Active	03-Dec-19	TODV	Can the TODV pay for the DP and BP?	The development permit and building permit costs are included in the current estimate. TODV believes that the council may be able to waive this, but further discussion would be needed with them.	Costs / Schedule	Medium	Medium		$ 200,000	$ -	The IPD PMT and the TODV to approach the council and have this discussion.		03-Dec-19
21	Active	23-Dec-19	TODV	Will Brazuea County 'donate' the gravel for the project from one of thier local pits?	In the SMT review on December 17 it was discussed with the TODV that this may be an option - as the TODV are already donating the land for the project so this could likely be an option.	Costs / Schedule	Medium	Medium		$ 250,000	$ -	This item requires a further discussion with BC - there is granular right now carried wiythin the estimate for below the slabs, site concrete and asphalt.		23-Dec-19
42	Active	23-Dec-19	TODV	Lanfill fees	It was discussed in the SMT meeting on December 17 that the TODV could potentially waive any landfill costs form garbage dumps.	Costs / Schedule	Medium	Medium		$ 10,000	$ -	This item requires further discussion and confirmation from the TODV. The project will be recycling as much of the waste as possible through a garbage control company such as the likes of a GFL (caried within base target cost budget)		23-Dec-19
43	Active	23-Dec-19	TODV	Provide the project with clay or topsoil?	It was discussed in the SMT meeting on December 17 that the TODV could potentially donate this from local stockpiles	Costs / Schedule	Medium	Medium		$ 20,000	$ -	This project is more of an export rather than an import of earthwork material due to the excavations of the pool and the current existing grades. However, topsoil will be required at minimum for the landscaped areas - further discussion with teh TODV required here.		23-Dec-19
44	Active	23-Dec-19	Chandos	Rent trailers and equipment from local companies (that are at reduced rates right now)	Rent as much as possible fro the project from DV - this will come at reduced rates and will save on freight costs from Edmonton	Costs / Schedule	High	High		$ 15,000	$ 15,000	Trailers can be rented ~$100/month cheaper than budgeted (~$1800 total). Freight savings at $750/trip from Edmonton (~$7500). Rental of AWP's etc at $100/month cheaper than Edmonton rates ($5000). There could be further opportunity here, more discussion required with trade partners.		23-Dec-19
45	Active	23-Dec-19	Chandos	Provide a heated quonsit on site for prefabrication as much as possible to just be installed within the building - JIT	The upfront cost of providing the quonsit will be off-set from teh labor savings/efficiencies from all trade partners and Chandos	Costs / Schedule	High	High		$ 25,000	$ 12,500	The upfront cost of the quonsit plus heating will be off-set by the labor efficiencies. Concrete formwork, parapets, boiler spoling, cable tray runs etc. can all be fabricated in this unit.		23-Dec-19
46														
										$ 1,400,000	$ 481,700			

7.0
DECISION MATRIX

7.1 PROJECT DECISION MATRIX

The decision matrix is used by our team to track changes in design, as they occur. We will track modifications to design as they occur, allowing us to proactively manage design development and communicate changes. This allows there to be a log of why certain decisions were made and how they affect the work following the decision. Assumptions and contingencies are logged and communicated to the consultant team where risk to cost is. This open clear communication of budget informs the team on their design direction, so that, as a team, we design to a detailed estimate.

DM number	Title	Notes	Champion	Status	Cost	$ -
DM-1	Site Selection - Site 2	Site 2 (north side of parking lot), was selected over site 1 (between School and Omniplex)	Arshia	Accept	$ -	$ -
DM-2	Base design for 6 Lanes Vs 8 Lanes	The 6 lane option is the base design, options for the 8 lane version have also been provided	Arshia	Accept	$ -	$ -
DM-3	2nd Storey Fitness Centre Not Required	Was discussed with the town that a 2nd storey fitness area is not required as the Omniplex currently has a fitness area	Troy Smith	Accept	$ -	$ -
DM-4	Geothermal Design	Geothermal was rejected due to budget constraints	David Owen	Reject	~$2M (ROM)	$ -
DM-5	Combined Heat & Power (COGEN)	COGEN was rejected due to budget constraints	Sam Lane	Reject	~$275,000	$ -
DM-6	Waste Heat from Omniplex	Waste Heat was rejected due to supply limitations and budget	Reggie Nicholas	Reject	$ -	$ -
DM-7	Waterslide (infrastructure for future)	The 6 lane base option does not include for the waterslide infrastructure, however pricing has been provided in other options	Harry Hanson	Accept	$ -	$ -
DM-8	Solar - Future Distribution Rough In	Infrastructure only for future Solar Panels has been included for the budget	AltaPro (WSP)	Reject	$ -	$ -
DM-9	Deep-well Geothermal (EAVOR)	Costs for this will be allocated to a separate budget by the town of Drayton Valley	Michael Henderson	Reject	Unknown	$ -
DM-10	Tanks - concrete or prefabrication (Myrtha)	Cost analysis was done for concrete pool wall vs prefabricated (Myrtha) steel walls, the budget is reflecting concrete walls	Harry Hanson	Reject	$ 361,415.00	$ -
DM-11	Metal Deck (painted) vs Westdek	Cost analysis was done for 76mm metal deck on steel joist vs 80mm Westdek on steel joists, the budget is reflecting metal deck	Harry Hanson	Reject	$ 205,951.00	$ -
DM-12	Gas Fired vs. Hydronic Systems	Cost analysis shows both systems are the same price, Hydronic was selected due to longevity, efficiency and ease of use	Reggie & Michael	Accept	$ -	$ -
DM-13	Site Location - placement on the lot (pipeline undisturbed soil)	Building was adjusted slightly to suit foundation placement over existing pipeline	Troy Smith	Accept	$ -	$ -
DM-14	Site Groundwater - Presence & Amelioration	Under slab drainage and mechanically supported piping have been included for within the budget	Blair D	Accept	$ -	$ -

8.0
TARGET COST

8.1 TARGET BUDGET

6-LANE

Option 1 (Base Target Cost)

- 6-Lane, 25m pool with no consideration for a future slide
- Approval to proceed with project received no later than April 30, 2020
- **Total Cost = $20,317,408 (Jan 9)**

**If approval to proceed with the project is received after April 30, 2020 the IPD team reserves the right to review the provided budget and make any necessary adjustments that could be required due to rising inflation and escalation.*

Option 2

- 6-Lane, 25m pool with consideration for a future slide
- Approval to proceed with project received no later than April 30, 2020
- **Total Cost = $20,620,762 (Jan 9)**

**If approval to proceed with the project is received after April 30, 2020 the IPD team reserves the right to review the provided budget and make any necessary adjustments that could be required due to rising inflation and escalation.*

8-LANE

Option 1

- 8-Lane, 25m pool with no consideration for a future slide
- Approval to proceed with project received no later than April 30, 2020
- **Total Cost = $20,923,315 (Jan 9)**

**If approval to proceed with the project is received after April 30, 2020 the IPD team reserves the right to review the provided budget and make any necessary adjustments that could be required due to rising inflation and escalation.*

Option 2

- 8-Lane, 25m pool with consideration for a future slide
- Approval to proceed with project received no later than April 30, 2020
- **Total Cost = $21,241,319 (Jan 9)**

**If approval to proceed with the project is received after April 30, 2020 the IPD team reserves the right to review the provided budget and make any necessary adjustments that could be required due to rising inflation and escalation.*

COST ESTIMATE SUMMARY

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: HH
DATE: January 9, 2020

SECTION	CURRENT COST	CURRENT 24,111 SF $/GCA	CURRENT % OF TOTAL CONS COST	ORIGINAL [ENTER DATE] COST	ORIGINAL SF $/GCA	ORIGINAL % OF TOTAL	VARIANCE COST
02 00 00 EXISTING CONDITIONS	$ -	$ -	0.00%				$ -
03 00 00 CONCRETE	$ 1,136,211	$ 47.12	5.76%				$ 1,136,211
04 00 00 MASONRY	$ 401,023	$ 16.63	2.03%				$ 401,023
05 00 00 METALS	$ 807,285	$ 33.48	4.09%				$ 807,285
06 00 00 WOOD, PLASTICS & COMPOSITES	$ 131,546	$ 5.46	0.67%				$ 131,546
07 00 00 THERMAL AND MOISTURE PROTECTION	$ 1,158,042	$ 48.03	5.87%				$ 1,158,042
08 00 00 OPENINGS	$ 321,668	$ 13.34	1.63%				$ 321,668
09 00 00 FINISHES	$ 1,069,804	$ 44.37	5.42%				$ 1,069,804
10 00 00 SPECIALTIES	$ 180,410	$ 7.48	0.91%				$ 180,410
11 00 00 EQUIPMENT	$ -	$ -	0.00%				$ -
12 00 00 FURNISHINGS	$ -	$ -	0.00%				$ -
13 00 00 SPECIAL CONSTRUCTION	$ 1,836,881	$ 76.18	9.31%				$ 1,836,881
14 00 00 CONVEYING EQUIPMENT	$ -	$ -	0.00%				$ -
21 00 00 - 25 00 00 MECHANICAL	$ 2,892,960	$ 119.98	14.66%				$ 2,892,960
26 00 00 - 28 00 00 ELECTRICAL	$ 928,830	$ 38.52	4.71%				$ 928,830
31 00 00 EARTHWORK	$ 560,938	$ 23.26	2.84%				$ 560,938
32 00 00 EXTERIOR IMPROVEMENTS	$ 642,541	$ 26.65	3.26%				$ 642,541
33 00 00 UTILITIES	$ 554,500	$ 23.00	2.81%				$ 554,500
TOTAL DIRECT COST	**$ 12,622,639**	**$ 523.52**	**63.96%**				**$ 12,622,639**
General Requirements	$ 1,798,455						$ 1,798,455
Winter Conditions	$ 271,083						$ 271,083
LOA / travel - superintendent	$ 144,000						$ 144,000
LOA / travel - craft	$ 353,962						$ 353,962
Insurances	$ 49,126						$ 49,126
Permits	$ 132,046						$ 132,046
Subtrade Bonding	$ 38,693						$ 38,693
CM Bonding	$ 94,609						$ 94,609
Validation Costs	$ 500,000						$ 500,000
Design, Warranty and As Built Costs	$ 1,377,327						$ 1,377,327
Overhead	$ 1,272,691						$ 1,272,691
Profit	$ 1,079,811						$ 1,079,811
TOTAL CONSTRUCTION COSTS	**$ 19,734,442**	**$ 818.48**					**$ 6,031,991**
Design Contingency 0.00%	$ -						$ -
Construction Contingency 0.00%	$ -						$ -
Risk Register	$ 747,500						$ 747,500
Opportunity / Fee at Risk 3% of total construction cost	$ (592,033)						$ (592,033)
Variance Log	$ -						$ -
Cash Allowances	$ 427,500						$ 427,500
ANTICIPATED TOTAL CONSTRUCTION COSTS INCL. CONTINGENCIES, EXCLUDES GST	**$ 20,317,408**	**$ 842.66**					**$ 20,317,408**

COST ESTIMATE BREAKDOWN

Class D Estimate

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: Harry Hanson
DATE: January 9, 2020

CSI #	DESCRIPTION	CURRENT QUAN.	UOM	UNIT RATE $	TOTAL $	24,111 SF $/SF	VARIANCE COST $	COMMENTS
02 00 00	EXISTING CONDITIONS				$ -	$ -	$ -	
02 41 00	DEMOLITION				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
02 80 00	FACILITY REMEDIATION				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
03 00 00	CONCRETE				$ 1,136,211	$ 47.12	$ 1,136,211	
03 10 00	FORMWORK / CONCRETE / REINFORCING				$ 1,136,211	$ 47.12	$ 1,136,211	
	formwork / concrete / reinforcing	1	LS	$ 1,136,210.70	$ 1,136,211	$ 47.12	$ 1,136,211	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
03 40 00	PRECAST CONCRETE				$ -	$ -	$ -	
	precast panel - R25	-	sf	$ 35.60	$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
04 00 00	MASONRY				$ 401,023	$ 16.63	$ 401,023	
04 21 13	BRICK VENEER MASONRY				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
04 22 00	CONCRETE UNIT MASONRY				$ 401,023	$ 16.63	$ 401,023	
	CMU walls - program area	833	m2	$ 305.00	$ 254,065	$ 10.54	$ 254,065	185m x 4.5 tall
	CMU walls - natatorium	451	m2	$ 305.00	$ 137,555	$ 5.71	$ 137,555	
	wind bracing / dowels / rough bucks (see div 4)	1	ls	$ 9,403.08	$ 9,403	$ 0.39	$ 9,403	
05 00 00	METALS				$ 807,285	$ 33.48	$ 807,285	
05 12 00	STRUCTURAL STEEL FRAMING				$ 793,110	$ 32.89	$ 793,110	
	Structural Steel	24,111	sf	$ 31.22	$ 752,650	$ 31.22	$ 752,650	
	misc metals - supply	1	ls	$ 37,567.90	$ 37,568	$ 1.56	$ 37,568	
	misc metals - install	1	ls	$ 2,891.77	$ 2,892	$ 0.12	$ 2,892	
05 20 00	METAL JOISTS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
05 30 00	METAL DECKING				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
05 40 00	COLD FORMED METAL FRAMING				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
05 50 00	METAL FABRICATIONS				$ 14,175	$ 0.59	$ 14,175	
	railing - between swimming & public area	35	m	$ 405.00	$ 14,175	$ 0.59	$ 14,175	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
06 00 00	WOOD, PLASTICS & COMPOSITES				$ 131,546	$ 5.46	$ 131,546	
06 10 00	ROUGH CARPENTRY				$ 47,291	$ 1.96	$ 47,291	
	rough carpentry	1	LS	$ 47,291.36	$ 47,291	$ 1.96	$ 47,291	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
06 11 00	WOOD FRAMING				$ -	$ -	$ -	
	WestDek - supply (130mm fluted fir)	18,126	sf	$ -	$ -	$ -	$ -	
	plywood - supply	18,126	sf	$ -	$ -	$ -	$ -	
	WestDek / plywood - install	1	LS	$ -	$ -	$ -	$ -	
	trucking	10	ls	$ -	$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
06 20 00	FINISH CARPENTRY & MILLWORK				$ 84,255	$ 3.49	$ 84,255	
	front reception desk	1	pcs	$ 15,000.00	$ 15,000	$ 0.62	$ 15,000	
	reception cabinets	4	m	$ 350.00	$ 1,540	$ 0.06	$ 1,540	
	vanity	8	pcs	$ 3,500.00	$ 28,000	$ 1.16	$ 28,000	
	MP room cabinets	7	m	$ 350.00	$ 2,275	$ 0.09	$ 2,275	
	lifeguard room cabinets	8	m	$ 350.00	$ 2,940	$ 0.12	$ 2,940	
	benches	12	pcs	$ 2,500.00	$ 30,000	$ 1.24	$ 30,000	
	cubbies on deck	3	pcs	$ 1,500.00	$ 4,500	$ 0.19	$ 4,500	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
12 36 00	COUNTERTOPS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 00 00	THERMAL AND MOISTURE PROTECTION				$ 1,158,042	$ 48.03	$ 1,158,042	
07 10 00	DAMPPROOFING AND WATERPROOFING				$ 100,219	$ 4.16	$ 100,219	
	dampproofing & insulation to perimeter grade beam	1,862	sf	$ 12.00	$ 22,344	$ 0.93	$ 22,344	
	weeping tile	623	m	$ 125.00	$ 77,875	$ 3.23	$ 77,875	
	Item				$ -	$ -	$ -	
07 21 00	THERMAL INSULATION				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 24 00	E.I.F.S.				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 31 00	SHINGLES				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 41 00	ROOF PANELS & MEMBRANE ROOFING				$ 491,867	$ 20.40	$ 491,867	
	SBS - R40 mechanically fastened	24,111	sf	$ 20.40	$ 491,867	$ 20.40	$ 491,867	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 42 00	WALL PANELS & GENERAL CLADDING				$ 549,078	$ 22.77	$ 549,078	
	standing seam wall cladding - over R25 rockwool	7,022	sf	$ 31.50	$ 221,193	$ 9.17	$ 221,193	
	soffit - lux panel	1,718	sf	$ 42.50	$ 73,015	$ 3.03	$ 73,015	
	Ikme - R25 rockwool	6,620	sf	$ 38.50	$ 254,870	$ 10.57	$ 254,870	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 60 00	FLASHING AND SHEET METAL				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 70 00	ROOF AND WALL SPECIALTIES				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 81 00	APPLIED FIREPROOFING				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	

COST ESTIMATE BREAKDOWN
Class D Estimate

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: Harry Hanson
DATE: January 9, 2020

CSI #	DESCRIPTION	CURRENT QUAN.	UOM	UNIT RATE $	TOTAL $	24,111 SF $/SF	VARIANCE COST $	COMMENTS
07 84 00	**FIRESTOPPING**				**$ 16,878**	**$ 0.70**	**$ 16,878**	
	firestopping	24,111	sf	$ 0.70	$ 16,878	$ 0.70	$ 16,878	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 90 00	**JOINT PROTECTION**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
07 95 00	**EXPANSION CONTROL**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
08 00 00	**OPENINGS**				**$ 321,668**	**$ 13.34**	**$ 321,668**	
08 10 00	**DOORS AND FRAMES & HARDWARE**				**$ 47,215**	**$ 1.96**	**$ 47,215**	
	HMD / PSF - interior	14	pcs	$ 1,200.00	$ 16,800	$ 0.70	$ 16,800	
	HMD / PSF - exterior	3	pcs	$ 1,600.00	$ 4,800	$ 0.20	$ 4,800	
	install doors , frames, hardware	1	LS	$ 8,615.05	$ 8,615	$ 0.36	$ 8,615	
	auto operators	5	pcs	$ 3,400.00	$ 17,000	$ 0.71	$ 17,000	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
08 30 00	**SPECIALTY DOORS AND FRAMES**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
08 40 00	**ENTRANCES / STOREFRONTS / CURTAIN WALLS & HARDWARE**				**$ 195,413**	**$ 8.10**	**$ 195,413**	
	exterior aluminum frame & glazing (double)	1,421	sf	$ 83.00	$ 117,943	$ 4.89	$ 117,943	
	interior aluminum frame & glazing	538	sf	$ 65.00	$ 34,970	$ 1.45	$ 34,970	
	aluminum doors	17	pcs	$ 2,500.00	$ 42,500	$ 1.76	$ 42,500	
					$ -	$ -	$ -	
					$ -	$ -	$ -	
08 50 00	**WINDOWS**				**$ 79,040**	**$ 3.28**	**$ 79,040**	
	kalwall - R7.1	1,216	sf	$ 65.00	$ 79,040	$ 3.28	$ 79,040	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
08 80 00	**GLAZING**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
08 90 00	**LOUVERS AND VENTS**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
09 00 00	**FINISHES**				**$ 1,069,804**	**$ 44.37**	**$ 1,069,804**	
09 20 00	**PLASTER AND GYPSUM BOARD**				**$ 255,550**	**$ 10.60**	**$ 255,550**	
	drywall & steel studs	1	LS		$ 255,550	$ 10.60	$ 255,550	budget price from Kerr
	exterior wall	15,178	sf	$ 11.30		$ -	$ -	
	interior wall	5,113	sf	$ 8.20		$ -	$ -	
	parapets	610	sf	$ 10.50		$ -	$ -	
09 30 00	**TILING**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
09 50 00	**CEILINGS**				**$ -**	**$ -**	**$ -**	
	acoustic (T-bar)	3,262	sf	$ 6.00		$ -	$ -	
	wood slat ceiling		sf	$ 30.00	$ -	$ -	$ -	
	drywall	3,132	sf	$ 10.25		$ -	$ -	
	Item				$ -	$ -	$ -	

COST ESTIMATE BREAKDOWN
Class D Estimate

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: Harry Hanson
DATE: January 9, 2020

CSI #	DESCRIPTION	CURRENT QUAN.	UOM	UNIT RATE $	TOTAL $	24,111 SF $/SF	VARIANCE COST $	COMMENTS
09 60 00	**FLOORING**				**$ 569,505**	**$ 23.62**	**$ 569,505**	
	Flooring	24,111	sf	$ 23.62	$ 569,505	$ 23.62	$ 569,505	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
09 70 00	**WALL FINISHES**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
09 80 00	**ACOUSTIC TREATMENT**				**$ 172,238**	**$ 7.14**	**$ 172,238**	
	acoustics	7,655	sf	$ 22.50	$ 172,238	$ 7.14	$ 172,238	budget price from Western Noise Control
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
09 90 00	**PAINTING & COATING**				**$ 72,511**	**$ 3.01**	**$ 72,511**	
	paint	24,111	sf	$ 2.80	$ 67,511	$ 2.80	$ 67,511	
	paint RTU's	1	ls	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	Item				$ -	$ -	$ -	
10 00 00	**SPECIALTIES**				**$ 180,410**	**$ 7.48**	**$ 180,410**	
MISCELLANEOUS					**$ 180,410**	**$ 7.48**	**$ 180,410**	
	washroom accessories	4	pcs	$ 3,500.00	$ 14,000	$ 0.58	$ 14,000	
	boot racks	4	pcs	$ 575.00	$ 2,300	$ 0.10	$ 2,300	
	entry mat	1	pcs	$ 2,600.00	$ 2,600	$ 0.11	$ 2,600	
	lockers - double tier / phenolic	180	pcs	$ 405.00	$ 72,900	$ 3.02	$ 72,900	
	change room partitions	48	pcs	$ 1,050.00	$ 50,400	$ 2.09	$ 50,400	
	exterior basement access hatch	1	pcs	$ 10,000.00	$ 10,000	$ 0.41	$ 10,000	
	reception security grille	1	pcs	$ 12,500.00	$ 12,500	$ 0.52	$ 12,500	
	install accessories	1	ls	$ 15,710.14	$ 15,710	$ 0.65	$ 15,710	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
10 14 00	**SIGNAGE**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
11 00 00	**EQUIPMENT**				**$ -**	**$ -**	**$ -**	
11 20 00	**COMMERCIAL EQIUPMENT**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
11 30 00	**RESIDENTIAL EQUIPMENT**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
MISCELLANEOUS					**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
12 00 00	**FURNISHINGS**				**$ -**	**$ -**	**$ -**	
12 20 00	**WINDOW TREATMENTS**				**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
MISCELLANEOUS					**$ -**	**$ -**	**$ -**	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
13 00 00	**SPECIAL CONSTRUCTION**				**$ 1,836,881**	**$ 76.18**	**$ 1,836,881**	
13 11 00	**SWIMMING POOLS**				**$ 1,836,881**	**$ 76.18**	**$ 1,836,881**	

COST ESTIMATE BREAKDOWN
Class D Estimate

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: Harry Hanson
DATE: January 9, 2020

CSI #	DESCRIPTION	CURRENT QUAN.	UOM	UNIT RATE $	TOTAL $	24,111 SF $/SF	VARIANCE COST $	COMMENTS
	Pool Mechanical	1	LS	$ 1,836,881.00	$ 1,836,881	$ 76.18	$ 1,836,881	
	Item				$ -	$ -	$ -	
13 18 00	ICE RINKS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
13 30 00	SPECIAL STRUCTURES				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
13 30 00	SPECIAL STRUCTURES				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
14 00 00	CONVEYING EQUIPMENT				$ -	$ -	$ -	
14 20 00	ELEVATORS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
21 00 00 - 25 00 00	MECHANICAL				$ 2,892,960	$ 119.98	$ 2,892,960	
	MISCELLANEOUS MECHANICAL				$ 2,892,960	$ 119.98	$ 2,892,960	
	Mechanical	24,111	sf	$ 119.78	$ 2,887,960	$ 119.78	$ 2,887,960	
	Item				$ -	$ -	$ -	
	backfill	1	ls	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	TRENCHING / CONCRETE WORKS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
26 00 00 - 28 00 00	ELECTRICAL				$ 928,830	$ 38.52	$ 928,830	
	MISCELLANEOUS ELECTRICAL				$ 928,830	$ 38.52	$ 928,830	
	Electrical	24,111	sf	$ 38.32	$ 923,830	$ 38.32	$ 923,830	
	Item				$ -	$ -	$ -	
	backfill	1	ls	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	TRENCHING / CONCRETE WORKS				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
31 00 00	EARTHWORK				$ 560,938	$ 23.26	$ 560,938	
31 10 00	SITE CLEARING				$ 116,700	$ 4.84	$ 116,700	
	clear site	7,780	m2	$ 15.00	$ 116,700	$ 4.84	$ 116,700	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
31 20 00	EARTH MOVING				$ 186,148	$ 7.72	$ 186,148	
	excavation / backfill (see tab 31)	1	LS	$ 186,148.00	$ 186,148	$ 7.72	$ 186,148	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
31 21 00	RADON MITIGATION				$ 158,410	$ 6.57	$ 158,410	
	gravel & membrane	24,111	sf	$ 6.57	$ 158,410	$ 6.57	$ 158,410	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	

COST ESTIMATE BREAKDOWN
Class D Estimate

PROJECT NAME: Drayton Valley and Brazeau County Aquatic Centre
VERSION: 6 Lane - Option 1
LOCATION: Drayton Valley
CONSULTANT: Group 2
SCHEDULE (MOS): 18

ESTIMATE NO.: 2019.504
ESTIMATOR: Harry Hanson
DATE: January 9, 2020

CSI #	DESCRIPTION	CURRENT QUAN.	UOM	UNIT RATE $	TOTAL $	24,111 SF $/SF	VARIANCE COST $	COMMENTS
31 40 00	SHORING AND UNDERPINNING				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
31 60 00	SPECIAL FOUNDATIONS				$ 99,680	$ 4.13	$ 99,680	
	belled piles	56	pcs	$ 1,600.00	$ 89,600	$ 3.72	$ 89,600	
	casing - allow 3m per pile x 50%	84	m	$ 120.00	$ 10,080	$ 0.42	$ 10,080	
	Item				$ -	$ -	$ -	
32 00 00	EXTERIOR IMPROVEMENTS				$ 642,541	$ 26.65	$ 642,541	
	MISCELLANEOUS PAVING				$ 355,731	$ 14.75	$ 355,731	
	light duty	914	m2	$ 76.00	$ 69,464	$ 2.88	$ 69,464	
	heavy duty	1,041	m2	$ 108.00	$ 112,428	$ 4.66	$ 112,428	
	gravel roadway	331	m2	$ 45.00	$ 14,895	$ 0.62	$ 14,895	
	patch asphalt	1,020	m2	$ 150.00	$ 153,000	$ 6.35	$ 153,000	
	sawcutting	650	m	$ 6.56	$ 4,264	$ 0.18	$ 4,264	includes for new driveways and underground
	line painting	48	pcs	$ 35.00	$ 1,680	$ 0.07	$ 1,680	
	Item				$ -	$ -	$ -	
	CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS				$ 126,345	$ 5.24	$ 126,345	
	curbs	144	m	$ 175.00	$ 25,200	$ 1.05	$ 25,200	
	sidewalks	511	m2	$ 180.00	$ 91,980	$ 3.81	$ 91,980	
	concrete apron	39	m2	$ 235.00	$ 9,165	$ 0.38	$ 9,165	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	SITE IMPROVEMENTS AND LANDSCAPING				$ 160,465	$ 6.66	$ 160,465	
	landscaped area - 150mm topsoil and sod	2,603	m2	$ 55.00	$ 143,165	$ 5.94	$ 143,165	
	shrubs	100	pcs	$ 50.00	$ 5,000	$ 0.21	$ 5,000	
	trees	8	pcs	$ 600.00	$ 4,800	$ 0.20	$ 4,800	
	garbage enclosure	1	ls	$ 7,500.00	$ 7,500	$ 0.31	$ 7,500	
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
33 00 00	UTILITIES				$ 554,500	$ 23.00	$ 554,500	
	MISCELANEOUS UTILITIES				$ 554,500	$ 23.00	$ 554,500	
	sanitary	1	ls	$ 328,960.00	$ 328,960	$ 13.64	$ 328,960	budget price from Kichton
	storm	1	ls	$ 101,030.00	$ 101,030	$ 4.19	$ 101,030	budget price from Kichton
	water	1	ls	$ 124,510.00	$ 124,510	$ 5.16	$ 124,510	budget price from Kichton
	Item				$ -	$ -	$ -	
	Item				$ -	$ -	$ -	
	TOTAL DIRECT COST				$ 12,622,639	$ 523.52	$ 12,622,639	
	CASH ALLOWANCES				$ 427,500	$ 17.73	$ 427,500	
	CASH ALLOWANCES				$ 427,500	$ 17.73	$ 427,500	
	Testing & Inspections (concrete and earthwork)	1	LS	$ 75,000.00	$ 75,000	$ 3.11	$ 75,000	
	Pipe Line Relocation	1	LS	$ 70,000.00	$ 70,000	$ 2.90	$ 70,000	
	Sport Field Relocation	1	LS	$ -	$ 25,000	$ 1.04	$ 25,000	was $35K, will be covered by the Town of DV
	FFE	1	LS	$ 50,000.00	$ 50,000	$ 2.07	$ 50,000	
	Design co-location costs	1	LS	$ 50,000.00	$ 50,000	$ 2.07	$ 50,000	
	Underground Utility Locates	1	LS	$ 7,500.00	$ 7,500	$ 0.31	$ 7,500	
	Utility Connection Costs	1	LS	$ 50,000.00	$ 50,000	$ 2.07	$ 50,000	
	Site Security	1	LS	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	1 Year Warranty Costs	1	LS	$ -	$ -	$ -	$ -	
	TOPO Survey	1	LS	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	Steel Testing	1	LS	$ 5,000.00	$ 5,000	$ 0.21	$ 5,000	
	CCTV / Security / IT	1	LS	$ 50,000.00	$ 50,000	$ 2.07	$ 50,000	
	Make Good - existing sidewalk	1	LS	$ 10,000.00	$ 10,000	$ 0.41	$ 10,000	
	Shared Resources (man lifts)	1	LS	$ 25,000.00	$ 25,000	$ 1.04	$ 25,000	
	Item				$ -	$ -	$ -	

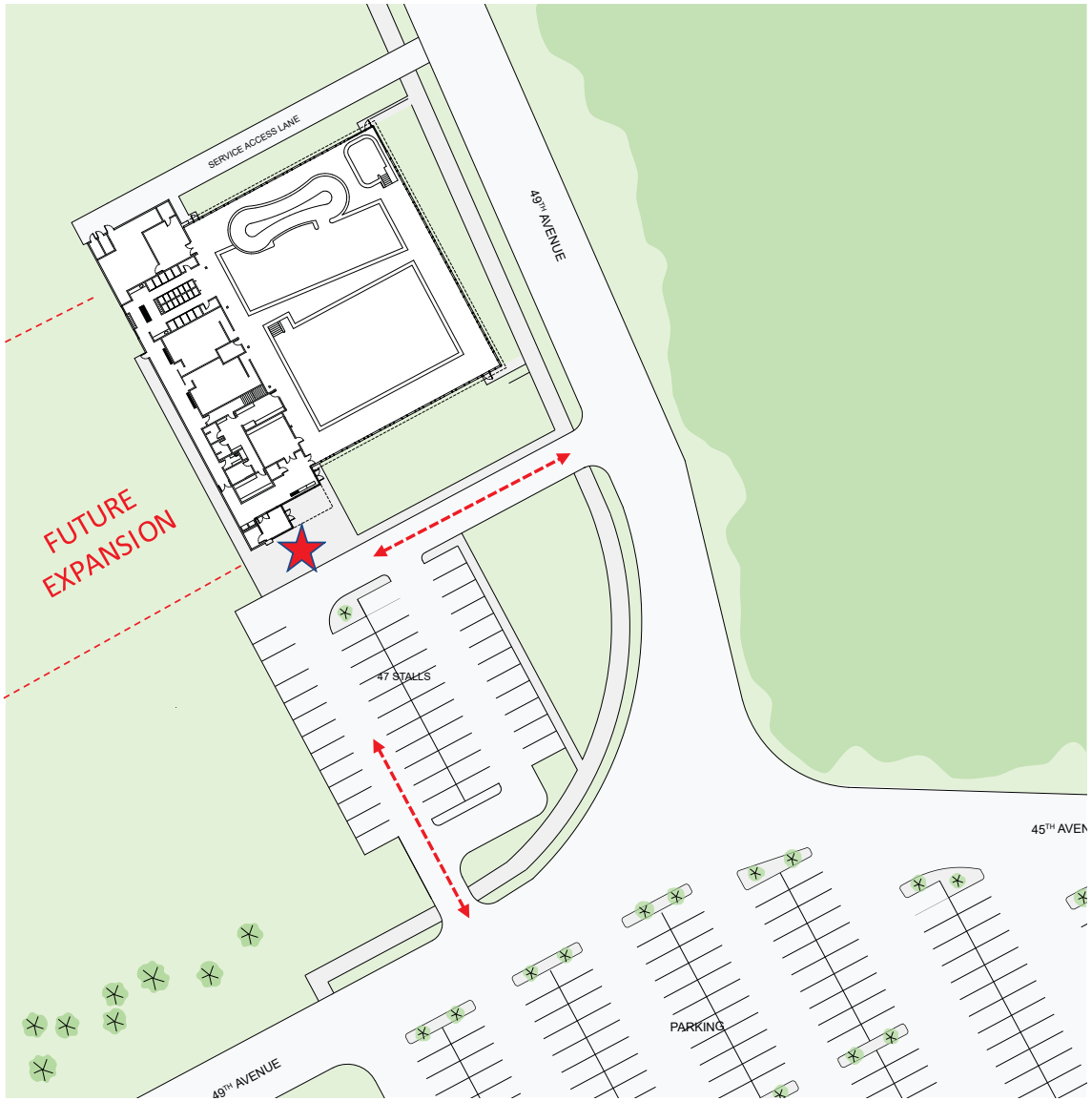
9.0
WISH LIST

9.0 WISHLIST

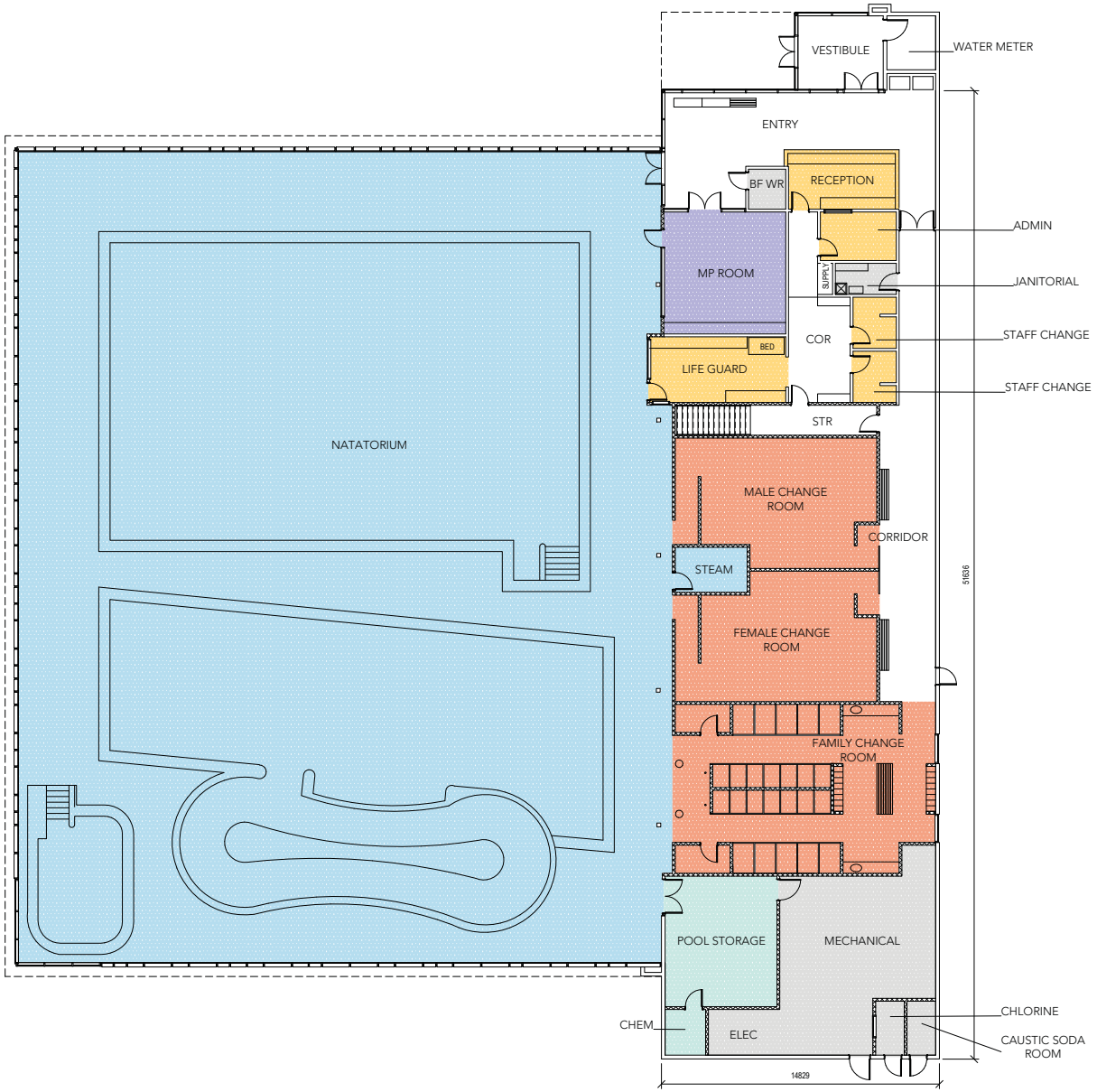
WL Item #	Description	Date Posted	Design Requirement (PIT's)	Procurement Date (Constructability PIT)	Last Responsible Moment (Owner Approval)	Activity Date (Constructability PIT)	Cost (Estimating PIT)	Priority (Owner's Rep.)	Next steps
1	**Parking Lot Plug-ins**	21-Nov-19	During Construction	Within Project Design	Prior to the seasonal work commencing in 2021		$ 8,000		Owner approval to proceed - Cost Associated with this wish list item includes 6 double outlet car peds which allows for 6 stalls to have plugs.
2	**8 Lane (from original budget of 6 lanes)**	21-Nov-19	Immediate upon approval to proceed with design implementation phase	n/a	Prior to design phase commencing (requires foundation work)		$ 647,000		Owner approval to proceed
3	**Waterslide**	21-Nov-19	Any time during or after construction if the future slide option is chosen	10 weeks delivery	Prior to design phase commencing (requires foundation work)		$ 350,000		Future slide not a possibility - due to the reduction of 4 meters to the natatorium overall width (~$1M cost savings)
4	**Climbing Wall**	21-Nov-19	Any time during or after construction	10 weeks delivery	3-months before substantial completion / opening of the facility (if required prior to opening)		$ 80,000		Owner approval to proceed
5	**Bathing Suit Spinners**	05-Dec-19	Any time during or after construction - electrical rough-in required however	10 weeks delivery	3-months before substantial completion / opening of the facility (if required prior to opening)		$3600 each plus electrical cost		Owner approval to proceed
6	**Water Spins Bikes**	05-Dec-19	Any time during or after construction	10 weeks delivery	3-months before substantial completion / opening of the facility (if required prior to opening)		$2800 each		Owner approval to proceed
7	**Westdeck - upgrade to a Westdeck on steel joist roof structure vs conventional metal deck on steel joist**	03-Dec-19	During Design Implementation Phase	12-14 weeks post shop drawing approval	Prior to structural steel design commencing		$ 205,951		Owner approval to proceed
8	**Plastic Lockers**	21-Nov-19	Mid-way through construction	6-8 weeks post shop drawing approval	3-months before substantial completion / opening of the facility (if required prior to opening)		$ 49,730		Owner approval to proceed
9	**Plastic Toilet Partitions**	21-Nov-19	Mid-way through construction	6-8 weeks post shop drawing approval	3-months before substantial completion / opening of the facility (if required prior to opening)		$ 20,160		Owner approval to proceed
10	**Screening of Roof Top Air Handling Units**	02-Dec-19	During Design Implementation Phase	6-weeks after approval	6-weeks prior to substantial completion		$ 50,000		Owner approval to proceed
11	**Re-introduce the circular section within the lazy river (c/w bench seating)**	04-Dec-19	Only available if the future slide option is accepted	Upon design commencement	Prior to design phase commencing (requires foundation work)		$ 25,030		Owner approval to proceed
12	**Paved access road to back entrance of building (for deliveries)(includes curb)**	04-Dec-19	During Design Implementation Phase	n/a	Prior to the seasonal work commencing in 2021	During the Spring/summer prior to hand-over	$ 31,350		Owner approval to proceed
13	**In-Floor Heating in Locker Rooms**	10-Dec-19	During Design Implementation Phase	Early Construction	Prior to design phase commencing (requires foundation work)	Early Construction	$ 15,000		Owner approval to proceed

10.0
DESIGN DOCUMENTS

ARCHITECTURAL
SITE PLAN



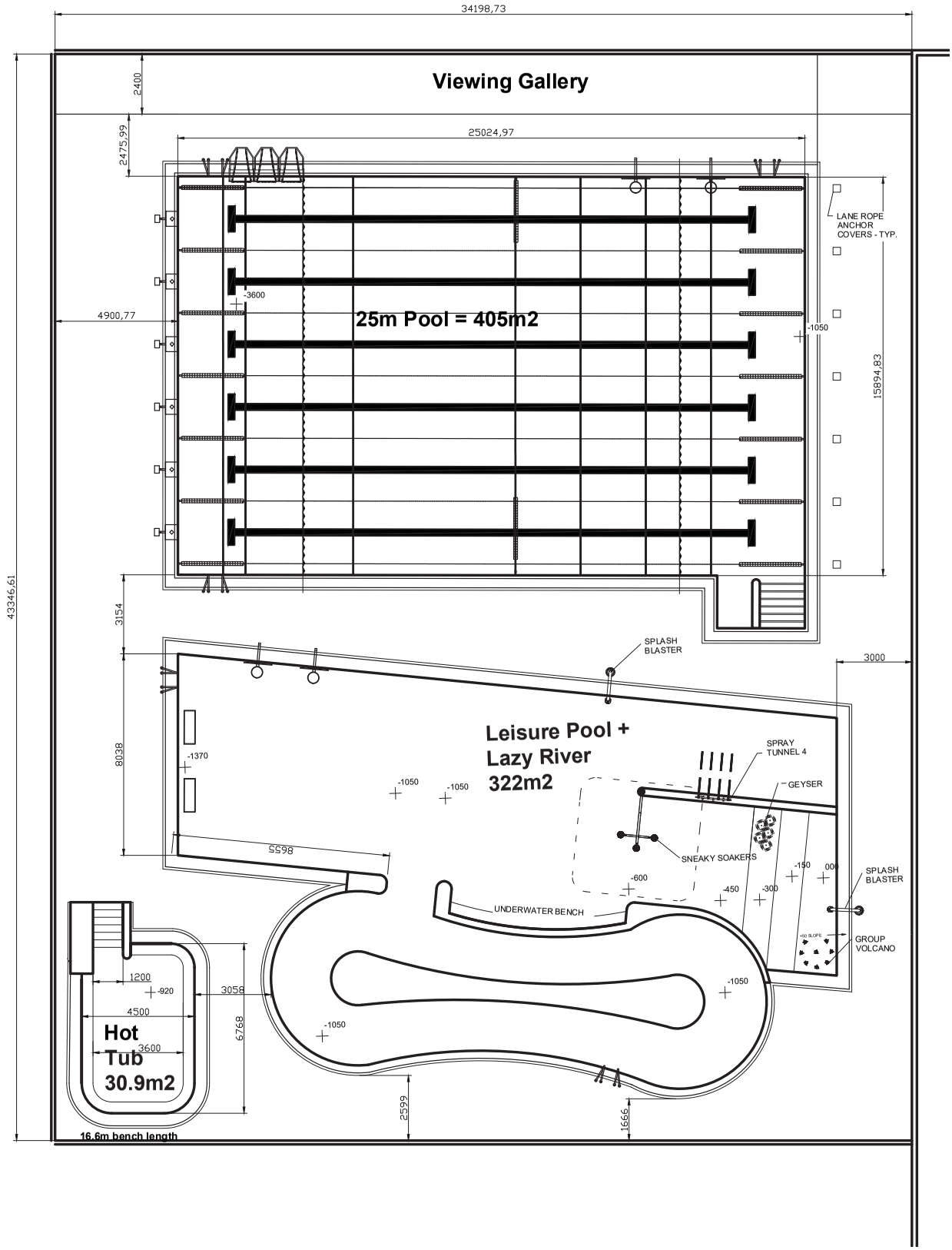
ARCHITECTURAL
FLOOR PLAN



Program Legend

- ADMINISTRATION
- CHANGE ROOM
- MULTI PURPOSE
- POOL
- POOL SERVICE
- CIRCULATION
- SERVICE

N



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE

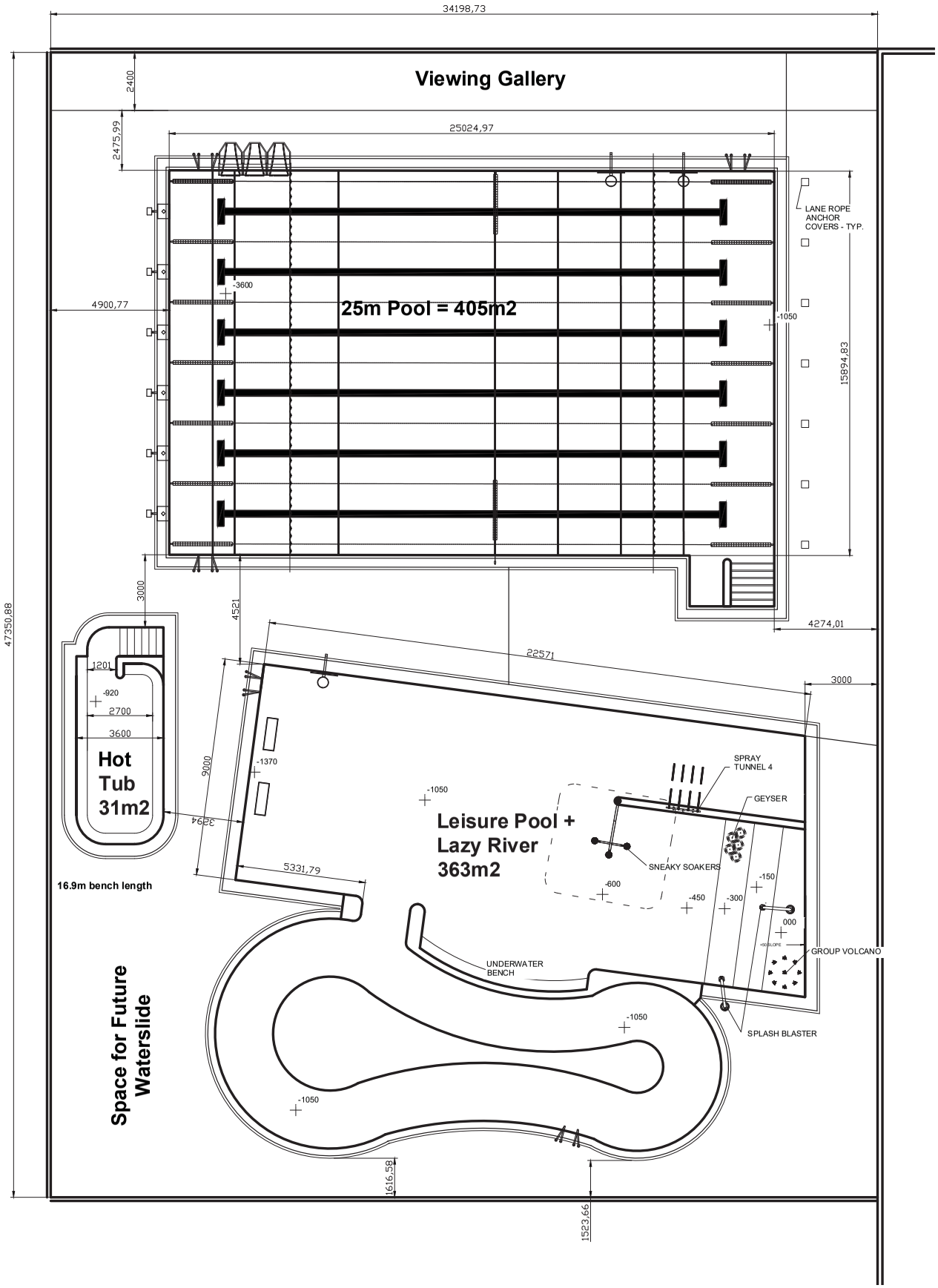
Group2 Architecture Interior Design

Group2 Architecture Interior Design Ltd.

N

Pool Plan
6 Lane Opt1

12/02/19
19046



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE

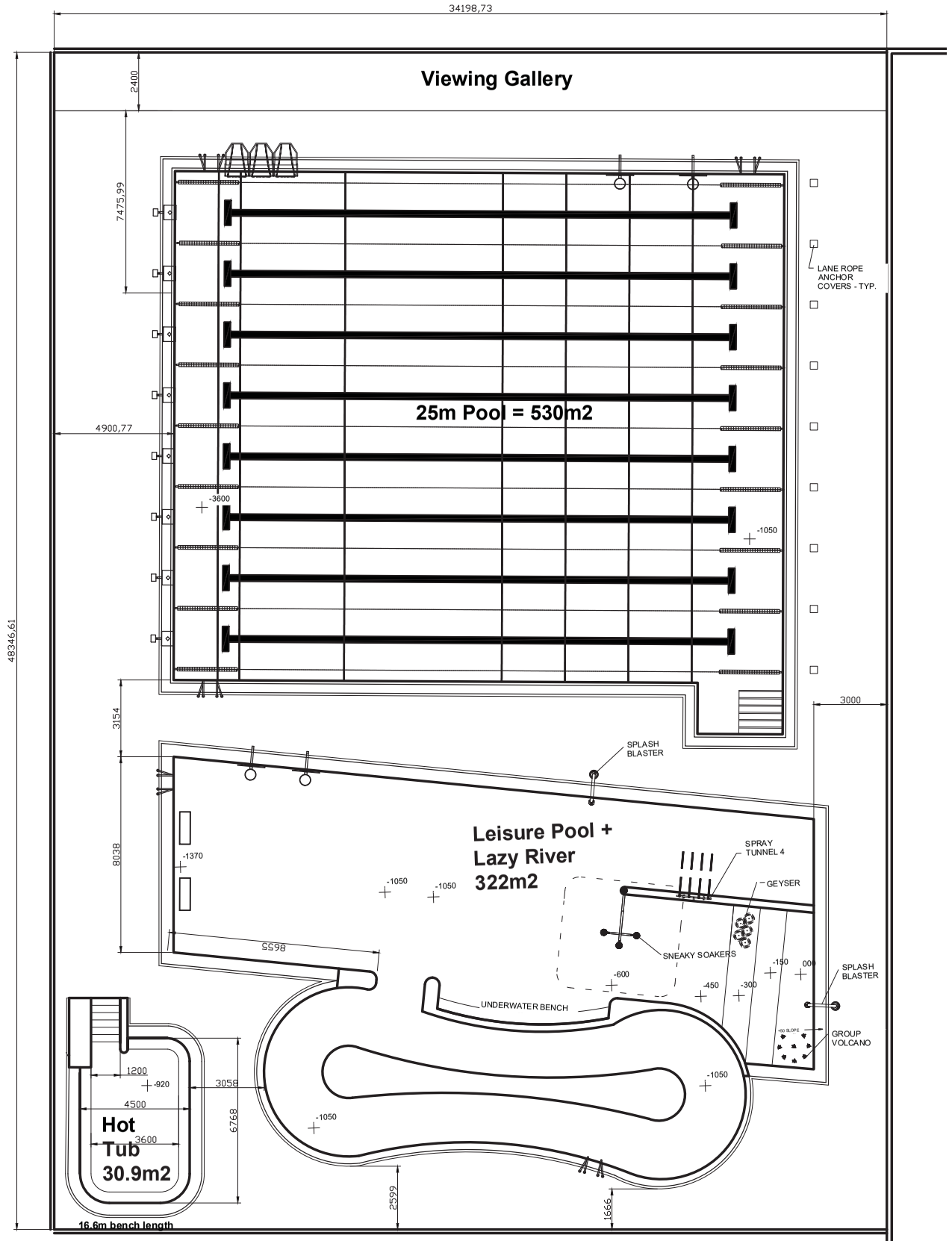
Group2 Architecture Interior Design

Group2 Architecture Interior Design Ltd.

N

Pool Plan
6 Lane Opt2

12/02/19
19046



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE

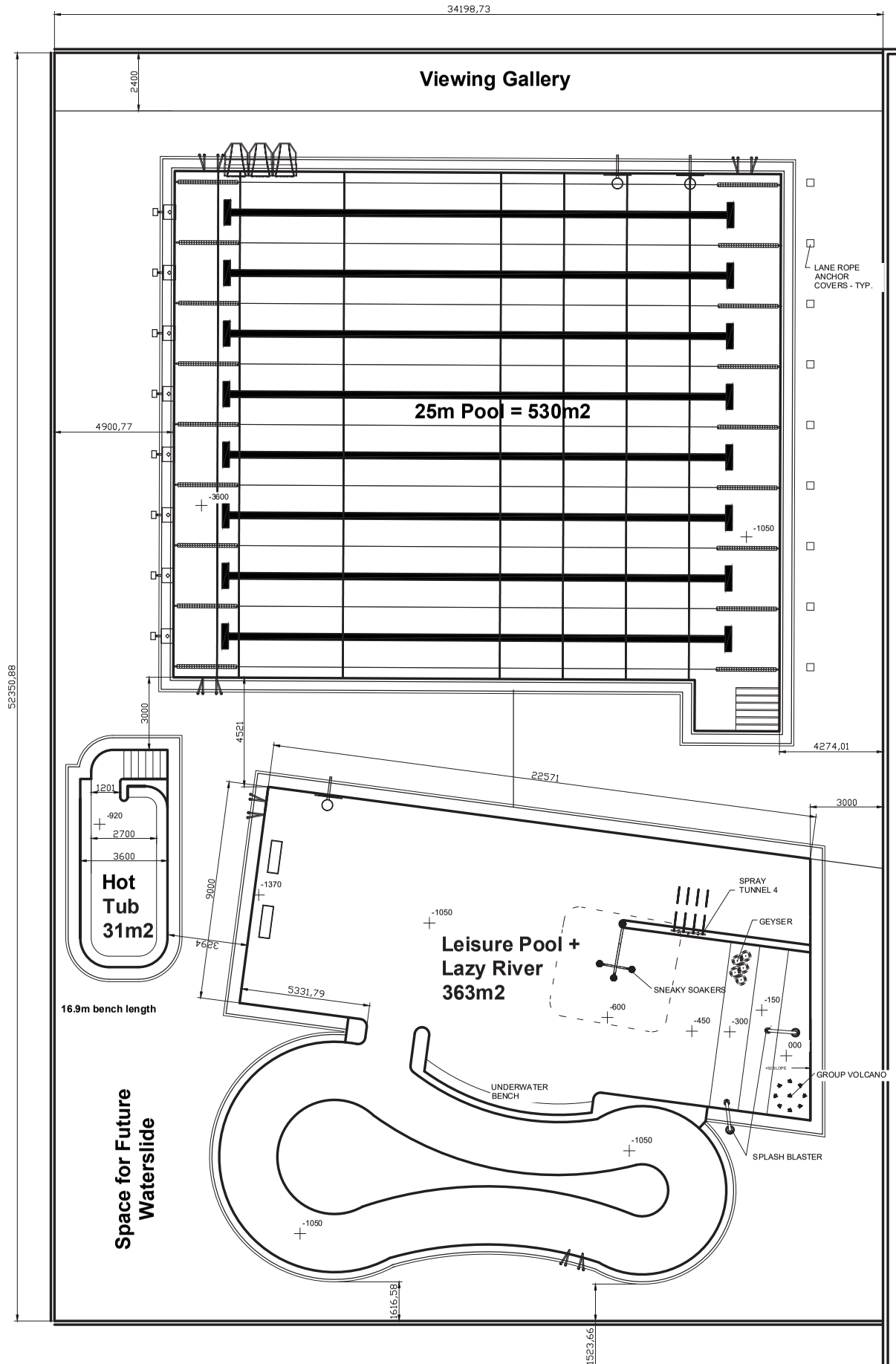
Group2 Architecture Interior Design

Group2 Architecture Interior Design Ltd.

N

Pool Plan
8 Lane Opt1

12/02/19
19046



DRAYTON VALLEY AND BRAZEAU AQUATIC CENTRE

Group2 Architecture Interior Design

Group2 Architecture Interior Design Ltd.

N

Pool Plan
8 Lane Opt2

12/02/19
19046

ARCHITECTURAL
ROOM DATA SHEETS

ROOM DATA SHEET

Department:	Aquatic Centre
Space Name:	Natatorium
Space Number:	
Space Area:	(1511 m2) Bather Load of 320
Function:	Includes all tanks, pool deck area, and viewing area
Rating (Fire / STC):	
Proximity:	Adjacent to Change Rooms, Life Guard, Multi-Purpose, Steam, Pool Sotrage and Chemical Storage

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint, Tile	X Acoustic	Special Floor Loading	Base Cabinets	X Clear Height: 8m to U/S Deck
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	X Clear Span: Yes
X Chemical Resistant	Water Impervious	Drywall		Other:	
X Non-Slip	Special Protection	Special: Exposed			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	Single	X Desirable
X Aluminum	Card Access	Width Oversized (48")	X Double w/ Astrigal	Not Required
Sidelight	X Door Closer	Height Standard	Double w/o Astrigal	Blackout
X Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	X Special: Diffused
Special: Rolling Overhead Shutters	X Special: Door position sensosrst ext.	Special: Custom opeing	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	X Water Fountain (w/ Bottle Filler)	X Floor Drain (Trench drains)	Trench drains to be wider than 3" Hose bibs to be recessed
Kitchen Sink	Water Closet (BF)	X Shower (Deck Shower for Steam Rm)	X Special: Hose bibs	
Mop Sink	Urinal	Shower (BF)	X Special: Hot Tub w. 2 hand rails, but no chair lift	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Radiant heat (? - dependant on fenestration R-values)
x Critical: 27C to 30C	x Critical: 50% to 60%	X High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	Minimum 450 Lux	X General Receptacle	X 8 General Locations	Zones over the deck to allow for special events Under-water lighting separate, 20 Amp Circuits, Receptacles shall be with weather proof covers, Lighting to be dimmable to meet NECB. Day light harvesting may need to be incorporated if clearstory openings exist.
Task		Emergency Power Recept.		
X Dimmable		Special Outlet (208/220v)	X Hard-Wired for Water Fountain	
X Daylight				
Switching				
X Manual				
Occupancy				
Vacancy				
X Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
X Telephone (designated landline)	Closed Circuit TV	X Display Monitors	X PA System	Will likely need cellular dial-out redundancy for the fibre line Clock near hot tub, steam room. Rough-in for display monitors on deck area seating zone.
Data	X Clock (Master System)	Tackboards	X Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Pace clock	2		Yes	Existing	Brought from existing pool
2	Hooks for Kayaks	7				
3	Portable Accessible Lift	1				Electrical: locations and type to be determined with Client. Minimum 15A/1A dedicated at each location
4	Bleachers - Telescopic					Provided as an FF&E item
5	Stantions for Basketball Hoop, Volley ball net and Backstroke Flag line					Pool package
6						
7						

ROOM DATA SHEET

Department:	Aquatic Centre
Space Name:	Steam Room
Space Number:	
Space Area:	(9 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Natatorium
	Possibly Am-Finn package or similar

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: As per insert
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	Drywall		Other:	
X Non-Slip	Special Protection	Special:			
Special:	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	Lockable	X Width Standard	X Single	Desirable
Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	X Door Closer	X Height Standard	Double w/o Astrigal	Blackout
X Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special: Kawneer Alumium	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	Floor Drain	Am-Finn system or similar
Kitchen Sink	Water Closet (BF)	Shower	Special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Process driven
Critical:	Critical:	High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	150 Lux	General Receptacle		Need to discuss if a vacancy sensor will work in this environment. Perhaps we can get a timer switch. Lighting to be IP66 rated.
Task		Emergency Power Recept.		
Dimmable		Special Outlet (208/220v)		
Daylight				
Switching				
X Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	PA System	Outlet for digital clock rated for damp location
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Clock	1		Yes	New	Difficult conditions
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Aquatic Centre
Space Name:	Pool Storage
Space Number:	
Space Area:	(41 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Natatorium

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height:
X Easily Cleaned	Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	Drywall		Other:	
X Non-Slip	Special Protection	X Special: Exposed			
Special:	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	X Double w/o Astrigal	Blackout
Glazed Panel	X Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	X Special: Pinned Leaf	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	X Floor Drain	
Kitchen Sink	Water Closet (BF)	Shower	Special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
x Normal	x Normal	Standard	Exhaust
Critical:	Critical:	X High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	250 Lux	X General Receptacle	Housekeeping	
Task		Emergency Power Recept.		
Dimmable		Special Outlet (208/220v)		
Daylight				
Switching				
Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Open Shelving					1 wall
2	Aquatic Spin Bikes	13				Owner supplied
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Aquatic Centre
Space Name:	Multi-Purpose
Space Number:	
Space Area:	(43 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Natatorium, and Entry

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
Water Impervious	X Paint	X Acoustic	Special Floor Loading	X Base Cabinets (West Wall) 50% lockable)	Clear Height:
Easily Cleaned	Washable	Washable	wt.	Upper Cabinets	Clear Span:
Chemical Resistant	Water Impervious	Drywall		X Other: Solid Surface Counters	
X Non-Slip	Special Protection	Special:			
X Special: Sheet Vinyl	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required (borrowed desireable)
X Sidelight	Door Closer	Height Standard	Double w/o Astrigal	Blackout
X Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	Floor Drain	
X Kitchen Sink	Water Closet (BF)	Shower	Special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
X Normal	X Normal	X Standard	
Critical:	Critical:	High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	2 20 Amp above counter	
Task		Emergency Power Recept.	1 Bar Fridge	
X Dimmable		Special Outlet (208/220v)	1 Outlet and Data on wall for monitor	
Daylight				
Switching				
X Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	8' WB
X Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	X Whiteboards	Teleconferencing	
X WAP	X Special: Skype Capabilities	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Stackable tables	5			New	Owner supplied
2	Chairs	20			New	Owner supplied
3	Wall Mounted TV Monitor	1			New	Owner supplied
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Pool Mechanical/Water Treatment
Space Number:	
Space Area:	(186 m2)
Function:	
Rating (Fire / STC):	
Proximity:	

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	X Special Floor Loading	Base Cabinets	Clear Height:
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	Water Impervious	Drywall		Other:	
X Non-Slip	Special Protection	Special: Exposed			
X Special: Sealed Concrete	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
X Special: Floor Hatch/Overhead door	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	X Floor Drain	Trench drains
Kitchen Sink	Water Closet (BF)	Shower	X Special: Eye Wash	
Mop Sink	Urinal	Shower (BF)	X Special: Stainless Basin	
Laboratory Sink	Lavatory	Emergency Shower	X Special: Hose bib	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
x Normal	x Normal	X Standard	
Critical:	Critical:	High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	250 Lux	X General Receptacle		Leak detection Carbon monoxide detection NB: Any areas that are to be hosed down will need to be weatherproof
Task		Emergency Power Recept.		
Dimmable		Special Outlet (208/220v)		
Daylight				
Switching				
X Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
X Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1						
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Chlorine Room
Space Number:	
Space Area:	(5 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Main floor, direct access from exterior, view window from Mechanical

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height:
X Easily Cleaned	Washable	Washable	wt.	Upper Cabinets	X Clear Span: 5'x11'
X Chemical Resistant	Water Impervious	Drywall		Other:	
X Non-Slip	X Special Protection: Block walls	X Special: Exposed			
X Special: Sealed Concrete	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	X Special: Glazing from Mechanical
Special:	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	Floor Drain	
Kitchen Sink	Water Closet (BF)	Shower	special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
x Normal	x Normal	Standard	Exhaust fan to the exterior Alarm, strobe needed, to be located in Admin area Strobe needed at exterior of door and next to viewing window in Mechanical Switching for lighting to be in Mechanical room and in the Chlorine room
Critical:	Critical:	X High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	250 Lux	X General Receptacle		Elec to tie in the above Gasketed fixtures
Task		Emergency Power Recept.		
Dimmable		Special Outlet (208/220v)		
Daylight				
Switching				
X Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
X Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1						
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Caustic Soda Room
Space Number:	
Space Area:	(4.0 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Separate from public area, accessed from Pool Mechanical

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height:
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	X Clear Span: 4'x10'
X Chemical Resistant	X Water Impervious	Drywall		Other:	
X Non-Slip	X Special Protection	X Special: Exposed			
X Special: Sealed Concrete	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	Floor Drain	Piping needed to run the slurry to the Pool Mechanical room where it can be mixed in
Kitchen Sink	Water Closet (BF)	Shower	X Special: Hose bib	
Mop Sink	Urinal	Shower (BF)	X Special: Eye Wash (?)	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
X Normal	X Normal	X Standard	
Critical:	Critical:	High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General	250 Lux	X General Receptacle	1	Mixer may require a 20 amp circuit
Task		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)		
Daylight				
Switching				
X Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
X Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1						
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Chemical Storage
Space Number:	
Space Area:	(5 m2) May not be a room, Lockable storage off deck or in Mechanical room
Function:	
Rating (Fire / STC):	
Proximity:	Located in Pool Storage

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
[X] Water Impervious	[X] Paint	[ ] Acoustic	[ ] Special Floor Loading	[ ] Base Cabinets	[ ] Clear Height:
[ ] Easily Cleaned	[ ] Washable	[ ] Washable	wt.	[ ] Upper Cabinets	[ ] Clear Span:
[X] Chemical Resistant	[ ] Water Impervious	[ ] Drywall		[ ] Other:	
[ ] Non-Slip	[ ] Special Protection	[X] Special: Exposed			
[X] Special: Sealed Concrete	[ ] Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
[ ] Solid Core Wood	[X] Lockable	[X] Width Standard	[X] Single	[ ] Desirable
[X] Hollow Metal	[ ] Card Access	[ ] Width Oversized (48")	[ ] Double w/ Astrigal	[X] Not Required
[ ] Sidelight	[ ] Door Closer	[X] Height Standard	[ ] Double w/o Astrigal	[ ] Blackout
[ ] Glazed Panel	[ ] Trolley/Kick Plates	[ ] Height Oversized:	[ ] Double Egress	[ ] Special:
[ ] Special:	[ ] Special:	[ ] Special:	[ ] Special:	

PLUMBING DATA

Fixtures				Notes
[ ] Hand Wash Sink	[ ] Water Closet	[ ] Water Fountain	[ ] Floor Drain	
[ ] Kitchen Sink	[ ] Water Closet (BF)	[ ] Shower	[ ] Special:	
[ ] Mop Sink	[ ] Urinal	[ ] Shower (BF)	[ ] Special:	
[ ] Laboratory Sink	[ ] Lavatory	[ ] Emergency Shower	[ ] Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
[x] Normal	[x] Normal	[x] Standard	Exhaust
[ ] Critical:	[ ] Critical:	[ ] High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
[X] General		[ ] General Receptacle	[ ]	
[ ] Task		[ ] Emergency Power Recept.	[ ]	
[ ] Dimmable		[ ] Special Outlet (208/220v)	[ ]	
[ ] Daylight				
Switching				
[ ] Manual				
[ ] Occupancy				
[X] Vacancy				
[ ] Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
[ ] Telephone	[ ] Closed Circuit TV	[ ] Display Monitors	[ ] PA System	
[ ] Data	[ ] Clock (Master System)	[ ] Tackboards	[ ] Speakers/Audio System	
[ ] VOIP	[ ] Intercom	[ ] Whiteboards	[ ] Teleconferencing	
[ ] WAP	[ ] Special:	[ ] Projection Equipment	[ ] Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Metal Storage Rack	1				Storage rack for chemicals
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Mechanical
Space Number:	
Space Area:	(72 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Main Floor, separate but visual connection to Chlorine

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
[ ] Water Impervious	[ ] Paint	[ ] Acoustic	[ ] Special Floor Loading	[ ] Base Cabinets	[ ] Clear Height:
[ ] Easily Cleaned	[ ] Washable	[ ] Washable	wt.	[ ] Upper Cabinets	[ ] Clear Span:
[ ] Chemical Resistant	[ ] Water Impervious	[ ] Drywall		[ ] Other:	
[ ] Non-Slip	[ ] Special Protection	[ ] Special: Exposed			
[ ] Special:	[ ] Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
[ ] Solid Core Wood	[X] Lockable	[X] Width Standard	[X] Single	[ ] Desirable
[X] Hollow Metal	[ ] Card Access	[ ] Width Oversized (48")	[ ] Double w/ Astrigal	[X] Not Required
[ ] Sidelight	[ ] Door Closer	[X] Height Standard	[ ] Double w/o Astrigal	[ ] Blackout
[ ] Glazed Panel	[ ] Trolley/Kick Plates	[ ] Height Oversized:	[ ] Double Egress	[ ] Special:
[ ] Special:	[ ] Special:	[X] Special: Exposed	[ ] Special:	

PLUMBING DATA

Fixtures				Notes
[ ] Hand Wash Sink	[ ] Water Closet	[ ] Water Fountain	[X] Floor Drain	
[ ] Kitchen Sink	[ ] Water Closet (BF)	[ ] Shower	[ ] Special:	
[ ] Mop Sink	[ ] Urinal	[ ] Shower (BF)	[ ] Special:	
[ ] Laboratory Sink	[ ] Lavatory	[ ] Emergency Shower	[ ] Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
[x] Normal	[x] Normal	[x] Standard	
[ ] Critical:	[ ] Critical:	[ ] High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
[X] General		[ ] General Receptacle	[ ]	Leak detection may be a client preference
[ ] Task		[ ] Emergency Power Recept.	[ ]	
[ ] Dimmable		[X] Special Outlet (208/220v)	[ ]	
[ ] Daylight				
Switching				
[ ] Manual				
[ ] Occupancy				
[X] Vacancy				
[ ] Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
[ ] Telephone	[ ] Closed Circuit TV	[ ] Display Monitors	[X] PA System	
[X] Data (BMS Access Redundancy)	[ ] Clock (Master System)	[ ] Tackboards	[ ] Speakers/Audio System	
[ ] VOIP	[ ] Intercom	[ ] Whiteboards	[ ] Teleconferencing	
[X] WAP	[ ] Special:	[ ] Projection Equipment	[ ] Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1						
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Service
Space Name:	Electrical
Space Number:	
Space Area:	(9 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Located in Mechanical Room

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☐ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☐ Clear Height:
☒ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☒ 7'
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☒ Non-Slip	☐ Special Protection	☒ Special: Exposed			
☒ Special: Sealed Concrete	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☒ Single	☐ Desirable
☒ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☒ Not Required
☐ Sidelight	☐ Door Closer	☐ Height Standard	☐ Double w/o Astrigal	☐ Blackout
☐ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☐ Special:	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	Cooling (passive?) for electrical equipment
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☐ General Receptacle	☐	
☐ Task		☐ Emergency Power Recept.	☐	
☐ Dimmable		☐ Special Outlet (208/220v)	☐	
☐ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	
☐ Data	☐ Clock (Master System)	☐ Tackboards	☐ Speakers/Audio System	
☐ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☐ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1						
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Circulation
Space Name:	Change Room Corridor
Space Number:	
Space Area:	(65 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Connects Entry to Change Rooms

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☐ Clear Height: 3 m Min
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☐ Non-Slip	☐ Special Protection	☐ Special:			
☒ Special: Vinyl Sheet Flooring	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☐ Single	☒ Desirable
☐ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☐ Not Required
☐ Sidelight	☒ Door Closer	☒ Height Standard	☒ Double w/o Astrigal	☐ Blackout
☒ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☒ Double Egress	☐ Special:
☐ Special: Kawneer Aluminum	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain (w/ bottle filler)	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ Special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☒ General Receptacle	☐ Housekeeping	
☐ Task		☒ Emergency Power Recept.	☐	
☐ Dimmable		☐ Special Outlet (208/220v)	☐	
☐ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	
☐ Data	☐ Clock (Master System)	☐ Tackboards	☐ Speakers/Audio System	
☐ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Boot Racks outside ofChange Rms					Owner supplied
2						
3						
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Circulation
Space Name:	Stair
Space Number:	
Space Area:	17 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Leads to Pool Mechanical

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☐ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☐ Clear Height:
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☒ Non-Slip	☐ Special Protection	☒ Special: Exposed			
☒ Special: Sealed Concrete	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☒ Single	☐ Desirable
☒ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☒ Not Required
☐ Sidelight	☒ Door Closer	☒ Height Standard	☐ Double w/o Astrigal	☐ Blackout
☐ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☐ Special:	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☐ General Receptacle	☐	
☐ Task		☐ Emergency Power Recept.	☐	
☐ Dimmable		☐ Special Outlet (208/220v)	☐	
☐ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	
☐ Data	☐ Clock (Master System)	☐ Tackboards	☐ Speakers/Audio System	
☐ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1		☐				
2		☐				
3		☐				
4		☐				
5		☐				
6		☐				
7		☐				

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Front Vestibule
Space Number:	
Space Area:	(19 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Direct access from exterior, adjacent to Entry

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☐ Clear Height: 3 m Min
☒ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☐ Non-Slip	☐ Special Protection	☐ Special:			
☒ Special: Vinyl Sheet Flooring & Walk off Matt	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☐ Single	☒ Desirable
☐ Hollow Metal	☒ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☐ Not Required
☐ Sidelight	☒ Door Closer	☒ Height Standard	☒ Double w/o Astrigal	☐ Blackout
☒ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☒ Special: Kawneer Aluminum	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	Force Flow Heater
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☐ General Receptacle	☐	Fire alarm annunciator panel
☐ Task		☐ Emergency Power Recept.	☐	Alarm system keypad
☐ Dimmable		☐ Special Outlet (208/220v)	☐	
☒ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☐ PA System	
☐ Data	☐ Clock (Master System)	☐ Tackboards	☐ Speakers/Audio System	
☐ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☐ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Moveable Benches	4				
2		☐				
3		☐				
4		☐				
5		☐				
6		☐				
7		☐				

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Reception
Space Number:	
Space Area:	(19 m2)
Function:	Taking payments, Control point,
Rating (Fire / STC):	
Proximity:	Overlooking Entry and Change Room Corridors, interconnected with Admin Area (May be in the same space) Future control point for Field House

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☒ Base Cabinets (w/ Glass Front Disp.)	☐ Clear Height: 3 m Min
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☒ Other: Security Grill	
☐ Non-Slip	☐ Special Protection	☐ Special:		☒ Other: Full Height storage at back	
☒ Special: Sheet Vinyl	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☒ Single	☒ Desirable
☒ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☐ Not Required
☐ Sidelight	☐ Door Closer	☒ Height Standard	☐ Double w/o Astrigal	☐ Blackout
☐ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☐ Special:	☐ Special:	☐ Special:	☐ Special:	

Discussion required on need for security grill at reception.

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ Special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☒ General Receptacle		
☐ Task		☐ Emergency Power Recept.		
☐ Dimmable		☐ Special Outlet (208/220v)		
☐ Daylight				

Switching

- ☐ Manual
- ☐ Occupancy
- ☒ Vacancy
- ☐ Scheduled

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☒ Closed Circuit TV/Monitoring	☒ Display Monitors	☒ PA System - Head unit	
☒ Data	☐ Clock (Master System)	☒ Tackboards	☐ Speakers/Audio System	
☒ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	POS System	1				
2	Workstation	2				
3	Combo Printer	1				
4	Cooler for Ice Cream	1				
5	Display case for vender items	1				
6						
7						

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Entry
Space Number:	
Space Area:	(70 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Vestibule, Reception and Deck Spectator area Future access to Field House

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☒ Clear Height: 3 m Min
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☐ Non-Slip	☐ Special Protection	☐ Special:			
☒ Special: Sheet Vinyl	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☐ Single	☒ Desirable
☐ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☐ Not Required
☐ Sidelight	☒ Door Closer	☒ Height Standard	☒ Double w/o Astrigal	☐ Blackout
☒ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☒ Special: Kawneer Aluminum to Deck	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☒ Water Fountain (w/ bottle filler)	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ Special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☒ General Receptacle	☐ Housekeeping	
☐ Task		☐ Emergency Power Recept.		
☐ Dimmable		☐ Special Outlet (208/220v)		
☐ Daylight				

Switching

- ☐ Manual
- ☐ Occupancy
- ☒ Vacancy
- ☐ Scheduled

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	1 Interior camera facing reception
☐ Data	☐ Clock (Master System)	☒ Tackboards	☐ Speakers/Audio System	
☐ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Boot racks					> 100 linear ft
2	Benches	2				
3	Vending Machines	2				
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Life Guard (Including First Aid)
Space Number:	
Space Area:	(26 m2)
Function:	First aid area, stretcher access through pool deck out of vestibule
Rating (Fire / STC):	
Proximity:	Adjacent to Natatorium, Admin Space, Staff Change

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☒ Base Cabinets (First Aid)	☒ Clear Height: 3m Min
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☒ Upper Cabinets (First Aid)	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☒ Other: Desk for up to 6 work stations	
☒ Non-Slip	☐ Special Protection	☐ Special:			
☒ Special: Sheet Vinyl	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☒ Single	☒ Desirable
☐ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☐ Not Required
☒ Sidelight	☒ Door Closer	☒ Height Standard	☐ Double w/o Astrigal	☐ Blackout
☒ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☒ Special: Kawneer Aluminium	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☒ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	Hand wash sink at First Aid counter on East wall
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ Special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☒ General Receptacle	1 Housekeeping	
☐ Task		☐ Emergency Power Recept.		
☐ Dimmable		☐ Special Outlet (208/220v)		
☐ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☐ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	
☒ Data	☒ Clock (Master System)	☐ Tackboards	☒ Speakers/Audio System Head Unit	
☒ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Workstations	6				
2	Moveable Storage	6				Furniture based rolling drawer units by work stations
3	Combo Printer	1				
4	Stretcher/Bed	1				
5	Wall mounted File Storage	2				For class lists
6						
7						

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Admin Office
Space Number:	
Space Area:	(10 m2)
Function:	Discreet office space
Rating (Fire / STC):	
Proximity:	Adjacent to Reception and Life Guard,

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
☐ Water Impervious	☒ Paint	☒ Acoustic	☐ Special Floor Loading	☐ Base Cabinets	☒ Clear Height: 3 m Min
☐ Easily Cleaned	☐ Washable	☐ Washable	wt.	☐ Upper Cabinets	☐ Clear Span:
☐ Chemical Resistant	☐ Water Impervious	☐ Drywall		☐ Other:	
☐ Non-Slip	☐ Special Protection	☐ Special:			
☒ Special: Sheet Vinyl	☐ Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
☐ Solid Core Wood	☒ Lockable	☒ Width Standard	☒ Single	☐ Desirable
☒ Hollow Metal	☐ Card Access	☐ Width Oversized (48")	☐ Double w/ Astrigal	☒ Not Required
☒ Sidelight	☐ Door Closer	☒ Height Standard	☐ Double w/o Astrigal	☐ Blackout
☐ Glazed Panel	☐ Trolley/Kick Plates	☐ Height Oversized:	☐ Double Egress	☐ Special:
☐ Special:	☐ Special:	☐ Special:	☐ Special:	

PLUMBING DATA

Fixtures				Notes
☐ Hand Wash Sink	☐ Water Closet	☐ Water Fountain	☐ Floor Drain	
☐ Kitchen Sink	☐ Water Closet (BF)	☐ Shower	☐ Special:	
☐ Mop Sink	☐ Urinal	☐ Shower (BF)	☐ Special:	
☐ Laboratory Sink	☐ Lavatory	☐ Emergency Shower	☐ Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
☒ Normal	☒ Normal	☒ Standard	
☐ Critical:	☐ Critical:	☐ High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
☒ General		☒ General Receptacle		
☐ Task		☐ Emergency Power Recept.		
☐ Dimmable		☐ Special Outlet (208/220v)		
☐ Daylight				
Switching				
☐ Manual				
☐ Occupancy				
☒ Vacancy				
☐ Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
☒ Telephone	☐ Closed Circuit TV	☐ Display Monitors	☒ PA System	Owner will provide phones and handsets.
☒ Data	☐ Clock (Master System)	☐ Tackboards	☐ Speakers/Audio System	
☒ VOIP	☐ Intercom	☐ Whiteboards	☐ Teleconferencing	
☒ WAP	☐ Special:	☐ Projection Equipment	☐ Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	workstation	1				
2	Office desk and chair	1				
3	Lockable File Cabinet	1				
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Facility Support and Amenity
Space Name:	Janitor
Space Number:	
Space Area:	(5 m2)
Function:	
Rating (Fire / STC):	
Proximity:	

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height:
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	Water Impervious	Drywall		Other:	
X Non-Slip	Special Protection	X Special: Exposed			
X Special: Sealed Concrete	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	X Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	X Floor Drain	
Kitchen Sink	Water Closet (BF)	Shower	Special:	
X Mop Sink w/ chemical disp.	Urinal	Shower (BF)	Special:	
Laboratory Sink	Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
X Normal	X Normal	X Standard	Exhaust
Critical:	Critical:	High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	1 Housekeeping	
Task		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)	1 Floor scrubber charging	
Daylight				

Switching

- Manual
- Occupancy
- X Vacancy
- Scheduled

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Floor Scrubber					Likely needs 20amp
2	Mop rack					Owner Supplied
3	Adjustable metal shelving					Owner Supplied
4						
5						
6						
7						

ROOM DATA SHEET

Department:	Change Rooms
Space Name:	Family Change
Space Number:	
Space Area:	(120 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Change Room Corridor and Natatorium

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: 3 m Min
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	X Drywall		X Other: Benches, Grooming Station	
X Non-Slip	Special Protection	Special:			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	Width Standard	Single	Desirable
Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
X Special: Locking Grille to Pool	X Special: Phenolic change cubicles	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	X Water Closet (x3)	Water Fountain	X Floor Drain (Trench)	Push botton showers Floor mount toilets
Kitchen Sink	X Water Closet (BF)	X Shower (x3)	Special:	Hardwired - faucets or push button
Mop Sink	Urinal	X Shower (BF)	Special:	Lever-flushed valves
Laboratory Sink	X Lavatory (x2)	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Heated floors (maybe) Exhaust
X Critical:	X Critical:	X High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	Housekeeping	
Task		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)	2 Above counter for hair dryers	
Daylight				

Switching

- Manual
- Occupancy
- X Vacancy
- Scheduled

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Lockers					Raised 1' off floor, plastic preferred
2	Coin-operated Spinner					Wish list
3	Change table	2				Wall mounted
4	Paper towel dispensers					Owner supplied
5	Soap Dispensers					Owner supplied
6	Shower Product Dispensers					Owner supplied
7	Towel Hooks					Near showers

ROOM DATA SHEET

Department:	Change Rooms
Space Name:	Women's
Space Number:	
Space Area:	(70 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Change Room Corridor and Natatorium

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: 3m Min
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	X Drywall		X Other: Benches, Grooming Station	
X Non-Slip	Special Protection	Special:			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	Width Standard	Single	Desirable
Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
X Special: Locking Grille to Pool	Special: Ceramic Tile	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	X Water Closet (x3)	Water Fountain	X Floor Drain	
Kitchen Sink	X Water Closet (BF)	X Shower (x3)	special:	
Mop Sink	Urinal	X Shower (BF)	Special:	
Laboratory Sink	X Lavatory (x2)	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Exhaust
x Critical:	x Critical:	x High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	Housekeeping	
Task		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)	2 Above counter for hair dryers	
Daylight				
Switching				
Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Lockers					Raised 1' off floor, plastic preferred
2	Coin-operated Spinner	1				Wish list
3	Change table	1				Wall mounted
4	Paper towel dispensers					Owner supplied
5	Soap Dispensers					Owner supplied
6	Shower Product Dispensers					Owner supplied
7	Towel Hooks					Near showers

ROOM DATA SHEET

Department:	Change Rooms
Space Name:	Men's
Space Number:	
Space Area:	(70 m2)
Function:	
Rating (Fire / STC):	
Proximity:	Adjacent to Change Room Corridor and Natatorium

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: 3 m Min
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	X Drywall		X Other: Benches, Grooming Station	
X Non-Slip	Special Protection	Special:			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	Lockable	Width Standard	Single	Desirable
Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
X Special: Locking Grille to Pool	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	X Water Closet	Water Fountain	X Floor Drain	
Kitchen Sink	X Water Closet (BF)	X Shower (x3)	Special:	
Mop Sink	X Urinal (x2)	X Shower (BF)	Special:	
Laboratory Sink	X Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Exhaust
x Critical:	x Critical:	x High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	Housekeeping	
Task		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)	2 Above counter for hair dryers	
Daylight				
Switching				
Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Lockers					Raised 1' off floor, plastic preferred
2	Coin-operated Spinner	1				
3	Change table	1				Wall mounted
4	Paper towel dispensers					Owner supplied
5	Soap Dispensers					Owner supplied
6	Shower Product Dispensers					Owner supplied
7	Towel Hooks					Near showers

ROOM DATA SHEET

Department:	Washroom
Space Name:	Barrier Free Washroom
Space Number:	
Space Area:	(4 m2)
Function:	Barrier Free Public Washroom
Rating (Fire / STC):	
Proximity:	Adjacent to Reception and Entry

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: 3 m Min
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	X Drywall		Other:	
X Non-Slip	Special Protection	Special:			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	X Special: Vacancy Indicator	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	Water Closet	Water Fountain	X Floor Drain	
Kitchen Sink	X Water Closet (BF)	Shower	Special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	X Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Exhaust
x Critical:	x Critical:	x High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		General Receptacle		
X Task: Over Mirror		Emergency Power Recept.		
Dimmable		Special Outlet (208/220v)		
Daylight				
Switching				
Manual				
Occupancy				
X Vacancy				
Scheduled				

COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	Paper towel dispensers	1				Owner supplied
2	Mirror	1				
3	Soap Dispensers	1				Owner supplied
4	Toilet Paper Dispensary	1				Owner supplied
5	Feminine Napkin Disposal	1				
6						
7						

ROOM DATA SHEET

Department:	Change Rooms
Space Name:	Staff
Space Number:	
Space Area:	(12 m2) 2 x Change Room @ 6 m2
Function:	Two change rooms, 1 shower and 1 water closet
Rating (Fire / STC):	
Proximity:	Adjacent to Admin and Life Guard

ARCHITECTURAL DATA

Floor Finishes	Wall Finishes	Ceiling Finishes	Floor Loading	Millwork	Critical Room Dimensions
X Water Impervious	X Paint	Acoustic	Special Floor Loading	Base Cabinets	Clear Height: 3 m Min
X Easily Cleaned	X Washable	Washable	wt.	Upper Cabinets	Clear Span:
X Chemical Resistant	X Water Impervious	X Drywall		X Other: Benches	
X Non-Slip	Special Protection	Special:			
X Special: Ceramic Tile	Acoustic Insulation				

Door Type	Hardware	Door Size	Door Configuration	Natural Light
Solid Core Wood	X Lockable	X Width Standard	X Single	Desirable
X Hollow Metal	Card Access	Width Oversized (48")	Double w/ Astrigal	X Not Required
Sidelight	Door Closer	X Height Standard	Double w/o Astrigal	Blackout
Glazed Panel	Trolley/Kick Plates	Height Oversized:	Double Egress	Special:
Special:	Special:	Special:	Special:	

PLUMBING DATA

Fixtures				Notes
Hand Wash Sink	X Water Closet	Water Fountain	X Floor Drain	Shower to have typical trim (not push button)
Kitchen Sink	Water Closet (BF)	X Shower	Special:	
Mop Sink	Urinal	Shower (BF)	Special:	
Laboratory Sink	X Lavatory	Emergency Shower	Special:	

VENTILATION DATA

Temperature	Relative Humidity	Ventilation	Notes
Normal	Normal	Standard	Exhaust
x Critical:	x Critical:	x High	

ELECTRICAL DATA

Lighting	Light Level Requirements	Power	Quantity and Location	Notes
X General		X General Receptacle	Housekeeping	
X Task: Over Mirror		Emergency Power Recept.		
Dimmable		X Special Outlet (208/220v)	1 Above counter for hair dryers	
Daylight				
Switching				
Manual				
Occupancy				
X Vacancy				
Scheduled				

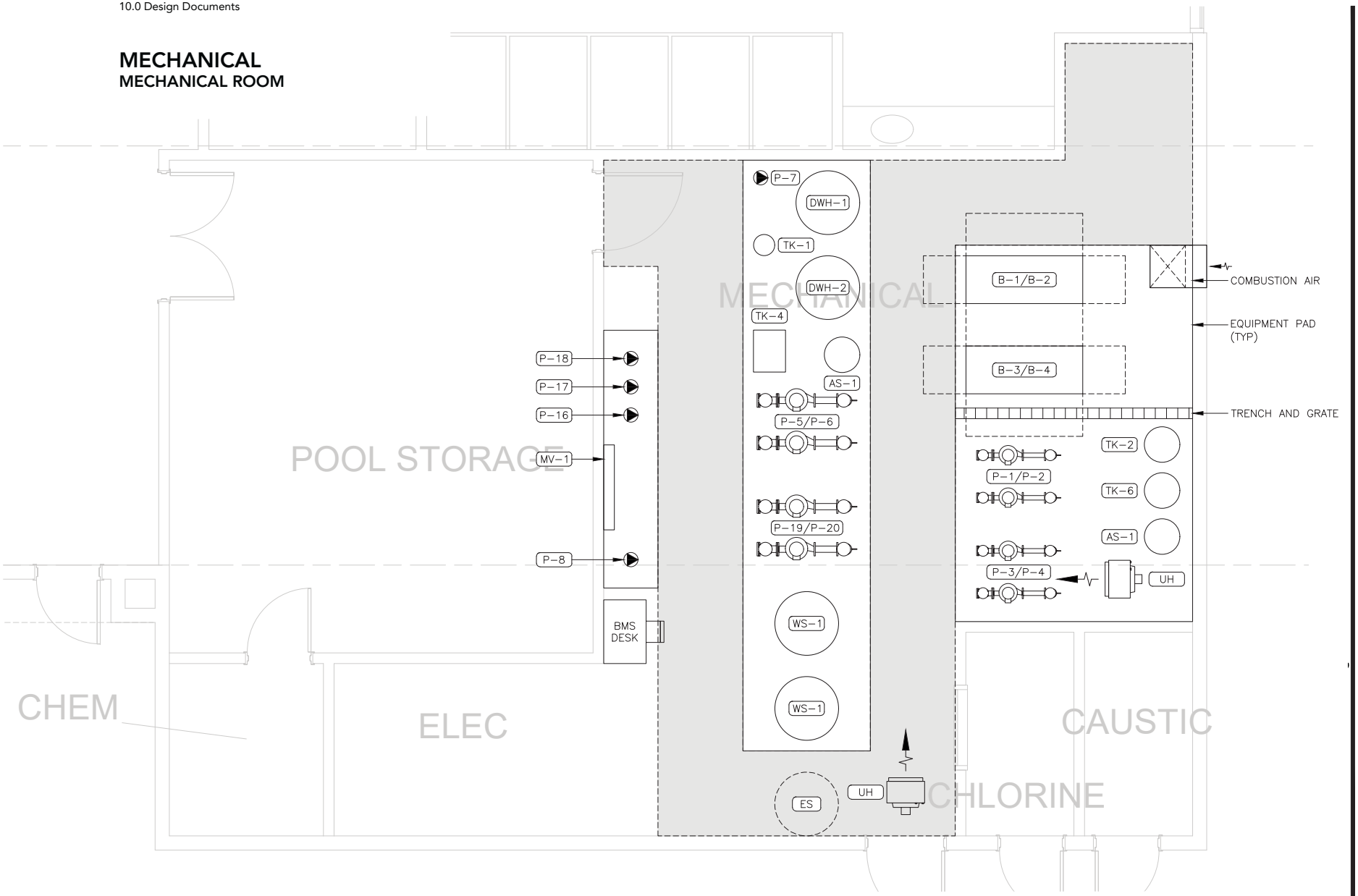
COMMUNICATION / AUDIO VISUAL DATA

Communication		Audio Visual		Notes
Telephone	Closed Circuit TV	Display Monitors	X PA System	
Data	Clock (Master System)	Tackboards	Speakers/Audio System	
VOIP	Intercom	Whiteboards	Teleconferencing	
X WAP	Special:	Projection Equipment	Special:	

FURNITURE AND EQUIPMENT

#	Description	Qt	Dimensions (L x W x H)	Special Power Requirements	New / Existing	Notes
1	16 half-height locker					
2	Mirror	1				
3	Paper towel dispensers	1				Owner supplied
4	Soap Dispensers	1				Owner supplied
5	Shower Product Dispensers	1				Owner supplied
6	Towel Hooks	4				Near showers
7	Coat Hooks	3				1/change, 1/WC, Back of door

MECHANICAL
MECHANICAL ROOM



MECHANICAL ROOM

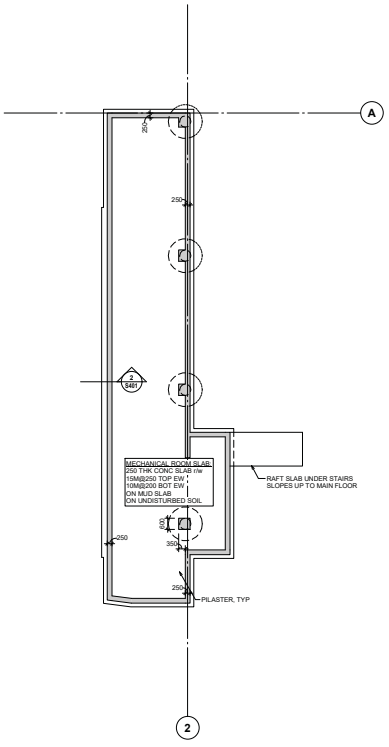
12/10/19
10097

ARROW ENGINEERING

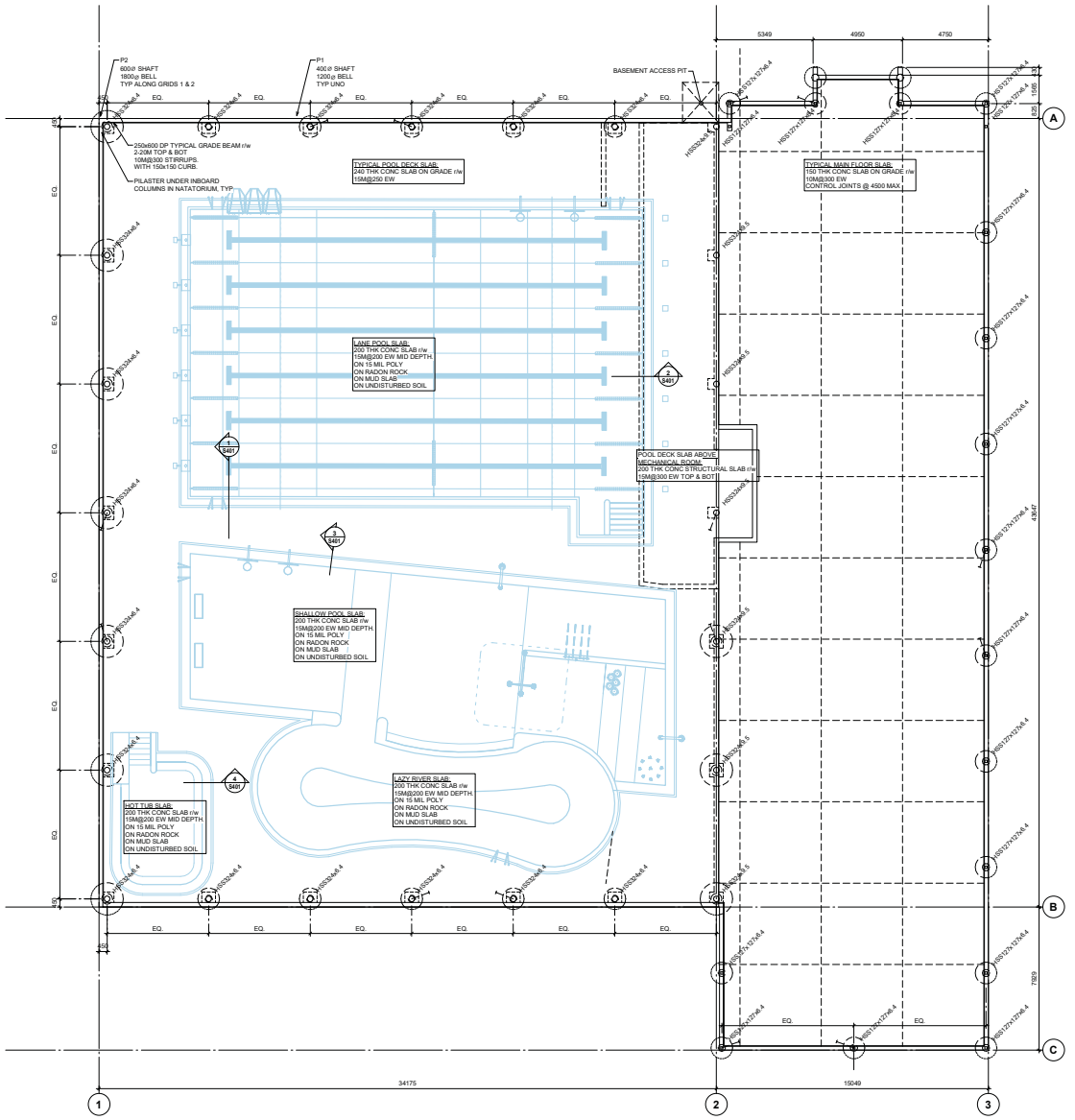
Group2 Architecture Interior Design

Group2 Architecture Interior Design Ltd.

STRUCTURAL
MAIN FLOOR AND BASEMENT PLAN



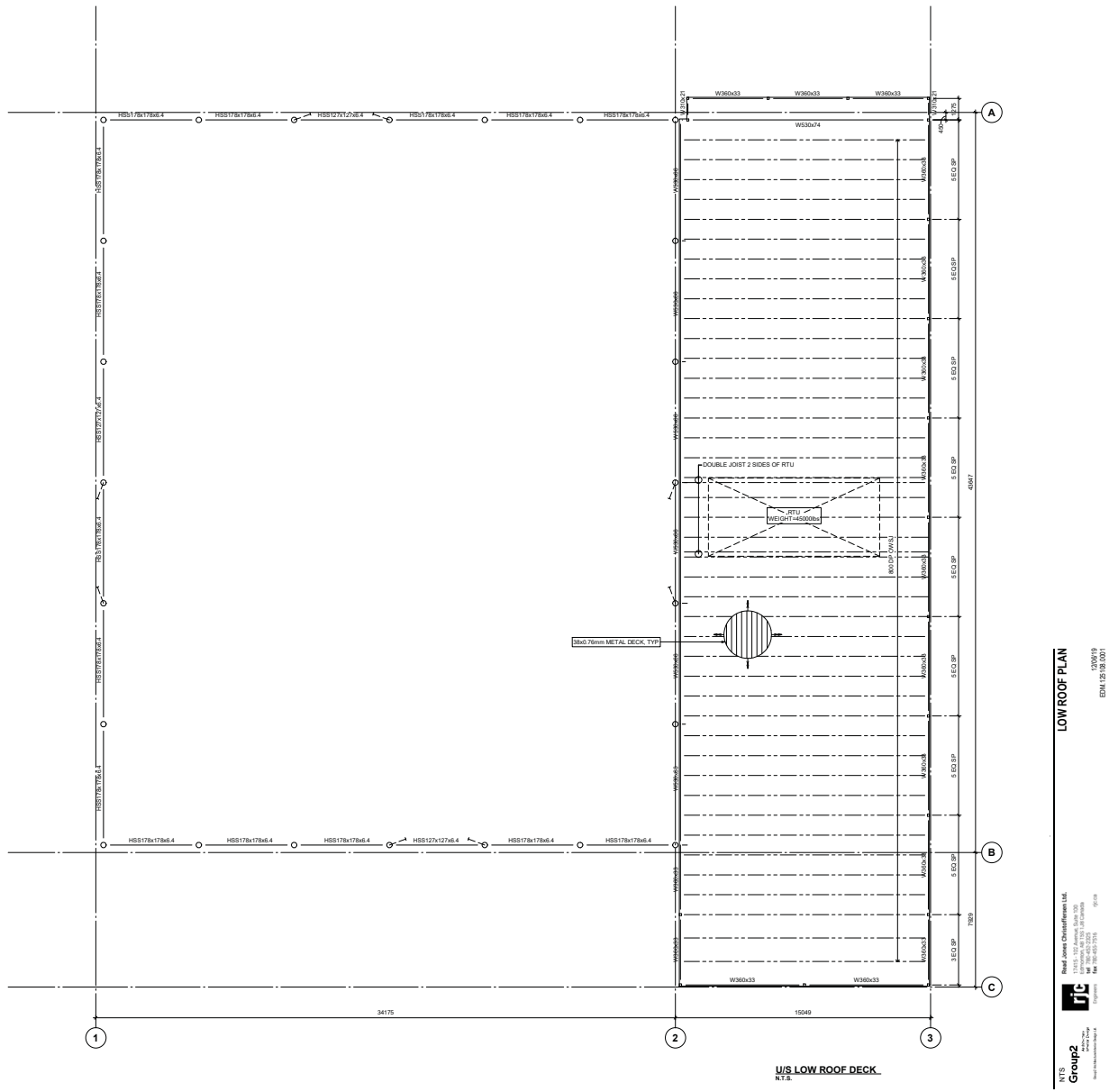
T/O MECH ROOM RAFT SLAB
N.T.S.



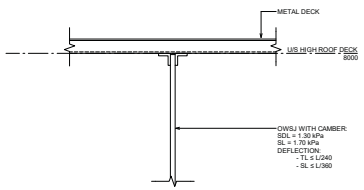
T/O MAIN FLOOR
N.T.S.

MAIN FLOOR AND BASEMENT PLAN
12/06/19
EDM.125109.0001
NTS
Group2
Read Jones Christoffersen Ltd.

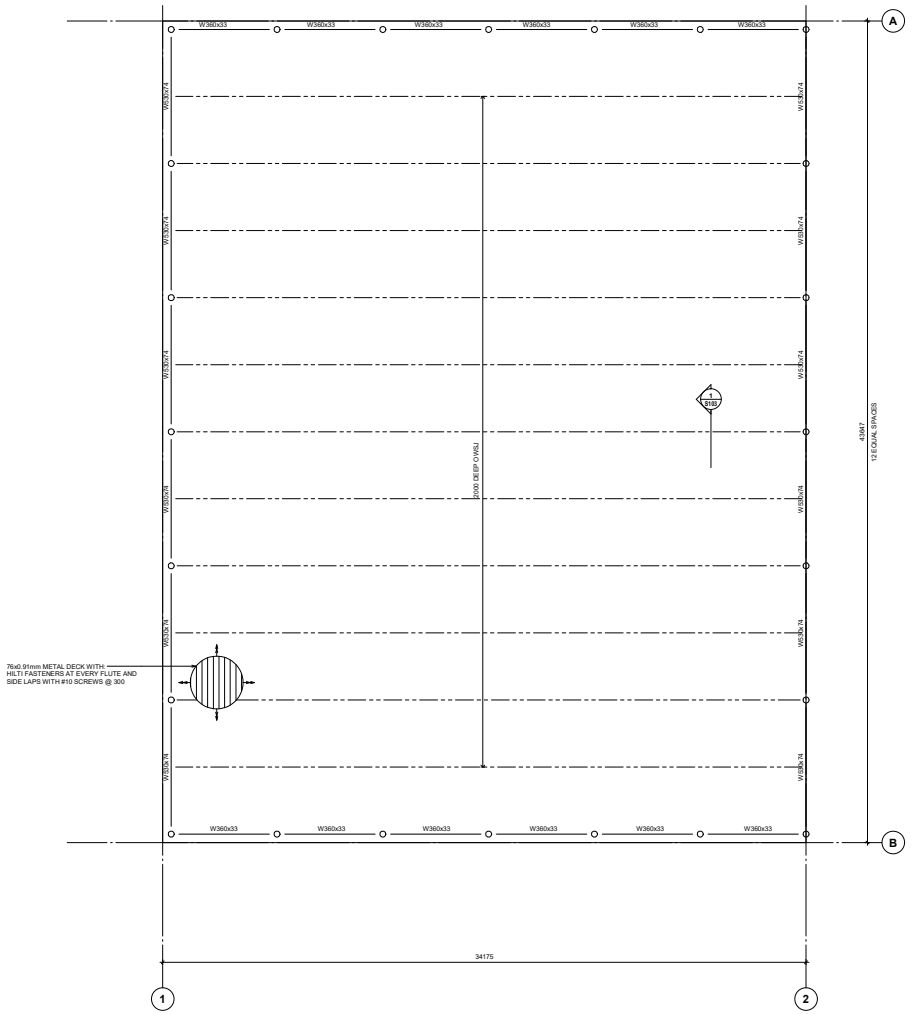
STRUCTURAL
LOW ROOF PLAN



STRUCTURAL
HIGH ROOF PLAN



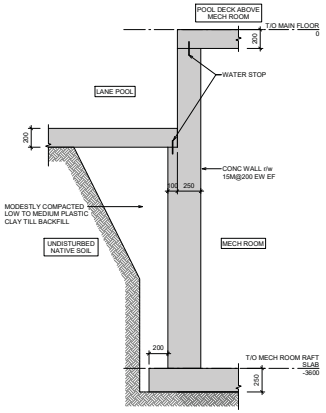
1 S103 TYPICAL SECTION
N.T.S.



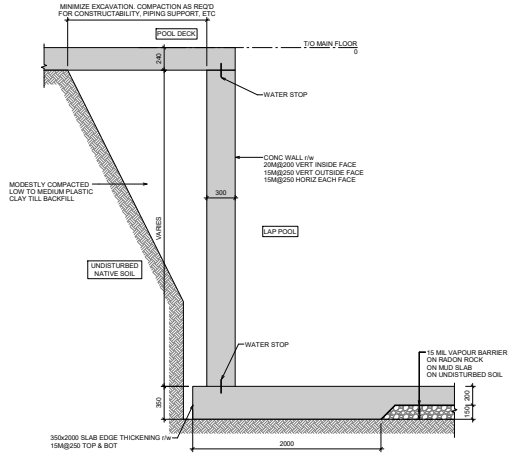
U/S HIGH ROOF DECK
N.T.S.

HIGH ROOF PLAN
12/06/19
EDM 125108.0001
Read Jones Christoffersen Ltd.
Group2
NTS

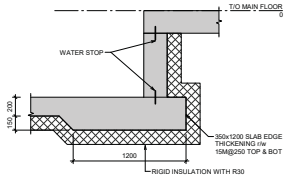
STRUCTURAL
SECTIONS AND DETAILS



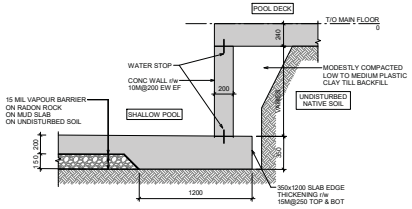
2 S401 SECTION N.T.S.



1 S401 SECTION N.T.S.



4 S401 SECTION N.T.S.



3 S401 SECTION N.T.S.

NTS
Group2
SECTIONS AND DETAILS
12/06/19
EDM.125109.0001

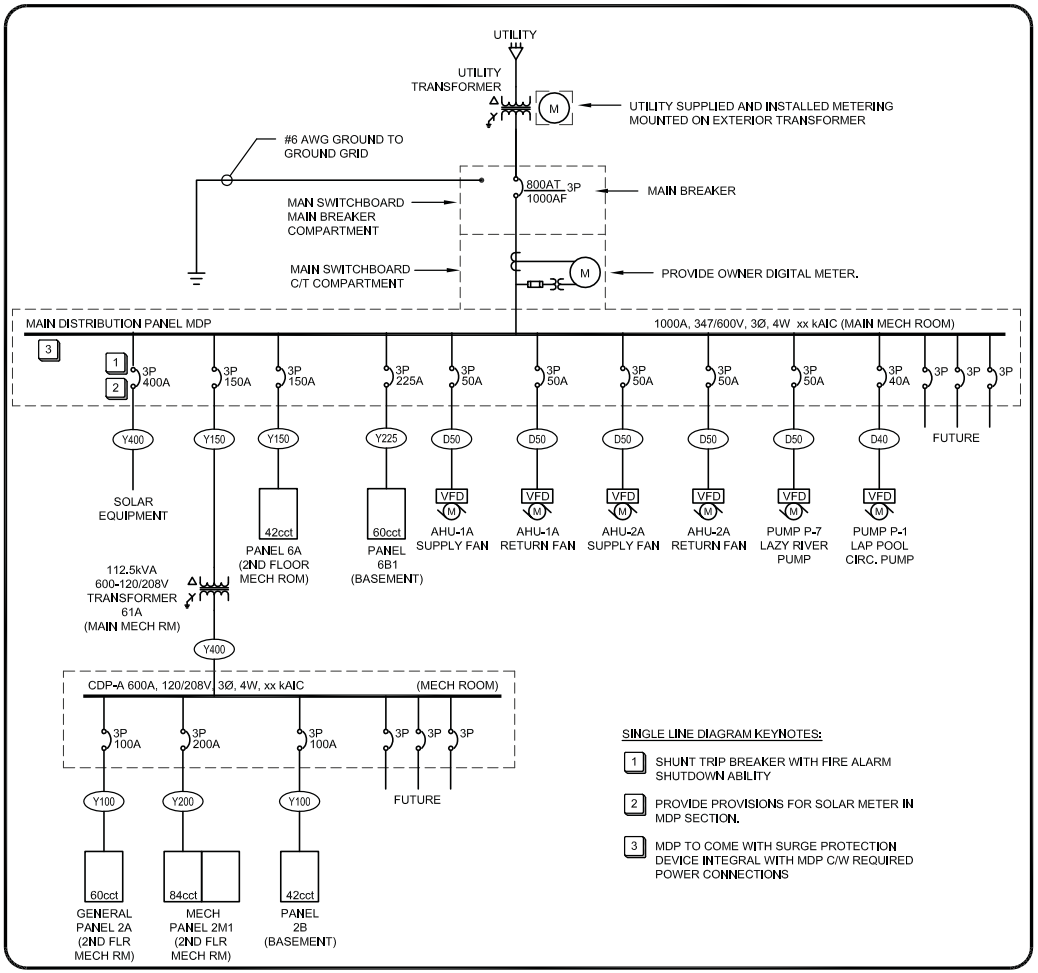
ELECTRICAL
LUMINAIRE SCHEDULE

Type		Description	Lamp	Mounting	Notes
200		4' LED light channel with protective cover, 4000K, 120V	LED: 4000 Lumens	Ceiling Mount	Provide mounting kit as per ceiling type. Some areas may require chain hung assembley and wire guards.
201		4' LED light channel with protective cover, 4000K, 120V	LED: 8000 Lumens	Ceiling Mount	Provide mounting kit as per ceiling type. Some areas may require chain hung assembley and wire guards.
202		2x2 LED flat panel luminaire, uniform luminous light output, acrylic lens, dimmable, 4000K, 120V	LED: 3800 to 4500 Lumens	Recessed Ceiling	Provide in T-Bar ceilings for Corridors, Multi-Purpose Room, Office spaces.
203		6" LED flat panel downlight for damp location with wide distribution, White trim, opal lens, 4000K, 120V.	LED: 3000 Lumens	Recessed Ceiling	Reception area and Individual change room Stalls: 3000 Lumens
204		LED wrap surface mounted luminaire, rated for damp location, smooth lens, white housing, 4000K, 120V.	LED: 4700 Lumens	Ceiling Surface	Change rooms and Basement mechanical space (based on humidity levels)
205		Feature pendant luminaire over admin area, cord suspended, dimmable, 120V or approved equal.	LED : 10W	Suspended Ceiling	Minimum 8' Suspensions length. Exact mounting height to be determined on site as per Architect.

206		Natatorium rated, suspended, indirect linear luminaire, extruded aluminum housing with remote driver mounting, dimmable, powder coat paint, 4000K, 347V	Single: 25,000 Lumens Double: 50,000 Lumens	Suspended Ceiling	Suspended pool lighting to be accessible from deck space for maintenance.
207		Natatorium rated, wall mount, indirect luminaire, extruded aluminum housing with remote driver mounting, powder coat paint, 4000K, 347V	10,950 Lumens	Wall	Perimeter pool lighting
EX1		Running man single face exit light with steel housing frame and acrylic faceplate. Batteries to be rated for 30 mins of operation; or approved equal.	LED	Wall or Ceiling	Life safety lighting to meet ABC
EX2		Running man double face exit light with steel housing frame and acrylic faceplate. Batteries to be rated for 30 mins of operation; or approved equal.	LED	Wall or Ceiling	Life safety lighting to meet ABC
EX3		Running man single face exit light with steel housing frame and acrylic faceplate with field aimable integral LED remote heads. Batteries to be rated for 30 mins of operation; or approved equal.	LED	Wall	Life safety lighting to meet ABC
EM		White steel cased battery pack with 2 field aimable integral LED remote heads. Batteries to be rated for 30 mins of operation; or approved equal.	LED	Wall	Life safety lighting to meet ABC
RH		Small style, dual head, field aimable LED remote heads. Connect to battery pack rated for 30 mins of operation; or approved equal.	LED	Wall or Ceiling	Life safety lighting to meet ABC

101		Medium site lighting luminaire complete with square pole. Housing, arm & pole to have premium powder coat paint applied at factory. Housing to be one piece die cast aluminum with impact resistant tempered clear glass lens with premium 95% reflective anodized aluminum reflector. Exterior lens to be on hinges with toolless entry for easy maintenance. Dark sky compliant with back light cut-off distribution of light pollution control. 347V. 3000K; or approved equal.	LED: 10,000 Lumens	27' square pole	Lighting zones controlled by Exterior Photocell & Timer. Coordinate final locations with Landscape and parking layout.
102		Small wall pack with forward throw optics, die cast aluminum housing, IP65 rated, gasketted, powder coat paint finish, 3000K, 120V. Or approved equal.	LED: 3000 Lumens	Mount 12" above door frame.	Exact mounting height to be coordinated with Architectural Details. Confirm with Architect at rough-in stage.
103		Large wall pack with forward throw optics, die cast aluminum housing, IP65 rated, gasketted, powder coat paint finish, 3000K, 120V. Or approved equal.	LED: 6000 Lumens	Building mount	Exact mounting height to be coordinated with Architectural Details. Confirm with Architect at rough-in stage.

ELECTRICAL
SINGLE LINE DIAGRAM



FEEDER SCHEDULE

3 PHASE, 4 WIRE AND GROUND COPPER WIRING (75°C RATING)
(600V WITH-OUT JACKET)

LABEL	AMPS	CONDUIT SIZE	CONDUCTORS	GROUND WIRE
Y15	15A	21mm C.	4#12	1#14 GRD
Y20	20A	21mm C.	4#12	1#14 GRD
Y30	30A	21mm C.	4#10	1#12 GRD
Y40	40A	27mm C.	4#8	1#10 GRD
Y50	50A	27mm C.	4#8	1#10 GRD
Y60	60A	27mm C.	4#6	1#10 GRD
Y70	70A	35mm C.	4#4	1#8 GRD
Y90	90A	35mm C.	4#3	1#8 GRD
Y100	100A	35mm C.	4#3	1#8 GRD
Y120	120A	41mm C.	4#1	1#6 GRD
Y125	125A	41mm C.	4#1	1#6 GRD
Y150	150A	53mm C.	4#1/0	1#6 GRD
Y175	175A	53mm C.	4#2/0	1#6 GRD
Y200	200A	53mm C.	4#3/0	1#6 GRD
Y225	225A	63mm C.	4#4/0	1#4 GRD
Y300	300A	78mm C.	4#350 MCM	1#4 GRD
Y400	400A	2 sets of: 63mm C.	4#4/0	1#3 GRD
Y500	500A	2 sets of: 78mm C.	4#250 MCM	1#2 GRD
Y600	600A	2 sets of: 78mm C.	4#350 MCM	1#1 GRD
Y800	800A	3 sets of: 78mm C.	4#300 MCM	1#1/0 GRD
Y1000	1000A	3 sets of: 78mm C.	4#400 MCM	1#2/0 GRD
Y1200	1200A	4 sets of: 78mm C.	4#350 MCM	1#2/0 GRD
Y1600	1600A	5 sets of: 78mm C.	4#400 MCM	1#2/0 GRD
Y2000	2000A	6 sets of: 78mm C.	4#400 MCM	1#2/0 GRD

3 PHASE, 3 WIRE AND GROUND COPPER WIRING (75°C RATING)
(600V WITH-OUT JACKET)

LABEL	AMPS	CONDUIT SIZE	CONDUCTORS	GROUND WIRE
D15	15A	21mm C.	3#12	1#14 GRD
D20	20A	21mm C.	3#12	1#14 GRD
D30	30A	21mm C.	3#10	1#12 GRD
D40	40A	21mm C.	3#8	1#10 GRD
D50	50A	21mm C.	3#8	1#10 GRD
D60	60A	27mm C.	3#6	1#10 GRD
D70	70A	27mm C.	3#4	1#8 GRD
D90	90A	35mm C.	3#3	1#8 GRD
D100	100A	35mm C.	3#3	1#8 GRD
D120	120A	41mm C.	3#1	1#6 GRD
D125	125A	41mm C.	3#1	1#6 GRD
D150	150A	41mm C.	3#1/0	1#6 GRD
D175	175A	53mm C.	3#2/0	1#6 GRD
D200	200A	53mm C.	3#3/0	1#6 GRD
D225	225A	53mm C.	3#4/0	1#4 GRD
D300	300A	78mm C.	3#350 MCM	1#4 GRD
D400	400A	2 sets of: 53mm C.	3#4/0	1#3 GRD
D500	500A	2 sets of: 63mm C.	3#250 MCM	1#2 GRD
D600	600A	2 sets of: 78mm C.	3#350 MCM	1#1 GRD
D800	800A	3 sets of: 63mm C.	3#300 MCM	1#1/0 GRD
D1000	1000A	3 sets of: 78mm C.	3#400 MCM	1#2/0 GRD
D1200	1200A	4 sets of: 78mm C.	3#350 MCM	1#2/0 GRD
D1600	1600A	5 sets of: 78mm C.	3#400 MCM	1#2/0 GRD
D2000	2000A	6 sets of: 78mm C.	3#400 MCM	1#2/0 GRD

ELECTRICAL SINGLE LINE DIAGRAM

12/10/19
19046

Group2 Architecture Interior Design
Group2 Architecture Interior Design Ltd.
1200, 10909 Jasper Avenue NW
Edmonton, AB, Canada T5J 3L9
T 403-255-5443 | F 780-440-4001 | www.g2a.com

DECISION MATRIX - DETAIL ANALYSIS

DM-1

Site Selection - Site 2

Opportunity / Option

There are two sites that the new Aquatic Facility could be built on:
Site 1: Between the School and the MacKenzie Centre
Site 2: On the north side; over the existing ball diamond.
Recommendation is to proceed with Site 2.

Opportunity Analysis

Site 1:

Pros: Closer to Omniplex if heat needs to be moved from the Omniplex to the pool.
Utilities may be easier to tap into.

Cons: Difficult to build in a tight spot; both from a Structural perspective and Construction.
Utilities may need to be upgraded.

Site 2:

Pros: Open site so easy to build
More opportunity to shape the building to the desired size and shape, space for solar farms and geo-thermal wells.

Cons: Farther away from Omniplex if Heat transfer is required.
Abatement of existing underground lines

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes to accept Site 2:					
Annette Driessen			Yes		
Troy Smith			Yes		
David Owen			Yes		
Arshia Ahmed			Yes		
Michael Henderson			Yes		
	$0.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
Higher costs will be incurred for both Design and Construction to be on Site 1. Exact costs have not been established but the team feels there are enough benefits to proceed with Site 2.	$				
	$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility	x			
Safety	x			
Quality	x			
Schedule		x		
Innovation & Continous Improvement	x			
Trust & Respect		x		
Collaboration		x		
Operational Functionality	x			
FUN		x		
Community Engagement		x		
Project Funding	x			
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
		$0.00

Impact to Schedule

None for validation.

Last Responsible Moment for Implementation	Date
	14/10/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	

Title

TEAM	CHAMPION	COLLABORATORS
All Team	Arshia	All PITs

PMT Review Date: 03-Oct-19

DM-2

Base design for 6 Lanes Vs 8 Lanes

Opportunity / Option

Base design will carry a 6 lane option. 8 Lane will be priced out as an option and presented to Council for approval to proceed as it is outside of current budget.

Opportunity Analysis

Given the budget constraint of $18.5M, the team has decided to proof out a 6 lane option as a basis of design for Validation. An 8 Lane option will be provided as a price adder to the Client as a wish list item. The Client would like an 8 Lane option to provide extended programming options. However, this puts them outside teh $18.5M budget. Team suggests to proceed with 6 Lane option to remain within the budget Council has provided.

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes to proceed with 6 Lanes:					
Annette Driessen			Yes		
Troy Smith			Yes		
David Owen			Yes		
Arshia Ahmed			Yes		
Michael Henderson			Yes		
	$0.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
Construction cost adder for 8 Lanes	$1,000,000.00	Harry			
validation	$0.00	Team			
	$1,000,000.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility		x		
Safety		x		
Quality		x		
Schedule	x			
Innovation & Continous Improvement		x		
Trust & Respect		x		
Collaboration		x		
Operational Functionality			x	
FUN		x		
Community Engagement		x		
Project Funding	x			
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$1,000,000.00	$0.00	$0.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
Validation	03/12/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"

Accept

Decision Made

Title

TEAM	CHAMPION	COLLABORATORS
Team Effort	Arshia Ahmed	Architecture
		Structural
PMT Review Date:	03-Dec-19	Electrical
		Mechanical
		Pool
		Estimating

DM-3		Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
2nd Storey Fitness Centre							
Opportunity / Option		**PMT Votes:**					
Town of DV made the decision to remove the 2nd storey fitness from the project scope - no further discussion required		Annette Driessen					
		Troy Smith					
		David Owen					
		Arshia Ahmed					
		Michael Henderson					
Opportunity Analysis							
			$0.00				
		Implementation Actions Required (After Approval)	**Costs**	**Individual Resp**	**Complete 'Y**	**Due Date**	**Email sent**
			$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility	x			
Safety	x			
Quality	x			
Schedule	x			
Innovation & Continous Improvement	x			
Trust & Respect	x			
Collaboration	x			
Operational Functionality	x			
FUN	x			
Community Engagement	x			
Project Funding	x			
Legacy	x			
Fit for Purpose	x			
Net ZeroTarget	x			

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

Last Responsible Moment for Implementation | **Date**

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	

Title

TEAM	CHAMPION	COLLABORATORS
PMT	Annette	

DM-3

PMT Review Date: 03-Oct-19

DM-4

Geothermal Design & Installation

Opportunity / Option

The use of geothermal heating to provide a heat source to the building so that building operational costs over the life-span of the building are reduced.

Opportunity Analysis

Within in the initial couple of weeks of the validation phase starting it was identified that geothermal is a potential method that could be used to reduce energy and ultimately reduce the operational costs of the building. After establishing pricing from two trades to carry out geothermal conductivity testing on the proposed site (both ~$20k) and applying a ROM of ~$2M for the complete installation the PMT decided not to pursue it. This decision was made after the Town of Drayton Valley and Brazeau County council's reduced the

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes:					
Annette Driessen		*Yes			
Troy Smith		*Yes			
David Owen		*Yes			
Arshia Ahmed		*Yes			
Michael Henderson		*Yes			
***votes were to not pursue this option**					
	~$2,000,000.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
	$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility		x		
Safety				x
Quality		x		
Schedule		x		
Innovation & Continous Improvement	x			
Trust & Respect		x		
Collaboration		x		
Operational Functionality	x			
FUN		x		
Community Engagement		x		
Project Funding			x	
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget	x			

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	~$2M (ROM)

Impact to Schedule

Nuetral (can be planned for prior to construction commencing)

Last Responsible Moment for Implementation	Date
	n/a

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Reject	Not to pursue geothermal energy for this project due to the overall budget constraint

Title

TEAM	CHAMPION	COLLABORATORS
PMT	David Owen	All PMT Members

DM-4

PMT Review Date: **07-Oct-19**

DM-5

Combined Heat & Power (COGEN)

Opportunity / Option

The use of natural gas fired cogeneration to provide low-cost and lower-carbon electricity to the facility, reducingenergy costs and associated emissions over the life-span of the building.

Opportunity Analysis

Once geo-exchange was eliminated from the project due to funding, the team investigated alternative sources of reducing energy consumption, cost, and emissions. Combined heat and power is one option which has no impact on energy consumption, but by using natural gas fuel can provide baseline heat and electricity. Cogen is typically well suited to pool facilities as the electricity required for pool pumping and natural gas consumption for pool heating are relatively constant and equal loads. Pricing was sourced from two trades to supply and install a cogen system ($250,000-275,000). Maintenance costs were quoted as $0.02/kWh for one supplier and $18.75 per operating hour by the other. THe lower quote estimated a payback of ~14 years. The Mechanical team indicated that while the cogen would be able to supplement heating loads for a favourable price, it is unlikely building heating systems (ie. boilers) could be undersized to compensate for the additional cogen cost, given that redundancy is required for cogen down-times. Given the additional capital cost, the PMT decided not to pursue cogen at the

Further Action Required	Costs	Individual Responsible	Complete 'Y' if Yes	Due Date	Email sent
PMT Votes:					
Annette Driessen		*Yes			
Troy Smith		*Yes			
David Owen		*Yes			
Arshia Ahmed		*Yes			
Michael Henderson		*Yes			
***votes were to not pursue this option**					
	~$275,000				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
	$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility			x	
Safety				x
Quality	x			
Schedule			x	
Innovation & Continous Improvement	x			
Trust & Respect		x		
Collaboration	x			
Operational Functionality	x			
FUN		x		
Community Engagement		x		
Project Funding			x	
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget	x			

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	~$275,000

Impact to Schedule

Nuetral (can be planned for prior to construction commencing)

Last Responsible Moment for Implementation	Date
	n/a

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Reject	Not to pursue combined heat and power for this project due to the overall budget constraint

Title

TEAM	CHAMPION	COLLABORATORS
PMT	David Owen	All PMT Members

DM-5

PMT Review Date: **23-12-2019**

DM-6

Waste Heat from Omniplex

Opportunity / Option

Use waste heat from the neighbouring Omniplex to preheat domestic hot water/pool heating/hydronic heating serving the Aquatic Centre.

Opportunity Analysis

The ice plant is not operational from the beginning of April to end of August

During the 7 months a year the ice plant is operational, the daily average of waste heat available is 11,000 kWh.

The capacity of heat available as waste heat is between 35% and 65% of the peak hydronic load for the building steady state load (building load + pool maintaining load).

Pipes would have to run from the Omniplex to the Aquatics Facility buried under ground. The pumping energy to pump the fluid from the Omniplex to the Aquatics Facility would be approximately 2% of the total heat energy available as waste heat.

To reduce the amount of heat loss as the fluid is pumped in the buried pipes, the pipes would have to be insulated.

The temperature of the fluid being pumped from the Omniplex would be relatively low (low grade heat) compared to the temperatures of the hydronic loops (building hydronics and pool heating) in the Aquatics Facility. The waste heat from the ice plant could be used to pre-heat the building's domestic hot water and pool heating water. To use the low grade heat as part of the building hydronic system, water-to-water heat pumps would have to be added.

Because the Omniplex arena only operates for 7 months a year, there is limited opportunity to decrease the size of mechanical equipment if the waste heat is utilitized.

Another concern with using the waste heat from the Omniplex includes the availability of it in the future: the expected life of the

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes:					
Annette Driessen					
Troy Smith					
David Owen					
Arshia Ahmed					
Michael Henderson					
	$0.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
	$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility	x			
Safety		x		
Quality			x	
Schedule				
Innovation & Continous Improvement	x			
Trust & Respect		x		
Collaboration	x			
Operational Functionality			x	
FUN		x		
Community Engagement		x		
Project Funding			x	
Legacy		x		
Fit for Purpose		x		
Net ZeroTarget	x			

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

Last Responsible Moment for Implementation	Date
	04/04/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made	Title
Reject	Because the Omniplex arena only operates for 7 months a year, there is limited opportunity to decrease the size of mechanical equipment if the waste heat is utilized. Another concern with using the waste heat from the Omniplex includes the availability of it in the future: the expected life of the Omniplex is likely to be significantly less than the expected life of the Aquatic's Facility.	

DM-6

TEAM	CHAMPION	COLLABORATORS
BIM PIT	Hunter	Architecture and Inter
		Structural PIT
PMT Review Date:	**07-Oct-19**	Mech Elect PIT

DM-7	Further Action Required	Costs	Individual Responsible	Complete 'Y' if Yes	Due Date	Email sent
Waterslide (infrastructure for future)						
Opportunity / Option	**PMT Votes:**					
Rough in infastructure and mechanical system for future slide.	Annette Driessen		Yes			
	Troy Smith		Yes			
	David Owen		Yes			
	Arshia Ahmed		Yes			
	Michael Henderson		Yes			
Opportunity Analysis						
		$0.00				
	Implementation Actions Required (After Approval)	**Costs**	**Individual Resp**	**Complete 'Y**	**Due Date**	**Email sent**
	concrete - supply / place / pump	$2,722.00				
	formwork	$1,148.00				
	reinforcing - supply / install	$835.00				
	void form - supply install	$1,334.00				
	piles	$6,400.00				
	pile casing	$750.00				
	slide water supply piping	$7,600.00				
	total rough in cost	$20,789.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility			x	
Safety		x		
Quality		x		
Schedule		x		
Innovation & Continous Improvement	x			
Trust & Respect		x		
Collaboration	x			
Operational Functionality		x		
FUN	x			
Community Engagement		x		
Project Funding			x	
Legacy	x			
Fit for Purpose	x			
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$20,789.00	$0.00	$20,789.00

Impact to Schedule

None for validation.

Last Responsible Moment for Implementation	Date
	14/10/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	cost is incorporated into option 2 of each budget

Title

TEAM	CHAMPION	COLLABORATORS
All Team	Harry Hanson	All PITs

PMT Review Date: 12-Nov-19

DM-8		Further Action Required	Costs	Individual Responsible	Complete 'Y' if Yes	Due Date	Email sent
Solar - Future Distribution Rough In		**PMT Votes:**					
Opportunity / Option		Annette Driessen					
Validation budget to include a preinstalled 400A, 3P breaker to pick up the future solar expansion.		Troy Smith					
		David Owen					
		Arshia Ahmed					
		Michael Henderson					
Opportunity Analysis							
Validation budget to include a preinstalled 400A, 3P breaker to pick up the future solar expansion. With the Main distribution at 1000A, 3P, 347/600V, there will be the 400A of spare power for future Solar add-on as mentioned above. The distribution size will need to increase if a larger future solar capacity is required. A distribution size of larger than 1200A will require more real estate space and 1.5 meter clearance zone. Given the budget constraints, it is recommended to proceed with 1000A, 3P 347/600V service with a 400A breaker for Solar.							
			$0.00				
		Implementation Actions Required (After Approval)	**Costs**	**Individual Resp**	**Complete 'Y**	**Due Date**	**Email sent**
		Electrical cost adder for 1200A service	$6,500.00				
		Electrical cost adder for 1600A service	$10,450.00				
			$16,950.00				

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Reject	

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitability		x		
Safety				x
Quality				x
Schedule		x		
Innovation & Continuus Improvement		x		
Trust & Respect				x
Collaboration		x		
Operational Functionality		x		
FUN				x
Community Engagement		x		
Project Funding	x			
Legacy		x		
Fit for Purpose	x			
Net Zero Target			x	

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
	19/11/2019

Title

TEAM	CHAMPION	COLLABORATORS
PMT	Arshia	Architecture
		Net Zero
PMT Review Date:	**07-Oct-19**	Electrical

DM-9

Deep-well Geothermal (EAVOR)

Opportunity / Option

There may be an opportunity to tie into a deep well geothermal facility that they are possibly building in Drayton Valley. We may be able to team with EAVOR to do a deep well bore near the site, and the pool systems would be completely powered by the plant.

Opportunity Analysis

Proceeding with this option would require us to convert all the mechanical systems to electrical powered equipment rather than the currently planned gas- fired. An analysis of the site would also still need to be done to determine viability. Costs at this time are unknown because of lack of information available (we may not know more unitl next summer). For validation purposes, we are going to assume this is not going ahead, but leave it open as an option if we have more information by the time we enter the design phase.

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes:					
Annette Driessen					
Troy Smith					
David Owen					
Arshia Ahmed					
Michael Henderson					
	$0.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete '\	Due Date	Email sent
	$0.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A	
Profitibility				x	Unknown
Safety				x	
Quality				x	
Schedule		x			
Innovation & Continous Improvement		x			
Trust & Respect				x	
Collaboration		x			
Operational Functionality		x			
FUN				x	
Community Engagement		x			
Project Funding				x	Unknown
Legacy		x			
Fit for Purpose	x				
Net ZeroTarget	x				

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
	26/11/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"

Reject

Decision Made

At this time, there is not enough information available to proceed with this option. However, the team is open to looking at this option in the future if more information and costing become available by the time the design phase begins.

Title

TEAM	CHAMPION	COLLABORATORS
Mechanical PIT	Michael	Architecture
		Net Zero
	PMT Review Date:	**07-Oct-19**
		Electrical
		Owner

DM-10		Further Action Required	Costs	Individual Responsible	Complete 'Y' if Yes	Due Date	Email sent
Tanks - concrete or prefabrication (mrytha)		**PMT Votes:**					
Opportunity / Option		Annette Driessen		Yes			
Looking at a structural concrete vs Myrtha design for the main lap pool		Troy Smith		Yes			
		David Owen		Yes			
		Arshia Ahmed		Yes			
		Michael Henderson		Yes			
Opportunity Analysis							
Analyzed the cost of each, did takeoff of each option.							
Had input from Myrtha on cost, delivery times and instalation duration			$0.00				
		Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
		design time:					
		concrete	0 days				
		myrtha	50 days				
		procurement:					
		concrete	35 days				
		myrtha	145 days				
		install duration					
		concrete	96 days				
		myrtha	93 days				
		Cost:					
		concrete	$606,443.00				
		myrtha	$967,858.00				
		difference	$361,415.00				

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Reject	Agreed by the whole team in review meeting on November 18, 2019.

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility			x	
Safety		x		
Quality		x		
Schedule		x		
Innovation & Continous Improvement		x		
Trust & Respect		x		
Collaboration		x		
Operational Functionality		x		
FUN		x		
Community Engagement		x		
Project Funding			x	
Legacy		x		
Fit for Purpose		x		
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$361,415.00	$0.00	$361,415.00

Impact to Schedule

None for validation.

Last Responsible Moment for Implementation	Date
	14/10/2019

Title

TEAM	CHAMPION	COLLABORATORS
All Team	Arshia	All PITs

PMT Review Date: 12-Nov-19

DM-11		Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
Metal Deck (painted) vs Westdek							
Opportunity / Option		**PMT Votes:**					
Cost comparrison from metal deck to WestDek		Annette Driessen		Yes			
		Troy Smith		Yes			
		David Owen		Yes			
		Arshia Ahmed		Yes			
		Michael Henderson		Yes			
Opportunity Analysis							
Analyzed the cost of each, did takeoff of each option.							
Had input from Western Archrib and Spartan Steel			$0.00				
		Implementation Actions Required (After Approval)	**Costs**	**Individual Resp**	**Complete 'Y**	**Due Date**	**Email sent**
		cost impact:					
		Westdek over conventional structure (80mm flat)	$1,479,137.00				
		Conventional structure c/w metal deck	$1,273,186.00				
		difference	$205,951.00				

Values Alignment				
Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.				
	POS	NEU	NEG	N/A
Profitibility			x	
Safety		x		
Quality		x		
Schedule		x		
Innovation & Continous Improvement		x		
Trust & Respect		x		
Collaboration		x		
Operational Functionality		x		
FUN		x		
Community Engagement		x		
Project Funding			x	
Legacy		x		
Fit for Purpose		x		
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$205,951.00	$0.00	$205,951.00

Impact to Schedule

None for validation.

Last Responsible Moment for Implementation	Date
	14/10/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Reject	

Title

TEAM	CHAMPION	COLLABORATORS
All Team	Arshia	All PITs

PMT Review Date: 12-Nov-19

DM-12		Further Action Required	Costs	Individual Responsible	Complete 'Y' if Yes	Due Date	Email sent
Gas Fired vs. Hydronic Systems		**PMT Votes:**					
Opportunity / Option		Annette Driessen					
Decision on which option is more cost effective: gas-fired or hydronic equipment.		Troy Smith					
		David Owen					
		Arshia Ahmed					
		Michael Henderson					
Opportunity Analysis							
Cost anaylsis between hydronic and gas-fired options. Advantages of a hydronic system include longer equipment life expectancy, ease of maintenance, lower utility costs, and easier controls integration.							
			$0.00				
		Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
		Hydronic Overall	$700,000.00				
		Gas-Fired Overall	$700,000.00				
			$1,400,000.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility	x			
Safety		x		
Quality		x		
Schedule		x		
Innovation & Continous Improvement		x		
Trust & Respect				x
Collaboration		x		
Operational Functionality	x			
FUN				x
Community Engagement		x		
Project Funding		x		
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
	26/11/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	Cost-wise, the two systems are a wash. Staying with the hydronic system since it will provide better long-term value for the owner.

Title

TEAM	CHAMPION	COLLABORATORS
Mechanical PIT	Michael	Architecture
		Net Zero
PMT Review Date:	12-Nov-19	Electrical
		Owner

DM-13		Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
Building Placement on Lot		**PMT Votes:**					
Opportunity / Option		Annette Driessen			Y		
The building needs to be placed on the site such that the existing pipelines (which are to be removed) create minimal impact on the building foundations including pool tank slabs.		Troy Smith			Y		
		David Owen			Y		
		Arshia Ahmed			Y		
		Michael Henderson			Y		
Opportunity Analysis							
The building has been located such that the Natatorium foundations are over undisturbed soil (not on the former pipelines) with only the west side of the administration/change room bar over the former north south pipeline area. This area will be pile and grade beam with slab on grade and should mitigate any ground movement.							
			$0.00				
		Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
			$0.00				

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitability	x			
Safety		x		
Quality	x			
Schedule	x			
Innovation & Continuous Improvement		x		
Trust & Respect				x
Collaboration		x		
Operational Functionality		x		
FUN				x
Community Engagement		x		
Project Funding		x		
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget		x		

Conditions of Satisfaction?

Attachment

Impact to Budget

Hard Costs	Soft Costs	Total
$0.00	$0.00	$0.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
	26/11/2019

Title

TEAM	CHAMPION	COLLABORATORS
Arch PIT	Troy	Civil
		Structural

PMT Review Date: 26-Nov

DM-14	
Site Groundwater - Presence and Amelioration	
Opportunity / Option	
Project Geotechnical report / borehole testing shows the presence of groundwater at a depth of +/- -1.0 to -1.5m below grade; some portions of the building require excavation/foundation construction at -3.5m, in particular in pool area. Groundwater is not expected to affect soil bearing capacity for construction but could compel construction dewatering, and dewatering at a high enough rate to cause cost impact and schedule delays.	
Opportunity Analysis	
Based on groundwater risk, continuous-footing slab structures for pools and pool mech room deemed appropriate (by Fran/RJC). Due to possibility of localized subsistence in soils due to high potential groundwater, all pool/mechanical piping to be supported from structure. Weeping tile to be installed around pools to minimize seasonal changes in groundwater concentration against structure.	

Further Action Required	Costs	Individual Responsible	Complete Y' if Yes	Due Date	Email sent
PMT Votes:					
Annette Driessen					
Troy Smith					
David Owen					
Arshia Ahmed					
Michael Henderson					
	$0.00				

Implementation Actions Required (After Approval)	Costs	Individual Resp	Complete 'Y	Due Date	Email sent
Pool Mech Pipe Supports	20 000				
	$20,000.00				

Values Alignment

Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.

	POS	NEU	NEG	N/A
Profitibility			x	
Safety		x		
Quality	x			
Schedule			x	
Innovation & Continous Improvement		x		
Trust & Respect				x
Collaboration		x		
Operational Functionality	x			
FUN				x
Community Engagement				x
Project Funding			x	
Legacy		x		
Fit for Purpose	x			
Net ZeroTarget			x	

Conditions of Satisfaction?

Minimize groundwater impact on construction and building

Attachment

Impact to Budget		
Hard Costs	Soft Costs	Total
$20,000.00	$0.00	$20,000.00

Impact to Schedule

None for Validation

Last Responsible Moment for Implementation	Date
	05/12/2019

Please indicate if Decision was to "Accept", "Reject" or "Under Review"	Decision Made
Accept	The costs are carried in Master Pools budget and Chandos GCs

Title

TEAM	CHAMPION	COLLABORATORS
Arch PIT	Troy	Civil
		Structural

PMT Review Date: 12-Nov-19

BIMX
LEVEL OF DEVELOPMENT (LOD) MATRIX

BIM - DELIVERABLES & LEVEL OF DEVELOPMENT

LEVEL OF DEVELOPMENT (LOD SPECIFICATION 2016)	
100	Symbolic or Generic Representation: No geometric representation is present.
200	Generic Element: Generic placeholder for approximate quantities, size, shape, location, and orientation.
300	Specific Element: Accurate graphic representation of quantity, size, shape, location, and orientation.
350	Coordination of Element: Parts necessary for coordination and interfacing with nearby or attached elements are modeled.
400	Detailed Element: Sufficient detail for fabrication, assembly, and installation is modeled.
500	Built Element: Field verified or "As-Built" representation in terms of size, shape, location, quantity, and orientation.
NA	Not Applicable to this Project

MODEL ELEMENTS				MODEL PRODUCTION & DELIVERY - BY PHASE								
				SD			DD			CD		
Level 1	Level 2	Level 3	Level 4	LOD	MEA	Comments	LOD	MEA	Comments	LOD	MEA	Comments
Major Group	Group Elements	Individual Elements	Sub Elements									
A: SUBSTRUCTURE												
	A10 - Foundations											
		A1010 - Standard Foundations		100	S		200	S		300	S	
			A1010.10 - Wall Foundations	100	S		200	S		300	S	
			A1010.11 - Wall Foundations Rebar	100	S		200	S		300	S	
			A1010.12 - Wall Foundations Pour Breaks	100	S		200	S		300	S	
			A1010.13 - Wall Foundations Embeds	100	S		200	S		300	S	
			A1010.30 - Column Foundations	100	S		200	S		300	S	
		A1020 - Special Foundations		100	S		200	S		300	S	
			A1020.10 - Bored Piles	100	S		200	S		300	S	
			A1020.70 - Pile Caps & Pilasters	100	S		200	S		300	S	
			A1020.80 - Grade Beam	100	S		200	S		300	S	
	A40 - Slabs-on-Grade											
		A4010 - Standard Slabs-on-Grade		100	S		200	S		300	S	
			A4010.10 - Slabs-on-Grade	100	S		200	S		300	S	
			A4010.11 - Slabs-on Grade Pour Breaks	100	S		200	S		300	S	
		A4020 - Structural Slabs-on-Grade		100	S		200	S		300	S	
			A4020.10 - Structural Slab-on-Grade	100	S		200	S		300	S	
			A4090.10 - Perimeter Insulation	100	A		200	A		300	A	
	A60 - Water and Gas Mitigation											
		A6010 - Building Subdrainage										
		A6020 - Off-Gassing Mitigation										
	A90 - Substructure Related Activities											
		A9010 - Substructure Excavation		100	S		200	S		200	S	
		A9030 - Excavation Support										

B: SHELL												
	B10 - Super Structure											
		B1020 - Roof Construction		100	S		200	S		300	S	
			B1020.10 - Roof Structural Frame	100	S		200	S		300	S	
			B1020.20 - Roof Decks, Slab, Sheathing	100	S		200	S		200	S	
			B1020.21 - Deck Edge Angles	100	S		200	S		300	S	
			B1020.22 - Mechanical Penetrations	100	S		200	S		300	S	
			B1020.90 - Firestopping	100	S		200	S		300	S	
		B1080 - Stairs		100	A		200	A		300	A	
			B1080.10 - Stair Construction	100	A		200	A		300	A	
			B1080.30 - Stair Soffits	100	A		200	A		300	A	
			B1080.50 - Stair Railings	100	A		200	A		300	A	
			B1080.70 - Metal Walkways (Training Tower)	100	A		200	A		300	A	
			B1080.80 - Ladders	100	A		200	A		300	A	
	B20 - Exterior Vertical Enclosures											
		B2010 - Exterior Walls		100	A		200	A		300	A	
		B2020 - Exterior Windows		100	A		200	A		300	A	
		B2050 - Exterior Doors and Grilles		100	A		200	A		300	A	
	B30 - Exterior Horizontal Enclosures											
		B3010 - Roofing		100	A		200	A		300	A	
		B3020 - Roof Appurtenances		100	A		200	A		300	A	
		B3040 - Traffic Bearing Horizontal Enclosures		100	A		200	A		300	A	
		B3060 - Horizontal Openings		100	A		200	A		300	A	
		B3080 - Overhead Exterior Enclosures		100	A		200	A		300	A	

C: INTERIORS												
	C10 - Interior Construction											
		C1010 - Interior Partitions		100	A		200	A		300	A	
		C1020 - Interior Windows		100	A		200	A		300	A	
		C1030 - Interior Doors		100	A		200	A		300	A	
		C1040 - Interior Grilles		100	A		200	A		300	A	
		C1070 - Suspended Ceiling		100	A		200	A		300	A	
		C1090 - Interior Specialties		100	A		200	A		300	A	
	C20 - Interior Finishes											
		C2010 - Wall Finishes		100	A		200	A		300	A	
		C2030 - Floor Finishes		100	A		200	A		300	A	
		C2040 - Stair Finishes		100	A		200	A		300	A	
		C2050 - Ceiling Finishes		100	A		200	A		300	A	
		C2090 - Interior Finish Schedules		100	A		200	A		300	A	

MODEL ELEMENTS				MODEL PRODUCTION & DELIVERY - BY PHASE								
				SD			DD			CD		
Level 1	Level 2	Level 3	Level 4	LOD	MEA	Comments	LOD	MEA	Comments	LOD	MEA	Comments
Major Group	Group Elements	Individual Elements	Sub Elements									
D: SERVICES												
	D10 - Conveying											
		D1010 - Elevators & Lifts		100	A		200	A		300	A	
	D20 - Plumbing											
		D2010 - Domestic Water Distribution		100	M		200	M		300	M	
		D2020 - Sanitary Drainage		100	M		200	M		300	M	
		D2030 - Building Support Plumbing		100	M		200	M		300	M	
	D30 - HVAC											
		D3010 - Facility Fuel Systems		100	M		200	M		300	M	
		D3020 - Heating Systems		100	M		200	M		300	M	
		D3030 - Cooling Systems		100	M		200	M		300	M	
		D3050 - Facility HVAC Distribution Systems		100	M		200	M		300	M	
		D3060 - Ventilation		100	M		200	M		300	M	
		D3070 - Special Purpose HVAC Systems		100	M		200	M		300	M	
	D40 - Fire Protection											
		D4010 - Fire Suppression								200	M	
		D4030 - Fire Protection Specialties								200	M	
	D50 - Electrical											
		D5010 - Facility Power Generation		100	E		200	E		300	E	
		D5020 - Electrical Service and Distribution		100	E		200	E		300	E	
		D5030 - General Purpose Electrical Power		100	E		200	E		300	E	
		D5040 - Lighting		100	E		200	E		300	E	
		D5080 - Misc. Electrical Systems		100	E		200	E		300	E	
	D60 - Communications											
		D6010 - Data Communications		100	E		200	E		300	E	
		D6020 - Voice Communications		100	E		200	E		300	E	
		D6030 - Audio-Video Communications		100	E		200	E		300	E	
		D6060 - Distributed Communications and Monitoring		100	E		200	E		300	E	
	D70 - Electronic Safety and Security											
		D7010 - Access Control and Intrusion Detection		100	E		200	E		300	E	
		D7030 - Electronic Surveillance		100	E		200	E		300	E	
		D7050 - Detection and Alarm		100	E		200	E		300	E	
	D80 - Integrated Automation											
		D8010 - Integrated Automation Facility Controls		100	E		200	E		300	E	
E: EQUIPMENT & FURNISHINGS												
	E10 - Equipment											
		E1010 - Vehicle and Pedestrian Equipment		100	A		200	A		300	A	
		E1030 - Commercial Equipment		100	A		200	A		300	A	
		E1040 - Institutional Equipment		100	A		200	A		300	A	
		E1060 - Residential Equipment		100	A		200	A		300	A	
		E1070 - Entertainment and Recreational Equipment		100	A		200	A		300	A	
	E20 - Furnishings											
		E2010 - Fixed Furnishings		100	A		200	A		300	A	
		E2050 - Movable Furnishings		100	A		200	A		300	A	

MODEL ELEMENTS				MODEL PRODUCTION & DELIVERY - BY PHASE								
				SD			DD			CD		
Level 1	Level 2	Level 3	Level 4	LOD	MEA	Comments	LOD	MEA	Comments	LOD	MEA	Comments
Major Group	Group Elements	Individual Elements	Sub Elements									
F: SPECIAL CONSTRUCTION & DEMOLITION												
	F10 - Special Construction											
		F1010 - Integrated Construction										
		F1020 - Special Structures										
			F1020.10 - Pool Walls	100	S		200	S		300	S	
		F1030 - Special Function Construction										
		F1050 Special Facility Components										
	F20 - Selective Building Demolition											
G: SITEWORK												
	G10 - Site Preparation											
		G1010 - Site Clearing										
			G1010.50 - Earth Stripping and Stockpiling									
		G1020 - Site Elements Demolition										
		G1030 - Site Element Relocations										
		G1050 - Site Remediation										
		G1070 - Site Earthwork										
			G1070.10 - Grading									
			G1070.20 - Excavation and Fill									
	G20 - Site Improvements											
		G2010 - Roadways		100	C							
		G2020 - Parking Lots		100	C							
		G2030 - Pedestrian Plazas and Walkways		100	A							
		G2040 - Airfields										
		G2050 - Athletic, Recreational, and Playfield Areas		100	C							
		G2060 - Site Development		100	A		200	A				
		G2080 - Landscaping		100	A		200	A				
	G30 - Liquid and Gas Site Utilities											
		G3010 - Water Utilities					100	C				
		G3020 - Sanitary Sewerage Utilities					100	C				
		G3030 - Storm Drainage Utilities					100	C				
		G3050 - Site Energy Distribution					100	C				
		G3060 - Site Fuel Distribution					100	C				
		G3090 - Liquid and Gas Site Utilities Supplementary Components					100	C				
	G40 - Electrical Site Improvements											
		G4010 - Site Electrical Distribution System		100	E		200	E		300	E	
		G4050 - Site Lighting		100	E		200	E		300	E	
	G50 - Site Communications											
		G5010 - Site Communications Systems		100	E		200	E		300	E	
	G90 - Miscellaneous Site Construction											

BIMX
APPENDICES

APPENDIX A – BIM USE DESCRIPTIONS

Building (Preventative) Maintenance Scheduling
Operate
Description:
A process in which the functionality of the building structure (walls, floors, roof, etc.) and equipment serving the building (mechanical, electrical, plumbing, etc.) are maintained over the operational life of a facility. A successful maintenance program will improve building performance, reduce repairs, and reduce overall maintenance costs.
Potential Value:
• Plan maintenance activities proactively and appropriately allocate maintenance staff. • Track maintenance history. • Reduce corrective maintenance and emergency maintenance repairs. • Increase productivity of maintenance staff because the physical location of equipment/system is clearly understood. • Evaluate different maintenance approaches based on cost. • Allow facility managers to justify the need and cost of establishing a reliability centered maintenance program.
Resources Required:
• Design review software to view Record Model and components. • Building Automation System (BAS) linked to Record Model. • Computerized Maintenance Management System (CMMS) linked to Record Model. • User-Friendly Dashboard Interface linked to Record Model to provide building performance information and/or other information to educate building users.
Team Competencies Required:
• Ability to understand and manipulate CMMS and building control systems with Record Model. • Ability to understand typical equipment operation and maintenance practices. • Ability to manipulate, navigate, and review a 3D Model.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Campbell, D.A. (2007). BIM – Web Applications for AEC, Web 3D Symposium. • Fallon, K. (2008). "Interoperability: Critical to Achieving BIM Benefits". AIA Edges Website: Singh, H.; W.H. Dunn (2008). Integrating Facilities Stovepipes for Total Asset Management (TAM). Journal of Building Information Modeling, Spring 2008. http://www.aia.ord/nwsltr_tap.cfm?pagename=tap_a_0704_interop • ASHRAE (2003). HVAC design Manual for Hospitals and Clinics. Atlanta, GA. (2004). Federal energy Management Program. O&M Best Practices: A Guide to Achieving Operational Efficiency, Release 2.0. July 2004. http://www1.eere.energy.gov/femp/pds.OM_5.pdf • Piotrowski, J. (2001). Pro-Active Maintenance for Pumps. Archives, February 2001, Pump-Zone.com

Building System Analysis
Operate
Description:
A process that measures how a building's performance compares to the specified design. This includes an analysis of the mechanical system operational characteristics including the energy use of a building. Other aspects of this analysis could include, but are not limited to, ventilated facade studies, lighting analysis, internal and external CFD airflow, and solar analysis.
Potential Value:
• Ensure building is operating to specified design and sustainable standards. • Identify opportunities to modify system operations to improve performance.
Resources Required:
• 3D Model manipulation. • Building Systems Analysis Software (Energy, Lighting, Mechanical, Other).
Team Competencies Required:
• Ability to manipulate, navigate, and review a 3D model. • Ability to understand building systems and typical operations. • Ability to assess building systems using analysis software.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Ayat E. Osman, Robert Ries. " Optimization For Cogeneration Systems in Buildings Based on Life Cycle Assessment" May 2006, http://itocn.org/2006/20/ • "Building Performance Analysis Using Revit" 2007 Autodesk Inc., http://images.autodesk.com/adsk/files/building_performance_analysis_using_revit.pdf

Asset Management

Operate

Description:

A process in which an organized management system will efficiently aid in the maintenance and operation of a facility and its assets. These assets, consisting of the physical building, systems, surrounding environment, and equipment, must be maintained, operated, and upgraded at an efficiency which will satisfy both the owner and users at the lowest appropriate cost. It assists in financial decision making, as well as short-term and long-term planning. Asset Management utilizes the data contained in a
record model to determine cost implications of changing or upgrading building assets, segregate costs of
assets for financial tax purposes, and maintain a current comprehensive database that can produce the value of a company's assets.

Potential Value:

- Store operations, maintenance owner user manuals, and equipment specifications.
- Perform and analyze facility and equipment condition assessments.
- Maintain up-to-date facility and equipment data including, but not limited to, maintenance schedules, warranties, cost data, upgrades, replacements, damages/deterioration, maintenance records, manufacturer's data, equipment functionality, and others required by owner.
- Provide one comprehensive source for tracking the use, performance, and maintenance of a building's assets for the owner, maintenance team, and financial department.
- Produce accurate inventory of current company assets which aids in financial reporting, bidding, and estimating the future cost implications of upgrades or replacements of a particular asset.
- Allow for future updates of record model to show current building asset information after upgrades, replacements, or maintenance by tracking changes.
- Aid financial department in efficiently analyzing different types of assets through an increased level of visualization.
- Increase the opportunity for measurement and verification of systems during building occupation.

Resources Required:

- 3D Model manipulation.
- Asset Management system.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D Model.
- Ability to manipulate an asset management system.
- Knowledge of tax requirements and related financial software.
- Knowledge of construction and the operation of a building (replacements, upgrades, etc.).
- Knowledge of which assets require tracking, whether the building is dynamic vs. static, and the end needs of the building to satisfy the owner.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- GSA Energy Performance and Operations: http://www.gsa.gov/portal/content/102283
- GSA Commissioning Overview: http://www.gsa.gov/portal/content/104824
- NIST General Buildings Information Handover Guide: Principles, Methodology and Case Studies http://www.fire.nist.gov/bfrlpubs/build07/PDF/b07015.pdf

Space Management and Tracking

Operate

Description:

A process in which BIM is utilized to effectively allocate, manage, and track assigned workspaces and related resources. A BIM model will allow the facility management team to analyze the existing use of the space and appropriately manage changes in clientele, use of space, and future changes throughout the facility's life. Space management and tracking is an application of the record model.

Potential Value:

- Identify and allocate space for appropriate building use.
- Track current use of space.
- Insure optimum use of the facility's space resources.
- Assist in planning future space needs for the facility.

Resources Required:

- 3D Model manipulation.
- Content management application.

Team Competencies Required:

- Ability to manipulate, navigate, and review record model.
- Ability to assess current space and assets and manage appropriately for future needs.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- Valcik, Nicolas A. and Patricia Huesca-Dorantes. "Building a GIS Database for Space and Facilities Management." New Directions for Institutional Research, n120 p53-61 2003.

Disaster Planning

Operate

Description:

A process in which emergency responders would have access to critical building information in the form of a model and information system. The BIM would provide critical building information to the responders that would improve the efficiency of the response and minimize the safety risks. The dynamic building information would be provided by a building automation system (BAS), while the static building information, such as floor plans and equipment schematics, would reside in a BIM model. These two systems would be integrated via a wireless connection and emergency responders would be linked to an overall system. The BIM coupled with the BAS would be able to clearly display where the emergency was located within the building, possible routes to the area, and any other harmful locations within the building.

Potential Value:

- Provide police, fire, public safety officials, and first responders access to critical building information in real-time.
- Improve the effectiveness of emergency response.
- Minimize risks to responders.

Resources Required:

- 3D Model manipulation.
- Building Automation System (BAS) knowledge.
- Emergency response knowledge.

Team Competencies Required:

- Ability to manipulate, navigate, and review BIM model for facility updates.
- Ability to understand dynamic building information through BAS.
- Ability to make appropriate decisions during an emergency.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- Building Information for Emergency Responders. Systemics, Cybernetics and Informatics, 11th World MultiConference (WMSCI 2007). Proceedings. Volume 3. Jointly with the Information Systems Analysis and Synthesis: ISAS 2007, 13th International Conference. July 8-11, 2007, Orlando, FL, Callaos, N.; Lesso, W.; Zinn, C. D.; Yang, H., Editor(s) (s), 1-6 pp, 2007. Treado, S. J.; Vinh, A.; Holmberg, D. G.; Galler, M.

Record Modeling

Construct

Operate

Description:

A process used to depict an accurate representation of the physical conditions, environment, and assets of a facility. The record model should, as a minimum, contain information relating to the main architectural and MEP elements. Additional information including equipment and space planning systems may be necessary if the owner intends to utilize the information. Furthermore, with the continuous updating and improvement of the record model and the capability to store more information, the model contains a true depiction of space with a link to information such as serial codes, warranties and maintenance history of all the components in the building. The record model also contains information linking pre-build specification to as-built specifications. This allows the owner to monitor the project relative to the specifications provided.

Potential Value:

- Aid in future modeling and 3D design coordination for renovation.
- Provide documentation of environment for future uses, e.g., renovation or historical documentation.
- Aid in the permitting process (e.g. continuous change vs. specified code).
- Dispute elimination (e.g. link to contract with historical data highlights expectations and comparisons drawn to final product).
- Solid understanding of project sequencing by stakeholders leads to reduced project delivery times, risk, cost, and law suits.

Resources Required:

- 3D Model manipulation.

Team Competencies Required:

- Ability to manipulate, navigate, and review 3D model.
- Ability to use BIM modeling application for facility updates.
- Ability to thoroughly understand site processes to ensure correct input.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- http://www.bimforum.org/index.php?option=com_content&task=view&id=19#Q6
- http://bentleybim.wordpress.com/2007/11/13/bentleys-bim-preferred-58-to-revit-38-executive-briefing/
- http://continuingeducation.construction.com/article.php?L=19&C=213&P=1
- http://www.aecbytes.com/buildingthefuture/2006/Expotitions_meeting.html

Site Utilization Planning
Construct
Description:
A process in which a 4D model is used to graphically represent both permanent and temporary facilities on site, with the construction activity schedule. Additional information incorporated into the model can include labor resources, materials and associated deliveries, and equipment location. Because the 3D model components are directly linked to the schedule, site management functions such as visualized planning, short-term re-planning, and resources can be analyzed over different spatial and temporal data.
Potential Value:
• Generate site usage layout for temporary facilities, assembly areas, and material deliveries for all phases of construction. • Identify potential and critical space and time conflicts. • Select a feasible construction scheme. • Update site organization and space usage as construction progresses.
Resources Required:
• 3D Model manipulation. • Design authoring software. • Scheduling software.
Team Competencies Required:
• Ability to manipulate, navigate, and review 3D model. • Ability to manipulate and asses construction schedule with 3D model. • Ability to understand typical construction methods.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Chau, K.W.; M. Anson, and J.P. Zhang. "Four-Dimensional Visualization of Construction Scheduling and Site Utilization." Journal of Construction Engineering and Management. (July/August 2004): 598-606. ASCE. 5 September 2008. http://cedb.asce.org/cgi/WWWdisplay.cgi?0410956 • Dawood, Nashwam et al. "The Virtual Construction Site (VIRCON) Tools: An Industrial Evaluation." ITcon. Vol. 10 (2005): 43-54. 8 September 2008. http://www.itcon.org/cgi-bin/works/Show?2005_5 • Heesom, David and Lamine Mahdjoubi. "Trends of 4D CAD Applications for Construction Planning." Construction Management and Economics. (February 2004). 22 171-182. 8 September 2008. http://www.tamu.edu/classes/choudhury/articles/1.pdf

Construction System Design (Virtual Mockup)
Construct
Description:
A process in which 3D System Design Software is used to design and analyze the construction of a complex building system (e.g. form work, glazing, tie-backs, etc.) in order to increase planning.
Potential Value:
• Increase constructability of a complex building system. • Increase construction productivity. • Increase safety awareness of a complex building system. • Decrease language barriers.
Resources Required:
• 3D System design software
Team Competencies Required:
• Ability to manipulate, navigate, and review 3D model. • Ability to make appropriate construction decisions using a 3D System Design Software. • Knowledge of typical and appropriate construction practices for each component.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Leventhal, Lauren." Delivering Instruction for Inherently-3D Construction Tasks: Lessons and Questions for Universal Accessibility". Workshop on Universal Accessibility of Ubiquitous Computing: Providing for the elderly. • Khemlano (2007). AECbytes: Building the Future (October 18, 2007).

Digital Fabrication
Construct
Description:
A process that utilizes machine technology to prefabricate objects directly from a 3D Model. The 3D Model is spooled into appropriate sections and inputted into fabrication equipment for production of system assemblies.
Potential Value:
• Automate building component fabrication. • Minimize tolerances through machine fabrication. • Maximize fabrication productivity.
Resources Required:
• 3D Model manipulation. • Fabrication equipment. • Fabrication methods.
Team Competencies Required:
• Ability to manipulate, navigate, and review a 3D model. • Ability to manufacture building components using digital information. • Ability to understand typical fabrication methods.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Rundell, Rick. "BIM and Digital Fabrication (1-2-3 Revit Tutorial)." http://www.cadalyst.com/aec/bim-and-digitalfabrication-1-2-3-revit-tutorial-3707. 8 February 2008.

3D Control and Planning (Digital Layout)
Construct
Description:
A process that utilizes a model to layout the building assemblies and produce lift drawings. Lift drawings are 2D/3D component drawings used by foremen during on site construction.
Potential Value:
• Decrease layout error by producing control directly from the 3D Construction Model. • Increase communication between office and field personnel. • Decrease/Eliminate language barriers.
Resources Required:
• 3D Model manipulation.
Team Competencies Required:
• Ability to manipulate, navigate, and review a 3D model. • Ability to understand and interpret lift drawings.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • http://www.construction-planning-and-control.com

3D Coordination
Design
Construct
Description:
A process in which Clash Detection software is used during the coordination process to determine field conflicts by comparing 3D models of building systems. The goal of clash detection is to eliminate the major system conflicts prior to installation.
Potential Value:
• Coordinate building project through a model. • Reduce and eliminate field conflicts; which reduces RFI's significantly compared to other methods. • Visualize construction. • Increase productivity. • Reduced construction cost; potentially less cost growth (i.e. less change orders). • Decrease construction time. • Increase productivity on site. • More accurate as built drawings.
Resources Required:
• 3D Model manipulation. • Model Review application.
Team Competencies Required:
• Ability to deal with people and project challenges. • Ability to manipulate, navigate, and review a 3D model. • Knowledge of BIM model applications for facility updates. • Knowledge of building systems.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Staub-French S and Khanzode A (2007) **3D and 4D Modeling for design and construction coordination: issues and lessons learned** ITcon Vol. 12, pg. 381-407, http://www.itcon.org/2007/26 • Khanzode A, Fischer M, Reed D (2008) **Benefits and lessons learned of implementing building virtual design and construction (VDC) technologies for coordination of mechanical, electrical, and plumbing (MEP) systems on a large healthcare project**, ITcon Vol. 13, Special Issue Case studies of BIM use , pg. 324-342, http://www.itcon.org/2008/22

Design Authoring
Design
Description:
A process in which 3D software is used to develop a Building Information Model based on criteria that are important to the translation of the building's design. Two groups of applications that are at the core of the BIM-based design process are design authoring tools and audit and analysis tools. Authoring tools create models while audit and analysis tools study or add to the richness of information in a model. Most of audit and analysis tools can be used for Design Review and Engineering Analysis BIM Uses. Design authoring tools are a first step towards BIM and the key is connecting the 3D model with a powerful database of properties, quantities, means and methods, costs and schedules.
Potential Value:
• Transparency of design for all stakeholders. • Better control and quality control of design, cost and schedule. • Powerful design visualization. • True collaboration between project stakeholders and BIM users. • Improved quality control and assurance.
Resources Required:
• 3D Model manipulation.
Team Competencies Required:
• Ability to manipulate, navigate, and review a 3D model. • Knowledge of construction means and methods. • Design and construction experience.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • Tardif, M. (2008). BIM: Reaching Forward, Reaching Back. AIArchitect This Week. Face of the AIA. AIArchitect

Engineering Analysis (Structural, Lighting, Energy, Mechanical, Other)

Design

Description:

A process in which intelligent modeling software uses the BIM model to determine the most effective engineering method based on design specifications. Development of this information is the basis for what will be passed on to the owner and/or operator for use in the building's systems (i.e. energy analysis, structural analysis, emergency evacuation planning, etc.). These analysis tools and performance simulations can significantly improve the design of the facility and its energy consumption during its lifecycle in the future.

Potential Value:

- Automating analysis and saving time and cost.
- Analysis tools are less costly than BIM authoring tools, easier to learn and implement and less disruptive to established workflow.
- Improve specialized expertise and services offered by the design firm.
- Achieve optimum, energy-efficient design solution by applying various rigorous analyses.
- Faster return on investment with applying audit and analysis tools for engineering analyses.
- Improve the quality and reduce the cycle time of the design analyses.

Resources Required:

- 3D Model manipulation.
- Engineering analysis tools and software.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D Model.
- Ability to assess a model through engineering analysis tools.
- Knowledge of construction means and methods.
- Design and construction experience.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- Malin, N. (2008). BIM Companies Acquiring Energy Modeling Capabilities. http://greensource.construction.com/news/080403BIMModeling.asp
- Marsh, A. (2006). Ecotect as a Teaching Tool. http://naturalfrequency.com/articles/ecotectasteacher
- Marsh, A. (2006). Building Analysis: Work Smart, Not Hard. http://naturalfrequency.com/articles/smartmodelling
- Novitzki, B. (2008). Energy Modeling for Sustainability. http://continuingeducation.construction.com/article.php?L=5&C=399
- Stumpf, A., Brucker, B. (2008). BIM Enables Early Design Energy Analysis. http://www.cecer.army.mil/td/tips/docs/BIM-EnergyAnalysis.pdf
- PIER Building Program (2008). Estimating Energy Use Early and Often. www.esource.com/esource/getpub/public/pdf/cec/CEC-TB-13_EstEnergyUse.pdf
- Ecotect - Building Analysis for Designers. http://www.cabs-cad.com/ecotect.htm
- Khemlani (2007). AECbytes: Building the Future (October 18, 2007).

Sustainability (LEED) Evaluation

Plan

Design

Construct

Operate

Description:

A process in which a project is evaluated based on LEED or other sustainable criteria. This can refer to materials, performance, or a process. Sustainability Evaluations can be applied across all four phases of a construction project, Planning, Design, Construction, and Operation. Sustainability evaluation is most effective when it is done in planning and design stages and then applied in the construction and operations phase. Model all sustainable aspects of a project throughout its life-cycle in order to obtain the desired LEED certification in the most efficient manner by condensing design analyses into a single database.

Potential Value:

- Accelerate design review and LEED certification process with efficient use of a single database with all the sustainable features present and archived.
- Improved communication between project participants in order to achieve LEED credits and decreased redesign efforts as a result.
- Align scheduling and material quantities tracking for more efficient material use and better cash flow analysis.
- Optimize building performance by tracking energy use, indoor air quality and space planning for the adherence to LEED standards leading to integrated facility management using a BIM model.

Resources Required:

- 3D Model manipulation.
- LEED credit knowledge.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D model.
- Knowledge of current LEED credit information.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- Building Information Modeling for Sustainable Design: http://goliath.ecnext.com/coms2/gi_01997985352/Building-information-modeling-for-sustainable.html
- Sustainable Perspectives: Building Information Modeling for Sustainable Design: http://www.edcmag.com/Articles/Featured_Special_Sections/BNP_GUID_9-5-2006_A_10000000000000214529
- Building Information for Sustainable Design (Revit White Paper)
- Building Information Modeling and the Adoption of Green Technologies: http://www.triplepundit.com/2008/05/building-information-modeling-and-the-adoption-of-green-technologies/
- Krygiel, E., and Brad N. (2008). Green BIM: Successful Sustainable Design with Building Information Modeling. San Francisco: Sybex, 2008

Building System Analysis

Design

Description:

A process in which code validation software is utilized to check the model parameters against project specific codes. Code validation is currently in its infant stage of development within the U.S. and is not in widespread use. However, as model checking tools continue to develop, code compliance software with more codes, code validation should become more prevalent within the design industry.

Potential Value:

- Validate that building design is in compliance with specific codes, e.g. IBC International Building Code, ADA Americans with Disabilities Act guidelines and other project related codes using the 3D BIM model.
- Code validation done early in design reduces the chance of code design errors, omissions or oversights that would be time consuming and more expensive to correct later in design or construction.
- Code validation done automatically while design progresses gives continuous feedback on code compliance.
- Reduced turnaround time for 3D BIM model review by local code officials or reduced time that needs to be spent meeting with code commissioners, visiting the site, etc. or fixing code violations during punch list or closeout phase.
- Saves time on multiple checking for code compliance and allows for a more efficient design process since mistakes cost time and money.

Resources Required:

- Local code knowledge.
- Model checking software.
- 3D Model manipulation.

Team Competencies Required:

- Ability to use BIM authoring tool for design and model checking tool for design review.
- Ability to use code validation software and previous knowledge and experience with checking codes is needed.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). “BIM Project Execution Planning Guide – Version 2.0.” July, The Pennsylvania State University, University Park, PA, USA.
- Automated Circulation Validation using BIM. GSA. 1-22.
- Eastman, C., Liston, K., Sacks, R. and Teicholz, P. BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors. New York, NY: Wiley, 2008.

Design Reviews

Design

Construct

Description:

A process in which a 3D model is used to showcase the design to the stakeholders, evaluate meeting the program, and set criteria such as layout, sightlines, lighting, security, ergonomics, acoustics, textures and colors, etc. Virtual mock-ups can be done in high detail even on a part of the building like a façade to quickly analyze design alternatives and solve design and constructability issues. If properly executed, these reviews can resolve design issues by offering different options. Additionally design reviews reduce the cost and time invested in traditional mock-ups considering basic construction, making modifications after reviews and final demolition and removal expense.

Potential Value:

- Eliminate costly and timely traditional construction mock-ups.
- Different design options and alternatives are easy to model and change real-time during design review by end users or owner.
- Create shorter and more efficient design reviews.
- Resolve the conflicts that would arise in a mock-up and model the potential fixes in real-time along with tolerances revised and RFI's answered.
- Preview space aesthetics and layout during design review in a virtual environment.
- Evaluate effectiveness of design in meeting building program criteria and owner's needs.
- Creates efficiencies in design process.
- Easily communicate the design to the owner, construction team and end users. Get instant feedback on meeting program requirements, owner’s needs and building or space aesthetics.

Resources Required:

- 3D Model manipulation.
- Design Review Software.
- Interactive review space.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D model.
- Ability to model photo realistically including textures, colors and finishes and easily navigable by using different software or plug-ins.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). “BIM Project Execution Planning Guide – Version 2.0.” July, The Pennsylvania State University, University Park, PA, USA.
- Dunston, Phillip S., Arns, Laura L., and McGlothin, James D. (2007). "An Immersive Virtual Reality Mock-up for Design Review of Hospital Patient Rooms," 7th International Conference on Construction Applications of Virtual Reality, University Park, Pennsylvania, October 22-23, 9 pages
- Majumdar, Tulika, Fischer, Martin A., and Schwegler, Benedict R. (2006). "Conceptual Design Review with a Virtual Reality Mock-Up Model," Building on IT: Joint International Conference on Computing and Decision Making in Civil and Building Engineering, Hugues Rivard, Edmond Miresco, and Hani Melham, editors, Montreal, Canada, June 14-16, 2902-2911.
- Maldovan, Kurt D., Messner, John I., and Faddoul, Mera (2006). "Framework for Reviewing Mockups in an Immersive Environment," CONVR 2006: 6th International Conference on Construction Applications of Virtual Reality, R. Raymond Issa, editor, Orlando, Florida, August 3-4, on CD, 6 pages

Programming

Plan

Design

Description:

A process in which a spatial program is used to efficiently and accurately assess design performance in regard to spatial requirements. The developed BIM model allows the project team to analyze space and understand the complexity of space standards and regulations. Critical decisions are made in this phase of design and bring the most value to the project when needs and options are discussed with the client and the best approach is analyzed.

Potential Value:

- Efficient and accurate assessment of design performance in regard to spatial requirements by the owner.

Resources Required:

- Design Authoring Software.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D model.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- GSA BIM Guide

Site Analysis

Plan

Design

Description:

A process in which BIM/GIS tools are used to evaluate properties in a given area to determine the most optimal site location for a future project. The site data collected is used to first select the site and then position the building based on other criteria.

Potential Value:

- Use calculated decision making to determine if potential sites meet the required criteria according to project requirements, technical factors, and financial factors.
- Decrease costs of utility demand and demolition.
- Increase energy efficiency.
- Minimize risk of hazardous material.
- Maximize return on investment.

Resources Required:

- GIS software.
- 3D Model manipulation.

Team Competencies Required:

- Ability to manipulate, navigate, and review a 3D model.
- Knowledge and understanding of local authority's system (GIS, database information).

Selected Resources:

- Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA.
- The Site Selection Guide. US General Services Administration (GSA) Public Building Service.
- Optimal Site Selection for Military Land Management, R.M. Wallace, ASCE Conf. Proc. 138, 159 (2004). DOI: 10. 1061/40737(2004)159.
- Farnsworth, Stephen J. "Site Selection Perspective." Prospecting Sites. June 1995, 29-31.
- WPBG Sustainable Committee. Optimizing Site Potential.
- Suermann P.C. Leveraging GIS Tools in Defense and Response at the U.S. Air Force Academy. ASCE Conf. Proc. 179, 82 (2005) DOI: 10. 1061/40794(179)82.
- GIS – Based Engineering Management Service Functions: Taking GIS Beyond Mapping for Municipal Governments.

Phase Planning (4D Modeling)

Plan
Design
Construct

Description:

A process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in a renovation, retrofit, addition, or to show the construction sequence and space requirements on a building site. 4D modeling is a powerful visualization and communication tool that can give a project team, including the owner, a better understanding of project milestones and construction plans.

Potential Value:

- Better understanding of the phasing schedule by the owner and project participants and showing the flow of work for of the project.
- Dynamic phasing plans of occupancy offering multiple options and solutions to space conflicts.
- Integrate planning of human, equipment and material resources with the BIM model to better schedule and cost estimate the project.
- Space and workspace conflicts identified and resolved ahead of the construction process.
- Marketing purposes and publicity.
- Identification of schedule, sequencing or phasing issues.
- More readily constructible, operable and maintainable project.
- Monitor procurement status of project materials.
- Increased productivity and decreased waste on job sites.
- Conveying the spatial complexities of the project, planning information, and support conducting additional analyses.

Resources Required:

- 3D Model manipulation.
- Scheduling software.
- 4D Modeling software.

Team Competencies Required:

- Knowledge of construction scheduling and general construction process. A 4D model is connected to a schedule, and is therefore only as good as the schedule to which it is linked.
- Ability to manipulate, navigate, and review a 3D model.
- Knowledge of 4D software: import geometry, manage links to schedules, produce and control animations, etc.

Selected Resources:

- Computer Integrated Construction Research Program. (2010). “BIM Project Execution Planning Guide – Version 2.0.” July, The Pennsylvania State University, University Park, PA, USA.
- Jongeling, R., Kim, J., Fischer, M., Morgeous, C., and Olofsson, T. (2008). Quantitative analysis of workflow, temporary structure usage, and productivity using 4D models. Automation in Construction, Pgs. 780-791.
- Kang, J. H., Anderson, S. D., and Clayton, M. J. (2007). Empirical Study on the Merit of Web-based 4D
- Visualization in Collaborative Construction Planning and Scheduling. Journal of Construction Engineering and Management, Pgs. 447-461.

Cost Estimation

Plan
Design
Construct

Description:

A process in which a BIM model can be used to generate an accurate quantity take-off and cost estimate early in the design process and provide cost effects of additions and modifications with potential to save time and money and avoid budget overruns. This process also allows designers to see the cost effects of their changes in a timely manner which can help curb excessive budget overruns due to project modifications.

Potential Value:

- Precisely estimate material quantities and generate quick revisions if needed.
- Stay within budget constraints with frequent preliminary cost estimate while the design progresses.
- Better visual representation of project and construction elements that need to be estimated: taken off and priced.
- Provide cost information to the owner during the early decision making phase of design.
- Focus on more value adding activities in estimating like identifying construction assemblies, generating pricing and factoring risks then quantity take-off, which are essential for high quality estimates.
- Exploring different design options and concepts within the owner’s budget.
- Saving estimator’s time and allowing them to focus on more important issues in an estimate since take-offs can be automatically provided.
- Quickly determine costs of specific objects.

Resources Required:

- Model-based estimating software.
- Design authoring software.
- Cost data.

Team Competencies Required:

- Ability to define specific design modeling procedures which yield accurate quantity take-off information.
- Ability to identify quantities for the appropriate estimating level (e.g. ROM, SF, etc.) upfront.

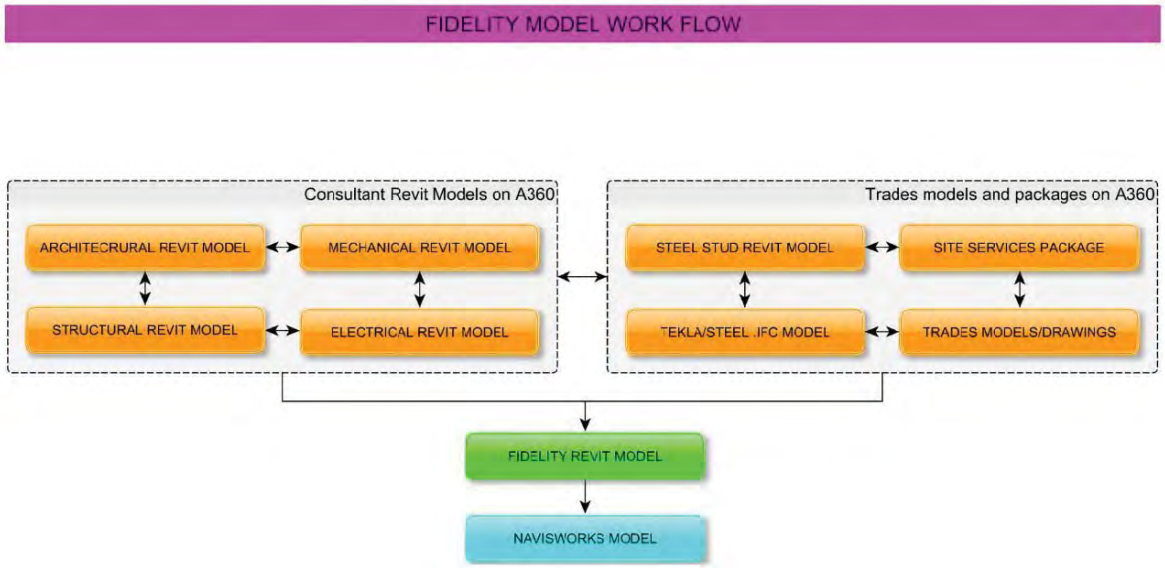
Selected Resources:

- Computer Integrated Construction Research Program. (2010). “BIM Project Execution Planning Guide – Version 2.0.” July, The Pennsylvania State University, University Park, PA, USA.
- Lee, H., Lee, Kim, J. (2008). A cost-based interior design decision support system for large-scale housing projects, ITcon Vol. 13, Pg. 20-38, http://www.itcon.org/2008/2
- Autodesk Revit. "BIM and Cost Estimating.” Press release. Jan. 2007. Autodesk. 11 Sept. 2008. http://images.autodesk.com/adsk/files/bim_cost_estimating_jan07_1_.pdf
- Dean, R. P., and McClendon, S. (2007). "Specifying and Cost Estimating with BIM.” ARCHI TECH. Apr. 2007. ARCHI TECH. 13 Sept. 2008. http://www.architechmag.com/articles/detail.aspx?contentid=3624
- Khemlani, L. (2006). "Visual Estimating: Extending BIM to Construction.” AEC Bytes. 21 Mar. 2006. 13 Sept. 2008. http://www.aecbytes.com/buildingthefuture/2006/visualestimating.html

Existing Condition Modeling
Plan
Design
Construct
Operate
Description:
A process in which a project team develops a 3D model of the existing conditions for a site, facilities on a site, or a specific area within a facility. This model can be developed in multiple ways depending on what is desired and what is most efficient. Once the model is constructed, it can be queried for information, whether it is for new construction or a modernization project.
Potential Value:
• Document existing building for historical use. • Provide documentation of environment for future uses. • Enhance efficiency and accuracy of existing conditions documentation. • Provide location information. • Aids in future modeling and 3D design coordination. • Use for visualization purposes.
Resources Required:
• 3D Model manipulation. • 3D Laser scanning. • 3D Laser scanning point cloud translation into objects.
Team Competencies Required:
• Ability to manipulate, navigate, and review a 3D model. • Knowledge of BIM authoring tools. • Knowledge of 3D laser scanning tools.
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. • GSA BIM Guide Series 3. 3D Laser Scanning.

Template
Plan
Design
Construct
Operate
Description:
Potential Value:
•
Resources Required:
•
Team Competencies Required:
•
Selected Resources:
• Computer Integrated Construction Research Program. (2010). "BIM Project Execution Planning Guide – Version 2.0." July, The Pennsylvania State University, University Park, PA, USA. •

APPENDIX C – TEMPLATE PROCESS MAPS



DRAYTON VALLEY

Welcome Home
Brazeau
County

Group2
Architecture
Interior Design

CHANDOS

rjc

ARROW
ENGINEERING

wsp

Stantec

AltaPro

MPA

PRIORITY
MECHANICAL
LTD.
P.M.

SPARTAN
STEEL