Prince George Aquatic Needs Assessment Report

September 2, 2016

DIALOG

Counsilman · Hunsaker
AQUATICS FOR LIFE

Table of Contents

1.0 Executive Summary

Report Purpose

The Community Recreation Services Plan was the launching point for this timely Aquatic Needs Assessment Report for the City of Prince George. The City operates two indoor aquatic centres; The Four Seasons - which is almost 50 years old (and renovated 33 years ago), and the Aquatic Centre, which is nearing 20 years old. The purpose of this study is to understand how these two facilities are performing and how aquatic programming should be delivered to meet the current and future demand of the Prince George community. The report will provide direction on what current and future aquatic services are required in the City, how those services can be provided, and whether the current facilities are able to meet those demands or if they require renovation or replacement. Recommendations, costs, and timelines are proposed on how the City can best move forward.

Report Methodology

The methodology applied to create this report involved the Consultant team:

1. reviewing previous reports completed on these two aquatic centres;
2. visiting each facility to complete an assessment of their condition;
3. speaking with both pool operations staff and management to discuss current operations and operations issues/successes;
4. speaking with key stakeholders (groups that regularly use the facilities) to discuss current and future usage;
5. meeting with the general public at an Open House to discuss what is needed for aquatics facilities in Prince George;
6. conducting an on-line survey to allow citizens of Prince George to voice their views on the current facilities; and
7. analyze the demand and how to best meet this demand in the near future and beyond.

Report Outcomes

Based on the information gathered from the survey, Open House, stakeholder meetings, and City staff meetings, the City of Prince George is not meeting the demand for aquatic facility time being asked of it by its community. Some members of the community are not able to obtain a spot in the most basic of programs which they desire such as swimming lessons. The addition of one tank that has 8 x 25 metre lanes at a depth that would allow learn-to-swim and other programs to be conducted would meet the current and future needs into the foreseeable future. Locating it at the Aquatic Centre it would provide the additional benefit of acting as a warm-up tank for swim meets and allow for the City to host larger swim competitions. It would also allow for the expansion of the currently very limited learn-to-swim program at that facility.

The information gained from these sources also indicate that the Four Seasons facility is highly valued for the programs it offers and especially for its location. Its exact location is not essential, but strong opinion was voiced that it should be somewhere within its current vicinity. The Four Seasons is approaching its end of its service life. Due to the age of the facility it does not meet many modern Code standards, such as accessibility. This creates user dissatisfaction and often frustration. In the case of the often referenced slippery deck tiles, also no longer allowed under the current Code, users are very concerned about being able to navigate the pool deck safely. The building envelope is in poor condition creating hazards to the integrity of the structure through the transfer of moisture. The wooden window frames in the natatorium are rotting, which will eventually cause the glass to fall out. The deck finish is a serious slipping hazard and a liability to patrons and staff alike. The architecture, mechanical, structural and electrical systems are compromised to the point of representing a significant operational cost. The facility programming suffers from inadequate arrangement of spaces which do not meet the changes in community culture over the last thirty years. Capital and operational investments into this existing building would be a poor use of City funds over the long term.

Report Recommendations

There are several possible options on how to proceed to satisfy the aquatic needs in the City of Prince George. However, our professional recommendation is for the City to pursue the following option:

Option Two

- Construct a replacement facility for the Four Season facility on a new site that is similar in program to what the Four Seasons presently offers, but upgraded to current contemporary standards for aquatic facilities. The existing facility would remain in operation until the new facility is completed and fully operational.
- Complete the renovations recommended for the Aquatic Centre, with the following improvements: a new swim tank, additional family changeroom space, expand the fitness centre, expand storage facilities, provide space for spectator facilities, and improve the accessibility throughout the facility and into the pool tanks.

This option is the only option that addresses all of the concerns raised in the reports, stakeholder meetings, online surveys, and the Public Open House. Its selection will allow the City to continue to offer safe and functional aquatic facilities while also be able to meet current and future demands for aquatics programme time.

- We recommend that the City embrace and provide universal access in both facilities.
- We recommend that the City provide adequate aquatics infrastructure to service the current program requirements.
- We recommend that the City provide at least two separate aquatics facilities.

2.0 Introduction

The DIALOG / Councilman-Hunsaker consultant team was commissioned by the City of Prince George to provide an Aquatic Needs Assessment. The main goal of this study is to provide direction to the City on how to best provide aquatic services to its residents over the next five to fifteen years. This includes reviewing how the two current aquatic facilities are performing and whether they are capable of continuing to provide the required amenities and services that city residents need, or if the facilities need to be renovated or re-built to do so.

The Aquatic Needs Assessment was identified as a priority for Council for 2016 to “prioritize service, transportation, recreation, and facility infrastructure needs and investments”. This project aims to achieve the following:

1. Implement the Community Recreation Services Plan
2. Assess, prioritize, and align all capital, operating and maintenance activities
3. Update and improve systems to ensure appropriate and valid customer service delivery

Key deliverables of this project include:

- Existing Facility Evaluation
- Needs Analysis
- Concept Planning
- Operations & Pro-forma Plan

With a long history for providing swimming pools for its residents, the City of Prince George currently owns and operates two aquatic facilities: The Four Seasons Pool and the Prince George Aquatic Centre. This aquatic needs assessment was initiated as a result of the Community Recreation Services Plan completed in 2014. The Plan is a foundational launching point for the continuation of this study. The existing pools are facing physical and functional obsolescence that are not unusual for pools of their age; thus, the City would like to provide residents with new up-to-date aquatic facilities more aligned with the current needs of the City. While considering capital, operating and maintenance costs associated with such facilities.

A number of condition assessments have been completed for both facilities as listed below:

- Tetra Tech EBA (2015)
- Building Science Engineering (2012)
- Read Jones Christoffersen (RJC) (2010)
- AME Group (2010)
- Energy Advantage (2008)

This report is intended to provide a more comprehensive review of the facilities condition in concert with the community needs. As identified in public meetings, residents see a need for aquatic facilities throughout the city. Residents in the centre of the city see a need for a newer aquatic facility that would remain accessible to older neighbourhoods in the community.

It is the goal of the City to create attractive facilities that will be useful for all residents, thereby generating repeat visits. The consulting team worked closely with the City to fashion an implementation strategy for the future development of the Prince George aquatics system. This report provides options within the implementation strategy.

By prolonging any upgrade to an asset, the associated costs may become exponentially larger the longer a project is delayed. The exponential increases are due to the continuing aging of the facilities' primary mechanical, electrical, structural systems, the annual increase in construction and material/labour costs to address additional ongoing future issues as well as the cost to the community wellbeing for not providing adequate services to meet their needs. A vibrant healthy, active community delivers bottom line financial success to the city economically.

2.1 Methodology

Existing Facility Evaluation

Needs Assessment

- Community Outreach
    - Common Vocabulary, Vision
- Evaluate Existing Area Providers
- Research Area Demographics
- Identify Potential User Groups

Program Requirements

- Develop Options for Programming
- Provide Conceptual Diagrams
- Develop Project Cost Estimates

Operations Plan

- Opinion of Operating Expenses
- Opinion of Revenue
- Capital Replacement Funds

Implementation Plan

- Pool types and locations
- Phasing

2.2 Meeting Summary

58 groups were contacted to participate in stakeholder meetings to allow for their input into the process and how they use the City's aquatic services. Of those 58 groups, the following 21 representatives of 17 groups attended the stakeholder meetings.

Tracy Arrowsmith – PG Pisces President of Summer Swim Club
Jean Bowen/Neil – Directions Below/Scuba Diving
Christine Glazier – Special Olympics
Nicole Barager – PG Waterlilies/Synchro Coach/President
Rick Brine – Northwest Brigade Paddling Club/Kayaking
Jim Van Bakel – PG Iceman Society
Kerim Ozcan – Vice President PG Barracudas Swim Club/Level 4 Official
Sheila Nelson – Treasurer PG Barracudas Swim Club/Master Official
Nancy Harris – Spinal Cord Injury
Furkana Khan – Spinal Cord Injury
Mia Robinson – Phoenix Physiotherapy
Julie O'Reilly – AiMHi
Lynn Bermann – Child Development Centre
Tim Bennett – Big Brothers Big Sisters
Christie Ray PG Chamber of Commerce
Stephanie Mikalishen – YMCA of Northern BC
Lynette Mikalishen – YMCA of Northern BC
Alana Oikonen – Rehab Services (Northern Health)
Marc Paulsen – Rehab Services (Northern Health)
Jessica Blewett – PG Accessibility Advisory Committee
Jane Daigle – Prince George Brain Injured Group

To follow up on those groups that did not or were not able to attend the stakeholder meetings, the remaining 41 groups were sent an emailed questionnaire. Five responses were received from the following groups.

Leslie Ann Wirth – Pacific Sports Northern BC
Chris Thornhill – PG Masters Swim Club
Dave Fuller – PG Water Polo
Tianna Dulmage – West Bowl Community Association
Chantell Grattan – CBI Health Group

A public input meeting was held on May 12th, 2016, in addition to an online public survey, to allow current general users to give input on the future of the aquatic facilities in Prince George.

2.3 What We Heard

- Both of the City's aquatic facilities are well utilized and support a variety of programs for the community.
- Both of the City's aquatic facilities serve as regional facilities for Northern British Columbia.
- Programs and activities are limited due to availability and access to pool tank space.
- The aquatic facilities offer programs for a variety of residents:
    - Kids to seniors
    - Beginners to elite athletes
    - Residents of all abilities
- The City of Prince George has a need to reinvest in the aquatic facilities if programs are to continue to grow to meet the increasing demand.

The two pools in Prince George complement each other to make an ideal system. The Four Seasons pool is geared more for entry level and beginner swimmers to take lessons and feel comfortable around pools; the pool is simpler, quieter, and more welcoming for new swimmers. The Prince George Aquatic Centre is a more active environment by comparison. It's ideal for training athletes as well as offering an exciting opportunity for young families to play.

2.4 Audit Findings

In order to attain a baseline of the current facilities, an on-site evaluation was performed for the two aquatic centres. As with other pools built at this same time, they are facing both physical and functional obsolescence. Physical obsolescence refers to physical plant such as equipment that needs to be replaced or is not operating as designed. Functional obsolescence describes the pools meeting the wants and needs of the community to increase attendance and continue operating in a sustainable manor.

The Facility Audit incorporates an analysis of building structures, building mechanical systems, substandard pool and mechanical elements, and identifies any substandard elements then provides options for repair or replacement of those elements. This report focuses on the physical obsolescence of those fundamentals. The following is a summary of the full report included in the appendix of this report.

2.4.1 Four Seasons Pool

Constructed in 1970, the pool is nearing 50 years of age, which is considered the full service-life expectancy for this type of facility. Structurally, mechanically, and electrically the building is still reasonably sound; however, the facility has a host of issues due to its age. It fails to meet many current code and design standards; thus it does not serve its intended purpose well. An audit report provided by Councilman-Hunsaker can be found in Section 11.1.4. While the Four Seasons Leisure Pool is operational, many aspects of the pools and their associated mechanical systems are nearing the end of their useful lives. Numerous items are in violation of sections of the governing codes and should be addressed immediately for safety reasons.

The following information is based on previous audits conducted (i.e., Tetra Tech report of 2015, AME report of 2010, RJC report of 2010) and the audits conducted by DIALOG and Councilman-Hunsaker in 2016.

The main issues are:

- Poor accessibility conditions for people with mobility issues.
- Inadequate changing rooms, especially for families and people with mobility issues.
- Unsafe deck tiles that create a highly slippery deck condition.
- Lack of associated amenities expected for an aquatic centre (i.e., cardio/weight fitness room, multi-purpose room, public room, etc.).
- Poor public access control.
- Poor office space, both in size and organization within the building.

Aquatic Upgrade Cost: $1,959,085

For a breakdown of these costs, please refer to Section 11.1.4.

Architectural Upgrade Cost: $7,442,570

For a breakdown of these costs, please refer to Section 11.1.1.

Mechanical/Electrical Upgrade Cost: $887,156

For a breakdown of these costs, please refer to Section 11.1.3.

Total Upgrade Cost: $10,288,811

The above costs include required maintenance/upgrading work to the pool tanks and mechanical system, the building's mechanical and electrical systems, exterior wall, window, and roof renovations, improvements to the facilities accessibility, replacement of the slippery deck tiles, acoustical improvements, and renovations of the change rooms. All work is confined to the existing building footprint.

As this is a facility that is almost fifty years old, it will require additional future repair and upgrade costs (drainage and piping systems, ducts, etc.) that cannot be determined at this time. Thus approximately every five years, enough components will have reached the end of their life cycle to require an additional large budget to repair/replace. In addition, the costs only include standard maintenance costs for items such as lighting and heat exchange systems, as opposed to a major upgrading of these systems. As such, the building will not meet current energy conservation standards and remain costlier to run as a result. Energy conservation upgrades would require extensive renovations and mechanical/electrical system replacements that would not be cost efficient for a building of this age.

The costs noted above to renovate and maintain the Four Seasons Pool are intended only to make the existing facility work within its existing envelope and to prevent the facility from structural and operational failures that would require it to be closed down. The costs include renovations of the change rooms to accommodate families, improvements to accessibility, and replacement of the slippery deck tiles, but the costs do not include correction of the problems that exist such as an acute shortage of change room space. To correct this condition would require an expansion of the facility. This also applies to space for fitness, meeting rooms, staff, storage, and food services.

Essentially, if the above expenditures are made, the facility will be able to continue operation, but also continue to function poorly for what is expected of it by the public simply because it is not large enough to do so. This situation will be exasperated as the city's population grows and repair/maintenance costs rise as the facility ages further.

2.4.2 Prince George Aquatic Centre

Constructed in 1998, the Prince George Aquatic Centre is structurally, mechanically, and electrically sound. A pool audit report of the facility was recently completed by Councilman-Hunsaker and can be found in Section 11.2.4. Overall, the Aquatic Centre is in good condition. It is obvious that a well trained staff has taken care of the pools and their associated mechanical systems. There are certain items that are not code compliant. These items should be addressed immediately for safety concerns.

This building is performing as required, but has the following drawbacks:

- While it is designed for competitions, it lacks a warm-up tank, and thus is very limited in the type of competitions that can be attracted to Prince George.
- The cardio/weight fitness area is undersized.
- The facility is at use capacity and thus unable to offer any significant learn-to-swim time or rental times to non-swim clubs.
- The mechanical system is not performing well and should be revamped.
- There is a significant building envelope issue at the roof-top parapets that must be dealt with in the immediate future.

The cardio/weight fitness area is undersized in comparison to most aquatic facilities of this size and as per comments received from the public (200m^2 existing vs. 800m^2 for other similar facilities). The intent of enlarging this space would not be to provide a full service fitness area (which would then compete with other providers in the city), but rather to provide enough space that allows this space to be functional and pleasant to use for what it currently provides and what is expected of it by users of the facility.

It is important to note here that recently a building envelope audit was conducted by EXP on the Aquatic Centre to determine the cause of the parapet failure, the bubbling of the roofing membrane, and the cracking of the exterior wall. This work resulted in identifying $1,780,000 in building envelope upgrades which are included in the Architectural Upgrade Cost below.

Aquatic Upgrade Cost: $1,071,343
For a breakdown of these costs, please refer to Section 11.2.4.

Architectural Upgrade Cost: $4,972,025
For a breakdown of these costs, please refer to Section 11.2.1.

Mechanical/Electrical Upgrade Cost: $1,683,153
For a breakdown of these costs, please refer to Section 11.2.3.

Total Upgrade Cost: $7,726,521

2.4.3 Summary

Based on the age of the Four Seasons Pool, it would not be cost effective to make all of the repairs needed to bring the facility up to the current code requirements and address all accessibility issues. When completing a substantial renovation, facilities are required to become fully compliant with the current code. This means that in order to remediate the issues with the recirculation equipment and pool structure, the bathhouse and ADA requirements would also need to be addressed. There is a concern that the effects of the aquatics environment, with moisture leakage through the roof system, may have significant impact on the integrity of the existing primary roof structure. The DIALOG / Councilman-Hunsaker team were not able to safely access the primary roof structure to document deterioration. Moreover, in order to correct some of the circulation patterns within the facility, pools and amenities would need to be relocated which would require complete demolition and replacement. Each of these items address only the physical obsolescence and not the functional obsolescence. It would be more cost effective to completely demolish all the pools and start from scratch.

The Prince George Aquatic Centre is an excellent aquatic facility, but over time systems have become outdated or have just past their useful life. Most products for pools have a useful life between 15-25 years. Based on the age of the Prince George Aquatic Centre, a major investment in the systems is due. The Aquatics Centre requires significant repairs to its exterior envelope to keep it from deteriorating before its life expectancy.

We recommend that every five to ten years, a review of the aquatics trends and needs be completed and considered within the operating budget.

3.0 Survey and Stakeholder Input

3.1 Summary of the Online Survey

An online survey was conducted between May 4th and June 10th, 2016. It was posted on the City's web page and received 628 responses. The survey was open to all and in order to attract as many responses as possible the survey was kept to just four questions. No demographic information was collected as a result. At face value the 628 responses represent approximately one respondent for every 115 persons in the City, which can also be generally extrapolated to one of every five families in the City providing a response. These numbers would indicate a high interest in aquatic facilities by citizens of Prince George.

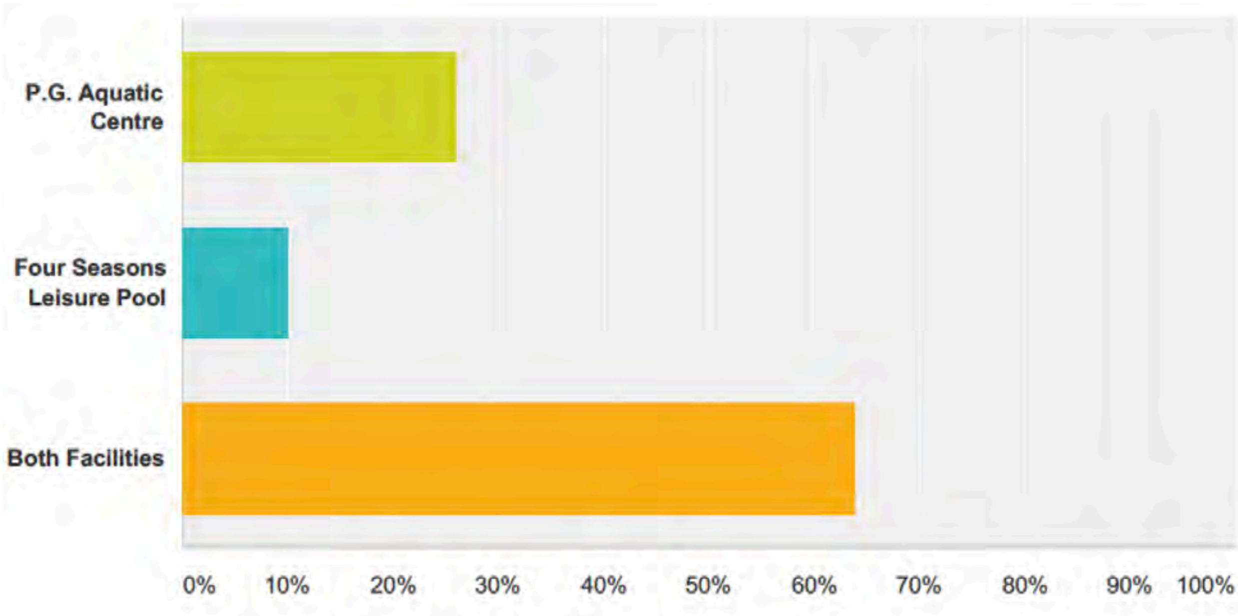
To give the responses to this survey some context, the results of a previous survey through the Community Recreation Services Plan and conducted by the City that included questions on user satisfaction of all indoor recreational facilities should be reviewed in a comparative light. That survey had 500 responses (2/3 of responders were women). The aquatic facilities received the most responses of any other indoor facility. The Four Seasons Pool was noted by 423 responders, of which approximately only 35% were satisfied or very satisfied with that facility. In comparison, the Prince George Aquatic Centre was noted by 442 responders of which approximately 68% were satisfied or very satisfied. In the comment section the Four Seasons Pool was most frequently mentioned as being old and need of repair/updating and in need of better change rooms and family change rooms. It should be noted that an almost equal number of responses were made for the two aquatic facilities, which could be generalized as indicating that both facilities receive similar use. This is backed by other data in the survey that showed 76.3% of all respondents had a family member use one or other of the two aquatic facilities. This result was more than fitness centre use (55.7%), gymnasium use (27.7%) and hockey rink use (18%), indicating that aquatic facilities are highly valued/used by the citizens of Prince George.

In the current online survey that concluded on June 10th, the three questions asked were:

- *What pool facility do you visit?*
- *How often do you use the following amenities?*
  (This question listed the various amenities in each facility)
- *How often do you use the following services?*
  (This question listed the various programs available at each facility)
- *What enhancements should be considered?*

(This question allowed the responders to write anything they wished)

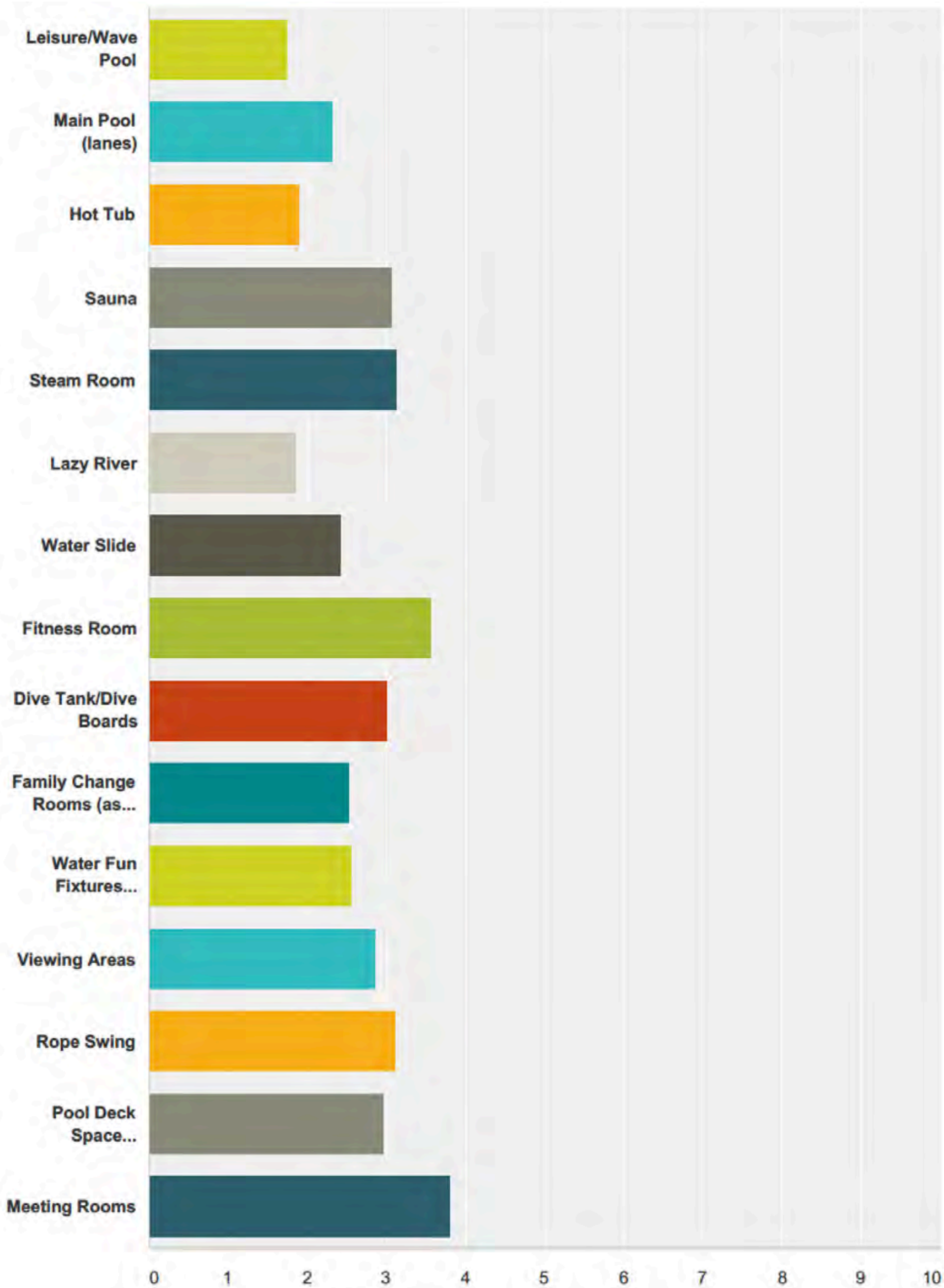
The results of the first question mirrored the results of the previously completed survey. 64% of the responders used both facilities, with 10% using only the Four Seasons Pool and 26% using only the Prince George Aquatic Centre. This would generally indicate that having two aquatic facilities is working well for aquatic facility users in Prince George. There were 623 responses to this question.



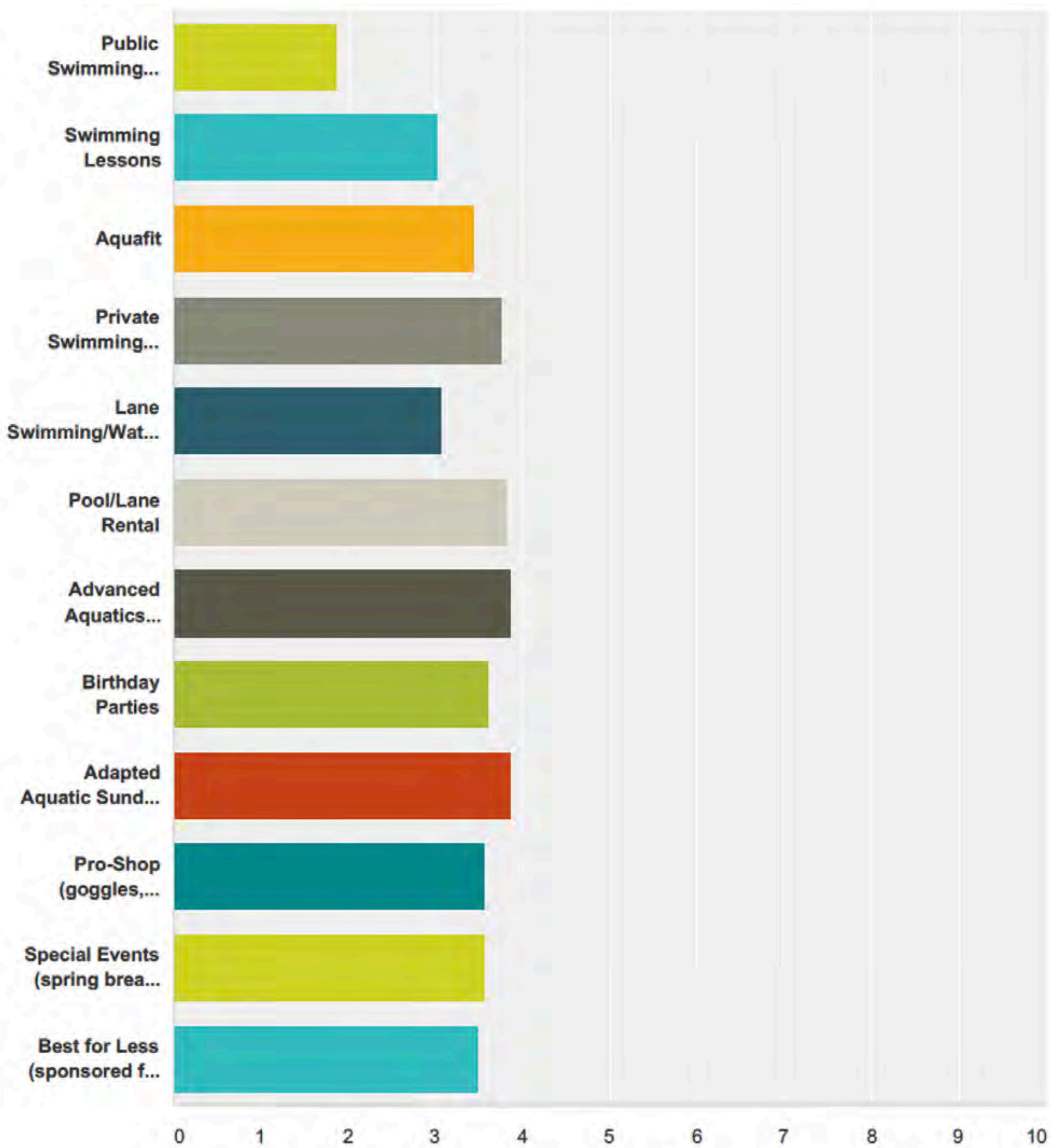
The results of the second question showed that there is a high use of the following amenities. There were 598 responses to this question.

- Sauna
- Steam room
- Fitness room
- Dive boards
- Rope swing
- Pool deck
- Meeting rooms

Overall, no amenity showed poor use and generally the use was equally distributed except for the noted amenities. This would generally indicate that both facilities offer a good mix of amenities.


Leisure/Wave Pool
Main Pool (lanes)
Hot Tub
Sauna
Steam Room
Lazy River
Water Slide
Fitness Room
Dive Tank/Dive Boards
Family Change Rooms (as...
Water Fun Fixtures...
Viewing Areas
Rope Swing
Pool Deck Space...
Meeting Rooms
0
1
2
3
4
5
6
7
8
9
10

The results of the third question showed that almost all programs offered by the City were used equally well, from swimming lessons to birthday parties to aquafit. This would generally indicate that that both facilities offer programming that is in demand and well balanced. There were 587 responses to this question.



The fourth question allowed for open comments. 459 comments were submitted. Once again, both aquatic facilities received a good proportion of comments, indicating that both facilities are well used. 35% of the responders referenced the Four Seasons Pool and 21% referenced the Prince George Aquatic Centre. It is worthwhile to note that the vast majority of the comments regarding the Four Seasons Pool were negative responses regarding its condition and functionality. A review of the responder's comments showed the following key concerns/desires for both facilities.

- 6% were concerned about accessibility and 2% were concerned about slipping (slipping comments were specifically regarding the Four Seasons Pool).
- 14% were concerned with a lack of cleanliness, mainly in the locker rooms. Locker room cleanliness is generally a function of design and not inadequate cleaning by staff.
- 16% expressed a need to update, renovate, refresh, repair, or upgrade the Four Seasons Pool.
- 16% wanted a waterslide at the Prince George Aquatic Centre.
- 22% were concerned about lack of access to lessons or classes. This mirrors the stakeholder meeting comments which indicated there was a shortage of pool time in the City.
- 23% wanted family change rooms or improved family change rooms.
- 39% had comments about the change rooms, with most comments being negative (lack of size, lack of family change rooms, inadequate accessibility, cleanliness, etc.).

The results of the fourth question show a strong desire by the users for improvements to the facilities to make them more functional. For the Prince George Aquatic Centre it is mainly having more family change rooms and a water slide. For the Four Seasons Pool the comments mainly revolved around its aging condition and particularly the lack of space in the change rooms and the lack of family change rooms.

3.2 Summary of the Stakeholder Meetings

The goal of the Stakeholder meetings was to gain specific user group input to allow the team to analyze and refine the purpose, needs, and objectives of aquatic services in Prince George. The Consulting team was provided with a list of 58 potential stakeholders. The list included a variety of user groups such as the following:

- swim clubs and diving clubs,
- local social support agencies such as the Child Development Centre,
- non-government organizations such as the YMCA and the Chamber of Commerce,
- health organizations such as Northern Health and Spinal Cord Injury BC,
- Community Associations, and
- Educational Institutions such as School District #57 and UNBC.

These stakeholders were informed by phone and email of the stakeholder meetings. Initially a broad range of 58 varied stakeholders were invited in order to ensure that any stakeholders with a keen interest in the City’s aquatic facilities. 17 groups eventually elected to attend the meetings. A further effort was made to get comments from those groups that opted not attend the stakeholder meetings. Emails were send that contained the key discussion items brought up at the meetings. Of the 41 groups that initially did not attend the stakeholder meetings, 6 provided feedback. In total, 23 key stakeholder groups gave input to the process.

<u>Format</u>

For each stakeholder meeting held, a preamble to the meeting was provided that stated that the City was interested to know how the stakeholders used the current facilities, whether the provision of the facilities was adequate to run their programs, and what could be done to allow better utilization of the facilities for continued long-term success of their programs. Discussions followed and minutes were taken of these discussions. The meeting minutes are found in Section 11.4.

For those groups that did not attend and were contacted by email, two questions were asked of them that were similar to the questions asked at the Stakeholder meetings. The questions were, “how does your organization utilize the City's current aquatic facilities and programs to further the goals of your organization?” and, “how could the current aquatic facilities and programs be changed or improved to further your organizations abilities to achieve its goals?” Their replies are found in Section 11.5.

The gathered information was reviewed and synthesized into a needs and wants list for consideration in answering what is required of aquatic facilities in Prince George.

Four Seasons Pool

For the Four Seasons Pool there was high user satisfaction with it location and its multiple tank layout. The facility's location was seen as essential for providing programming to seniors, disadvantaged youth, and high/special needs children, but it was also seen as a means to define the facility. The Four Seasons Pool was largely seen as the "learn to swim" facility and a facility for seniors. However, this may be due to the lack of available time at the Prince George Aquatic Centre for learn to swim programs and the improvements made at the Four Season Pool for tank accessibility. The Four Seasons Pool was also thought of as a quieter pool, which would explain its popularity with seniors. The less "busyness" of this facility made it ideal for health care providers dealing with special needs children and persons rehabilitating from brain injuries.

The expressed drawbacks of the Four Seasons Pool reflected those opinions given in the online survey. Lack of space in the change rooms, lack of family change rooms, cleanliness, accessibility inside and outside of the facility, and slippery pool deck tiles. The issue of the slippery floors at the Four Seasons Pool was a common theme amongst the stakeholders. Common to both facilities was the expressed lack of time available for programs. There simply is not enough tank space in Prince George to accommodate the needs of the user groups. Some groups had already cut back their programs and many groups were concerned that they will not be able to provide their programs in the future due to the demands of so many groups for pool time.

Prince George Aquatic Centre

The Prince George Aquatic Centre garnered high user satisfaction. Most of the problems experienced at the Four Seasons Pool do not exist at the Prince George Aquatic Centre. The swim club and other similar users effectively use the facility for training and fitness swimmers enjoy the lap swimming that is available.

The expressed drawbacks of the Prince George Aquatic Centre mainly dealt with lack of tank time to run programs. The swim clubs particularly are squeezed for training time and this affects how many members the swim club can accept and the effectiveness of their program for competitive swimming. Groups like synchronized swimming are currently seeing growth in their programs, but this will have to be curtailed without expansion of the number of tanks at this facility.

Other expressed drawbacks of the Prince George Aquatic Centre were that it was noisy, lacked enough family change rooms, and that it lacked enough "learn to swim" programming.

It was expressed that by adding a 25 metre warm up tank at this facility would be meet the needs of the swim club, the growing demand of other users, allow for more "learn to swim" programming, and allow for the City to host larger swim competitions.

The assumptions that can be made from the Stakeholder Meeting about both aquatic facilities are as follows:

- there is not enough pool time available for the users to adequately run their programs currently, and this will be exasperated in the future as membership and demand grows,
- both facilities are highly valued and having two separate facilities serves the community well, and
- the Four Seasons Pool is appreciated for its location and function, but that beyond its tanks it is not functional, physically accessible, and the pool deck presents a safety hazard.
- There needs to be larger change rooms, but more specifically, there needs to be more family change rooms (at both facilities).

3.3 Summary of the Public Open House

An invitation was sent out to the public for an Open House to allow for comments on aquatic facilities in Prince George to be gathered from non-stakeholder specific users. The invitation stated that the City wished to know what opportunities are there for aquatic services in Prince George in the future that are not provided for currently.

Format

At the start of the Public Open House the Consulting team gave the attendees a general presentation of aquatic facilities in order to prime them for the discussions. The presentation was followed by an open-forum question-and-answer session to discuss specific concerns and needs of those individuals attending the meeting. This would allow those attendees the opportunity to bring up any issue that they thought very important. By allowing for this, the round table discussions would not be monopolized by that one issue. As noted, the attendees were then divided into round table groups with each group having a facilitator from the Consulting team or the City. Notes were taken for each table discussion. Comment sheets were also provided for those individuals who wished to comment further at a later date. At the end of 30 minutes of round table discussions, each table presented to the entire gathering what their table discussed. The other groups then provided feedback and discussion on each tables presentation. It should be noted that due to the demographics, the issues that were brought forward mainly dealt with the needs of seniors.

The key outcomes of the Public Open House were as follows:

- Both facilities could be improved for accessibility, both into the tanks and in the change rooms. Accessibility concerns were with slippery tiles (at the Four Seasons Pool), steps, steps and handrails into pools, and space for changing. Accessibility deals not only with wheel chairs, but also with people who are not in wheel chairs but who have mobility issues.
- Strong opinion was provided that the current location of the Four Seasons Pool was very important and if it were to be re-built is should be rebuilt near its current location.
- The size of the change rooms and the lack of family change rooms was an issue, especially for the Four Seasons Pool.

Other issues that were noted but not seen as urgent as the above issues were as follows:

- Lack of adequate parking at the Four Seasons Pool.
- The remoteness of the transit stop from the doors of the Prince George Aquatic Centre.
- Lack of food services/public gathering place at either facility.
- Size of fitness area at the Prince George Aquatic Centre and the lack of a fitness centre at the Four Seasons Pool.
- Noise levels at both facilities, but particularly the Prince George Aquatic Centre.

The assumptions that can be made from the Public Open House closely mirror the outcomes from the online survey and the stakeholder meetings.

- Change rooms need to be larger and more space dedicated to family change rooms.
- The Four Seasons Pool is not functioning well and should be replaced and it should be replaced near its current location.
- Accessibility needs to be improved at both facilities, including entering the building, getting through the locker rooms and other public spaces, safe footing issues, and getting into the pools.

3.4 General Summary

Based on the information gathered from the initial survey on indoor recreation facilities in Prince George, the recent online survey on aquatic facilities, the stakeholder meetings, and the Public Open House, the following assumptions can be made:

- The Four Seasons Pool should be re-built near its current location with a similar design for its tanks but with larger change rooms, family change rooms, good accessibility from the front door through to entering the tanks, a fitness area, and with public gathering spaces.

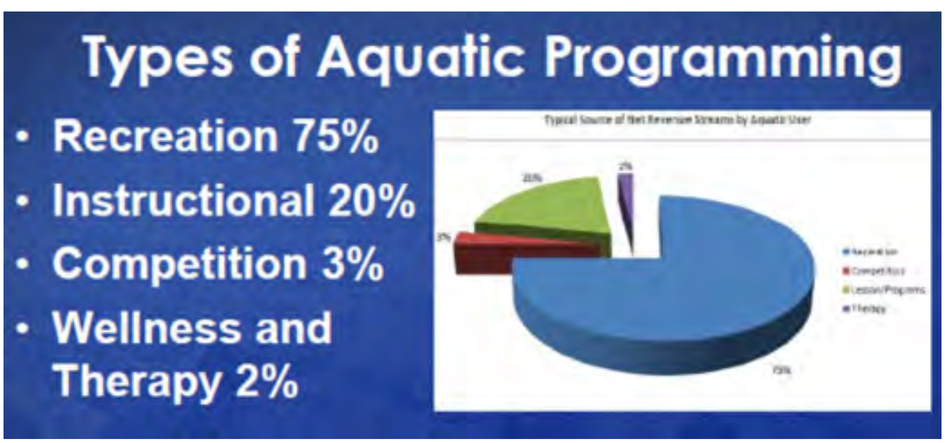
- The Prince George Aquatic Centre should be renovated to include an additional 25 metre tank, increase family change rooms, improved accessibility throughout, an enlarged fitness area, and a waterslide.

4.0 Aquatic Centre Trends

Contemporary Aquatic Centres are fully Americans with Disabilities Act (ADA) accessible where everyone can benefit from aquatic activities. BC Code references the ADA, because Canada currently does not have a similar document. As more athletes cross train with water fitness components and more doctors recommend water rehabilitation for injured, obese, diabetic, and aging patients, multi-generational Aquatic Centres are inclusive of the entire community.

- Within the last decade, demand for higher quality and a unique pool experience has risen.
- There are four types of aquatic facility users: *instructional, wellness, recreational, and competitive.*
- Each of these groups requires specific areas, features, and services to fulfill their needs. The following descriptions make evident the very different requirements for each of these aquatic user groups when planning and designing an aquatic facility.

With a balance of competitive and fitness user amenities, in addition to water leisure amenities, the Prince George Aquatic Centre and Four Seasons Pool are up to date with current aquatic amenity trends. The following table shows the typical breakout of revenue for modern aquatic facilities. The majority of use typically come from the general recreational user (75%), with programed activities coming in second (20%). Competitive swimming and wellness activities are typically the lowest source of revenue for these facilities.



As we compare the Prince George facility revenues to these standards, we find that the two facilities complement each other to provide a complete system. Currently, over 50% of the revenue generated at the Four Seasons Pool is from programmed activities, where only 10% of the revenue at the Aquatic Centre is from programs. Bring the two together, we find the 25% of the total revenue generated from aquatic programs in Prince George are from programmed activities, and approximately 70% from recreational swimming.

Aquatic centres across North America and British Columbia are seeing an increase in the aging population visit their facilities. These demographic groups prefer shallow, warm water for both fitness and leisure. Some organizations are choosing to add therapy pools to their facilities, while others are using their existing amenities to serve this population. *To continue to be current with trends, it is recommended that Prince George ensure there is adequate shallow, warm water and programs to support this growing demographic group.*

4.1 Instructional Enthusiasts

The following describes national trends for lessons and fitness users that includes learn-to-swim, water safety instruction, lifeguard instruction, life safety skills, survival swimming, scuba, and other aquatic skills.

Swim Lessons

According to the Centres for Disease Control, more than one in five people who die from drowning are children age 14 and younger. For every child who dies from drowning, another four receive emergency care for nonfatal submersion injuries, which can cause brain damage that may result in long-term disabilities, including memory problems, learning disabilities, and permanent loss of basic functioning.

Knowing how to avoid drowning is essential for children and adults, whether living in areas with natural bodies of water or simply being invited to pool parties. With more than one available pool in an Aquatic Centre, lessons can be maximized so that a large number of residents can be taught to swim. Ideally, water depth for instruction should accommodate young participants to stand comfortably in the water. Recreation pools easily provide this preference. Deeper competition pools offer moveable floors or other means of altering water depth for instructional purposes.

A well-run water lesson program is essential in introducing young swimmers to safe aquatic skills that can be used throughout their lives. By offering the community a comfortable, controlled aquatic environment, swimming and diving lessons can become an enjoyable learning experience. There are many different types of water safety lessons that can teach children not only how to swim and dive but how to survive in adverse water conditions. From small water craft instruction to drown-proofing, water safety is an integral part of any community. Many will go on to formal competitive aquatic programs in school or age-group swimming programs. Some will excel to become state champions. Benefits such as scholarship offers may occur when a swimmer or diver selects a college, which could lead to national level competition.

Drown-Proofing

Aware of 74 cases of body entrapments, including 13 confirmed deaths between January 1990 and August 2004, the U.S. Consumer Product Safety Commission reported the deaths were the result of drowning after the body or limb was held against the drain by the suction of the circulation pump. The incidents occurred in both residential and public settings.

Subsequently, a federal pool and spa safety law was signed by former President George W. Bush on December 19, 2007. The Virginia Graeme Baker Pool and Spa Safety Act requires all public pools and spas to have safety drain covers, and in certain circumstances, an anti-entrapment system. The goal of the law is to improve the safety of all pools and spas by increasing the use of layers of protection and promoting uninterrupted supervision to prevent child entrapments and drownings.

When teaching proper drown-proofing, some classes mimic the natural environment through instructor creativity (i.e., creating wave action with hands and arms to mimic river tides), while others simply require small children to memorize what they would do in a situation where drowning is likely, and then enact memorized skills with an instructor present. Knowing how to avoid drowning is essential for children and adults, and even more so when living in areas where natural bodies of water are prevalent.

Lifeguarding and CPR

Water rescue skills and CPR are typically taught to all lifeguards. However, teaching water rescue and CPR skills are integral to the community since families are the true lifeguards of one another whether at the beach or a backyard pool. Often, such courses are sponsored by the Red Cross, Ellis and Associates, and other providers of safety training.

School District Lesson Users

School districts are often valuable contributors to help efficiently program aquatic facilities. Potential programming might embrace swim lessons for elementary students, lifeguarding classes, physical education classes, therapy for high school athletes, and other joint partnership agreements to aid in directing area children to learn to swim. Aquatic sports (diving, water polo, synchronized swimming, underwater hockey, etc.) can contribute to the overall use of the facility as well as fitness use by faculty, special education therapy, and recreation. In addition, an aquatic facility may provide aquatic opportunities to pre-school children cared for by private daycare providers.

Aquatic Fitness

The more often the pool can be utilized for group activities for participants and spectators, the more likely the aquatic facility will be “alive” day in and day out. The types of activities that tend to draw a crowd are participatory, measurable, exciting, and often challenging—but not always so challenging that only elite swimmers can participate. Activities can be tailored to different ages, sizes, and/or skill levels.

The industry has responded to the continued popularity of aquatic fitness by creating a wide range of activities with related devices and equipment for a greater diversity of water-based aqua exercise options. Aerobic dancing, walking, and running in shallow and deep-water environments, including current channels for walking against the current, are just a few of the choices available to people wishing to add less stressful elements of a cross-training regimen or even to use aqua aerobics for their entire fitness program. Additionally, businesses might sponsor or subsidize aquatic fitness as part of their employee wellness training discipline.

- Water-based exercise is the *fastest* growing fitness choice in the U.S.
- In 1983 there were nearly 200,000 participants.
- 1988 – 2.2 million
- 2004 – 5.8 million
- 2007 – 7.2 million

LIFETIME EXPECTANCY	
Year	Both Sexes
1900	47.3
1950	68.2
2000	77.0
Source: National Ctr. For Health Statistics	

Aquatic fitness also remains one of the most popular forms of exercise among senior adults. Data taken from the National Centre for Health Statistics shows lifetime expectancy is up 30 years since 1900. The older adult market spans four generations from the Progressive Era 1900-1928, Depression Era 1929-1939, WWII Era 1940-1945, and Baby Boomers 1946-1964.

Gray power can be a large, affluent market willing to participate in water fitness, wellness programming, and other recreation opportunities. This diverse age group from 55 to 90+ includes sub-groups of which some are still working; some have children in college; and some are focusing on retirement, grandkids, and wellness. Consequently, seniors can be willing, enthusiastic participants if certain requirements are met. They typically feel uncomfortable in an environment with teens and generally respond better to strictly defined programming of well-structured activities such as water aerobics, arthritis water exercise, water walking, physical therapy, adult swim lessons, 'Save a Life' workshops, lap swimming, and masters swimming.

Water Fitness Trends

Aquatic programming accommodates beginner lessons that graduate to higher levels of intensity and skill. The following provides a snapshot of popular aquatic fitness programs.

Walking and Jogging in Shallow and Deep Water: The current channel, attached to a leisure pool, provides water traveling at approximately three miles per hour, thus creating an opportunity for walking against the current as a non-programmed or programmed fitness activity. According to waterart.org, "30 minutes of walking and jogging in shallow and deep water is equal to 80 minutes of jogging on land."

Water Aerobics: Remaining one of the fastest growing segments of the adult fitness industry, water aerobic workouts usually combine a variety of land aerobic techniques, including walking or running backwards and forwards, jumping jacks, mimicking cross-country skiing, and various arm movements. The workout may also incorporate equipment such as flotation devices and foam water weights.

Deep Water Aerobics: This type of water aerobics offers a muscular endurance workout in deep water that consists of simulated running in the deep end of the pool aided by a flotation device (vest or belt) where the participant is held in one location by a tether cord, essentially running in place.

Finning: This active swimming program requires training fins or flippers and utilizes fitness lap lanes of a pool. The kicking and pulling enhances conditioning and toning.

Liquid Gym: This aqua training workout can be as intense as desired with a personal trainer for the purpose of improved athletic performance.

Navy Seals: This aquatic class consists of Finning, water jogging, deep water aerobics, and scuba instruction.

Water Yoga: Warm water, as in a therapy pool, enhances asanas (stretching poses) to relax muscles and increase range of motion and balance. Pan flute music and dim lights deepen the experience. (yogaafloat.com)

Boot Camp: This amphibious program incorporates land and water fitness in a fast paced military-style interval training course with running in the pool, calisthenics, jumping jacks, pushups, and football-style drills.

Scuba and Snorkeling: These lessons are growing in popularity (possibly due to the increase of environmental professions) and typically start in swimming pools.

Scuba Rangers: Scuba and snorkeling skills are taught to kids 8 to 12 while using underwater flashlights, navigation compasses, and underwater photography.

Underwater Hockey: According to USOA Underwater Hockey, "The pool should be 25-metres by 15-metres and two-metres deep all the way across, but anything will do, even slopes (just change ends at half-time). Lead weights and three metres of rope can be used as goals, though the sound of the puck thunking into the back of a metal goal is very satisfying and should be experienced."

Water Polo: Dimensions of a water polo pool are not fixed and can vary between 20 by 10 and 30 by 20 metres. Minimum water depth must be at least six feet. The goals are three metres wide and 90 centimetres high.

Kayak Polo: This sport involves water polo being played from kayaks. According to Carolina Kayak Polo, "It is difficult to describe the passion and excitement that is created when a kayak water polo game is in progress. The participants—speeding the length of the pool weaving through the opponent's lines of defense and spinning in their kayaks to receive a pass—create a fast and thrilling event."

Water Basketball: Ideated in 1986 by Italian teacher, Francesco Rizzuto, this sport is a mixture of basketball and water polo. When designing a pool, full court water basketball is more challenging when tile lines are encrypted into the floor of the pool.

Water Volleyball: Portable and floatable aqua water volleyball sets come complete with two net positions, two anchor bags, and a staked floating perimeter boundary.

Triathlons: These athletic competitions, which the contestants compete in three different events to find the best all-around athlete, typically consist of swimming, cycling, and running.

Kayak and Canoe Clubs: Due to the popularity of Extreme Sports, kayak and canoe clubs are growing in popularity and use large pools for training.

Swim lessons, lap swimming, water jogging, deep-water aerobics, life-saving instruction, diving lessons, survival swimming, synchronized swimming, water polo, underwater hockey, and scuba instruction can take place in a competitive/lesson/training pool, which frees up the recreation pool for swimmers who want to use the play features. Fitness classes are usually offered in the morning, at lunchtime, and in the early evening. Instructor information and/or training can be acquired through related organizations.

4.2 Water Wellness Seekers

The following describes national trends for water wellness seekers, the fastest growing aquatic user group that includes therapy programs, water exercise classes, water aerobics classes, and fitness classes.

Aquatic therapy is rehabilitation performed in warm water and involves physical activity of exercise and motion in the presence of an aquatic therapist, also called an aquatic therapy provider. Warm water may increase the dynamics of blood pressure and blood and lymph circulation, as well as decreasing swelling in skin and other tissues.

Participation in an aquatic therapy program offers improvement in:

- Overall health and fitness
- Stretching capacity
- Range of motion
- Movement capabilities
- Coordination
- Physical stamina and endurance
- Swimming skills, safety, and abilities

Though many people who use aquatic therapy are enthusiasts of meditation or massage, some are looking for rehabilitating or improving a certain level of health. The Arthritis Foundation certifies instructors to teach arthritis aquatics. Many participants in these programs report reduced arthritis symptoms, including increased mobility and decreased pain and stiffness. New studies by the Aquatic Exercise Association suggest that the management of bone density can be facilitated by water exercise. When moderate exercise is recommended for obese patients, the low-gravity qualities of aquatic therapy can be very appealing to this user group. Over the past several years, water exercise programs have multiplied in health clubs, pain clinics, and hospitals.

Users include:

Injured Athletes: Athletic trainers and sports medicine physicians are prescribing aquatic therapy as a rehabilitative/preventive fitness program.

Post-Operative Patients and the Disabled: Includes patients with physical ramifications such as spinal dysfunctions, post-operative muscle toning, injuries, and arthritis.

Arthritis Sufferers: The Arthritis Foundation certifies instructors to teach arthritis exercises such as Rusty Hinges and Joint Effort.

Aging Baby Boomers: Some 70 million strong, “boomers” invented the fitness movement and show no sign of abandoning it as they age, especially in warm water pools.

Obese Patients: More doctors are prescribing water wellness for overweight issues.

Pregnant Women: Effects of the low resistance of water exercise is soothing to this user group.

Meditation Enthusiasts: Fans of mind and body movements enjoy immersing in warm water pools to complete the tranquil state of meditation.

Key Components of Aquatic Therapy Centres

Aquatic therapy centres are growing in necessity for rejuvenation and social wellness for rehabilitation needs and developmental disorders. Colorful environments and interactive water is a stimulating, effective, and cathartic treatment, while specific design elements are ultimately inspired by the rehabilitative needs of patients.

Key components include:

- Warm pool water capability with fast pool turnovers.
- High-quality water chemical treatment systems, including dual sanitization methods and an appropriately designed HVAC/DH system.
- Easy access from the parking lot to the locker rooms, pool deck, and into the pool.
- Ample space in locker rooms and wider pool deck for wheelchairs, walkers, dry and wet equipment, and dry-side therapy.
- In-water amenities such as perimeter railings, aerobic steppers, treadmills, underwater benches, and ramps.
- Flexible pool depths for multiple programmatic needs.
- Aesthetically pleasing and light-filled private spaces.

4.3 Recreation Swimmers

The following describes national trends for recreation swimmers, the most popular and diverse aquatic user group that is family oriented for tots, teen, and adults.

- Swimming is the 3rd most popular sport or exercise activity
  - Recreational Leagues
  - Fitness Classes
  - Lap Swimming
- There are approximately 314 million visits to recreational water sites each year.

Successful Aquatic Centres combine creative water play areas for various age groups in a safe, friendly atmosphere. While aquatic recreation has become much more age-defined, attractions have age limitations and appropriateness due to elements of thrill and capabilities. Tots enjoy shallow pools with gentle water features and play areas tucked securely out of the way of the more active areas.

Once children grow out of the tot stage, they enjoy romping in zero-depth recreation pools, making their adventurous way across lily pad walks, and climbing on participatory play features with "just-their-size" waterslides.

Older children speed down flume and drop slides and enjoy larger water play structures. Teens enjoy gathering spots like action islands with access to deep water pools and adventurous waterslides. Lazy rivers and current channels cater to most demographics while spas and lap lanes are geared towards adults.

Age Group	Recreational Aquatic Age-Group National Trends
Age 0-3	Tot Pool, Tot Slides, Gentle Spray Features
Age 4-7	Water Sprayground, Zero-Depth Pool, Participatory Play Features, Sand Play
Age 8-11	Water Walks, Large Play Structures, Full-Size Waterslides, Open Water
Age 12-16	Water Walks, Large Waterslides, Open Water, Lazy River, Gathering Places, Sand Volleyball, Mat Racer, Diving Boards
Age 17-22	Action Island, Intense Waterslides, Flow Rider, Mat Racer, Climbing Wall, Open Water, Sand Volleyball, Drop Slides, Diving Boards
Age 23-45	Zero-Depth Pool (to be w/children), Open Water, Spa, Sun Deck, Lap Lanes, Lazy River, Waterslides, Diving Boards
Age 46+	Spa, Sun Deck, Lap Lanes, Lazy River, Family-Friendly Waterslides

Source: Counsilman-Hunsaker

Recreation Pool Features

Leisure Pool

The free-form leisure pool provides an inviting atmosphere with plenty of shallow water from zero-depth to four feet, allowing adults and children to interact for hours of splash and play entertainment. With opportunity for many different sizes and designs, the leisure pool is a desirable amenity for all age and skill levels where various attractions may be incorporated to increase the experience factor, which increases attendance, the amount of time spent at the facility, and return visits.

Zero-Depth Entry / Spray Features

Swimmers enjoy easy access into leisure pools that simulate an ocean beach, where the pool bottom slopes gradually toward the deeper water. Instead of jumping or climbing into the pool, patrons simply walk in. Lounging in the zero-depth is a pleasant way to enjoy the water and sun while watching children at play with spray features.

Participatory Play Feature

Located within the leisure pool, play features are multi-level, interactive structures where children can scamper through spraying water, climb across bridges, scurry over and under tunnels, and slide down just-their-size waterslides. As children manipulate valves and chains, they control where and when the water sprays will occur—all within sight of parents and lifeguards.

Current Channel / Lazy River

A current channel is part of the leisure pool, usually 6-8 feet wide, with water traveling at approximately two and a half miles per hour. The channel is popular as a water walking setting for fitness classes or adults seeking non-programmed exercise, walking with or against the current.

Waterslides

The thrill of mounting the stairs to the exhilaration of sliding down into the water makes waterslides a desired attraction. While some slides are straight with a steep or gentle gradient, others wind down with sharp enclosed curves or high walls on the outside of the curves. Slides can be a long tube or alternate between an open chute and closed tube. Experiences can range from family-friendly to surprisingly intense.

Drop Slide

A drop slide offers the thrill of walking up the steps of the waterslide, hearing the excitement and splash of water sliders ahead, then sliding down to the water with the added bonus of dropping into the pool upon exit in a short freefall.

Lap Lanes

Fitness lap swimming and water walking are important to many adults and seniors. Opportunities for limited practice and training exist in a two, three or four lane 25-yard lap pool adjacent to the leisure pool. Additionally, programming can be incorporated for lessons and activities.

Otter Slide

Otter slides are designed for “in-between” children who are too big for the kiddy slides, but too little for the height restrictions of larger waterslides.

Crossing Activity

Tethered to the bottom of the pool, a foam floating water walk spans across the pool with a spun braided rope or cargo net suspended overhead for hours of adventure and physical fitness.

Diving Board

A flexible springboard in 1 metre or 3 metres secured at one end and projecting over deep water provides experienced swimmers the challenge of diving. Deep water can also be programmed for advanced swim lessons, lifeguard training, diving lessons, water safety, water polo, scuba, synchronized swimming lessons, and deep water fitness classes.

Sprayground

An interactive water sprayground features entertaining components, including large above-ground water sprays and smaller flush-mounted water equipment. A water sprayground delights children in a colorful, interactive water wonderland atmosphere for hours of interactive play.

Shade Umbrellas

Fabric umbrellas come in many styles and colors to provide necessary shade while lending a festive atmosphere. They cover, connect, and join areas while providing relaxation out of the sun.

4.4 Future Aquatic Centre Expectations

To ensure that existing customers keep coming back and to get more customers through the turnstiles, staying ahead of the trends impacts the recreation industry. “Local” is the environmental buzzword when it comes to entertainment during economic disruptions. A large part of aquatic expectations is the result of tourism whereby travelers have seen what other communities have in the form of public sector, affiliated with a hotel/resort, part of a corporate chain, privately owned, or international aquatics including European communities.

Hotel/Resort Influence

- The hospitality industry has exploded in destination aquatic environments that create indelible memories.
- Experiences include a combination of tranquil and exhilarating pools and attractions, relaxing spas, exquisite poolside dining, and children’s programs.
- Attractions include infinity edge pools with cascading waterfalls, hydrotherapy bubbling spas, caves, fountains, waterslides, and adventure rides.
- Some designs blend with a spectacular geologic formation or a scenic region, while others, such as Las Vegas and Orlando, create themed immersive environments where guests can imagine they are in far-away locations.

European waterparks are beginning to offer more adult-oriented amenities. With lifetime expectancy up 30 years in the U.S. since 1900, adults are strong advocates of well-being pursuits, i.e., therapy pools, leisure pools, and lap swimming. Thus, European influence will most likely be embraced in the U.S. in the near future.

While Prince George will not likely operate a waterpark- resort, the resort ambience has proven to be successful when applied to any aquatic centre. Future plans may include resort-style theming or program amenities such as areas for private reservation that include concessions waitstaff.

European Influence

Schwaben Quellen, a large spa/waterpark complex located in Stuttgart, Germany, offers multiple steam rooms, saunas, and themed shower experiences complete with special effects, sounds, and aromatherapy, even rooms where guests can roll in the snow following use of a sauna or other type of steam room.

Wave-die Worgler Wasserwelten, Austria, offers concentrated body-warm (98.6°F) saline baths enriched with salt from the Dead Sea, creating a weightless floating experience with a play of colors and atmospheric underwater music, putting the guest in a state of mental balance.

The addition of more adult amenities influences childcare activities so that mom and dad can partake in revitalization, purification, and other well-being experiences. Inspired by kids' clubs on cruise ships and resorts, childcare activities engage in more supervised events and dynamic aquatic activities.

4.5 Competition Pools

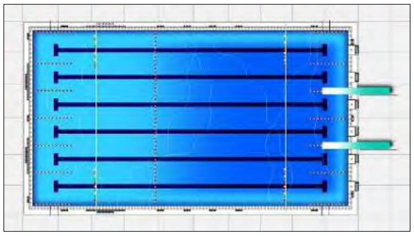
Simplest pool to define

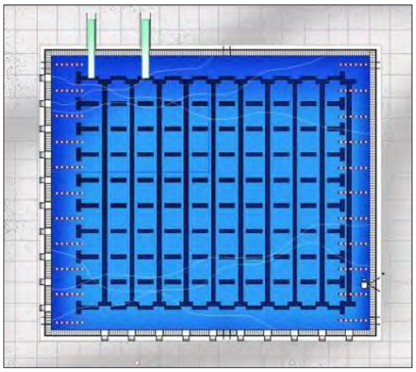
- 25 Yards
- 25 Metres
- 50 Metres

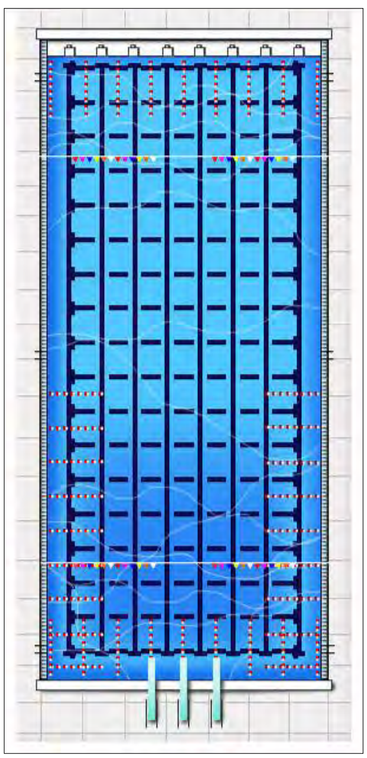
Aquatic Governing Organizations with rules and regulations that preside over various aquatics

- NFSHS
- NCAA
- USA Swimming
- FINA

Cooler water temperature







A competition pool must be 25 yards or 25 metres for short-course events and 50 metres for long-course events. USA Swimming and FINA sanction short-course 25-metre as well as long-course 50-metre competitions. Depending on the level of competition, a minimum of six lanes is required, but eight lanes are expected to better allow for larger heats. While almost all 50-metre pools have ten lanes, 1 and 10 serve as buffer lanes. National caliber water polo matches take place in 30-metre fields of play minimum with at least a 2-metre zone behind each goal line.

High schools, USA Swimming, the YMCA, and NCAA conduct short-course 25-yard competitions. For high school and NCAA events, a pool must have a minimum of six lanes, each at least seven feet wide. Several current standards require six feet or more of water beneath starting blocks. While some shallow water is acceptable, water depths of two metres or more “is required” as per applicable rules.

High school and college water polo often use 25-yard and 25-metre pools, but all high-level meets for USA Water Polo and international events are held in 50-metre pools. Water depth of two metres or more “is required” as per applicable rules.

Synchronized swimming requires a deep 12-by-25-metre pool area. A minimum water depth of 2.5 metres “is required” as per applicable rules. National and international events are generally conducted in 50-metre pools.

Diving

Now more than ever, world-class diving venues are being constructed across the United States and abroad. There are two kinds of diving competitions: springboard and platform. Springboard competitions take place at 1-metre and 3-metre heights. At elite venues, a minimum of two 1-metre and two 3-metre springboards are provided. These competition springboards are typically placed on the same side of the pool as the platforms. Often, additional springboards are placed around the dive pool for practice and summer camps. While not a requirement, a separate dive pool is desired for elite dive competition and training.

Springboards

1 Metre

- High School, Recreation Value
- Water Depth 12' 6"
- Ceiling Height 20' minimum bottom of beam

3 Metre

- US Diving, Club
- Water Depth 13' 6"
- Ceiling Height 27' minimum bottom of beam

Platform

Platform diving competition takes place at 10 metres; however, 1, 3, 5, and 7.5 heights are also typically provided for training and warm up. Occasionally, a ½-metre platform is constructed for divers to practice take offs. A facility without a 10-metre tower but only a 5-metre tower can host a platform diving event if both teams agree on this height.

Dry-land Training Room

For high level diving training, a separate room should be equipped with dry-land springboards, trampoline, pits, and video recording. The use of video recording is popular with competitive diving. Tivo can be used to video tape and coach divers. Video recording should be available in the dry-land training area as well as on deck near the springboards and platforms. Often, dry-land training rooms are smaller, and sometimes portions of this equipment is located on the pool deck next to the dive tower.

Spectator Seating

Spectator seating from the side and elevated in a mezzanine is desired. Specifications are limited to recommendations simply because some areas hold meets that utilize temporary seating. Large world-class diving events have recently been staged with temporary pools with seating for 10,000 or more. Due to the spectator and deck seating requirements for a championship facility, the square footage of such a facility (and therefore cost) is greatly increased.

Ample deck space on the sides and end of the dive pool is also needed for viewing the dives by judges. Three, five, seven or nine judges may be positioned on the side or end of the pool depending on the level of competition.

Program Requirements:

- Local Meets (100-150)
- High School
- Dual Meets
- Regional Meets (500-750)
- State Championships
- Zones
- National Venue (1,000-1,500)
- USA Regionals

Competitive User Groups

High School Users

High school varsity swimming is typically well supported in most communities across the U.S.; however, many schools lack the ideal facility for training and competition. Because quality pool time is usually scarce in most areas, renting pool time from other area facilities can be daunting due to various needs and agendas, thus pool availability can diminish as facilities experience capacity.

High school competitive swimming requirements include:

- Course length of 25 yards with a minimum width of 45 feet for six 7-foot-wide lanes or 60 feet for eight 7-foot-wide lanes.
- 125 spectator seats.
- Pace clocks, stretch cords, mats (for sit-ups, etc.), free weights, medicine balls, weight training equipment, kickboards, fins, paddles, pull buoys, course caps, and goggles.

Location of club teams surrounding Prince George

Swimming Canada

Swimming Canada serves as the national governing body of competitive swimming in Canada. The federation comprises 75,000 members and 400 swim clubs. Their mission statement:

We create and develop an environment that allows people to achieve sustained success and leadership; we ensure a welcoming and safe environment; we promote our brand so that Canadians view swimming as a premier sport and activity in Canada; we drive growth through innovation, quality programming and partnerships; we lead and govern with organizational excellence and business performance.

Canada Games

Held every two years, alternating between summer and winter, the Canada Games are a key event in the development of Canada's young athletes. Prince George hosted the 2015 winter games that included swimming.

Community Swim and Dive Teams

Numerous communities sponsor competitive swimming and diving teams for children and teens. The purpose is to offer opportunity to enjoy the healthy fun of swimming; to support individual achievement of personal bests; and to promote goal setting, life skills, and sportsmanship. Teams typically adhere to recognized swimming rules and swim the standard strokes of swim meets but in shorter lengths. Swimmers with limited or no competitive experience are provided stroke conditioning clinics as a recommended alternative. Teams are usually more active in the warmer months, and not directly associated with a national swim organization. Many swimmers who begin their competitive swimming experience on a local swim team proceed to join nationally governed teams.

Pool Rental

Competitive swimmers, particularly members of independent swimming associations, are accustomed to renting lane space for training as well as leasing entire facilities, either for long-term use or on a one- to three-day basis for special events and competitions. Although there is more than one accepted way to receive fees from swim teams, pool lane rental is usually based on cost per lane/per hour. Entire facilities leased on a per-day basis generally have a fixed schedule of costs for such use. Long-term facility leases are generally the product of negotiation and, accordingly, are too varied and specialized for consideration in the context of this study.

4.6 Specific Programs

Standard Programs

Recreation Swimmers

- Tots, children, pre-teens, teens, young adults, adults, elderly
- ADA Accessible
- Parties / Social Function Rentals

Instruction/Fitness Enthusiasts

- Club Activities: Kayaks, Canoes, SCUBA
- Water Safety Lifesaving
- Organized Water Exercise: Water Aerobics, Lap Swimming

Therapy Seekers

- Disabled / Physically Impaired Utilization

Competition User Groups

- Competitive Swimming
- Diving
- Synchronized Swimming
- Water Polo

Alternative Programs

- Dive-In Movie Nights
- Summer Splash Camp
- Triathlon Clinics
- Kids Triathlon Camps
- Aquatics Sports Camp
- Mommy & Me Story and Splash Time

Programs are the lifeblood of any aquatic centre because they provide a necessary service that it is unlikely they will receive elsewhere. The Prince George Aquatic Centre and Four Seasons Pool offer programming typical for an aquatic center, which includes swim lessons, recreational swim, water aerobics, and other water fitness opportunities. Other British Columbia facilities are offering special events and classes that are not currently being offered at the Prince George facilities.

As measured within the industry of competitors providing similar services, *in order to remain current, maximize revenue potential and generate interest from new users, it is recommended that some alternative programming be considered, such as day camps and special events.* New users may come for a special event they hear about, but will have a great experience and leave your facility registered for swim lessons or with a membership. By offering classes and events that are multi-generational, all-access, and not just for a specific user-group, Prince George can attract entire families to use their facility, regardless of their experience and skill level in the water.

4.7 Economic Growth

Encouraging residents to use public recreation facilities requires helpfulness of the promotional materials, perceived value against other providers, and public awareness that the facility addresses the prevailing needs and concerns of the community. The Aquatic Centre must be seen as integral to economic development through:

- Real estate values and property tax
- Business attraction and retention
- Stimulating the creative economy
- Promoting tourism

According to the *Importance of Quality of Life in the Location Decisions of New Economy Firms*, "modern businesses typically choose communities with cultural and recreational amenities that will attract and retain a well-educated workforce." This enlarges the tax base and stimulates the economy, which then provides more tax revenue that parks and recreation agencies can use to enhance or expand infrastructure, facilities, and programs. Park and recreation amenities stimulate happier and healthier families, positive business growth and economic development opportunities, contributing to quality of life. Creative, active people choose to live in communities with high quality amenities and experiences. Furthermore, championship venues bring tourism revenue to local hotels, restaurants, and retail businesses.

4.8 Bundling Amenities

Locating Aquatic Centres adjacent to parks, schools, businesses and transportation hubs promotes accessibility. Bundling civic destination points can encourage customers to extend the duration of their visit, nurture community identity, and increase operational efficiency for those agencies responsible for park maintenance and facility security by minimizing demand on parking lots, access roads, and traffic signals.

If the site has an existing recreation facility, utilities more than likely are already in place. Electricity, natural gas, water and sewer services can be very expensive to introduce to a site from main trunk lines, especially if those lines are several miles away. Because bringing utilities to the project site has no programmatic or recreation value, the adjacency and availability of existing utilities can dramatically and positively impact site development costs with little or no negative impact to the end user. This allows the bulk of construction monies to be allocated for recreational improvements.

Many communities choose to co-locate outdoor and indoor facilities to share spaces without either facility interrupting the operations of the other. For example, a separate outdoor entrance to an Aquatic Centre can accommodate patrons to that facility, minimizing congestion in the main building. Plans can be made for locker rooms to support both outdoor and indoor spaces, eliminating redundancy. Physically connecting the indoor aquatic spaces with those that are outside makes for the easy transition of patrons from outdoor to indoor swimming—particularly crucial in cases of inclement weather. This also helps keep facility guests on site, thus maximizing opportunities for revenue generation.

In the case of Prince George Aquatic Centre, it is located adjacent to the soccer complex, which serves thousands of residents each year. Locating the aquatic centre next door provides an increased opportunity for cross-promotion during tournaments, which can allow teams to receive a reduced rate to visit the aquatic centre between games. In addition, residents can participate in programs at both facilities simultaneously, which is an enormous convenience for busy families and may result in their selection of Prince George Aquatic Centre over neighboring facilities.

Useful promotional tools include partnerships with local business centres, which can generate valuable word-of-mouth appeal for the facility. As noted, an Aquatic Centre's economic well-being often depends on its proximity to well-traveled roads, highways and transportation hubs. Sites located in valleys or on hillsides adjacent to major highways can be developed into exciting destination points. A site in a valley near a main transportation artery can be oriented so that guests enter the recreation facility and instantly gain an overview of the park. This allows guests to immediately spot their favorite destinations and level of anticipation, yet because of enhanced transparency also provides for the safety and comfort of different age groups.

The Four Seasons Pool may be replaced in the future. Part of this replacement may include relocation to another site. *During the planning process, should this be decided it is highly recommended that a location near other recreational amenities with proximity to main thoroughfares be selected.*

4.9 Marketing

Many marketing efforts will focus on the sales budget, developing an easy and concise means of explaining activities and fees to users, and creating a simple protocol for scheduling rentals and other events. Branding refers to the summation of all the amenities—state-of-the-art facilities, attractions, and programming—in an eye-appealing package with a competitive advantage. Strong aesthetic visuals include a cohesive logo, website, brochures, video spots, and staff uniforms. Competitive advantages may include cross-generational multiplicity, daily admission fees versus membership fees, cultural diversity, or perhaps the facility is the only championship venue in the region. For a loyal customer base, a great deal of marketing effort will be focused on customer outreach.

Customer Outreach

Marketers understand their target market—a vital investment to success—by identifying potential user groups while developing a clear message that explains how the Aquatic Centre can fulfill their needs. Marketers define the identity and mission (sell the experience) by branding around the core competencies of the facility. They continue to benchmark successful recreation providers who are meeting the needs of a market segment and generating demand, while finding what makes it work and determining what would make it better. Their single most important ingredient is customer relationships (getting them and gaining their loyalty). Valuing customers and their opinions gives users a sense of ownership and pride in the facility, a perfect combination for continued word-of-mouth promotion. Customers are a source of innovative ideas, thus marketers must:

- Identify user groups and verify that the message of each marketing campaign is being successfully communicated.
- Ask for feedback through focus groups and surveys of programs while being open to customers’ observations and suggestions to help build a network within the community.
- Evaluate customer feedback to measure how users and non-users view the image of the facility. Use the information to determine current levels of satisfaction, program fulfillment, and future needs.
- Make quantitative and qualitative improvements based on data (from what makes programs and services successful) so that services are consistently high quality to increase revenue.
- Set objectives for improvement to increase market share.
- Identify resources and means of implementation by listing key action plans and cycle times.
- Brand services with consistency; position each service to fit the market segment and promote the benefit of the experience; people buy benefits.

Marketing Development Plan

Take time to address market conditions and challenges; define steps to solve the challenges and improve all aspects of the event or program by using a marketing development plan. When developing a special event or program, answer the following questions.

1. *What is the current situation you are addressing?*
2. *What are the market conditions?*
3. *What are the objectives of this marketing plan?*
4. *What are the key elements you wish to implement?*
5. *What are the timelines for each element?*
6. *What resources will be used for this implementation? (funds, staff, external support)*
7. *How will you measure the success of the plan?*

Media and Community Relations

Traditional advertising such as program brochures, school flyers, visual displays, newspaper, radio, and television can target specific campaigns. As a not-for-profit entity, various local media outlets represent a valuable opportunity for free or low-cost publicity. Develop public relation contacts with local broadcast and print media by submitting articles or suggesting topics on the Aquatic Centre's activities and services, including issues involving education and accident prevention. The use of local celebrities, such as sports and radio personalities, can also help promote events or sponsor organizations and outreach programs to local groups, including girl/boy scouts, hospitals, retirement communities, and corporations. Such programs can be tailored to the needs and interests of individual groups by focusing on wellness, safety, training, competition, or recreation. Utilize small segmented promotions to create an individualized plan for items of user interest, special events, and fun activities.

Corporate Sponsorship and Venue Signage

Shrinking funds and tightening budgets result in seeking opportunities to subsidize expenses of construction and operation. Marketing opportunities look to local, regional, and even national businesses for sponsorship and advertising signage. These opportunities can range from naming the entire facility for an individual or commercial benefactor, to naming individual rooms, benches, tiles, and so forth. Opportunities for revenue include selling permanent and temporary venue signage.

Digital Marketing

Marketers widen the scope of multimedia plans through the increased use of on-demand media such as online broadcasting and video spots, and utilizing email marketing. Marketing must thrive in an exciting digital culture in order to grab and retain potential customers to positively affect revenue, influence attendance, and promote sponsorships.

Embracing information sharing can prove to be a benefit to your business practices. These inexpensive information sharing platforms are becoming more and more effective in direct connection and building community. For example, YouTube can be used as a free web host of professional video tours of the facility as well as on-going training videos for staff. A Facebook business page can be a free web host of amenities, hours of operation, and employee and program scheduling with email access to “fans” regarding specials, coupons, and special events. Twitter can quickly tweet cancellations or reminders for lessons, classes or programs to followers.

Customer email addresses may be submitted when registering for memberships, classes, and special events. With customer permission, marketers may use these email addresses for email marketing campaigns of monthly newsletters and promotional messages regarding upcoming events and classes.

Websurfers looking for exciting visual examples of recreation opportunities will stop and shop cutting-edge websites that showcase the recreation portfolio in an outstanding way. Online photo galleries and streaming video can demonstrate exciting swim meets, families playing in shallow water, teens sliding down waterslides, and seniors swimming laps, thus allowing potential customers to browse the facility without having to be on site. An immediate price quote offers a means to sell rental opportunities for birthday parties, reunions, and corporate picnics. Voice-overs can communicate classes, programs, drop-in activities, meets, and special events.

The face of fundraising is also enhanced by interactive media. When sent a video spot, potential sponsors can witness a cohesive branding package accompanied by exciting video of an event, showing crowds of people in attendance, and other sponsors’ booths.

A study conducted by Media Life Research reveals that 63% of moviegoers are not opposed to onscreen commercials; 79% of U.S. theaters offer commercial spots before a movie. Onscreen ads can promote local recreation attractions to a receptive young demographic. Video spots of a thrilling Aquatic Centre on a hot summer day can potentially reach thousands of people in one month.

Other ways of utilizing video spots to help launch the new facility campaign include looping video spot DVDs on in-house TVs at the park and recreation headquarters, the county welcome centre, the visitors’ bureau, and realtor offices to communicate to the community, visitors, and potential residents the creative recreation amenities that the community has to offer.

Summary

No matter how many amenities are offered and how great the marketing is, creating a memorable experience will be the primary factor that keeps guests coming back time and time again. Whether it's the greeting they get from the guest services team upon entering the aquatic centre, the cleanliness of the entire facility, or the safe environment provided by the lifeguards, always strive to provide an experience that guests will remember for years to come. *It is recommended that Prince George spend time exploring their brand message and how it is communicated to potential users. The tag line of, "More than just water," should be on every piece of marketing that is distributed and staff should live and breathe that brand message.*

Social Media

One way to increase Prince George's brand awareness is to fully engage the community through social media. Currently, the Prince George Aquatics Facebook page is used primarily for advertising programs. *It is encouraged that the page be used for many purposes, including the promotion of water safety, trending aquatic videos, and customer engagement.* Organizations who successfully use their social media pages encourage interaction with their posts by posting a call to action. For example, "What is your favorite thing about the Prince George Aquatic Center?" Others will stage giveaways where the users must guess an object that is pictured underwater. At a specific time, you will randomly select someone with the correct answer and provide them with one free recreational swim pass, or something of a similar nature. This encourages interaction with the social media page, which will boost your position higher in their feed and lead to more page likes.

Saturation

Currently, the aquatics program is marketed through the website and the recreation guide. While this is typical for an operation of this type, *it is recommended that Prince George explore developing and implementing a marketing action plan that encompasses several of the mediums discussed previously in this section.* When creating an online ad or flyer, be sure to include a coupon that is specific to that medium. This allows for your investment to be tracked to determine if the funding spent on that particular medium was effective. While some advertising and marketing mediums can be expensive, soliciting sponsorships and partners can assist tremendously through this process.

5.0 Demographics

Factors that influence attendance of Aquatic Centres include population characteristics, including growth or decline, income, and age groups. Market studies are used to predict how relevant products, services and fees are to residents. In this section, demographic statistics provided by Manifold Data Mining Inc. were looked at in concentric rings around the existing facilities to determine current service level as well as potential growth within the existing market. For a description of Manifold's Methodology, please refer to section 10.7 in the Appendices.

The primary area is assumed as 10 kilometres, and the service area is assumed as 25 kilometres. The difference between "primary" and "service area" is that specific program users will customarily drive farther to use a facility then will community pool users. Thus, a study of demographic patterns in the area is helpful in projecting usage rates. The resident market area has been divided into the following distances.

Distance From Site
0 to 3 Kilometres
3 to 5 Kilometres
5 to 10 Kilometres
10 to 15 Kilometres
15 to 25 Kilometres

Demographic Overview

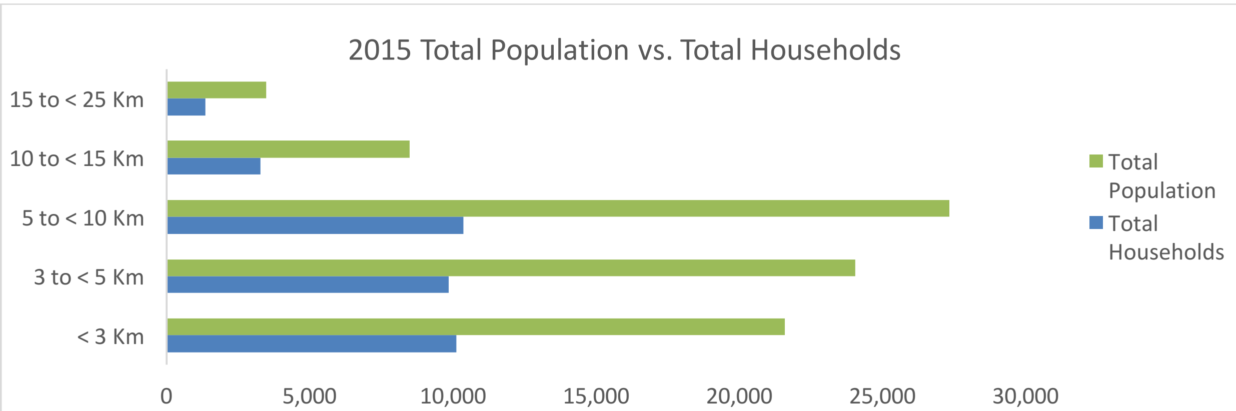
- Population
    - Prince George is home to over 83,000 people and over 320,000 people in the trading area. (2015 BC Stats)
- *Housing*
    - Average cost of purchasing a home in June 2016: $300,903, up 6.6% from June 2015 (BC Northern Real Estate Board)
    - Average cost of renting a two-bedroom apartment as of October 2015: $806. (CMHC data)
- *Earnings*
    - Average household income before tax in 2015: $132,013. (CRA data compiled by Manifold Data Mining Inc.)
    - Average income before tax of total population 15 years and older: $46,623. (CRA data compiled by Manifold Data Mining Inc.)
    - Average Household Total Income $86,720. (CRA data compiled by Manifold Data Mining Inc.)

5.1 Four Seasons Pool

Population

The following chart presents a summary of market area population with concentric rings surrounding the Four Seasons Pool.

- The population base within the primary area is 72,982.
- The population base within the service area is 81,935.

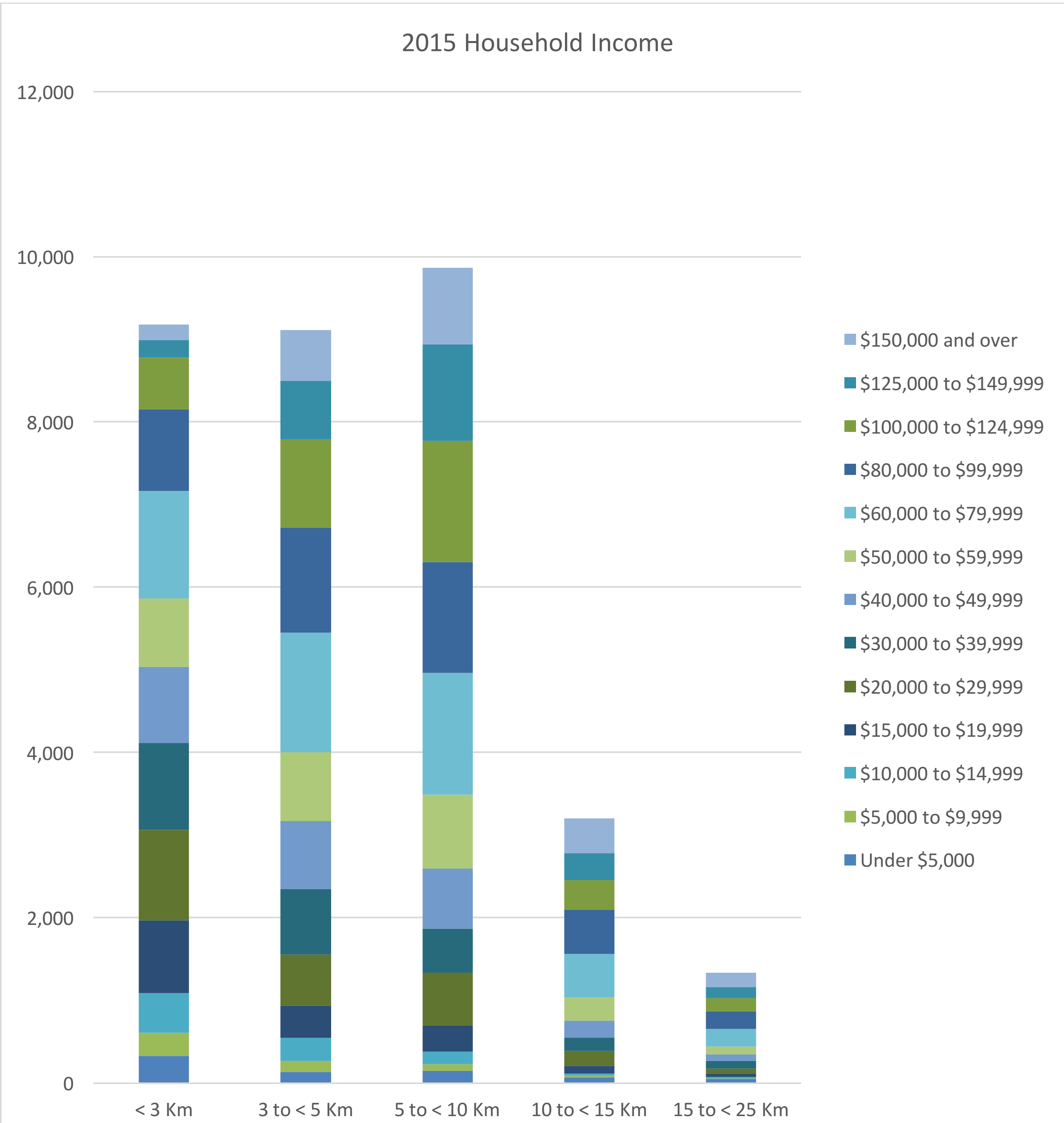


	3 Kilometers : 775 Dominion Street	3-5 Kilometers : 775 Dominion Street	5-10 Kilometers : 775 Dominion Street	10-15 Kilometers : 775 Dominion Street	15-25 Kilometers : 775 Dominion Street
SuperDemographics 2015 Basic Variables					
Total households	10,106	9,856	10,362	3,281	1,350
Total population	21,583	24,054	27,345	8,483	3,470

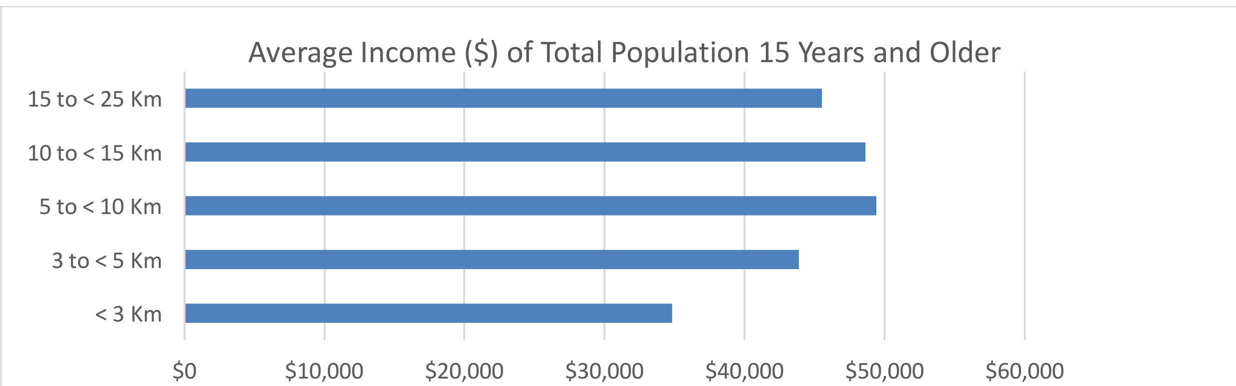
Income

To a certain degree, the likelihood of residents to engage in aquatics depends on their ability to pay for admission and program fees.

- The income of the primary service area is below average for Prince George.
- With a low cost of living, residents still have an ability to pay for recreational services.



	3 Kilometers : 775 Dominion Street	3-5 Kilometers : 775 Dominion Street	5-10 Kilometers : 775 Dominion Street	10-15 Kilometers : 775 Dominion Street	15-25 Kilometers : 775 Dominion Street
SuperDemographics 2015 Household Income: Total					
Under $5,000	330	134	148	66	49
$5,000 to $9,999	275	134	82	21	6
$10,000 to $14,999	483	278	150	29	19
$15,000 to $19,999	878	392	312	90	40
$20,000 to $29,999	1,096	619	643	180	62
$30,000 to $39,999	1,053	793	536	162	92
$40,000 to $49,999	921	817	728	205	79
$50,000 to $59,999	827	837	892	283	95
$60,000 to $79,999	1,305	1,450	1,472	523	211
$80,000 to $99,999	983	1,264	1,343	537	217
$100,000 to $124,999	629	1,076	1,468	361	159
$125,000 to $149,999	214	708	1,167	325	130
$150,000 and over	185	614	928	419	178

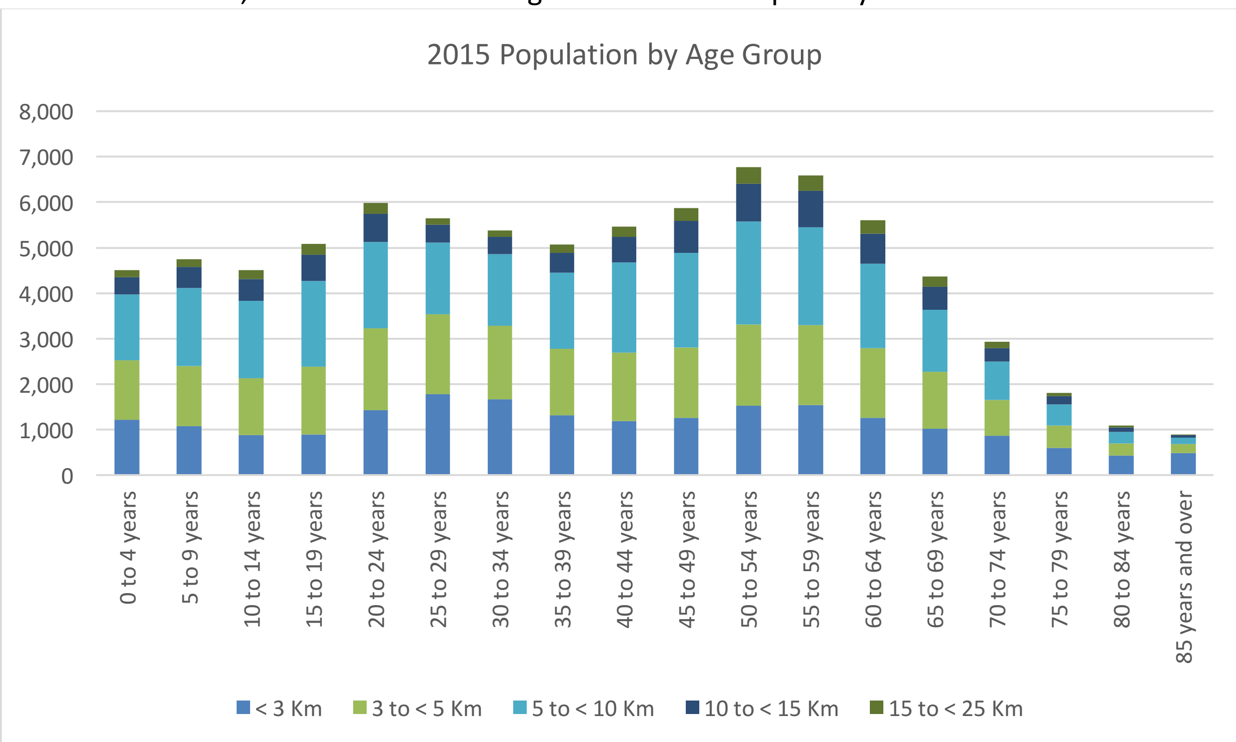


	3 Kilometers : 775 Dominion Street	3-5 Kilometers : 775 Dominion Street	5-10 Kilometers : 775 Dominion Street	10-15 Kilometers : 775 Dominion Street	15-25 Kilometers : 775 Dominion Street
SuperDemographics 2015 Income: Population 15+					
Average income ($) of total population 15 years and over	$34,805	$43,858	$49,401	$48,632	$45,491

Age Distribution

Age distribution is another population characteristic used to determine the type and level of use of any type of program. The following table provides the number of residents for each age group within the market area. Aquatic facilities primarily serve two age groups; families with young children and ageing senior population.

- There are 11,924 children under the age of 15 within the primary market area.
- There are 9,484 seniors over the age of 65 within the primary market area



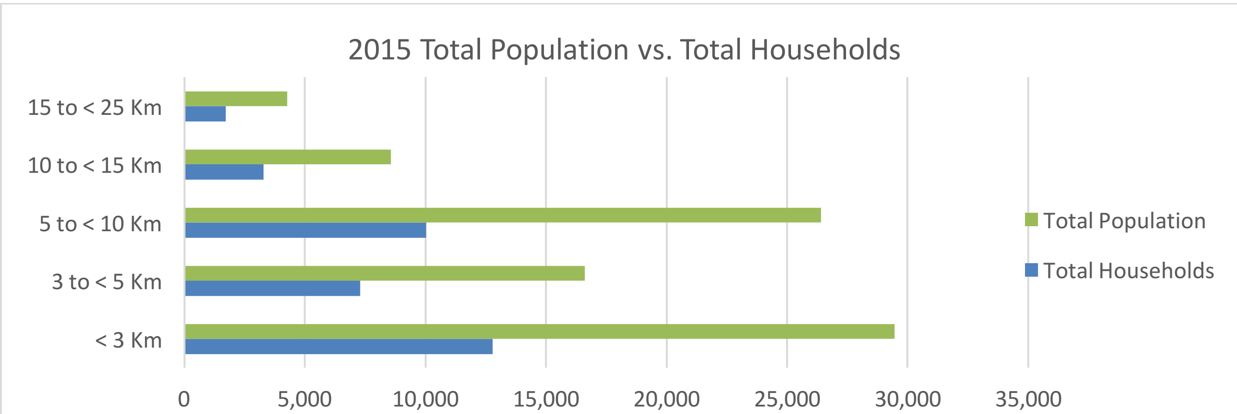
	3 Kilometers : 775 Dominion Street	3-5 Kilometers : 775 Dominion Street	5-10 Kilometers : 775 Dominion Street	10-15 Kilometers : 775 Dominion Street	15-25 Kilometers : 775 Dominion Street
SuperDemographics 2015 Population: Age Groups					
0 to 4 years	1,214	1,319	1,435	386	149
5 to 9 years	1,076	1,318	1,722	463	175
10 to 14 years	883	1,257	1,700	473	200
15 to 19 years	901	1,480	1,893	571	238
20 to 24 years	1,437	1,799	1,894	612	239
25 to 29 years	1,778	1,766	1,569	395	141
30 to 34 years	1,675	1,615	1,569	378	148
35 to 39 years	1,318	1,458	1,683	434	180
40 to 44 years	1,194	1,507	1,982	556	232
45 to 49 years	1,269	1,540	2,084	695	290
50 to 54 years	1,525	1,789	2,261	836	357
55 to 59 years	1,546	1,757	2,154	788	338
60 to 64 years	1,258	1,529	1,865	664	292
65 to 69 years	1,023	1,248	1,370	501	228
70 to 74 years	865	793	843	296	142
75 to 79 years	596	494	466	183	74
80 to 84 years	436	269	252	95	42
85 years and over	492	189	148	55	19

5.2 Prince George Aquatic Centre

Population

The following chart presents a summary of market area population with concentric rings surrounding the Four Seasons Pool.

- The population base within the primary area is 72,465.
- The population base within the service area is 85,285.

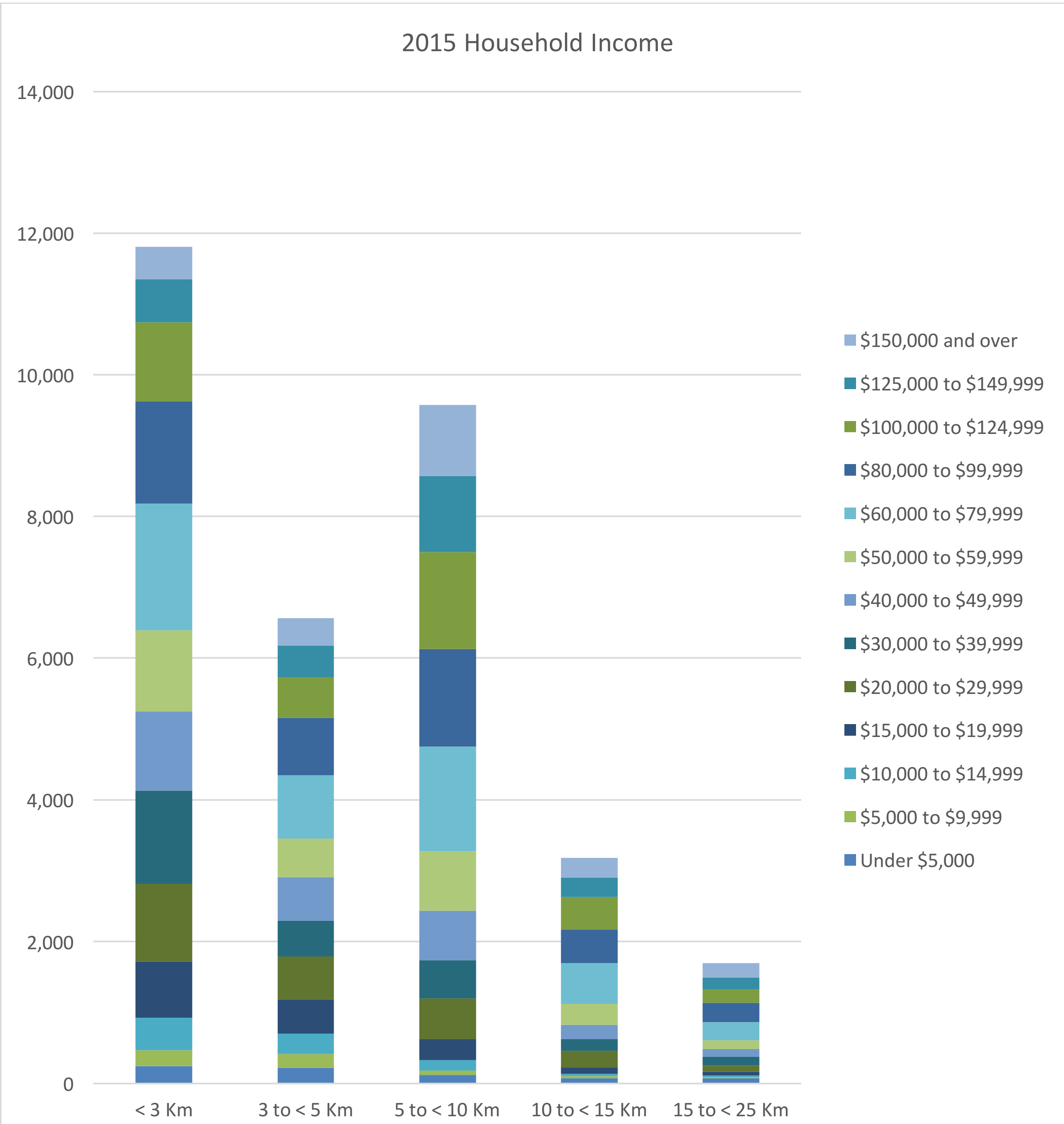


	3 Kilometers 1770 George Paul Ln	3-5 Kilometers 1770 George Paul Ln	5-10 Kilometers 1770 George Paul Ln	10-15 Kilometers 1770 George Paul Ln	15-25 Kilometers 1770 George Paul Ln
SuperDemographics 2015 Basic Variables					
Total households	12,772	7,296	10,034	3,277	1,711
Total population	29,457	16,607	26,401	8,564	4,256

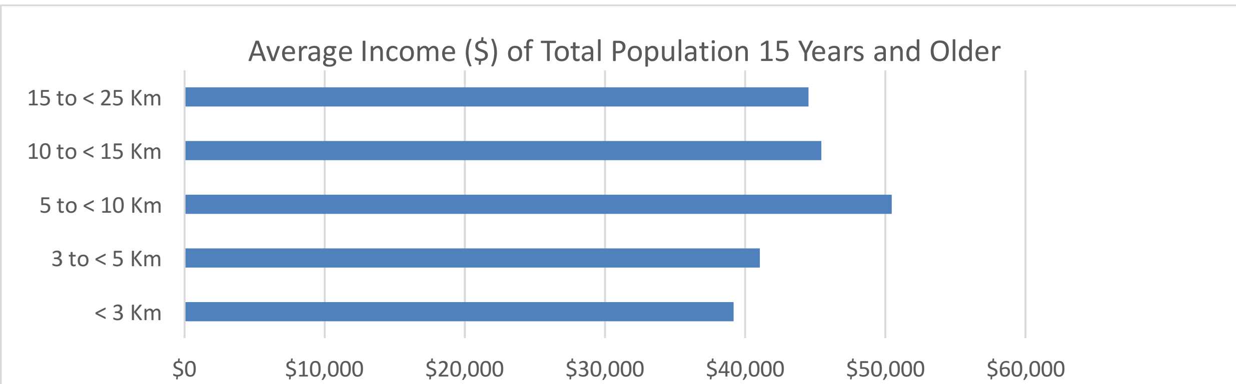
Income

To a certain degree, the likelihood of residents to engage in aquatics depends on their ability to pay for admission and program fees.

- The income of the primary service area is below average within the immediate area, but increase to above $50,000 between 5-10 kilometres.
- With a low cost of living, residents still have an ability to pay for recreational services.



	3 Kilometers 1770 George Paul Ln	3-5 Kilometers 1770 George Paul Ln	5-10 Kilometers 1770 George Paul Ln	10-15 Kilometers 1770 George Paul Ln	15-25 Kilometers 1770 George Paul Ln
SuperDemographics 2015 Household Income: Total					
Under $5,000	247	223	120	70	76
$5,000 to $9,999	220	189	66	32	10
$10,000 to $14,999	465	289	141	35	27
$15,000 to $19,999	787	485	296	91	50
$20,000 to $29,999	1,100	605	578	231	93
$30,000 to $39,999	1,314	507	537	166	123
$40,000 to $49,999	1,124	618	700	206	103
$50,000 to $59,999	1,139	537	842	296	129
$60,000 to $79,999	1,787	898	1,475	569	253
$80,000 to $99,999	1,442	806	1,379	479	272
$100,000 to $124,999	1,122	578	1,370	456	190
$125,000 to $149,999	601	440	1,073	274	167
$150,000 and over	464	391	998	281	203

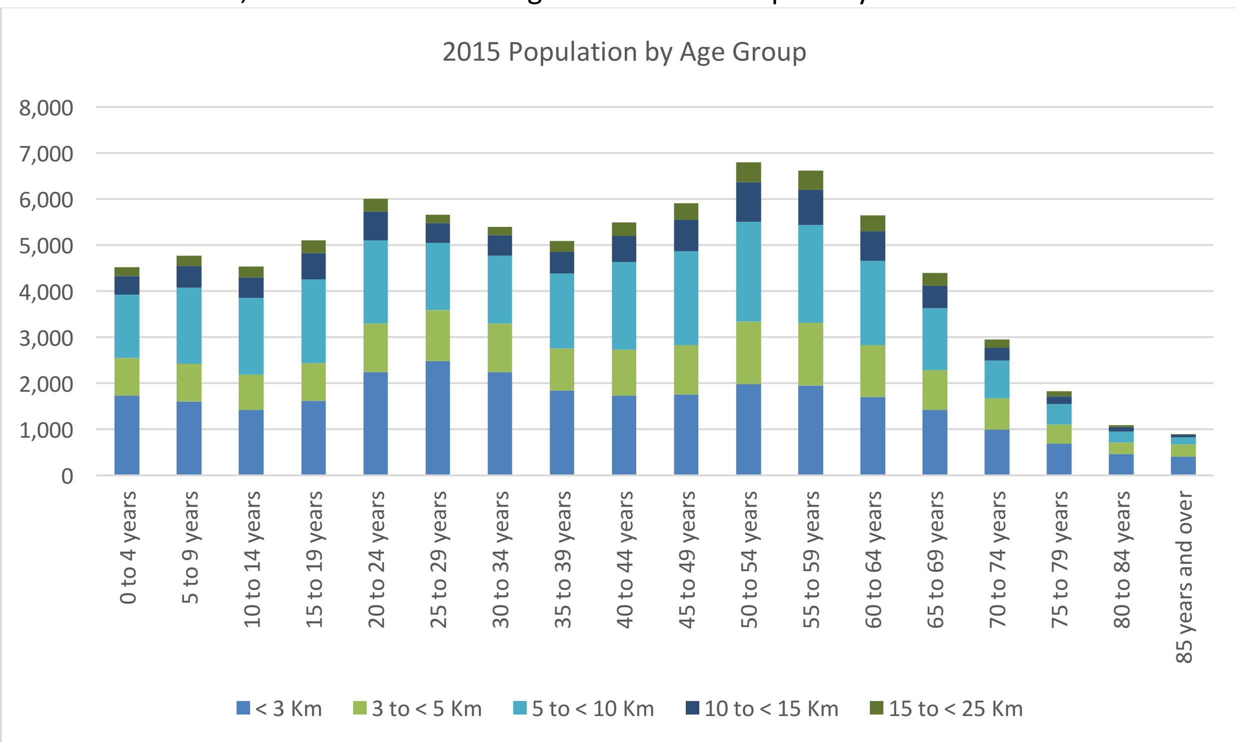


	3 Kilometers 1770 George Paul Ln	3-5 Kilometers 1770 George Paul Ln	5-10 Kilometers 1770 George Paul Ln	10-15 Kilometers 1770 George Paul Ln	15-25 Kilometers 1770 George Paul Ln
SuperDemographics 2015 Income: Population 15+					
Average income ($) of total population 15 years and over	$39,153	$41,019	$50,401	$45,378	$44,493

Age Distribution

Age distribution is another population characteristic used to determine the type and level of use of any type of program. The following table provides the number of residents for each age group within the market area. Aquatic facilities primarily serve two age groups; families with young children and ageing senior population.

- There are 11,858 children under the age of 15 within the primary market area.
- There are 9,459 seniors over the age of 65 within the primary market area.



	3 Kilometers 1770 George Paul Ln	3-5 Kilometers 1770 George Paul Ln	5-10 Kilometers 1770 George Paul Ln	10-15 Kilometers 1770 George Paul Ln	15-25 Kilometers 1770 George Paul Ln
SuperDemographics 2015 Population: Age Groups					
0 to 4 years	1,731	826	1,371	401	188
5 to 9 years	1,608	813	1,660	469	217
10 to 14 years	1,432	755	1,662	448	233
15 to 19 years	1,625	809	1,824	568	279
20 to 24 years	2,240	1,056	1,812	615	283
25 to 29 years	2,486	1,101	1,463	434	181
30 to 34 years	2,243	1,050	1,474	444	187
35 to 39 years	1,847	918	1,620	475	230
40 to 44 years	1,733	993	1,911	568	284
45 to 49 years	1,752	1,079	2,031	686	356
50 to 54 years	1,984	1,359	2,166	860	436
55 to 59 years	1,955	1,361	2,117	767	425
60 to 64 years	1,707	1,126	1,830	630	349
65 to 69 years	1,426	866	1,341	484	275
70 to 74 years	989	685	821	274	188
75 to 79 years	685	415	452	171	102
80 to 84 years	465	246	241	96	50
85 years and over	414	267	146	56	19

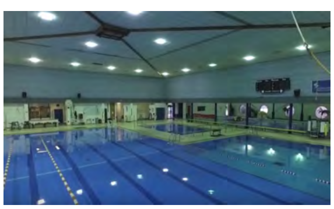
Summary

As we compare the primary service areas around each of the facilities, we see that they are very similar in terms of total population, income levels, as well as age distribution. This is due to the fact that the facilities are less than 5 kilometres apart and therefore have overlapping service areas. While this led the consulting team to consider a single pool scenario, the direction we received from the public was that each pool was needed. Our assessment of the current pool systems is that any resident could attend and be served by either facility, but each facility has a different value and program offering in terms of the types of users they serve. This creates an ideal situation for Prince George to offer specific programs and services at each facility in order to better serve the entire community.

6.0 Area Aquatic Providers

The recreation industry is a competitive market vying for disposable income driven by population trends, income levels, demographic profiles, and favorable locations. Large Aquatic Centres and destination facilities offer a grand scale of cutting-edge amenities, deliver a unique customer experience, and draw from a large radius. Small to medium Aquatic Centres compete by offering family amenities in a cozy atmosphere, thus delivering a friendly customer experience to the local market.

The aquatic facilities in neighboring communities to Prince George, such as Vanderhoof and Quesnel, are small facilities that offer basic programming and do not represent competition to the Prince George facilities, nor do they influence the admission prices set for the Prince George facilities. They serve small communities and are purpose suited for that role. The City of Prince George, however, is a much larger centre and has a population large enough to require a diverse amount of aquatic services. By providing the expected amenities for its own larger population, the Prince George aquatic centres are also able to provide amenities that centres like Vanderhoof and Quesnel cannot provide. As such, the aquatic facilities in Prince George naturally become regional draws and can benefit from this with increased revenues.

Name	*Location*	*Population*	*Features*	*Programs*
Four Seasons Leisure Pool 	Prince George	72,000	• Indoor 25-metre pool • Tot pool • Leisure pool with a 65-metre long waterslide • Large spray fountain operates during public swims	• Swim Lessons • Aquafit classes
Prince George Aquatic Centre 	Prince George	72,000	• Indoor 50-metre competition pool • Diving platform • Zero-depth entry leisure wave pool • Overhead sprays • Lazy river channel • Sauna, steam, whirlpool	• Swim Lessons • Aquafit classes

Name	Admission Fee ($)*				Annual Membership ($)*			
Age Group	*Child*	*Youth/ Student*	*Adult*	*Senior*	*Child*	*Youth/ Student*	*Adult*	*Senior*
Four Seasons Pool	3.40	4.80	6.30	4.80	313.10	440.05	577.50	440.05
Prince George Aquatic Centre	3.40	4.80	6.30	4.80	313.10	440.05	577.50	440.05

Name	Admission Fee ($)*					
Age Group	*Child*	*Youth/ Student*	*Adult*	*Senior*	*1st Family*	*2nd Family*
Richmond Watermania	4.62	5.19	6.38	5.19	-	-
Township of Langley	2.52	3.22	5.12	3.90	-	-
Kamloops Canada G. P.	3.57	5.00	66.7	5.00	-	-
Coquitlam City Centre	2.86	4.29	5.71	4.29	-	-
Saanich CommonWealth	3.10	5.24	6.19	5.24	-	-
Nanaimo Aquatic Centre	3.57	5.00	6.67	5.00	-	-
Delta Sungod Recreation Centre	3.81	4.52	6.43	4.52	-	-
Kelowna Parkinson Recreation Centre	2.67	3.62	4.81	3.62	-	-
Prince George Aquatic Centre	3.40	4.80	6.30	4.80	4.75	3.40
Average	3.35	4.54	6.03	4.62	-	-
Percentage over/under average	+ 1.6%	+ 6%	+ 4%	+ 4%	0%	0%

**Fees shown exclude GST (5%).*

7.0 New Implementation Strategy

In developing the implementation strategies, the City not only looked at multiple scenarios in meeting aquatic needs but also travel distance from facilities and access both financially and geographically in each area. The new strategies support the City's aquatics goal of providing more progressive, user-specific amenities that will command a greater citywide experience.

Of equal importance, providing affordable access to aquatic facilities for all segments of its citizenry has been tailored to strike a careful balance between securing reasonable compensation for enhanced amenities while preserving the program's tradition of affordability.

In determining an Aquatic Master Plan, the City looked at the needs of the local aquatics groups, neighbourhoods and other service providers. Moreover, factors such as accessibility, affordability and sustainability were taken into consideration.

<u>Options for Consideration</u>

Option 1: Replace Four Seasons Pool with a similar sized facility that meets current codes and safety standards and allows access for all residents.

- It would be difficult but not impossible to do this on the same site, but other nearby sites would be more practical and cost efficient.
- The Prince George Aquatic Centre would only receive required maintenance work to correct mechanical and building envelope issues.
- This option fixes the problems at the Four Seasons Pool, but does not deal with the issues at the Prince George Aquatic Centre or the need for additional aquatic facility programming.

Option 2: Add additional training and program space to Prince George Aquatic Centre to support current and future programs.

- The Four Seasons pool will need to be replaced in conjunction with the additional tank to meet all aquatic needs in the city.
- The two project could be phased in any order and still maintain aquatic services within the city.
- This option deals with all current issues but required the City to continue to operate two aquatic centres.

Option 3: Expand the Prince George Aquatic Centre to support all aquatic needs in the city and create a regional destination.

- This option deals with all the needs for aquatic facility programming in the city, but reduces the number of aquatic centres in the city to one (the Prince George Aquatic Centre) and decommissions the Four Seasons Pool for a non-aquatic use.

7.1 Option 1

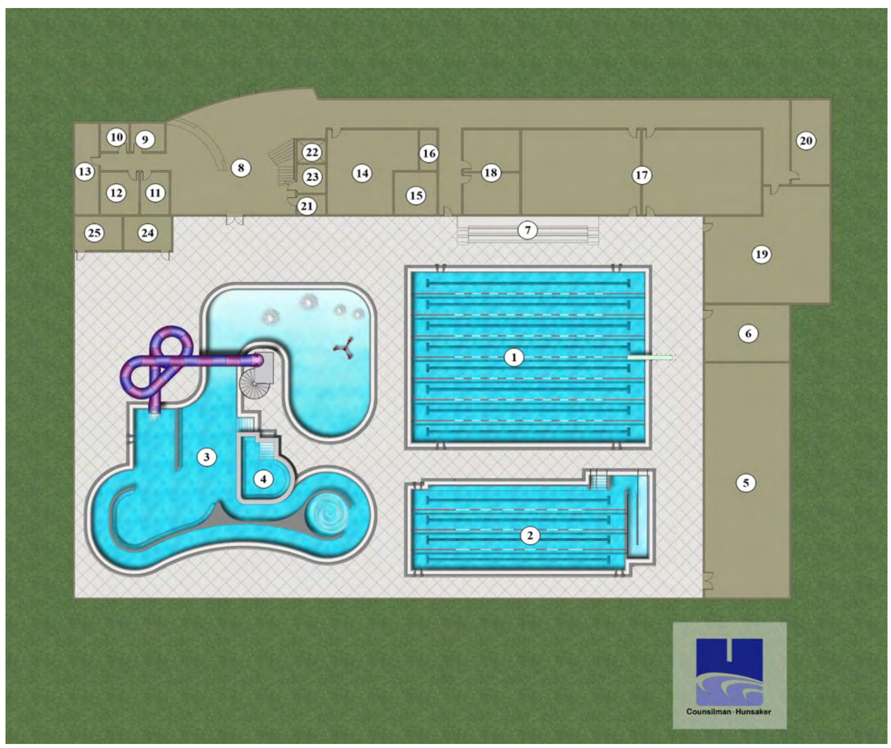
Due to the age and functional issues with the current Four Seasons Pool, it is not recommended to continue the operations of that facility far into the future. However, based on the needs assessment and community feedback, a similar sized facility is needed within that region of the community. Option 1 proposing replacing the Four Seasons Pool with a similar sized facility that meets current codes and safety standards and allows access for all residents. This option ensures that the City will be able to continue its aquatic program offerings for the next 30 years.

Items 26 to 29 in the legend are placed on the second floor above and adjacent to the lobby space because building up is more cost effective than building out.

LEGEND

1 - 8 Lane 25 Meter Lap Pool	4,920 sq. ft.
2 - Teaching Pool	2,400 sq. ft.
3 - Leisure Pool	5,270 sq. ft.
4 - Warm Water Spa	300 sq. ft.
5 - Pool Mechanical Room	2,500 sq. ft.
6 - Wet Classroom/Meet Management	600 sq. ft.
7 - Deck Seating (125 seats)	500 sq. ft.
8 - Lobby	1,450 sq. ft.
9 - Facility Manager	120 sq. ft
10 - Aquatic Coordinator	100 sq. ft.
11 - Lifeguard/First Aid	150 sq. ft.
12 - Coaches Workspace	200 sq. ft.
13 - Office Storage	250 sq. ft.
14 - Multi-Purpose Room	800 sq. ft.
15 - Kitchen	250 sq. ft
16 - Storage	100 sq. ft.
17 - Locker Rooms	2,500 sq. ft.
18 - Family Changing Rooms	600 sq. ft.
19 - Building Mechanical	1,600 sq. ft.
20 - Electrical	400 sq. ft.
21 - Janitor	70 sq. ft.
22 - Elevator	80 sq. ft.
23 - Elevator Machine	100 sq. ft.
24 - Sauna	200 sq. ft.
25 - Steam Room	200 sq. ft.
26 - Birthday Party Rooms (Upstairs)	1,500 sq. ft.
27 - Cardio/Weight/Stretching (Upstairs)	3,000 sq. ft.
28 - Group Exercise (Upstairs)	1,200 sq. ft.
29 - Storage (Upstairs)	200 sq. ft.

Note: Upstairs not illustrated.



OPINION OF PROJECT COST - OPTION 1: COMMUNITY INDOOR			
Description	Unit	Amount	Opinion of Cost
Demolition / Land Acquisition			Not Included
Entrance		1,450	$473,355
Basic Lobby	Sq. Ft.	1,000	
Lobby Aesthetics	Sq. Ft.	300	
Front Desk	Sq. Ft.	150	
Office Space		820	$244,606
Facility Manager	Sq. Ft.	120	
Aquatic Coordinator	Sq. Ft.	100	
Lifeguard/First Aid	Sq. Ft.	150	
Coaches Workspace	Sq. Ft.	200	
Office Storage	Sq. Ft.	250	
Natatorium		28,000	$15,427,541
8 Lane 25 Metre Lap Pool	Sq. Ft.	4,920	
Springboard Diving	Quantity	1	
Leisure Pool	Sq. Ft.	5,270	
Spray Amenities	Allowance	1	
Current Channel	Add Cost	1	
Water Slide	Quantity	1	
Warm Water Spa	Sq. Ft.	250	
Teaching Pool	Sq. Ft.	2,400	
Natatorium Enclosure	Sq. Ft.	25,000	
Deck Seating (125 seats)	Sq. Ft.	500	
Wet Classroom / Meet Management		600	
Pool Mechanical Room	Sq. Ft.	2,500	

Description	Unit	Amount	Opinion of Cost
Fitness Center		3,500	$1,060,535
Cardio/Weight/Stretching	Sq. Ft.	2,500	
Group Exercise	Sq. Ft.	800	
Storage	Sq. Ft.	200	
Shared Areas		6,150	$2,371,093
Multi-Purpose Room	Sq. Ft.	800	
Storage	Sq. Ft.	100	
Kitchen	Sq. Ft.	250	
Sauna	Sq. Ft.	200	
Steam Room	Sq. Ft.	200	
Birthday Party Room (2)	Sq. Ft.	1,500	
Locker Rooms	Sq. Ft.	2,500	
Family Changing Rooms	Sq. Ft.	600	
Building Support		2,250	$1,113,722
Building Mechanical	Sq. Ft.	1,600	
Electrical	Sq. Ft.	400	
Janitor	Sq. Ft.	70	
Elevator	Sq. Ft.	80	
Elevator Machine	Sq. Ft.	100	
Efficiency		7,734	$1,160,100
Circulation and Walls (20%)	Sq. Ft.	7,734	
Unit		Sq. Ft.	
Total Building Construction Costs		**46,404**	**21,850,951**
Site Construction Costs (landscaping, utilities, walks)			$1,856,160
Furniture, Fixtures, Equipment			$418,000
Subtotal			**$24,125,111**
Inflation (1 year)	6.0%		$1,447,507
Contingency	15.0%		$3,835,893
Indirect Costs	12.0%		$3,529,021
Total Estimated Project Costs:			**$32,937,531**
Say			**$32,938,000**

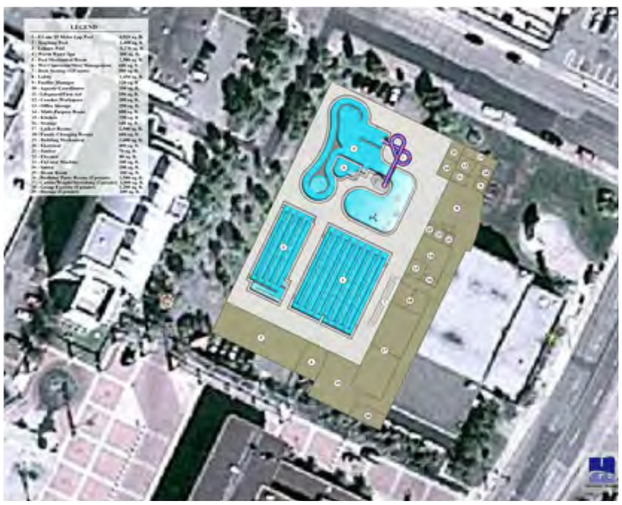
Source: Counsilman-Hunsaker

Site Considerations

While the general location of the Four Seasons Pool is important, the specific site it is currently located on has several limiting factors. For these reasons, *it is recommended to consider other potential sites within the immediate area.* During the discussion with staff, three sites were identified as possible locations.

Site 1 – Existing Site

The new facility could be located on the existing site, however phasing the project to keep pools open during construction is not possible and therefore would result in no aquatic programs in this area for 2-3 years during construction. This site may have utility savings because it is in the vicinity of the District Energy.



Site 2 – Land Across from City Hall

The City noted that there is extra land available across from City Hall. This land would keep the 4SLP in the downtown area, but would allow the construction to be phased in way that would not impact aquatic programs. Additionally, parking concerns could be addressed with this site. This site may have utility savings because it is in the vicinity of the District Energy.

Site 3 – Connaught Youth Centre Site

The third site identified was the land available adjacent to the youth centre. This site is still within the primary service area, and allows for phasing along with potential for increased utilization due to the location of households in the immediate area. This location does not provide for utility savings opportunity, being at a distance from the District Energy.

7.2 Option 2

During the needs assessment, it was determined that the City could use additional training space for programs, lessons, aerobics, as well as competition. Option 2 looks at adding additional training and program space to Prince George Aquatic Centre to support current and future programs. In order to enhance the current offerings, Option 2 also assumes the replacement of the Four Seasons Pool.

Option 2 assumes that upgrades to the existing Prince George Aquatics Centre are included. The existing change rooms will be completely upgraded to match the type and quality of the new change rooms in the addition.

LEGEND

1 - 8 Lane 25 Meter Lap Pool	4,920 sq. ft.
2 - Pool Mechanical and Storage	1,000 sq. ft.
3 - Dryland Training/Team Space	500 sq. ft.
4 - Locker Rooms	1,000 sq. ft.
5 - Family Changing Rooms	1,000 sq. ft.
6 - Cardio/Weight/Stretching	3,000 sq. ft.
7 - Group Exercise	1,200 sq. ft.
8 - Storage	200 sq. ft.

OPINION OF PROJECT COST - OPTION 2: Aquatic Center Expansion and Renovation				
	Description	Unit	Amount	Opinion of Cost
Demolition / Land Acquisition				Not Included
Repairs				$6,686,283
	Architectural Repairs	Allowance	1	$4,324,000
	Mechanical Repairs	Allowance	1	$1,430,680
	Pool Repairs	Allowance	1	$931,603
Indoor Aquatic Spaces			22,750	$10,800,658
	8 Lane 25 Meter Lap Pool	Sq. Ft.	4,920	$1,506,258
	Natatorium Enclosure	Sq. Ft.	10,000	$4,474,500
	Dry Land Training / Team Space	Sq. Ft.	500	$153,075
	Pool Mechanical and Storage	Sq. Ft.	1,000	$251,200
	Spectator Seating Expansion (1500)	Sq. Ft.	11,250	$4,415,625
Shared Areas			2,000	$894,900
	Locker Rooms	Sq. Ft.	1,000	$447,450
	Family Changing Rooms	Sq. Ft.	1,000	$447,450
Fitness Center Addition			4,400	$598,170
	Cardio/Weight/Stretching	Sq. Ft.	3,000	$376,800
	Group Exercise	Sq. Ft.	1,200	$150,720
	Storage	Sq. Ft.	200	$70,650
Efficiency			5,830	$874,500
	Circulation and Walls (20%)	Sq. Ft.	5,830	$874,500
Unit			Sq. Ft.	
Total Building Construction Costs			**34,980**	**19,854,511**
Site Construction Costs (landscaping, utilities, walks)				$1,399,200
Furniture, Fixtures, Equipment				$315,000
Subtotal				**$21,568,711**
Inflation (1 year)		6.0%		$1,294,123
Contingency		15.0%		$3,469,425
Indirect Costs		12.0%		$3,155,071
Total Estimated Project Costs:				**$29,447,330**
Say				**$29,448,000**
Source: Counsilman-Hunsaker				

Option 2 Summary

Four Seasons Pool Replacement: $32,938,000

Prince George Aquatic Centre Improvements: $29,448,000

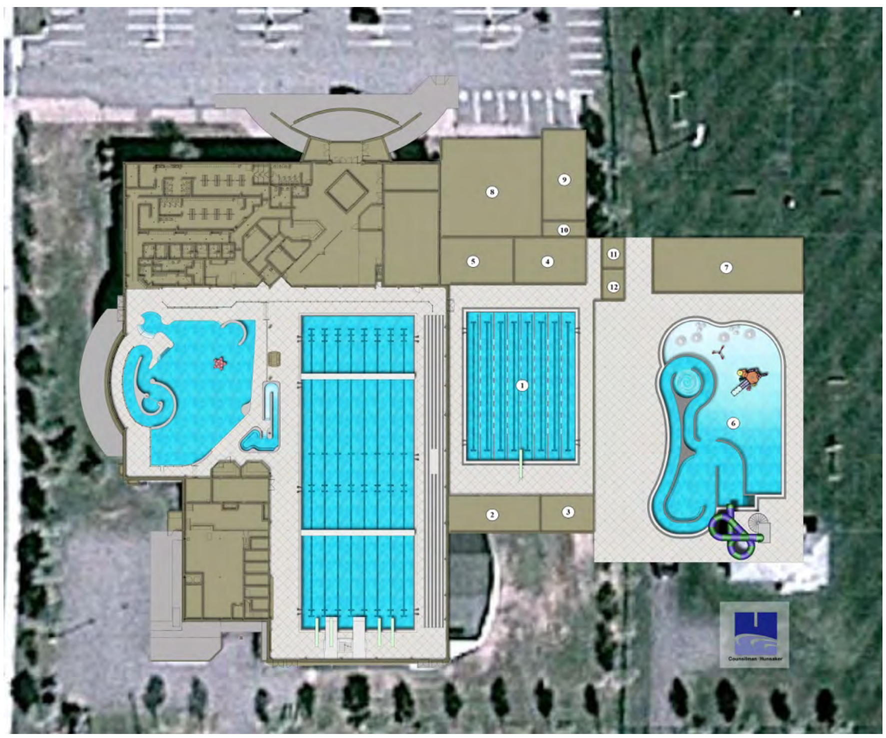
Total Option 2 Cost: $62,386,000

7.3 Option 3

During the initial discussions, the idea of locating all aquatic program offerings at the Prince George Aquatic Centre site. Option 3 considers expanding the Prince George Aquatic Centre to support all aquatic needs in the city and create a regional destination. While all current aquatic programs could be met with this option, the facility would experience extreme capacity issues and would not be able to grow future programs. This option includes all upgrade costs to the existing facility.

LEGEND

1 - 8 Lane 25 Meter Lap Pool	4,920 sq. ft.
2 - Pool Mechanical and Storage	1,000 sq. ft.
3 - Dryland Training/Team Space	500 sq. ft.
4 - Locker Rooms	1,000 sq. ft.
5 - Family Changing Rooms	1,000 sq. ft.
6 - Leisure Pool	6,000 sq. ft.
7 - Seasonal Bathhouse	2,500 sq. ft.
8 - Cardio/Weight/Stretching	3,000 sq. ft.
9 - Group Exercise	1,200 sq. ft.
10 - Storage	200 sq. ft.
11 - Sauna	200 sq. ft.
12 - Steam Room	200 sq. ft.



OPINION OF PROJECT COST - OPTION 3: Aquatic Center Expansion			
Description	Unit	Amount	Opinion of Cost
Demolition / Land Acquisition			Not Included
Repairs			$6,465,935
Architectural Repairs	Allowance	1	$4,324,000
Mechanical Repairs	Allowance	1	$1,430,680
Pool Repairs	Allowance	1	$931,603
Indoor Aquatic Spaces		22,750	$10,800,658
8 Lane 25 Meter Lap Pool	Sq. Ft.	4,920	$1,506,258
Natatorium Enclosure	Sq. Ft.	10,000	$4,474,500
Dry Land Training / Team Space	Sq. Ft.	500	$153,075
Pool Mechanical and Storage	Sq. Ft.	1,000	$251,200
Spectator Seating Expansion (1500)	Sq. Ft.	11,250	$4,415,625
Shared Areas		2,400	$1,073,880
Locker Rooms	Sq. Ft.	1,000	$447,450
Family Changing Rooms	Sq. Ft.	1,000	$447,450
Sauna	Sq. Ft.	200	$89,490
Steam Room	Sq. Ft.	200	$89,490
Fitness Center Addition		4,400	$598,170
Cardio/Weight/Stretching	Sq. Ft.	3,000	$376,800
Group Exercise	Sq. Ft.	1,200	$150,720
Storage	Sq. Ft.	200	$70,650
Efficiency		5,910	$886,500
Circulation and Walls (20%)	Sq. Ft.	5,910	$886,500
Outdoor Aquatics		20,500	$4,271,085
Seasonal Bathhouse	Sq. Ft.	2,500	$1,118,625
Leisure Pool	Sq. Ft.	6,000	$2,119,500
Waterslides	Quantity	2	$390,000
Play Feature	Allowance	1	$250,000
Current Channel	Add. Cost	1	$35,000
Outdoor Deck	Sq. Ft.	12,000	$169,560
Overhead Lighting	Sq. Ft.	18,000	$113,040
Fencing	Linear Ft.	600	$75,360

Unit		Sq. Ft.	
Total Building Construction Costs		**55,960**	**24,316,576**
Site Construction Costs (landscaping, utilities, walks)			$2,238,400
Furniture, Fixtures, Equipment			$504,000
Subtotal			**$27,058,976**
Inflation (1 year)	6.0%		$1,623,539
Contingency	15.0%		$4,302,377
Indirect Costs	12.0%		$3,958,187
Total Estimated Project Costs:			**$36,943,079**
Say			**$36,944,000**
Source: Counsilman-Hunsaker			

7.4 Capacity

Types of spaces and associated capacity will determine the degree the facilities will be used.

- Generally, recreational swimmers prefer shallow water of four feet or less allowing participation in a variety of water-related activities while still touching the pool bottom. In estimating capacity for recreational use, a maximum density of 25 square feet per person is assumed. Based on a length of stay of two to three hours, turnover in-house attendance is two and a half times per day for the recreational swimmer.
- For deep water, the maximum density is assumed to be 100 square feet per person. Based on a length of stay of two to three hours, turnover in-house attendance is three times per day for the competitive swimmer.

Additional spaces not listed such as office space and locker rooms have no impact on programming and market penetration has not been included in this analysis. Capacity of spaces is directly correlated to attendance.

The following table is one way to view the contribution the available capacity has to the projected attendance. It is necessary to use the descriptive above to project how many people can be accommodated in any given space using the per square foot guideline.

	Replace Four Seasons	AC Addition	AC Expansion
WET-SIDE CAPACITY			
Training (Available 25-Meter Lanes)			
Indoor Lap	8	8	8
Indoor Teaching	4	0	0
Total	12	8	8
Estimated Holding Capacity	60	40	40
Daily Training Capacity	180	120	120
Spectator Seating (Square Feet)	500	11,250	11,250
Spectator Seating Capacity	125	1500	1500
Recreation (Surface Area Sq. Ft.)	438	352	432
Indoor Lap	4,920	4,920	4,920
Indoor Leisure	5,270	0	0
Indoor Teaching	2,400	0	0
Indoor Spa	250	0	0
Outdoor Leisure	0	0	6,000
Total	12,840	4,920	10,920

Estimated Recreation Holding Capacity	437	153	339
Daily Recreation Holding Capacity	1,091	381	846
Total Holding Capacity	497	193	379
Total Daily Facility Capacity	**1,271**	**501**	**966**

	Replace Four Seasons	AC Addition	AC Expansion
DRY-SIDE CAPACITY Surface Area Sq. Ft.)			
Group Exercise Room	800	1,200	1,200
Cardio/Weight	2,500	3,000	3,000
Sauna/Steam Room	400	-	400
Multi-Purpose Room	800	500	500
Estimated Holding Capacity			
Group Exercise Room	16	24	24
Cardio/Weight	50	60	60
Sauna/Steam Room	27	-	27
Multi-Purpose Room	53	33	33
Total	146	117	144
Daily Dry-Side Capacity	438	352	432
Total Holding Capacity	643	310	523
Total Daily Facility Capacity	1,709	853	1,398

7.5 Existing Capacity

The following chart shows the current capacity for the existing facilities, using the same assumptions as referenced above.

	Four Seasons Pool	Prince George Aquatics Centre
WET-SIDE CAPACITY		
Training (Available 25-Meter Lanes)		
Lap Pool	6	16
Total	6	16
Estimated Training Holding Capacity	30	80
Daily Training Capacity	90	240
Recreation (Surface Area Sq. Ft.)		
Lap Pool	4,658	10,408
Teaching Pool	600	0
Recreation Pool	2,100	4,316
Spa	177	323
Total	7,535	15,047
Estimated Recreation Holding Capacity	256	376
Daily Recreation Holding Capacity	640	940
Total Holding Capacity	286	456
Total Daily Facility Capacity	**730**	**1,180**

The proposed replacement option for the Four Seasons Leisure Pool (Option 1) increases the size of the pool space to add additional capacity. The new facility would have an estimated recreation capacity of 437 as compared to the current facility that has a recreational holding capacity of 256 participants.

7.4 Summary of Options

While each of the options will allow the City of Prince George to continue to offer aquatic programs into the future, Option 2 is the only option that enhances the aquatic offerings and allows the City to grow its programs for the foreseeable future. Option 1 is only a starting point that allows no current aquatic programming offerings are lost, but fails to address the deficit in programming time. *While Option 3 can reduce the annual operating cost from current annual cost of $2,500,780 to $1,771,890, the consulting team does not recommend Option 3 due to the need and desire of the community to have multiple locations and facility types.*

BRITISH COLUMBIA POOLS BY POPULATION			
City	Population	Municipal Pools	Residents per Pool
Vanderhoof, BC	4,460	1	4,460
Mackenzie, BC	3,507	1	3,507
Dawson Creek, BC	11,583	1	11,583
Ft. St. John, BC	17,402	1	17,402
Terrace, BC	11,486	1	11,486
Kitimat, BC	8,335	1	8,335
Prince Rupert, BC	12,506	1	12,506
Prince George, BC	72,000	2	36,000
AVERAGE	**17,663**	**1**	**15,700**
Source: Counsilman-Hunsaker			

8.0 Operations

8.1 Trends in Aquatic Operations

Aquatic facilities contain complex equipment, amenities, and support spaces that require intensive planning and extreme quality control measures. Balancing numbers in aquatic operations entails several different areas: 1) basic budgeting, 2) facility maintenance plan, and 3) staying ahead of the curve when it comes to the latest trends in aquatics for a new facility or expanding an existing one. Aquatic operators who spend time analyzing and planning these three areas to manage and achieve daily results will set the tone for their organization's future success and financial sustainability.

<u>Basic Budgeting</u>
While catering to the needs of the demographics of the community to help make the facility a success from day one, a budget plan will help to ensure that the provided amenities will allow for a financially sustainable operation. Paying careful attention to the financial details of the facility will help plan for budgets and run a more efficient and sustainable operation.

After analyzing basic budgets across the country, aquatic operations typically include five primary areas of expenses:

- Personnel/labour
- Chemicals
- Utilities
- Maintenance
- Operational supplies

On average, aquatic personnel costs will make up at least 50% of the operational budget, and sometimes can get close to 75-80% depending on the size of the facility, number of operating hours, and staffing levels required in maintaining a safe environment. Managing labour strategically and effectively will be the primary factor in turning around and lowering the financial expense numbers of the aquatic operation. Evaluating staffing levels and exploring areas for decreasing staff hours will bring the biggest savings. Try to develop more efficient ways to complete opening and closing tasks each day with less staff on duty, or have fewer lifeguards on break, which can easily save upwards of 5% off of the seasonal budget.

After labour costs, chemicals, utilities, and maintenance all typically fall into the 8-12% range, while operational supplies will make up the other 3-5%. These numbers may vary from year-to-year depending on the scope of maintenance projects, as well as any emergency repairs that need to be made. For example, an outdoor wave pool that has a $9,000 air compressor malfunction, or an indoor pool that needs major plaster repairs will obviously have a huge jump in maintenance expenses compared to a year when all the equipment functions properly.

Facility Maintenance Planning

Aquatic facility maintenance always proves to be one of the top challenges faced by aquatic facility operators. When designing a new aquatic facility or adding amenities, the aquatic designer will explain the benefits and weaknesses of new products, as well as complying with codes and regulations in the industry. But because of the sheer number of sophisticated moving parts associated with keeping a facility running, (especially with all the new technologies that have been introduced over the past several years), operators should develop an ongoing facility maintenance and replacement plan.

The pool operations team includes the overall maintenance of the pool system and features for risk reduction to the users, employees, and facility. Pump room technicians include a unique skill set, including Certified Pool Operator (CPO) or Aquatic Facility Operator (AFO) for day-to-day chemical knowledge in order to operate the facility in compliance with the local health department requirements. Operations include industry knowledge for inspection to identify and fix necessary parts and repairs.

Life Expectancy

Item	Years
Pool Stucture	30 to 50
Filters	15 to 20
Pumps	20 to 25
Finish - Tile / Grout	50+ / 5 to 10
Finish - Plaster	10+
Finish - Paint	1 to 3
Electrical Interior Switchgear and Panels	30
Electrical Exterior Switchgear and Panels	15 to 20
Transformers	20
Light Fixtures	20 to 30
Dehumidification units	15 to 20
Ductwork	30+
Piping	30+
Boilers	20 to 25
Heat Exchangers	20 to 30

Note: Life is reduced by exposure to moisture & corrosive elements
Life is reduced by unbalanced pool water (aggressive or scale forming)

The maintenance plan should take into account the lifespans for the various pieces of equipment to help counteract the signs of aging at the facility. While the pool structure may stay in place for over 50 years, the mechanical systems finishes have a much shorter lifespan. By developing a list of every piece of onsite equipment, notating the installation date, the expected lifespan, and the repair/replacement cost, this plan can help determine the yearly budget. As a general rule of thumb, a facility should save 0.5% of the construction cost each year for future repairs/replacements. Planning ahead, preventative maintenance, and constant communication with the organization's financial director will significantly benefit operations in the long run.

Industry Trends

With the evolution of the family Aquatic Centre throughout the municipal parks and recreation world, it's much more prevalent to find "waterpark-type attractions" (wave pools, lazy rivers, waterslides, etc.) closer to home than it was 20 years ago. This trend in the municipal environment toward thrill rides allows for more financially sustainable opportunities, but also provides more competition in the marketplace for those critical "make or break" 100 days from Victoria Day to Labor Day each year.

Since today's Aquatic Centres incorporate recreation swimming and wellness pools to augment revenue of competitive swimming, thereby creating multigenerational facilities through shared expenses, trends continue to point to adventurous attractions. But don't forget to incorporate passive play spaces for those who want a calmer, relaxing environment, such as current channels, children's areas, and whirlpool spas. By providing multi-generational spaces so that families can experience the park together, the Aquatic Centre will capture a greater audience with "something for everyone" which will increase attendance and revenue, the two primary drivers of a sustainable operation.

8.2 Future Facility and Expansion Operating Projections

Revenue

Revenue analysis includes special user group usage and facility per capita spending trends, thus developing an opinion of revenue for the first five years of operation. Recreation programming revenue is based on user groups and local programming fees. Fee structure is based on fees from members and other users to project per capita income. Revenue is estimated, taking recommended fee schedules into account.

Any program schedule will require flexibility to adapt to specific needs of the community. It is the responsibility of the aquatic supervisor to monitor user group demands and adjust schedules accordingly. Revenue projections are based on marketing programming that would include the following programs:

- Rentals
- Swim Lessons
- Public Swim
- Leadership Programs
- Special Events / Bookings

The following tables estimate the future revenue potential for each of the proposed options. The charts look at per cap spending per revenue category along with annual participations to estimate the total revenue.

- *Visits per Program:* number of participants in a particular activity throughout the year.
- *Per Capita Spending:* revenue generated per participant per day of activity presented as an average.
- *Opinion of Revenue:* the resulting revenue generated by each activity.

Expenses

Expense analysis includes a detailed budget model for estimating probable expenses for major areas of labour, contractual services, commodities, and utilities. User projections are made based on programming. Expenses are estimated, taking into account hours of operation, attendance projections, local weather patterns, local utility rates, and other key items. Operating data from other facilities in the area were reviewed and taken into account to form projections.

Commodities

Commodities are day-to-day products used to operate Aquatic Centres. Office supplies, program supplies, custodial supplies, repair supplies, and chemicals are included. In determining annual chemical expense, chemical treatment assumes the use of calcium hypochlorite and muriatic acid (pH buffer). Chemical use can depend on bather load and chemical balance of the water. In estimating annual costs, medium bather load figures are assumed.

Heating/Dehumidification

In determining utility costs, current energy costs at other facilities in the area were reviewed. Total costs include energy, energy demand, and delivery charges. Caution must be used when comparing this cost with operating expenses of other facilities across the country.

Electricity

The calculations are based on 2016 utility rate information. Electricity demand for pumps, motors, lighting, and ancillary equipment was projected, the local utilities rates were factored in to estimate the annual cost.

Water and Sewer

Water and sewer services will be needed for domestic use and compensation for evaporation and backwashing purposes. Backwash water and domestic water will be released to the sanitary system. This does not include landscape irrigation.

Facility Staff

Projected annual payroll expenses are listed by full time and part time classifications reflecting benefits and taxes. Scheduling employees is determined by programming demand and management procedure. Wherever possible, current pay rates were used based on local classifications and wage scales. Cost for swim instructors and other employees associated with program income were factored in based current programming revenue and growth.

8.2.1 Option 1

FSLP Replacement Opinion of Revenue

Aquatics Program Revenue

Revenue	Price Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$11.30	$11.30	$11.87	$11.87	$12.22
Swim Lessons	$64.00	$64.00	$67.20	$67.20	$69.22
Public Swim	$4.25	$4.25	$4.46	$4.46	$4.60
Leadership Programs	$234.00	$234.00	$245.70	$245.70	$253.07
Special Events / Bookings	$70.00	$70.00	$73.50	$73.50	$75.71

Revenue	Total Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	885	903	903	921	921
Swim Lessons	4200	4,284	4,284	4,370	4,370
Public Swim	53,806	55,312	56,861	58,453	60,090
Leadership Programs	235	240	240	244	244
Special Events / Bookings	285	291	291	297	297

Revenue	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$10,001	$10,201	$10,711	$10,925	$11,252
Swim Lessons	$268,800	$274,176	$287,885	$293,642	$302,452
Public Swim	$228,675	$235,078	$253,743	$260,848	$276,196
Leadership Programs	$54,990	$56,090	$58,894	$60,072	$61,874
Special Events / Bookings	$19,950	$20,349	$21,366	$21,794	$22,448
	$582,416	**$595,893**	**$632,599**	**$647,281**	**$674,223**

Modern aquatic facilities are starting to operate more like businesses and operators are taking an entrepreneurial approach to increase facility usage. The revenue assumptions included in this report assume that the facility will increase fees every other year to keep up with increasing costs. Additionally, new facilities are increasing marketing efforts in order to increase usage on an annual basis, despite static populations.

FSLP Replacement Opinion of Expenses

Direct Facility Expense Budget

Labour and Benefits	
Full-time Employment	$700,405
Part-time Employment	$422,703
Programing Staff	$161,895
Total Labor	**$1,285,003**
Contractual Services	
Repair and Maintenance	$39,600
Other / Miscellaneous	$27,720
Total Contractual Services	**$67,320**
Materials and Supplies	
Operating Supplies	$23,760
Program Supplies	$23,297
Class Materials	$14,100
Advertising / Printing	$20,000
Chemicals	$13,066
Total Commodities	**$94,222**
Utilities	
HVAC	$171,510
Electricity	$81,389
Pool Heating	$36,000
Telephone	$2,592
Trash Service	$3,120
Water & Sewer	$14,040
Total Utilities	**$308,652**
Total Operating Expenses	**$1,755,197**

FSLP Replacement Summary

The following chart provides a "recapture rate" to define the percentage of operating expenses recuperated or recaptured by operating revenue.

	2017	2018	2019	2020	2021
Replace 4 Seasons					
Project Cost	$32,938,000				
Attendance	53,806				
Revenue	$582,416	$595,893	$632,599	$647,281	$674,223
Expense	$1,755,197	$1,799,076	$1,844,053	$1,890,155	$1,937,409
Operating Cashflow	($1,172,781)	($1,203,183)	($1,211,454)	($1,242,873)	($1,263,186)
Recapture Rate	**33%**	**33%**	**34%**	**34%**	**35%**
Capital Replacement Fund	$164,700	$164,700	$164,700	$164,700	$164,700
Cash Flow	($1,337,481)	($1,367,883)	($1,376,154)	($1,407,573)	($1,427,886)

8.2.2 Option 2

AC Addition Opinion of Revenue

Aquatics Program Revenue

Revenue	Price Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$11.30	$11.30	$11.87	$11.87	$12.22
Swim Lessons	$64.00	$64.00	$67.20	$67.20	$69.22
Public Swim	$4.25	$4.25	$4.46	$4.46	$4.60
Leadership Programs	$234.00	$234.00	$245.70	$245.70	$253.07
Special Events / Bookings	$70.00	$70.00	$73.50	$73.50	$75.71

Revenue	Total Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	1100	1,122	1,122	1,144	1,144
Swim Lessons	150	153	153	156	156
Public Swim	21,620	22,225	22,847	23,487	24,145
Leadership Programs	12	12	12	12	12
Special Events / Bookings	285	291	291	297	297

Revenue	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$12,430	$12,679	$13,313	$13,579	$13,986
Swim Lessons	$9,600	$9,792	$10,282	$10,487	$10,802
Public Swim	$91,883	$94,456	$101,955	$104,810	$110,977
Leadership Programs	$2,808	$2,864	$3,007	$3,068	$3,160
Special Events / Bookings	$19,950	$20,349	$21,366	$21,794	$22,448
	$136,671	**$140,139**	**$149,923**	**$153,737**	**$161,372**

The above table represent the new revenue that could be generated from the proposed expansion.

AC Addition Opinion of Expenses

Direct Facility Expense Budget

Labour and Benefits	
Part-time Employment	$193,346
Programing Staff	$6,204
Total Labor	**$199,550**
Contractual Services	
Repair and Maintenance	$18,000
Other / Miscellaneous	$12,600
Total Contractual Services	**$30,600**
Materials and Supplies	
Operating Supplies	$10,800
Program Supplies	$5,467
Class Materials	$720
Advertising / Printing	$5,000
Chemicals	$5,277
Total Commodities	**$27,264**
Utilities	
HVAC	$135,104
Electricity	$50,746
Pool Heating	$12,000
Telephone	$864
Trash Service	$0
Water & Sewer	$6,559
Total Utilities	**$205,273**
Total Operating Expenses	**$462,687**

The above table represents the additional cost of operating the proposed expansion.

AC Addition Summary

The following is a summary of the new revenue and expenses directly related to the expansion.

Increase Revenue and Expenses

AC Addition					
Project Cost	$14,917,000				
Attendance	21,620				
Revenue	$136,671	$140,139	$149,923	$153,737	$161,372
Expense	$462,687	$474,254	$486,110	$498,263	$510,719
Operating Cashflow	($326,016)	($334,114)	($336,187)	($344,525)	($349,347)
Recapture Rate	**30%**	**30%**	**31%**	**31%**	**32%**
Capital Replacement Fund	$74,600	$74,600	$74,600	$74,600	$74,600
Cash Flow	($400,616)	($408,714)	($410,787)	($419,125)	($423,947)

Total AC Addition Revenue and Expenses

AC Addition				
Project Cost	$29,147,000			
Attendance	21,620			
Revenue	$1,346,708	$1,350,176	$1,359,960	$1,363,774
Expense	$2,968,067	$3,042,268	$3,118,325	$3,196,283
Operating Cashflow	($1,154,072)	($1,213,123)	($1,267,422)	($1,329,292)
Recapture Rate	**54%**	**53%**	**52%**	**51%**

8.2.3 Option 3

AC Expansion Opinion of Revenue

Aquatics Program Revenue

Revenue	Price Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$11.30	$11.30	$11.87	$11.87	$12.22
Swim Lessons	$64.00	$64.00	$67.20	$67.20	$69.22
Public Swim	$4.25	$4.25	$4.46	$4.46	$4.60
Leadership Programs	$234.00	$234.00	$245.70	$245.70	$253.07
Special Events / Bookings	$70.00	$70.00	$73.50	$73.50	$75.71

Revenue	Total Per Session				
	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	1100	1,122	1,122	1,144	1,144
Swim Lessons	150	153	153	156	156
Public Swim	55,178	56,723	58,311	59,944	61,622
Leadership Programs	12	12	12	12	12
Special Events / Bookings	285	291	291	297	297

Revenue	Year 1	Year 2	Year 3	Year 4	Year 5
Rentals	$12,430	$12,679	$13,313	$13,579	$13,986
Swim Lessons	$9,600	$9,792	$10,282	$10,487	$10,802
Public Swim	$234,506	$241,072	$260,213	$267,499	$283,239
Leadership Programs	$2,808	$2,864	$3,007	$3,068	$3,160
Special Events / Bookings	$19,950	$20,349	$21,366	$21,794	$22,448
	$279,294	**$286,756**	**$308,181**	**$316,426**	**$333,634**

AC Expansion Opinion of Expenses

Direct Facility Expense Budget

Labour and Benefits	
Part-time Employment	$359,880
Programing Staff	$6,204
Total Labor	**$366,084**
Contractual Services	
Repair and Maintenance	$26,900
Other / Miscellaneous	$18,830
Total Contractual Services	**$45,730**
Materials and Supplies	
Operating Supplies	$16,140
Program Supplies	$11,172
Class Materials	$720
Advertising / Printing	$10,000
Chemicals	$14,286
Total Commodities	**$52,317**
Utilities	
HVAC	$171,733
Electricity	$88,421
Pool Heating	$18,000
Telephone	$1,728
Trash Service	$720
Water & Sewer	$15,708
Total Utilities	**$296,309**
Total Operating Expenses	**$760,441**

The above table represents the additional cost of operating the proposed expansion.

Option 3 AC Expansion Summary

The following is a summary of the total estimated revenue and expenses including the expansion and the existing facility.

Increase Revenue and Expenses

Project Cost	$22,413,000				
Attendance	55,178				
Revenue	$279,294	$286,756	$308,181	$316,426	$333,634
Expense	$760,441	$779,452	$798,938	$818,912	$839,384
Operating Cashflow	($481,147)	($492,696)	($490,757)	($502,485)	($505,750)
Recapture Rate	**37%**	**37%**	**39%**	**39%**	**40%**
Capital Replacement Fund	$112,100	$112,100	$112,100	$112,100	$112,100
Cash Flow	($593,247)	($604,796)	($602,857)	($614,585)	($617,850)

Total AC Expansion Revenue and Expenses

Project Cost	$22,413,000				
Attendance	55,178				
Revenue	$1,489,331	$1,496,793	$1,518,218	$1,526,463	$1,543,671
Expense	$3,261,221	$3,342,751	$3,426,320	$3,511,978	$3,599,778
Operating Cashflow	($1,771,890)	($1,845,959)	($1,908,102)	($1,985,515)	($2,056,107)
Recapture Rate	**46%**	**45%**	**44%**	**43%**	**43%**

8.2.3 Summary of Options

The following chart summarizes the total operating revenue and expenses for each of the three options.

	Option 1	Option 2	Option 3
Revenue	$1,792,453	$1,929,124	$1,489,331
Expenses	$4,255,977	$4,723,263	$3,266,051
Operating Cashflow	*($2,463,524)*	*($2,794,140)*	*($1,776,720)*

9.0 Recommendations

DIALOG and Councilman Hunsaker reviewed/conducted the following:

- Existing studies completed on the condition of the Four Seasons Pool.
- Existing survey on Indoor Recreation Centres, with specific data on use and satisfaction of the aquatic centres.
- New survey on aquatic facility use.
- Comparative aquatic facilities for centres the size of Prince George.
- Current trends in aquatic centre operations.
- Local demographics.
- Site reviews of both aquatic facilities that reviewed architectural, structural, mechanical, electrical, and pool tank and pool mechanical systems.
- Aquatic centre operations staff meetings to discuss operational issues.
- Stakeholder meetings with key users such as swim clubs and physical/mental rehabilitation service providers.
- A Public Open House to gauge public opinion on the issue of aquatic services in Prince George.

The outcomes from the information gathered in the items above are listed below. We recommend choosing the option which has the greatest impact on improving these existing outcomes.

- There is not enough available time in both aquatic facilities to meet the current demand, and this will get worse as the population and demand grows.
- Both the Four Seasons Pool and the Prince George Aquatic Centre are equally well used.
- Users like the differences between the two aquatic centres and make a conscious choice to use one or the other.
- Users like having access to aquatic services in the area of the current Four Seasons Pool location and do not want one single centralized aquatic facility.
- The Four Seasons Pool has significant accessibility issues, both entering the building and moving through it.
- The Four Seasons Pool has a serious issue with slippery deck tiles.
- The Four Seasons Pool has no family change rooms and insufficient change room space.
- The Four Seasons Pool lacks a fitness area and a public meeting space.
- The Four Seasons Pool is poorly laid out for staff functions and storage.
- The users want some form of food services at both aquatic centres.
- The Four Seasons Pool roof membrane and side mansard roof is failing and must be replaced not later than 2018.
- The Prince George Aquatic Centre is loud.

- The Prince George Aquatic Centre needs more family change room space.
- Users want a water slide at the Prince George Aquatic Centre.
- Users want improvements to the fitness centre at the Prince George Aquatic Centre.
- There are accessibility issues in some areas of the Prince George Aquatic Centre.
- There is a need for more learn to swim programming at the Prince George Aquatic Centre.
- There is a need for a warm-up tank at The Prince George Aquatic Centre that would allow the City to host larger swim competitions and to provide for the needed additional aquatic facility programme time to alleviate the shortage of aquatics programme time in the City.

Based on this information the Consulting team formulated three potential options.

- *Option One* – demolish or re-purpose the Four Seasons Pool and replace it with a facility that has similar tanks but which has modern change room, staffing, and fitness facilities and which is 100% accessible for people with mobility issues. It would be located close to its current location.

This Option deals with the issues related to the Four Seasons Pool resulting from its age and outdated design, but it does not deal with the issue of the lack of aquatics programme time nor the ability to host larger competitions.

- *Option Two* – This option would have option one completed as well as adding a warm-up tank and additional family change rooms to the Prince George Aquatic Centre.

This Option deals with the issues related to the Four Seasons Pool resulting from its age and outdated design, and it deals with the issue of the lack of aquatics programme time within the City and the ability to host larger competitions at the Prince George Aquatic Centre.

- *Option Three* – This option would leave the Four Seasons Pool as it is but add a warm-up tank to the Prince George Aquatic Centre, additional family change rooms, and an outdoor water park.

These changes would deal with the lack of aquatics programme time within the City, and it would allow the City to host larger swim competitions. It would also make the Prince George Aquatic Centre a destination in the summer as well as the winter and provide an additional recreation amenity for citizens and participants at summer sport tournaments. However, this option would not deal with the problems at the Four Seasons Pool and a significant amount of money would have to be dedicated to the Four Seasons Pool to keep it operating year to year.

Recommendation

Our professional recommendation is for the City to pursue *Option Two*:

- Construct a replacement facility for the Four Seasons facility on a new site that is similar in program to what the Four Seasons presently offers, but upgraded to current contemporary standards for aquatic facilities. The existing facility would remain in operation until the new facility is completed and fully operational.

- Complete the renovations recommended for the Aquatic Centre, with the following improvements: a new swim tank, additional family changeroom space, expand the fitness centre, expand storage facilities, provide space for spectator facilities, and improve the accessibility throughout the facility and into the pool tanks.

Option One is a solution where a minimal amount of investment spending will only defer a much larger, growing problem into the future when the costs will become exponentially unacceptable to the community. This solution does not address the fact that the demand for more programming has exceeded the supply of the existing aquatics infrastructure. This solution is not a long term cost effective solution when weighed against, the community needs and economic inflation.

Option Three

Option Two is the minimum cost to complete the required maintenance and repairs, while providing increased programming capacity required by current demand and deliver a strong for the community to have the aquatics split into two locations. Over the long term future this is the most cost effective solution. This option is also the only option that addresses all of the concerns raised in the reports, stakeholder meetings, online surveys, and the Public Open House. Its selection will allow the City to continue to offer safe and functional aquatic facilities while also be able to meet current and future demands for aquatics programme time.

Summary of Individual Recommendations made Throughout this Report

These recommendations culminate from all the information gathered.

- To continue to be current with trends, it is recommended that Prince George ensure there is adequate shallow, warm water and programs to support this growing demographic group.
- In order to remain current, maximize revenue potential and generate interest from new users, it is recommended that some alternative programming be considered, such as day camps and special events
- During the planning process for the Four Seasons Pool, it is highly recommended that a location near other recreational amenities with proximity to main thoroughfares be selected.
- It is recommended that operations take time to address market conditions and challenges; define steps to solve the challenges and improve all aspects of the event or program by using a marketing development plan.
- It is recommended that Prince George spend time exploring their brand message and how it is communicated to potential users. The tag line of, "More than just water," should be on every piece of marketing that is distributed and staff should live and breathe that brand message.
- It is encouraged that the Facebook page be used for many purposes, including the promotion of water safety, trending aquatic videos, and customer engagement.
- It is recommended that Prince George explore developing and implementing a marketing action plan that encompasses several of the mediums discussed in Section 4.9.
- Due to the age and functional issues with the current Four Seasons Pool, it is recommended to discontinue the operations of that facility into the future.
- Due to several limiting factors of the current site, it is recommended to consider other potential sites for the Four Seasons Pool within the immediate area.
- While Option 3 can reduce the annual operating cost from current annual cost of $2,500,780 to $1,771,890, the consulting team does not recommend Option 3 due to the need and desire of the community to have multiple locations and facility types.
- It is recommended for the Four Seasons Pool, that the roof trusses be assessed independently for structural integrity.
- We recommend for the Prince George Aquatics Centre, that the finishes be removed and the rust brushed off or removed to sound material.
- We recommend that every five to ten years, a review of the aquatics trends and needs be completed and considered within the operating budget.

10.0 Glossary of Terms

Term	*Definition*
Accessibility	The ability for individuals with mobility limitations, which includes wheelchair bound persons, persons with visual impairment, persons requiring scooter assisted mobility, and persons requiring crutches, walkers, or canes. Accessibility issues include traction of floor surfaces, ability to open doors, ability to maneuver through buildings and through crowds in buildings, access into pool tanks, and the ability to access different levels of a building.
ADA	Acronym for the *Americans with Disabilities Act*. Under Title III, no individual may be discriminated against on the basis of disability with regards to the full and equal enjoyment of the goods, services, facilities, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation.
BMS	Acronym for *Building Management Systems*. Computerized controls of heating, air conditioning, lighting, etc.
CDP	Acronym for *Central Distribution Panel*. Panel where electrical distribution is located.
CMHC	Acronym for *Canadian Mortgage and Housing Corporation*. Federal Crown corporation responsible for insuring mortgages.
CPR	Acronym for *Cardiopulmonary Resuscitation*. The emergency procedure that combines chest compression often with artificial ventilation in an effort to manually preserve intact brain function.
CRA	Acronym for *Canada Revenue Agency*. Federal department responsible for taxation collection.
DDC	Acronym for *Direct Digital Control*. Computer control of a process.
Expansion	The addition of new spaces, within or adjacent to, an existing building to enhance programming offerings and increase capacity.
FINA	Acronym for the *Federation Internationale de Natation*. The international governing body for aquatic sports.
MCC	Acronym for *Motor Control Centre*. Panels where motor controls are located.

Term	*Definition*
NCAA	Acronym for the *National Collegiate Athletic Association*. The governing body for collegiate sport in the United States.
NFSHS	Acronym for the *National Federation of State High School Associations*. The umbrella group body that oversees high school sport in the United States.
Operating Cashflow	The amount of cash a company (or facility) generates from the revenues it brings in, excluding costs associated with long-term investment on capital items.
Programming Staff	The specific staff required to offer a particular program or activity beyond the base level operations staff. Example includes the need for instructors to offer swim lessons.
PV	Acronym for *Photovoltaic*. A lighting system that uses solar power to charge it.
Recapture Rate	The percentage of operating costs that is paid for through direct operational revenues.
USOA	Acronym for the *Underwater Society Of America*. The governing body for scuba diving and related sports.

11.0 Appendices

11.1 Audit Report: Four Seasons Pool

11.1.1 Architecture


Interior of Four Seasons Pool

Based on the reviews of past reports and our recent facility reviews the Four Seasons facility, we recommend the demolition and re-building of this facility. The facility has significant issues that cannot be cost effectively dealt with through maintenance and renovation. These issues include:

- No family change rooms;
- A lack of changeroom space;
- A lack of accessible change room space;
- Extremely poor or non-existent accessibility throughout the facility, inside and outside, due to multiple level changes;
- Highly slippery tiles on all decks;
- A breakdown of the building envelope at all exterior glazing locations;
- A breakdown of the building's vapour barrier at walls and roof locations;

- A requirement to repair a large area of the roof;
- A need for a complementary fitness area;
- A need for enlarged and centralized staffing area;
- A need to centralize the access to the change rooms/pool tanks past the front desk;
- A need for public facilities on the main floor;
- A need to provide a proper public viewing space that is accessible and has proper seating areas with non-slip flooring;
- A need to provide some form of food services, and
- Insufficient parking.

Making the renovations to this facility difficult and costly would be the need to complete significant changes to the floor levels within the confines of the existing structure. The additional space requirements are also not feasible given the site is already fully occupied and parking is insufficient. Thus while the building is currently structurally sound and could be maintained to be so for another use, it would not be cost efficient to renovated it to meet current aquatic user needs and aquatic facility standards.

Furthermore, the renovation work at the Four Seasons could take up to two years, given the difficulty of working within the existing structure (as opposed to demolishing it and building unencumbered). This would cause a very significant interruption of aquatic services for a prolonged period of time; delaying learn-to-swim for many children and reducing swim club time and possibly cancelling other aquatic services at the Aquatic Centre. This would also delay the construction of a new tank at the Aquatic Centre and further compound the issue of insufficient pool tank space for aquatic facility users in the City.

It should be noted that the building envelope issues are considered an independent project that requires moving forward on an independent and more time-sensitive schedule. If the renovations to the Aquatic Centre are approved, but work does not begin until later than 2017/18, the building envelope remediation work should be completed prior to the renovation work.

While there are many favourable sites to locate the new Four Seasons facility, the least disruptive and most advantageously positioned site is the Ron Brent Park site. This site has a school, seniors housing, and a multi-use facility on-site that would be complementary to an aquatic centre on this site. The site is located in the middle of a residential area, is close to downtown - mere blocks away from the current facilities location, - and it is serviced by transit.

Acoustical Systems

It is observed that the acoustics in the area of the pool tanks is very poor with respect to the instructor's ability to communicate with the users or other staff in the vicinity. The instructors must use extra effort to project their instructions to the users. The combination of the background music and poor sound absorption and reverberation makes it difficult for the users to hear the instructor's directions for lessons etc.

The acoustics in all other facility support spaces are adequate and do not require specific attention. Where privacy is required this is maintained.

The current acoustical performance of the pool tanks space makes providing instruction difficult, and compromises safety communications.

The ceiling of the pool tanks area is the only location where acoustics are managed architecturally. There are 1'x1' white acoustical ceiling tiles in place to mitigate the bouncing of sound off the ceiling back to the water surface. All other surfaces are hard surfaces, such as block, wood planks, concrete, deck tile etc., thus making the space excessively loud and noisy. An active noisy aquatics centre, to a degree is desirable, because it infuses the space with a greater sense of activity. The current situation requires improvement through the use of acoustical panels mounted to the upper vertical sections of the walls and or sound baffles strung across the ceiling space.

We find the acoustics in the Four Seasons Pool to be compromising the performance of staff and safety aspects of the facility. Our professional recommendation is to augment the existing facility with some acoustical treatment in order to modify the noise level for better performance.

Doors and Door Frames

The interior doors at the Four Seasons Pool are primarily wood doors in painted hollow metal frames with stainless steel kickplates mounted to the bottom of each door. The doors appear to be in good condition without much deterioration given the moist conditions. The doors to the mechanical spaces are painted hollow metal and in good condition. There is minor rusting and deterioration of the frames at the bases where doors are located directly off the pool deck.

The exterior doors are either glass storefront or painted hollow metal. These are in generally good condition and operation except for some deterioration occurring at the base of the metal frames and in some cases at the header.

The door hardware appears to be in good condition and operation in all cases of doors, although the majority of the interior doors do not meet the accessibility criteria. They currently have the old fashioned round door knobs instead of lever handles. This increases the difficulty for people accessibility requirements to comfortably, independently be able to move through the facility on their own.

We find the doors in the Four Season Leisure Pool to be adequate for future use and do not recommend any changes except to provide accessible hardware.

Accessibility

Accessibility at the Four Seasons Pool is significantly compromised at both the interior and exterior. Many conditions are not code compliant.

Exterior

The main entrance is not an accessible path into the facility. The accessible entrance to the facility is at the southeast corner of the building. A ramp provides the access to doors at the main pool deck level. This entrance location poses an operational and accessibility challenge. The accessible parking is located on the opposite side of the building requiring a very long path of travel for the disabled person to arrive which does not conform to local parking bylaws. This entrance is more of a “back door” location based on internal operations and thus by passes the security provided by the front desk. Being a back door entrance does not provide a respectful welcome to those who are disabled.

The accessible parking is adequate with respect to code compliance, number of stalls, signage and meeting parking stall access standards.

Not all door entrances are code compliant, or provide equal access hardware to make access easy. The entrance doors off the parking lot do not incorporate push button type accessible hardware to enable the door to automatically open with virtually little effort for those without the strength to pull it open.

Interior

Doors:

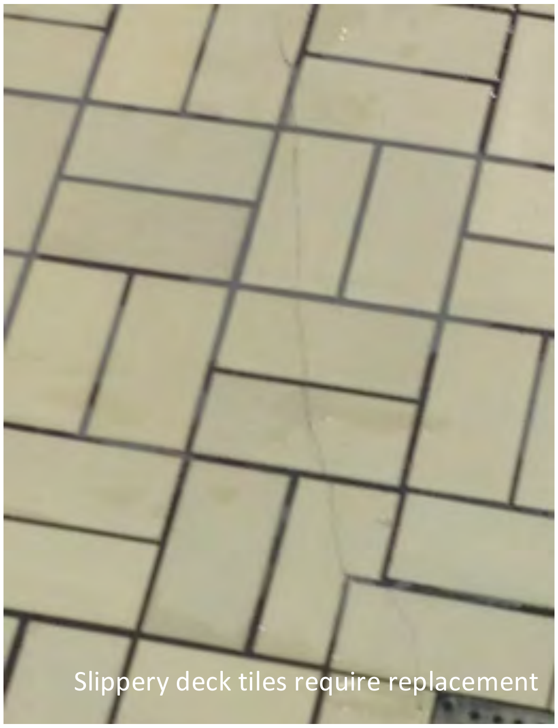
Some of the interior doors are not code compliant, and need to be equipped with door hardware which is accessible. Doors have door knobs (round handles) instead of lever type, closers and openers are not provided in locations where automated opening is ideal.

Change Rooms/ Washrooms:

The public change rooms, washrooms and lifeguard/coaches change rooms do not comply with code, and require accessible toilets, sinks, accessories and changing spaces that can accommodate a wheelchair or other disabilities. In some instances, a few steps separate the disabled user from accessing the spaces. The toilet cubicles are too small to accommodate a wheelchair and sometimes don’t allow for a turning radius to exit the room as a whole. The sinks and counters required adjustments in height, under counter clearance and depth. Accessories such as mirrors, toilet paper dispensers, grab bars all require updating with respect to mounting heights.

General:

The security of the building is compromised by the fact that disabled users must use a “back door” to access the facility, crossing the pool deck to get to the front desk to register or make payment for use. There are multiple levels, interior to the facility which are not accessible and don’t meet code.



Slippery deck tiles require replacement

Pool deck and tanks:

There is an accessible ramp from the training/teaching tanks to the leisure tank/ pool slide. The pool deck does not comply with today's accessibility requirements with respect to visually impaired warning strips, change in colour of deck tiles at ramps or stairs. The pool deck is not accessible from the staff change rooms without travelling a significant distance through the facility. The tanks themselves are accessible, albeit cumbersome with equipment specially manufactured for disabled access.

The spectator deck on the north side of the pool tanks is not code compliant and is only accessible by stairs. It requires a ramp system to be provided or lowering that portion of the deck to resolve this problem.

Administration/ Support spaces/ Multi-purpose room:

Review of these spaces identified the primary accessibility concerns being non-compliant door hardware and clearances at doors for opening and closing.

The accessibility review of the Four Seasons Pool finds the majority of the facility is not compliant with today's codes and regulations. Our professional recommendation is that major renovations to entrances, change rooms, locker rooms, spectator deck and site parking be made to bring it into the 21st Century compliance.

Four Seasons Pool: Architectural Upgrade Costing – Major Components

Roof repair	$1,529,000
Envelope repair	$217,000
Deck tile replacement	$1,177,800
Change room renovations	$2,340,000
Staff change room renovations to correct accessibility issues	$144,000
Removal of raised deck to correct accessibility issues	$294,000
Overall accessibility improvements (including elevator)	$480,000
Acoustical improvements	$290,000
Sub-total	*$6,471,800*
15% Construction Contingency	$970,770
*Total**	*$7,442,570*

**Note: Roof and envelope repair costs are derived from the 2010 RJC report plus 12% inflation.*

11.1.2 Structural

This facility has exposed steel columns and concrete block masonry walls as the structural support system. The roof structure is not visible but is assumed to be a steel structure. Structural drawings for this building were not available, however a report by RJC Consulting Engineers dated May 21st, 2010 and titled “Four Seasons Swimming Pool – Moisture Transfer Investigation” was provided to us. In the RJC report it notes that the moisture transfer through the roof space may compromise the integrity of the roofing system, the mansard roof wood structure and potentially the steel connections to those elements. This puts both patrons and staff at possible risk of some sort of collapse given the significant snow loads in Prince George.

The internal steel columns appear to be in good condition. Steel reinforcements consisting of welded plates have been applied to the base of all visible columns. We understand that this reinforcement was carried out in order to remove corroded portions of the columns.

Access to the roof and mansard structure was not provided. Based on the RJC report, we understand that the roof structure consists of steel beams and steel deck on open web steel joists. The upper section of the exterior walls and the mansard roof is a combination of wood framing and structural steel. The RJC report states that no wood deterioration was found at the time of the report. It also states that, although some surface corrosion was observed on some structural steel components, it is RJC's opinion that their structural integrity was not compromised. Despite this, *it is recommended for the Four Seasons Pool, that the roof trusses be assessed independently for structural integrity.*

Access to the basement was provided, and a visual review of the concrete structure including the concrete pool slab and walls revealed extensive leaching deposits on the walls and underside of the pool slab. Rust colouring was visible in many locations indicating possible corrosion of embedded reinforcing steel. It is recommended that a full condition survey of the concrete structure be carried out, and a rehabilitation program be established in order to extend the useful life of the structure.

Cracking in various locations in the walls and slabs was observed. It is recommended that remediation of these cracks be carried out as part of the condition survey and rehabilitation program described above.

Cracking was also observed in the pool deck finishes at various locations. It is likely that these cracks were initiated by similar cracks in the supporting slabs below.

11.1.3 Mechanical and Electrical Systems

A site review was completed to examine the condition of the mechanical and electrical systems (air conditioning, plumbing, distribution, etc., and lights, communications, power, etc.) related to non-pool tank areas at the Four Seasons Pool. In addition, previously completed reports (RJC 2010, AME, 2010, Tetra Tech, 2015, etc.) were reviewed for their findings. The mechanical/electrical systems for the pool tank areas are covered in Section 11.1.4.

All electrical items relate to normal ongoing minor and major maintenance and operation work. Repairs and replacement can be scheduled on a yearly basis during normal operations or yearly shutdowns. There are no electrical systems that cannot be upgraded or replaced in order to maintain the operation of the Four Season Pool for its current operations.

Mechanical items are related to both ongoing minor and major maintenance and operation work and equipment replacement due to end-of-service-life conditions. As with electrical items, repairs and replacement work for minor and major maintenance and operation work can be scheduled on a yearly basis during normal operations or yearly shutdowns. The implementation of capital replacement items for end-of-service-life conditions will be more disruptive. It would be best if several capital replacement items are scheduled to happen at the same time as part of distinct work packaged (preferably grouped with any architectural or structural upgrades) in order to minimize the number of times the facility has to be shut down outside of the normal yearly shutdown period.

As per the electrical systems, there are no mechanical systems that cannot be upgraded or replaced in order to maintain the operation of the Four Season Pool for its current operations. However, given the current age of the Four Seasons Pool, many energy savings mechanical systems that would be installed in a new facility (i.e., low flush toilets, HE heat exchangers) would require a commitment to significant architectural upgrades/renovations in order to make their implementation cost effective.

Below is a summary of the total funds that require allocation year to year for ongoing and major mechanical and electrical system maintenance and major capital end-of-service-life conditions from 2016 to 2024.

Tetratech Summary by Year and Facility

Four Seasons	2016 Total	$64,338
Four Seasons	2017 Total	$67,766
Four Seasons	2018 Total	$90,787
Four Seasons	2019 Total	116,032
Four Seasons	2020 Total	$ 3,660
Four Seasons	2021 Total	$32,916
FOUR SEASONS GRAND TOTAL		*$375,499*

Total electrical expenditures to 2024 - $115,680

Total mechanical expenditures to 2024 - $424,268

Below is a summary of mechanical and electrical work recommended. See Section 11.4 for a listing of all work and the costs associated with each work item for both aquatic centres.

Plumbing

Condition Notes:

Plumbing fixtures throughout the facility are in general of original installation, have reached the end of their useful life and require replacement with more modern, water conserving fixtures. There are infrared controlled lavatory faucets in the main washrooms that have been added and are in acceptable condition.

The majority of plumbing drainage within finished spaces was generally inaccessible for review, of the piping that was visible in the mechanical areas below pool deck, the sanitary drainage piping is showing signs of corrosion, there have been numerous spot repairs and spot replacements, but of the remaining piping, it is in poor shape and given the age, is due for replacement.

Hot and cold supply piping within finished spaces was generally inaccessible for review, of the piping that was visible in the mechanical areas below pool deck, the piping, similar to the drainage system is showing signs of corrosion, there have also been numerous spot repairs and spot replacements on this system, but of the remaining piping, it is in poor shape and given the age, is due for replacement.

Hot water heating is now being provided by the district energy system Energy Transfer Station (ETS), condition is excellent, while performing well on the day of inspection, there was some anecdotal discussion from the maintenance staff that when the temperature of the district energy system supply water is reset to cooler temperatures in summer, hot water supply temperatures can be supplied cooler than desired.

Recommendation Notes:

There are no short term repair recommendations. The Tetra Tech Report of 2015 has earmarked funds in 2015 to replace some piping and fixtures but is non-specific on details. The report has also identified budget in 2018 and 2019 for additional repairs of fixtures and piping, but the scope identified falls short of replacing the overall system piping and fixtures, this additional scope should be planned for. Over the next eight years, it appears that continued spot repairs and selected piping system replacement are allocated in the 10 year work plan, past that plan, wholesale system replacement should be considered. As piping is replaced over the next ten years, the old piping should be carefully examined for condition and an overall progression of system deterioration should be tracked.

HVAC /Controls

Condition Notes:

There are two vintages of air handling units in the facility, the original air handling units (AH1 and AH2) and the pool addition air handling unit AH3. The basic concept of design for the air handling system, while lacking many of the modern energy conservation features of newer facilities, should if kept in good working order and properly balanced, adequately control temperature, humidity and pressurization in the space.

All units require replacement due to age, state of repair and ability to function with the new district heating supply system. Controls functions are antiquated and compromised due to limits described anecdotally with respect to the district heating system ETS to the building.

Staff have had difficulty getting adequate supply air performance from the units, the issue becomes worse with low ambient air temperature. More study is required to determine the exact issues but it appears there are a number of potential contributing issues.

1. Suspected heating water flow issues to the loads potentially due to a combination of pump performance
2. questions of piping sizing to the remote loads
3. glycol heat exchanger performance
4. supply water temperature control scheme by the district heating controller (limiting supply water available based on controlling to a minimum return water differential)
5. coil performance at the units

At times when sufficient heat is unavailable, operations staff are left to improvise; humidity control is overridden by opening emergency bypass ducts or directly opening the return air fan cabinet, additional recirculated air at the unit is used to attain higher supply air temperatures, this scheme unfortunately upsets the facility air balance, likely increasing indoor facility negative air pressure, causing additional air infiltration and subsequently making the lack of heating worse, while also allowing higher indoor air humidity.

Indoor comfort in summer is poor due to lack of cooling on units AH1 and AH3, additional cooling while not required, should be considered as part of a business plan to increase summer use by providing better comfort.

Hot water heating elements throughout the facility are generally aged, some damaged. Controls are pneumatic and electric and are generally serviceable but lack the flexibility that DDC control offers.

The facility contains a DDC control backbone with most of the main systems now migrated from pneumatic to digital control. Terminal unit control is generally pneumatic with some electric control.

The AH3 cooling unit was not accessible for review, but due to its age, it should likely be upgraded with AH3.

The dominant public entrance for the facility is not protected with a vestibule, in cold weather compromising comfort temperature conditions and humidity control in the area of the entrance within the pool enclosure.

Recommendation Notes:

Short Term:
An engineering study is required to verify the basis of design of the new district heating system ETS. The new air handling units when replaced should be redesigned and optimized for the available energy supply from the ETS with respect to seasonal and peak supply water temperature available, distribution piping and pumping basis of design, and any restrictions of supply water temperature flows or temperature either imposed by seasonal or ambient reset schemes or control schemes designed to maximize district energy system supply/return temperature drop. New air handling unit size and performance should ideally be designed to work within the available parameters of the district heating system (presuming the parameters are found to be workable).

Unit replacement should be accompanied by energy conservation features for the units such as off hour reduced recirculation rates, variable speed drive fans with air flow measuring to control building pressure, exhaust heat recovery for outdoor air preheating and migration to full digital control should be undertaken. A business case for mechanical cooling of the pool enclosure should be considered. At the same time as the main air handling unit upgrades, existing exhaust fans that have not yet been replaced due to age should also be replaced.

Long Term:
AH3 is exposed to the pool enclosure environment, hastening deterioration of the unit and auxiliary components. Consideration of enclosing the unit and isolating it form the pool atmosphere to improve unit longevity is a worthy consideration.

Miscellaneous heating units such as unit heaters, entrance force flow heaters and main administration area reheat coils should all be replaced, due to age of the components. Verifying the internal condition of branch heating water piping feeding their devices

Hot water heating terminal units should be replaced as part of architectural and finishes upgrading. Controls should be migrated from pneumatic and electric control to DDC. As part of the study and anticipated redesign of the hot water system downstream of the district heating ETS, additional upgrading of the pumping systems and their control would also be required both on the glycol and hot water heating side of things.

The Tetra Tech Report of 2015 has earmarked funds in 2016, 2017 and 2019 to replace the air handling units. The units should be replaced, along with the glycol heating system, at the same time as they will all rely on similar new criteria for heating water design conditions, flows etc.

Ducting System

Condition Notes:
Visible ductwork within the facility was observed, primarily some of the accessible and exposed ductwork at AH-3 and the below deck ductwork for units AH1 and AH2. AH2 ductwork is in fair shape with some, but not extensive, signs of corrosion evident. AH1 and AH2 ductwork shows considerable deterioration, rust and corrosion evident. Grilles throughout the facility are functional but showing their age with poor condition, some bent and damaged grilles evident throughout the facility. There are sections of external duct insulation in poor repair or missing in under deck areas.

Recommendation Notes:

Short Term:
Non-accessible ductwork should be accessed and reviewed for corrosion, specific review of the condition of fire dampers and balancing dampers (usually the first to show signs of deterioration due to corrosion). Replace corroded balancing dampers and fire dampers after individually testing operation of each one.

Due to the age of the facility and to protect new air handling unit equipment, it would stand to reason that the return and exhaust ductwork should be cleaned.

Long Term:
Selected corroded main under deck duct runs for AH1 and AH2 should be replaced. Insulation should be repaired, replaced and patched to protect ductwork from sweating and continued degradation.

Lighting

Condition Notes:
The majority of facility lighting has been retrofitted from what was the original design fixtures. Compact fluorescent pot lights, T8 fluorescent and retrofitted LED (replacing metal halide) pool enclosure fixtures. The majority of has not been upgrades to newer LED technologies.

Lighting controls are primarily manual with little application of occupancy or vacancy controls in evidence. They are primarily low voltage Douglas system, with local control at a central control panel, future integration with the BMS may be desirable, integration with additional controls for daylighting and occupancy/vacancy could also improve energy efficiency.

Power distribution is generally well instrumented and in good condition. Some upgrading of mechanical has modified the motor control with additional variable frequency drives.

Emergency lighting is provided with incandescent remote heads served from remote battery packs.

Exterior lighting is with wall mounted high pressure sodium wall packs.

The Tetra Tech Report of 2015 has earmarked funds in 2015, 2019, 2021 and 2022 to replace lighting. The report has also identified budget in miscellaneous years for wiring and panel board upgrading with respect to lighting.

An electrical energy conservation report could help lower operating cost and leverage the work plan through available utility grants and energy savings. The Energy Conservation Report could address implementation of renewable energy such as PV, migrating lighting sources to LED, reassessing lighting levels and updating conservation controls.

Recommendation Notes:

Short Term or Long Term:
There is no urgency in upgrading the lighting system due to current condition, spot repairs and replacements as required would render a serviceable system. Pending architectural space upgrading, light fixture upgrading throughout the facility to LED fixtures and modern occupancy, vacancy and/or daylight harvesting control when feasible would update aesthetics and save additional energy.

If the pool enclosure and ceilings were redesigned architecturally, then would also be a worthy goal to redesign the lighting with new LED pool fixtures, designed to be serviced from the pool deck with perhaps direct/indirect light distribution, depending on the new ceiling design.

As part of a pool enclosure lighting redesign, the pool LED fixtures could be circuited from a new central battery pack and inverter system, to power selected pool fixtures for emergency lighting. This would provide more even and enhanced illumination of the deck and pools under emergency lighting operation. This retrofit would allow for other new LED fixtures in the support areas to also be supplied from the central system.

If the pool enclosure is not remodeled, then a retrofit of the remote heads system currently in place with new LED heads would be recommended.

Power Distribution

Condition Notes:

Much of the original power distribution system is still in service with numerous changes and modifications evident. The main service board, breakers and panel boards are original, parts are unavailable for service purposes.

Recommendation Notes:

Short Term:
Given the age of the facility, the feeders, branch and circuit feeders should be reviewed in detail by an electrical service firm or City resources to confirm system integrity.

Pending mechanical system equipment replacements such as AH1, AH2 and AH3, AH3 cooling unit, and heating pumping system modifications, power distribution requirements will likely change significantly to serve the new and different motor loads. As part of this modernization (and any planned pool system renovations involving significant motor loads), a new main service, new MCC's and CDP's with new feeders should be installed to service new loads and serve existing loads.

Miscellaneous magnetic starters for miscellaneous loads should also be replaced as part of the modernization.

Short Term or Long Term:
As internal architectural upgrading/renovations occur, panel boards, circuiting and devices should also be upgraded as areas are renovated.

The Tetra Tech Report of 2015 has earmarked funds in miscellaneous, multiple years to replace upgrade the power distribution system. It makes sense to redistribute these budgets to coincide with mechanical and pool system upgrading plans for the main distribution, MCC's and CDP's and align panel boards, circuiting and device upgrading with architectural renovations.

Miscellaneous Systems

Condition Notes:
Fire alarm system is modern, addressable and reportedly in good working conditions.

Telephone system was assessed.

Security system is a DSC system, networked, serviceable and reportedly functioning well.

Recommendation Notes:

No specific recommendations for noted systems.

11.1.4 Aquatic Needs Assessment

intentionally blank for double sided printing

Four Seasons Leisure Pool

Prince George, British Columbia

Aquatic Needs Assessment

Counsilman • Hunsaker
AQUATICS FOR LIFE

August 2016

Contents

A. Executive Summary

Dialog Design commissioned Counsilman Hunsaker to provide an aquatic needs assessment of the Four Seasons Leisure Pool in March of 2016. The aquatic center at the Four Seasons was originally constructed in 1970. A recreation pool and spa were added in 1983. Minor improvements have been made to the pools, the building, and mechanical systems over the years in order to keep the pools in working condition. Dialog Design commissioned this audit to assist in identifying items that are substandard or not operating as designed. Providing a safe and sanitary environment for the users of the pool is the highest priority for the Owner.

The facility is used for swim lessons for all ages, leisure swimming, water aerobics, general recreation, and therapy/rehabilitation.

A site visit to the Four Seasons facility, by Kevin Post and Connor Riley of Counsilman Hunsaker, was performed on the 22nd and 23rd of March, 2016. The purpose of the site visit was to evaluate the existing pools, supporting building spaces, the respective mechanical systems and to provide an opinion of probable cost for items identified.

While the Four Seasons Leisure Pool is operational, many aspects of the pools and their associated mechanical systems are nearing the end of their useful lives. Numerous items are in violation of sections of the governing codes and should be addressed immediately for safety reasons.

All references to the regulations of the health department in this report refer to the B.C. Guidelines for Pool Design, Version 2, June 2014, Health Protection Branch Ministry of Health. These are the current swimming pool design standards for British Columbia. If a major renovation were to occur, all aspects of the pool and associated systems would need to be brought up to the current design standards. It is assumed that the all of the pool items were compliant with the existing code at the time of construction or the last major renovation. Other code references include the Federal Pool & Spa Safety Act (also known as the Virginia Graeme Baker Act), the Americans with Disabilities Act with specific reference to swimming pools, and the Federation Internationale de Natation Amateur (FINA) with regards to diving facility regulations. For simplicity in the report, all codes, regulations, and guidelines are referred to as “code”.

B. POOL INFORMATION

1. Lap Pool
   a. Dimensions – 25 m long x 13.4 m wide [82’-2” x 44’-0”] for the general swimming area plus a 10.7 m x 9.1 m [35’-0” x 30’-0”] attached diving tank
   b. Surface Area – 433 m^2 [4,658 ft^2]
   c. Depth – 1.1 m [3’-6”] depth at shallow end and 3.4 m [11’-0”] in the dive tank
   d. Number of Lanes – 6
   e. Lane Width – 2.1 m [7’-0”]
   f. Volume – ~795 m^3 [210,000 gallons] (volume as reported by operator)
   g. Perimeter – 95 m [312 ft]
2. Teaching Pool
   a. Dimensions – 9.1 m x 6.1 m [30’-0” x 20’-0”]
   b. Surface Area – 56 m^2 [600 ft^2]
   c. Depth – 0.9 m [3’-0”] deep
   d. Volume – ~49 m^3 [12,944 gallons] (Per email from Northern Health)
   e. Perimeter – 30 m [100 ft]
3. Recreation Pool
   a. Dimensions – Varies
   b. Surface Area – ~195 m^2 [2,100 ft^2]
   c. Depth – 0.3 m [1’-0”] depth at shallow end and 1.3 m [4’-2”] at the main drains
   d. Volume – ~151 m^3 [40,000 gallons] (volume as reported by operator)
   e. Perimeter – 61 m [200 ft]
4. Spa
   a. Dimensions – 4.6 m [15 ft] diameter circle
   b. Surface Area – 16.4 m^2 [177 ft^2]
   c. Depth – 0.7 m [2’-3”] deep on the spa bench and 1.1 m [3’-6”] deep on the spa floor
   d. Volume – ~9.5 m^3 [2,500 gallons] (volume as reported by operator)
   e. Perimeter – 14 m [47 feet]

*Note: Dimensions and volumes were taken from existing drawings and conversations with the operator, unless otherwise noted.

C. Pool Mechanical Items

1. Piping

CH Observations and Owner Comments:

- The exposed pool piping in the mechanical room was observed to be an assortment of different styles; Schedule 40 PVC, Schedule 80 PVC, and copper.
    - Copper piping, over a period of time, can lead to elevated levels of copper in the pool water and the eventual staining of pool finishes.
- Overhead/floor pipe supports and pipe hangers were present but many of them were observed to be in poor condition. A handful of supports had signs of severe corrosion.
- The B.C. Guidelines for Pool Design calls for a maximum velocity of 3.05 m/s [10 ft/s] in pressure lines and 1.83 m/s [6 ft/s] in suction lines. Upon study of the existing flow conditions, a handful of the piping systems are not compliant with the health department regulated velocity requirements.
    - The waterslide pump for the recreation pool is rated at 341 m^3/hr [1,500 GPM]. Without a flow meter present, it is assumed that the water is flowing at 341 m^3/hr [1,500 GPM]. The suction line is 10" and the pressure line is 8". By code, a maximum of 305 m^3/hr [1,343 GPM] is allowed to flow through a 10" suction line and a maximum of 323 m^3/hr [1,423 GPM] is allowed to flow through an 8" pressure line.
    - The jet pump for the spa is rated at 143 m^3/hr [630 GPM]. Without a flow meter, it is assumed that the water is flowing at 143 m^3/hr [630 GPM]. The suction line is 10". By code, a maximum of 111 m^3/hr [487 GPM] is allowed to flow through a 6" suction line.
- Numerous minor pipe leaks were observed throughout the mechanical room.
- Some of the piping is colour coordinated and labeled with directional arrows, however not all of the piping is properly labeled per code. Per the B.C. Guidelines for Pool Design, "Piping related to pool operation should be properly identified through a standard system of colour coding, flow directional arrows and function labeling."

- According to the existing drawings, the gutter piping from the lap pool is undersized for gravity flow 0.91 m/s [3 ft/s]. This could be the reason as to why the gutters are continually flooded. The B.C. Guidelines for Pool Design states, "Pool gutters and skimmers should be designed to collect 100% of the pool design flow rate."
- Impact style flow meters were installed on the return lines of each recirculation system but they were not installed on all main drain or gutter lines.
    - o According to the B.C. Guidelines for Pool Design, "A flow meter should be installed in either the main drain line or gutter/skimmer line to determine flow rates through the main drain and the proportion of recirculation flow through the gutters/skimmers."

Recommendations:

- Industry standard for all exposed pool piping outside of the pool shell is Schedule 80 PVC. Counsilman-Hunsaker recommends to replace all exposed piping in the mechanical room with Schedule 80 PVC.
- Valve back the waterslide pump and spa jet pump to ensure the water velocity in the pipes does not exceed the velocity allowed by code. A flow meter should be installed to confirm this. If a lower flowrate affects the performance of the waterslide and the spa jets, it is recommended to upsize the piping to these features.
- Provide colour coordination and directional flow arrows on all pool related piping per code.
- Replace all of the corroding pipe hangers and supports.
- Install flow meters on all main drain lines or gutter/skimmer lines.


Mechanical room piping


Corroding pipe hanger

2. PUMPS

CH Observations and Owner Comments:

- The mechanical room boasts an array of different sorts of pumps for water recirculation, feature flow, and hydrotherapy.
- The lap pool has a reported volume of 795 m^3 [210,000 gallons] and its recirculation pump is rated at 170 m^3/hr [750 GPM] providing a turnover rate of 4.67 hours. This meets the maximum turnover period of 6 hours allowed by code for this type of pool.
- The teaching pool has a reported volume of 49 m^3 [12,944 gallons]. Its recirculation pump was replaced in 2014 with a Whisperflo WFK-4 pump. According to the operator the teaching pool has a flowrate of 23.9 m^3/hr [105 GPM] providing a turnover rate of 2.05 hours. This does not meet the maximum turnover period of 2 hours allowed by code for this type of pool.
- The leisure pool has a reported volume of 151 m^3 [40,000 gallons] and its recirculation pump is rated at 90.9 m^3/hr [400 GPM] providing a turnover rate of 1.67 hours. This meets the maximum turnover period of 2 hours allowed by code for this type of pool.
- The spa has a reported volume of 9.5 m^3 [2,500 gallons]. The nameplate on the pump was missing. Judging by the impact style flowmeter, the flowrate was approximately 22.7 m^3/hr [100 GPM] providing a turnover rate of 0.42 hours. This meets the maximum turnover period of 30 minutes allowed by code for spas.
- Several of the pumps and strainers were supported by makeshift housekeeping pads. The B.C. Guidelines for Pool Design states, "The pump should be protected from damage and securely mounted on a housekeeping pad."
- Many of the pumps did not have vacuum or pressure gauges. Many others were broken or not working properly.
- All pumps were provided with hair and lint strainers.
- Some of the pumps, flanges, and check valves were observed to be corroding.
- All of the feature and hydrotherapy pumps were observed to be operating as designed, however many of them appeared to be nearing the end of their useful life.

- Variable frequency drives (VFDs) were not observed to be installed on the pool pumps in the mechanical room. A VFD is a system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor.
    - In the swimming pool industry, it is commonplace to install VFDs on the recirculation pumps. The VFD will ramp up and down the electrical power supplied to the motor depending on the differing head pressures in the system; such as when the filter is dirty versus when it is clean. This ultimately results in an energy savings to the Owner.
    - Sometimes it is cost effective to install VFDs on feature pumps that need to be controlled beyond the install start-up and adjustment to the proper flow rate.
    - VFDs serve to protect the pumps by shutting down the systems if problems occur and preventing hard starts and stops by ramping up and down the motors as needed.
    - On indoor pools that operate year round, VFDs can potentially recoup the cost in approximately 1-2 years.

Recommendations:

- All of the pumps are operational, however many are beginning to show their age. For future success, Counsilman-Hunsaker recommends to replace the pumps that are nearing the end of their useful life.
- The teaching pool does not meet the maximum code allowed turnover. A new pump should be provided that is capable of meeting a two (2) hour turnover.
- Provide concrete housekeeping pads for all pool pumps.
- Install new pressure and vacuum gauges on the influent and effluent sides of each recirculation pump.
- Replace all of the corroding flanges and check valves around the pumps.
- Provide and install VFDs for use on all of the recirculation pumps.


Recirculation pump


Makeshift housekeeping pads


Broken pressure gauge


Corroding flanges

3. VALVES & FLANGES

CH Observations and Owner Comments:

- The valves located in the pool mechanical room are a combination of ball valves, butterfly valves, isolation valves, and check valves.
- Many of the flanges and valves (especially butterfly valves) located in the equipment room were observed to be displaying serious signs of corrosion.
- For valves smaller than 3", the industry standard is to use true union ball valves to allow the valve to be accessed without having to cut the connecting PVC piping. Valves larger than 3" shall be SCH 80 PVC butterfly valves.
- The valves in the mechanical room do not have identification tags and there is no posted piping and valve schematic.

Recommendations:

- Replace all valves with Schedule 80 PVC true union style ball valves and butterfly valves when the pool mechanical room piping is replaced with Schedule 80 PVC.
- Provide valve tags for each valve and post a piping and valve chart system schematic in the pool mechanical room.
- Replace corroding flanges.


Butterfly valve


Flange

4. CHEMICAL TREATMENT

CH Observations and Owner Comments:

- The four (4) bodies of water utilize muriatic acid as the pH buffer, liquid chlorine as the sanitizer, and UV units for supplemental disinfection.
- The acid is stored in the abandoned ozone room. Excess acid is stored in the abandoned gas chlorine room.
    - The muriatic acid is stored in a chemical container/vat. Each pool draws acid from the same chemical container. Acid is pumped into each system via automatic chemical feeder pumps.
    - The muriatic acid is exposed to the atmosphere to allow the chemical tubing into the chemical container.
    - An acid fume scrubber was not provided.
    - It was not confirmed if the acid room was properly ventilated at the time of the site inspection.
    - Mild corrosion was observed in the acid room. Acid fumes are known for attacking any and all metallic items nearby.
    - The acid room was labeled, but there were no hazard signs present.
- Liquid chlorine (sodium hypochlorite) is stored in chemical containers near each pools' respective chemical injection point. Excess liquid chlorine in stored near the lap pool filters.
    - The sodium hypochlorite is pumped into each system with automatic chemical feeder pumps.
    - Corrosion was observed throughout the mechanical space. Chlorine fumes can attack nearby metallic elements and contribute to corrosion.

    - Proper chemical hazard signs were not observed in the mechanical room.
- When chemical inventory is low, chemicals are hauled around the mechanical room to the proper chemical storage containers. The mechanical room has poor lighting and uneven floor surfaces with many tripping hazards which makes this routine task a difficult and dangerous process.
- A shower/eye wash unit is provided in the lap pool mechanical area. A wall mounted eye wash station is provided near the acid room. Safety items such as protective gloves and goggles are located on site.
- The Owners expressed interest in solid chlorine (calcium hypochlorite) to replace their existing liquid chlorine system.
    - Calcium hypochlorite comes is solid tablets/briquettes. The tablets are placed in canisters and pool water is bypassed through the erosion feeders, dissolving the tablets and introducing chlorinated water back into the pool.
    - Calcium hypochlorite is easier to handle than liquid chlorine. It has a pH of 12, so it doesn't require as much buffering agent as liquid chlorine. It has a much higher concentration of available chlorine (65%) than liquid chlorine (12%). Calcium hypochlorite does not have a shelf life unlike liquid chlorine.
    - Calcium hypochlorite is typically delivered in 5-gallon plastic containers that weigh approximately 50 lbs. The containers are not fire rated, however calcium hypochlorite is relatively safe to handle and store. The container must be sealed at all times as the tablets cannot come into contact with other chemicals. The combination of a high concentration of chlorine combined with calcium makes it very reactive. When it comes in contact with other chemicals, the reaction will release chlorine gas into the air and could possibly explode. When on fire, it will produce its own oxygen.
- All four (4) bodies of water have Strantrol System 3 chemical controllers in good working condition.
- Each recirculation line has a UV light system used for supplemental sanitation.

- During the site visit, the UV system for the spa was out of commission. The maintenance staff was aware of the problem and was actively working on a solution.

Recommendations:

- For safety, accessibility, and longevity reasons, Counsilman-Hunsaker recommends to construct two (2) new chemical storage rooms in the existing mechanical space.
    - One chemical storage room will house the sanitizing systems (either sodium hypochlorite or calcium hypochlorite). The other chlorine room will house the pH buffer systems (muriatic acid).
    - Chemical rooms should be separately ventilated to the exterior and appropriately fire rated in accordance with the local fire marshal.
    - Chemical rooms shall be centrally located; conducive to each body of water.
    - Proper chemical hazard signs shall be affixed to the chemical room doors.
- The muriatic acid chemical container should be replaced with a larger double-walled model and affixed with acid scrubbers to prevent acid fumes from entering the mechanical space.
- While the chemical controller systems are functional, aquatic controllers have progressed significantly in the previous decade and replacement for newer models should be considered within the next few years.
- Ensure the spa UV system is repaired properly. If it cannot be repaired, it is recommended to replace with similar product.


Liquid chlorine


Muriatic acid

5. FILTERS

CH Observations and Owner Comments:

- The lap pool is filtered by means of two (2) horizontal high rate sand filters manufactured by Nemato.
    - The filters exterior coatings were observed to be fiberglass and the face piping was schedule 40 PVC.
    - Each commercial filter tank has a filter area of 2.89 m^2 [31.0 ft^2].
        - At the current provided flow rate of 170 m^3/hr [750 GPM], the approximate filtration rate is 29.58 m^3/hr/m^2 [12.1 GPM/Sq. Ft.].
    - The filter butterfly valves allow manual operation of the filter system.
    - The filters have manual air relief valves but no air relief valve drainage.
    - An interior filter inspection was not conducted at the time of the site inspection.
    - The filters are backwashed to the old vacuum filter structure. This structure is used as a holding tank before the water slowly drains to the sewer. There is no backwash flow meter so the backwash flow rate could not be determined.
    - The filters were replaced in 2002. The filters are scheduled to be replaced in December of 2016 during the annual shutdown.
        - It is unknown if the sand has ever been changed since their complete replacement in 2002.
    - The filters are not securely anchored to the mechanical room floor.
    - The manholes appeared to have a moderate amount of calcium buildup which is a sign that the manhole seals are failing.
- The leisure pool is filtered by means of two (2) horizontal high rate sand filters manufactured by Nemato.
    - The filters exterior coatings were observed to be fiberglass and the face piping was schedule 40 PVC.
    - Each commercial filter tank has a filter area of 1.79 m^2 [19.3 ft^2].
        - At the current provided flow rate of 73.82 m^3/hr [325 GPM], the approximate filtration rate is 20.58 m^3/hr/m^2 [8.42 GPM/ft^2].
    - The filter butterfly valves allow manual operation of the filter system.

- The filters have manual air relief valves but no air relief valve drainage.
- An interior filter inspection was not conducted at the time of the site inspection.
- The filters are backwashed to the old vacuum filter structure. This structure is used as a holding tank before the water slowly drains to the sewer. There is no backwash flow meter so the backwash flow rate could not be determined.
- The filters were replaced in 2002. The filters are scheduled to be replaced in December of 2016 during the annual shutdown.
  - It is unknown if the sand has ever been changed since their complete replacement in 2002.
- The filters are not securely anchored to the mechanical room floor.
- The manholes appeared to have a moderate amount of calcium buildup which is a sign that the manhole seals are failing.

- Both the teaching pool and the spa are filtered by means of two (2) vertical high rate sand filters manufactured by Pentair model TR140.
  - The filter exterior coatings were observed to be fiberglass and the face piping was schedule 40 PVC.
  - Each filter has a filter area of 0.66 m^2 [7.06 ft^2].
    - At the current provided flow rate of 23.85 m^3/hr [105 GPM] for the teaching pool, the approximate filtration rate is 18.19 $m^3/hr/m^2$ [7.44 GPM/ft^2].
    - At the current provided flow rate of 23.85 m^3/hr [105 GPM] for the spa, the approximate filtration rate is 17.31 $m^3/hr/m^2$ [7.08 GPM/ft^2].
  - The filter valves are a combination of butterfly and ball valves which allow manual operation of the filter systems.
  - The filters have manual air relief valves but no air relief valve drainage.
  - An interior filter inspection was not conducted at the time of the site inspection.

- The filters are backwashed to a vertical standpipe that drains directly to the sewer. There are no backwash flow meters so the backwash flow rates could not be determined.
- The filters were recently replaced in 2014.
- The filters are not securely anchored to the mechanical room floor.
- The filters are in good condition.

Recommendations:

- Remove and replace both the lap pool and leisure pool filters, filter face piping, and all other associated piping. Provide new high rate sand filtration systems capable of meeting the provided turnover rates.
- Provide and install flow meters on all of the backwash lines for backwashing and draining the pool procedures. Refer to filter manufacturer for recommended backwash flowrates.
- Each filter should be provided with automatic air relief valves hard plumbed to the nearest floor drain to limit water from pooling on the mechanical room floor.
- All filter tanks should be securely anchored to a housekeeping pad or the pool mechanical room floor to limit vibrations and to provide seismic movement.

Lap pool filters

Spa filters

6. POOL HEATING

CH Observations and Owner Comments:

- Each body of water contains its own separate heat exchanger to maintain the pool water temperature at the facility. The heat exchangers are in good condition with no reported issues.

Recommendations:

- As the heat exchangers are performing as designed, no recommendations are required at this time.

7. MECHANICAL ROOM

CH Observations and Owner Comments:

- The existing mechanical room is located in the underground chase surrounding the lap pool and teaching pool. The mechanical equipment for all four bodies of water is stored is various locations around the chase. The mechanical room is in poor condition and poses many safety hazards.
  - The floor is a mix of concrete, sand, and dirt. The array of different floor materials create uneven surfaces which create tripping hazards.
  - Certain sections of the mechanical room are poorly illuminated.
  - Hazardous chemicals are regularly carried to various locations around the mechanical room.
  - Old filter media from the sand filters has been abandoned and piled up in various locations around the mechanical room.
  - Some of the dirt floor patches were observed to be wet. The cause of the wet floors is undetermined.
  - Abandoned pool equipment, including but not limited to filters, pumps, and ozone equipment, was scattered around the mechanical room.

Recommendations:

- Provide a concrete floor for the entire mechanical room. Ensure all tripping hazards are removed.
- Provide adequate lighting around the entire length of the underground chase.
- Remove all abandoned items in the mechanical room and chemical rooms including but not limited to the ozone system, pumps, filters, and filter media.
- Determine the reason as to why patches of the floor were observed to be wet during the site visit. Repair as necessary.


Used filter media


Abandoned pool equipment

8. MISCELLANEOUS

CH Observations and Owner Comments:

- Water level controllers were not observed during the site visit.
  - The operator informed Counsilman-Hunsaker that water is manually added to the pools after hours.

Recommendations:

- Provide new water level controllers with surge tank mounted sensing probes for each body of water. Water level controllers to be model ELC-810 by AquatiControl or a technically similar product. In order to achieve proper surface skimming, the water must be at rim flow at all times. With a manual feed system, the pool is below rim flow numerous times throughout normal operation. A water level controller will ensure the pool maintains rim flow at all times.

D. POOL ITEMS

1. STRUCTURE AND FINISH

CH Observations and Owner Comments:

- Both the lap pool and the teaching pool shells are constructed out of cast in place concrete with a 2” x 2” ceramic tile finish on the pool floors and walls.
  - Signs of leaks in the pool shells were observed in numerous locations in the underground chase.
    - The leaks have calcified on the backside of the pool shells.
    - The mechanical room floor was observed to be wet in several locations in the underground chase.
  - Corrosion staining was observed to be penetrating through the tile finish in the lap pool at several locations on the pool floor and walls.
    - The likely cause of this is the rebar being placed too close to the surface of the floor/walls.
  - Tile grout was observed to be missing is numerous locations on both pools’ floors and walls.
- The recreation pool and the spa have cast in place concrete shells with 3” x 3” ceramic tile finishes on the pool floors and walls.
  - No signs of leaks were observed on the exterior of the recreation pool shell in the underground chase. However, the underground chase does not extended around the entire shell so other locations could not be observed.
  - The tile finishes were observed to be in fair condition.
    - Tile grout was observed to be missing is several locations in both the recreation pool and spa.
    - Tiles were observed to be stained at the time of the site visit; especially at the water line.

Recommendations:

- Counsilman-Hunsaker cannot verify the structural integrity of the pool shells based upon visual inspection and recommends a structural engineer be consulted to perform core testing of the pool shells.

- For the lap pool and the teaching pool, it is recommended to identify the locations of leaks in the pool shells by isolating the pools, performing a dye test, repairing the leaks, and performing a water tightness test. Repeat this process as necessary to ensure the pool vessels are watertight.
- For the recreation pool and spa, Counsilman-Hunsaker recommends to perform a water tightness test to ensure the vessels are watertight. If the pools are found to be losing water, it is recommended to identify the leaks by conducting a dye test and repair as necessary.
- Spot repair all of the corrosion staining in the pools by chipping out the areas that are experiencing corrosion. Once the source of corrosion is found (most likely rebar rods or rebar mesh), cut the rebar back a couple inches then patch and re-tile the areas that have been chipped out. If these spots are not addressed they will likely continue to get worse.
- Clean the waterline tile on a daily basis to combat staining. Staff should clean the tile with Permanon Pool & Spa Cleaner or a similar product.
- Spot repair the grout on the interior tile finishes for all bodies of water.

Leaks in pool shell

Wet mechanical room floor

Corrosion staining

Missing grout

2. PERIMETER OVERFLOW SYSTEM

CH Observations and Owner Comments:

- The lap pool and the teaching pool utilize a concrete perimeter overflow system with a tile finish and stainless steel dropout grates connected to SCH 40 PVC piping.
    - The lap pool contains twenty-two (22) dropout grates and the teaching pool contains eight (8).
        - The gutter dropout grates are corroding and staining through the tile around the grates.
    - Corrosion staining is present along certain areas of the gutter.
    - The gutters were observed to be flooded during the site inspection. The perimeter overflow system is not adequately skimming the surface of the water as designed. Judging by the existing drawings, it appears that the gutter drainage piping is not properly sized to handle 100% of the pools' flowrate.
- The recreation pool contains a perimeter gutter overflow system with perpendicular PVC gutter grating.
    - The perimeter handhold tile and the gutter grating are stained.
    - Large sections of caulking is missing between the gutter grating and the perimeter handhold tile.
    - The overflow gutter appears to be functioning as designed.
- The spa contains a skimmer overflow system with total of three (3) skimmers.
    - The skimmers appear to be functioning as designed.
- According to the B.C. Guidelines for Pool Design, "All pools with overflow gutter systems should have all overflow gutters connected to the circulation system through a properly designed surge tank."

Recommendations:

- Remove the stainless steel gutter dropout grating in the lap pool and the teaching pool and replace with PVC dropout grating.
- Spot repair all of the locations on the lap pool and teaching pool gutters that are experiencing corrosion staining. This involves chipping out the affected areas,

identify the sources of corrosion (most likely rebar rods or rebar mesh), cut the rebar back a couple inches then patch and re-tile the areas that have been chipped out. If these spots are not addressed they will likely continue to get worse.

- Provide properly sized gutter drainage piping in the lap pool and the teaching pool sized to handle 100% of the pools' flowrate.
- For aesthetic purposes, acid wash the PVC gutter grating on the recreation pool.
- Clean the perimeter handhold tile in the recreation pool on a daily basis to combat staining. Staff should clean the tile with Permanon Pool & Spa Cleaner or a similar product.
- Install new backing rod and re-seal the joint between the gutter grating and the perimeter handhold tile in the recreation pool with chlorine resistant caulking.
- Per code, provide properly sized surge tanks for each pool with a perimeter overflow gutter system (lap pool, teaching pool, and recreation pool). It could not be confirmed, but it would be worth checking if the pools are allowed to be "grandfathered in" without a surge tank.


Corroding gutter dropout grate


Corrosion staining on perimeter gutter


Missing section of caulking


Stained gutter grating

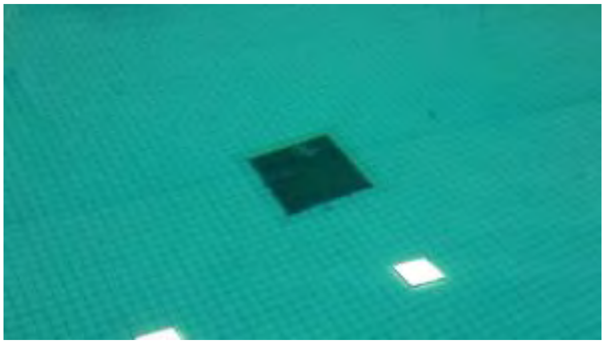
3. MAIN DRAINS

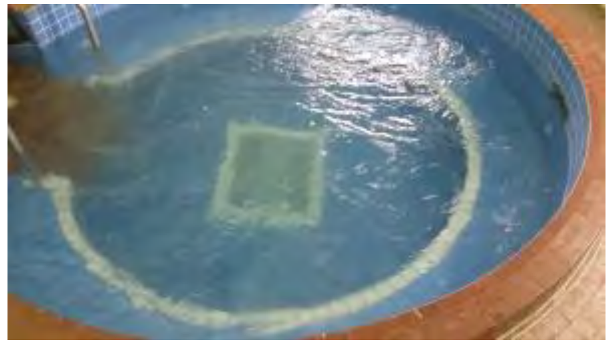
CH Observations and Owner Comments:

- All of the pools at the Four Seasons Aquatic Centre have main drains located at their deepest location. The Virginia Graeme-Baker Pool and Spa Safety Act (VGBPSSA) was passed in the United States to prevent the tragic and hidden hazard of drain entrapments and eviscerations in pools and spas.
- According the B.C. Guidelines for Pool Design, "The act outlines provisions to minimize the risk of entrapment, including vacuum covers, pool barriers and main drain requirements. While the VGBPSSA is not law in B.C., the Ministry of Health supports the efforts to reduce suction hazards."
- Not all of the pools have at least two (2) separated main drains which is key to helping prevent suction entrapment.
- The following has been taken from the B.C. Guidelines for Pool Design, "To minimize suction and entrapment hazards, it is strongly recommended, as an engineering best practice, that a minimum of two drains be installed in a pool."
    - "If it is not possible to install two drains (such as a pool retrofit), all outlet and discharge pipes should be adequately guarded to prevent an adverse suction hazard. Design considerations to minimize suction hazards where two drains are not feasible include:
        - Installing a side/vertical mounted suction fitting, as long as the main drain line and suction fitting are interconnected and the velocity through the suction fitting is less than 46 cm/sec (1.5 ft/sec) at the design flow rate.
        - Installing onto the main drain line an air line (anti-suction system), supplemental vacuum relief system, or automatic pump shutoff that will relieve the suction if the intake gets blocked.
        - Converting the drain plumbing into a gravity drainage system."
- It could not be confirmed at the time of the site visit if the main drain covers are compliant with the Pool Regulation. Further investigation is required.

Recommendations:

- As the most cost effective option, Counsilman-Hunsaker recommends to provide suction vacuum release systems on all recirculation lines that do not have separated dual main drains in order to comply with the governing code.


Lap pool main drain


Spa main drain

4. INLETS

CH Observations and Owner Comments:

- The B.C. Guidelines for Pool Design states the following regarding inlet fittings, "Inlet fittings should: Be of a type whereby the rate of flow and directional angle can be adjusted to improve circulation. Be placed in the pool wall and spaced no more than 9 m (30 ft) apart measured from the perimeter of the pool or one fitting for each 45,460 L (12,000 U.S. gallons) of pool volume, whichever is more."
  - The lap pool contains thirty-two (32) wall inlets with non-adjustable stainless steel inlet coverings. Some of the stainless steel coverings were observed to be missing at the time of the site inspection. Per code, the lap pool contains a sufficient number of inlets. The inlets are adequately spaced.
  - The teaching pool contains four (4) wall inlets with non-adjustable stainless steel inlet coverings. Per code, the teaching pool contains a sufficient number of inlets, however a section of the pool around the stairs contains a distance greater than 9 m [30 ft] without an inlet.
  - The recreation pool contains ten (10) adjustable PVC floor inlets. Per code, the recreation pool contains a sufficient number of inlets. The inlets are adequately spaced.
  - The spa contains three (3) adjustable PVC wall inlets. Per code, the spa contains a sufficient number of inlets. The inlets are adequately spaced.
    - The hydrotherapy jet inlets were observed to be in good working condition at the time of the site visit.

Recommendations:

- In order to comply with code, replace all of the non-adjustable inlets with, “a type whereby the rate of flow and directional angle can be adjusted to improve circulation.”
- Install an additional wall inlet near the stairs in the teaching pool. Provide water stops for all concrete penetrations.

5. SAFETY LINES AND LAP LINES

CH Observations and Owner Comments:

- Safety line anchors and lines are provided in the lap pool at the 2 m [6.5 ft] depth to designate the boundary between the swimming area and the diving area as required by code.
- A four inch wide tile marking strip of contrasting colour is provided at the 2 m [6.5 ft] depth.
- A safety line with floats is provided to separate the slide dropout area from general swimming area in the recreation pool.
- Lap lines were observed to be to be in fair/poor condition.

Recommendations:

- While the lap lines are functioning at the moment, they are beginning to show their age and should be replaced in the near future.

6. INGRESS AND EGRESS

CH Observations and Owner Comments:

- It should be noted that Canada is not required to follow the ADA Accessibility Guidelines used in the United States. However, the B.C. Guidelines for Pool Design references the following, “Special considerations specific to pool accessibility that may not be covered in the B.C. Building Code should be designed following good design practices, such as the use of the ADA Accessibility Guidelines”.
- The lap pool contains one (1) set of recessed steps with grab rails, three (3) removable ladders, and one (1) removable PVC stair system. A movable handicapped lift is provided and stored on the pool deck.

- The working condition of the handicapped lift was not observed during the site visit.
- The recessed steps in the lap pool were observed to have three (3) underwater steps. According to the B.C. Guidelines for Pool Design, "Steps (recessed and semi-recessed) and ladders should: Have at least four rungs/steps when placed in water depths greater than 1.5 m (5 ft)."

- The teaching pool contains a set of stairs along an entire end wall. Stainless steel rails are provided on either ends of the stairs.
- The recreation pool contains a removable ladder, a row of stairs on the shallow end with a stainless steel handrail located in the middle of the stairs, and a sloped entry with stainless steel hand rails on either side.
- The spa contains a set of stairs with stainless steel handrails on either side.
- A number of the stainless steel rail goods at the Four Seasons were displaying signs of corrosion at the time of the site visit. All rail goods displayed calcium staining.
    - Several escutcheon plates for rail goods were observed to be missing.
- Through observation during the site visit and the public meetings process, it is apparent that many elderly and handicapped persons use the Four Seasons facility on a regular basis.

Recommendations:

- Demolish and remove the recessed steps and grab rails in the lap pool. Provide a removable ladder with an adequate number of stair treads in order to comply with the governing code.
- Due to the fact that elderly people regularly use this facility, it is recommended to install an ADA complaint, concrete ramp in the shallow end of the lap pool. This will take the place of the removable plastic stair system.
- In order to comply with the ADA regulations, it is recommended to provide and install an ADA compliant lift for the teaching pool and the spa.
- Replace all of the stainless steel rail goods displaying signs of corrosion.
- While it is difficult to completely prevent corrosion, cleaning all stainless steel rail goods on a regular basis will minimize the spread of corrosion.


Corroding rail goods


Missing/broken escutcheon plates

E. Pool Deck Items

1. Deck

<u>*CH Observations and Owner Comments:*</u>

- The deck surrounding the lap pool and the teaching pool is in fair condition. It is composed of 4" x 8" ceramic tiles.
    - The tile were observed to become slippery when wet. This concern was brought to Counsilman-Hunsaker's attention numerous times during the site visit. The B.C. Guidelines for Pool Design calls for flooring within the pool area to, "Retain a nonslip (slip-resistant) texture and cause no discomfort to bare feet." Refer to the code for additional slip resistant guidelines.
    - The B.C. Guidelines for Pool Design states, "Tiles greater than 15 cm x 15 cm (6 in x 6 in) – are not recommended due to potential slip hazards and difficulty in maintaining pool deck slope."
    - There is roughly 63.5 cm [25 in] of clear deck space between the 3M diving board and the natatorium wall. According to B.C. Guidelines for Pool Design, "There should be at least 1.2 m (4 ft) of clear deck space surrounding all diving equipment, including stairs and ladders."
- The deck surrounding the recreation pool and the spa is in fair condition. It is composed of 3" x 3" ceramic tiles.
    - Calcium staining was observed on the deck tile in numerous locations.
    - Corrosion staining was observed on the ramp that connects the teaching pool deck to the recreation pool deck.
    - Grout was missing in several locations on the pool deck; especially near the deck slot drains.

<u>*Recommendations:*</u>

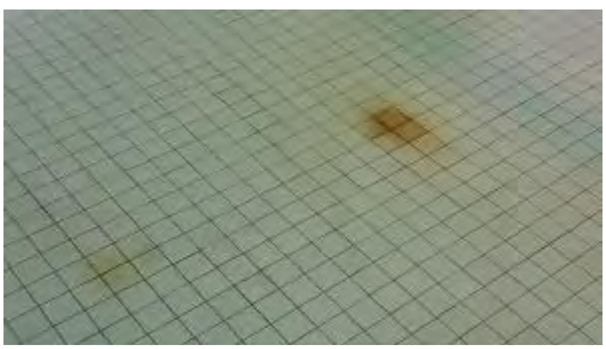
- Due to liability concerns, Counsilman-Hunsaker recommends to replace the entire lap pool and teaching pool deck immediately. Refer to the B.C. Guidelines for Pool Design to ensure the new deck meets all of the slip resistant requirements.
- Counsilman Hunsaker recommends to remove the 3M diving board and ensure at least 1.2 m [4 ft] of clear deck space is maintained around all obstructions per code. According to Northern Health, "The purpose of the 4 foot wide walkway is to allow

transit of patrons and access for emergency egress. 25 inches may or may not present an impediment for emergency access. This can be reviewed more closely by Northern Health if required. If the diving board were to be removed, notify Northern Health and ensure the deck is repaired to an acceptable standard."

- For aesthetic purposes, acid wash the deck tile in order to remove stains. Clean the deck tile on a daily basis to combat future staining.
- Spot repair all of the corrosion staining on the pool deck by chipping out the areas that are experiencing corrosion. Once the source of corrosion is found (most likely rebar rods or rebar mesh), cut the rebar back a couple inches then patch and re-tile the areas that have been chipped out. If these spots are not fixed they will likely continue to get worse.
- Fill in deteriorated grout in the pool deck with new grout.


Lap pool and teaching pool deck tile


Distance behind the 3M diving board


Corrosion staining


Missing grout

2. DIVING BOARDS

CH Observations and Owner Comments:

- The lap pool contains two (2) diving boards; one (1) 3M and one (1) 1M. The diving boards are located in a diving well that is separated from the general swim area with a safety line.
    - The diving boards and stands appear to be in fair condition with mild wear and tear.
- The dive tank is 3.35 m [11 ft] deep.
    - In British Columbia, water depths for spring boards are governed by the Federation Internationale de Natation Amateur (FINA)'s Facility Rules. For 1-meter spring boards, FINA calls for a minimum water depth of 3.4 m [11.2 ft]. For 3-meter spring boards, FINA calls for a minimum water depth of 3.7 m [12.1 ft].

Recommendations:

- Due to the depth of the dive tank, Counsilman-Hunsaker recommends to suspend diving at the facility. It should be noted that Northern Health mentioned, "FINA rules pertain more so to competitions and are not necessarily regulatory requirements for existing facilities. If the facility wishes to remove the diving board, Northern Health would not be opposed to this as long as the deck is repaired to an acceptable condition."

3. WATERSLIDE

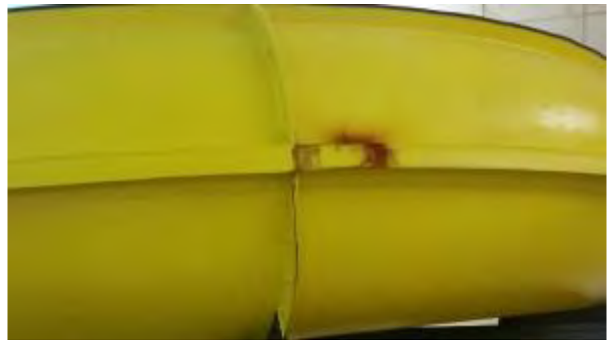
CH Observations and Owner Comments:

- The recreation pool contains one (1) open flume waterslide.
    - The waterslide is dirty, stained, and displaying signs of corrosion.
    - The support structure and stair system is also displaying signs of corrosion.

Recommendations:

- A structural engineer should be consulted to test the structural integrity of the slide supports and stair system.
- While the waterslide is fully functional, it is beginning to show its age and should be replaced in the near future.

Stained slide



Corrosion staining

4. TIMING SYSTEM AND STARTING BLOCKS

CH Observations and Owner Comments:

- One KDI Paragon starting block was provided for the lap pool. The starting block was 55.9 cm [22 in] off of the surface of the water.
    - The starting block was observed to be antiquated and in poor condition. The single post anchoring system was wobbly, the anchoring system was displaying signs of surface corrosion, and the stainless steel was stained.
    - An orange cone was used as a starting block cover to prevent patrons from using the staring block during open swim hours.
    - Three (3) extra starting blocks were observed to be stored in a support space.
- A timing scoreboard was observed on the wall in the natatorium.
    - It was not confirmed if the scoreboard is functional at the time of the site inspection.
    - Touch pads, cable harnesses, or any other timing equipment was not observed.

Recommendations:

- According to the operator, competitive swimming no longer occurs at the Four Seasons Aquatic Centre. Therefore, Counsilman-Hunsaker recommends to remove the starting blocks, the timing equipment, and the scoreboard from the facility.

Starting block anchor

Scoreboard

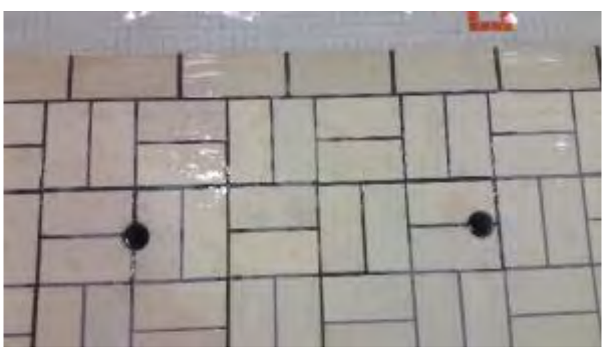
5. MISCELLANEOUS

CH Observations and Owner Comments:

- Holes in the pool decks were observed from abandoned grab rails, removable ladders, starting blocks, etc. These locations can allow water to pond and lay stagnant causing bacterial buildup.
- Various pieces of safety and maintenance equipment was observed throughout the facility. A complete inventory of these items was not taken at the time of the site visit.

Recommendations:

- Provide caps for the holes in the pool deck or fill in with concrete and retile.
- It would be advisable to take inventory of the present safety and maintenance equipment to ensure compliance with all of the governing codes.



Holes in pool deck

Safety equipment

F. Opinion of Probable Cost

Disclaimer: The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Soil conditions and structure methods can have large impact on project cost. Opinion of probable cost include typical structural design approaches, the consultant defers to the structural consultant for added cost if additional structure enforcement are dictated by project Geotechnical Report. Cost also are indicative of the typical General Contractor and Pool Contactor relationship. Specifics on construction methods and associated cost will have to be studied by outside firms. Opinions of probable cost are representative only of the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Rating Definitions

Deficiency Priority

1 = Necessary and Critical
2 = Necessary and High Priority
3 = Recommended - but not critical or high priority
4 = Deferrable

Age Category

1 = Old (Last 1/4 of Life)
2 = Older Mid Life (Third 1/4 of Life)
3 = New Mid Life (Second 1/4 of Life)
4 = New/Like New (First 1/4 of Life)

Condition

1 = Unusable/Not Servicable/Hazardous
2 = Damaged and/or does not meet standard
3 = Non - compliant aspects but replacement not critical
4 = Minor wear/tear but meets standard
5 = Excellent, meets standard

Four Seasons Leisure Pool - Opinion of Probable Cost

Recommendations

Item #	Item Description	Difficiency Priority	Age Category	Condition	Expected Life (Yrs)	Cost	Notes
1	Replace all exposed piping in the mechanical room with Schedule 80 PVC.	2	1	2	25	$274,750	
2	Provide colour coordination and directional flow arrows on all pool related piping per code.	2	N/A	N/A	50	$785	Regulatory guideline.
3	Replace all of the corroding pipe hangers and supports.	2	1	2	25	$0	Included in the pipe replacement cost.
4	Install impact style flow meters on all main drain lines or gutter/skimmer lines.	3	N/A	N/A	25	$1,256	Regulatory guideline.
5	Replace the pumps that are nearing the end of their useful life.	3	1	3	20	$47,100	
6	Provide a new recirculation pump for the teaching pool.	1	4	2	20	$7,850	
7	Install new pressure and vacuum gauges around each recirculation pump.	3	1	2	20	$1,570	
8	Replace all of the corroding flanges and check valves around the pumps.	2	1	2	25	$9,420	
9	Provide concrete housekeeping pads for all pool pumps.	3	N/A	N/A	50	$1,256	Regulatory guideline.
10	Provide and install VFDs on all of the recirculation pumps.	3	N/A	N/A	20	$21,980	Future cost savings recommendation.
11	Replace all valves with Schedule 80 PVC true union style ball valves and butterfly valves when the pool mechanical room piping is replaced with Schedule 80 PVC.	2	1	2	25	$0	Included in the pipe replacement cost.
12	Provide valve tags for each valve and post a piping and valve chart system schematic in the pool mechanical room.	3	N/A	N/A	50	$707	
13	Construct two (2) new chemical storage rooms in the existing mechanical space.	2	1	2	50	$78,500	Cost includes engineering design.
14	Replace the muriatic acid chemical container with a larger double-walled model and affix with acid scrubbers to prevent acid fumes from entering the mechanical space.	2	2	2	15	$3,925	
15	Consider replacing the chemical controllers with newer models.	4	2	4	15	$59,660	
16	Remove and replace both the lap pool and leisure pool filters, filter face piping, and all other associated piping.	2	1	2	15	$125,600	
17	Provide and install impact style flow meters on all of the backwash lines for backwashing and draining the pool procedures.	3	N/A	N/A	25	$1,256	
18	Provide automatic air relief valves for each filter and hard plumb each to the nearest floor drain to limit water from pooling on the mechanical room floor.	3	N/A	N/A	15	$1,570	
19	Securely anchor all filters to a housekeeping pad or the pool mechanical room floor to limit vibrations and to provide seismic movement.	2	N/A	N/A	15	$314	
20	Provide a concrete floor for the entire mechanical room. Ensure all tripping hazards are removed.	2	1	1	50	$66,040	Safety consideration.
21	Provide adequate lighting around the entire length of the underground chase.	2	1	1	50	$7,850	Safety consideration.
22	Provide new automatic water level controllers with in deck mounted sensing probes for each body of water.	2	1	1	10	$37,680	
23	Consult a structural engineer to perform core testing of the pool shells.	2	1	Unknown	50	$6,280	This line item will be better defined during the on-site evaluation and testing.
24	Identify the locations of leaks in the pool lap pool and teaching pool shells by isolating the pools, performing a dye test, repairing the leaks, and performing a water tightness test.	1	N/A	N/A	N/A	$15,700	This line item will be better defined during the on-site evaluation and testing.
25	Perform a water tightness test on the recreation pool and spa to ensure the vessels are watertight.	3	2	4	50	$7,850	
26	Spot repair all of the corrosion staining in the pools.	2	N/A	2	N/A	$31,400	
27	Spot repair the grout on the interior tile finishes in all bodies of water.	3	N/A	2	15	$7,850	
28	Remove the stainless steel gutter dropout grating in the lap pool and the teaching pool and replace with PVC dropout grating.	3	1	3	25	$11,775	
29	Provide properly sized gutter drainage piping in the lap pool and the teaching pool sized to handle 100% of the pools' flowrate.	1	2	2	25	$0	Included in the pipe replacement cost.
30	Acid wash the PVC gutter grating on the recreation pool.	4	3	4	25	$157	
31	Install new backing rod and re-seal the joint between the gutter grating and the perimeter handhold tile in the recreation pool with chlorine resistant caulking.	2	1	2	10	$1,884	
32	Provide properly sized surge tanks for each pool with a perimeter overflow gutter system (lap pool, teaching pool, and recreation pool).	3	N/A	N/A	50	$211,950	The pools may be able to be "grandfathered in". It is recommended to confirm with the governing code officials. Cost includes engineering design.
33	Provide suction vacuum release systems on all recirculation lines that do not have separated dual main drains in order to comply with the governing code.	1	N/A	2	25	$7,536	Regulatory guideline.
34	Replace all of the non-adjustable inlets.	2	2	2	25	$8,478	Regulatory guideline.
35	Install an additional wall inlet near the stairs in the teaching pool.	1	N/A	2	25	$785	Regulatory guideline.
36	Replace the lap lines.	3	1	3	15	$4,120	
37	Demolish and remove the recessed steps and grab rails in the lap pool. Provide a removable ladder with at least four (4) steps.	2	N/A	2	25	$4,710	Regulatory guideline.
38	Install an ADA complaint, concrete ramp in the shallow end of the lap pool.	3	N/A	N/A	50	$117,750	
38	Provide and install a handicapped pool lift for the teaching pool and the spa.	2	1	2	15	$18,840	ADA regulation.
39	Replace all of the stainless steel rail goods displaying signs of corrosion.	2	1	2	15	$18,840	
40	Replace the entire lap pool and teaching pool deck tile with new slip resistant tile.	1	1	1	25	$206,377	Safety concern that should be adressed immediately. Regulatory guideline.
41	Acid wash the deck tile around the recreation pool and spa in order to remove stains.	3	N/A	4	N/A	$3,575	
42	Spot repair all of the corrosion staining on the pool deck.	3	N/A	3	N/A	$23,550	
43	Fill in deteriorated grout in the recreation pool deck and spa deck with new grout.	3	1	3	10	$1,178	
44	Consult a structural engineer to test the structural integrity of the slide supports and stair system.	2	2	Unknown	20	$7,850	This line item will be better defined during the on-site evaluation and testing.
45	Replaced the waterslide.	4	2	4	25	$235,500	
46	Provide caps for the holes in the pool deck or fill in with concrete and retile.	2	N/A	N/A	N/A	$550	
					Items Subtotal	**$1,703,552**	
					15% Contingency	**$255,533**	
					Total (2016 CAN)	**$1,959,085**	

11.2 Audit Report: Prince George Aquatics Centre

11.2.1 Architecture

Based on the reviews of past reports and our recent facility reviews the Aquatic Centre requires some important upgrades beyond the addition of an additional pool tank. First and foremost is the observations made of a potential building envelope failure. There are three observed issues of concern:

- There is bubbling of the roofing membrane indicating that there are breaks in the roof's vapour barrier and this will eventually lead to degradation of the roofing membrane, energy loss, and potential structural member degradation.
- There is a breakdown of the roofing membrane and the vapour barrier in the parapets that is leading to energy loss, the failure of the parapets, and the potential degradation of the structural members below the parapet.
- There is a significant crack in the building's exterior wall approximately at the joint between the higher and lower sections of the building and this is allowing infiltration of outside air and the exhausting of moist interior air which will eventually lead to a breakdown of the exterior cladding of the building to a much greater extend. It is also a source of energy loss.

As such, we strongly recommend the immediate engagement of a building envelope specialist to investigate these issues, report on whether they are of a serious nature, and propose remedial action to prevent any further degradation of the roof and walls of the Aquatic Centre. The recommended remedial action should be acted upon as soon as financially possible as the current issues likely are leading to permanent damage to the structure of the facility and this would lead to much higher remedial repair costs in the future.

Other upgrades required to bring the Aquatic Centre up to current standards for aquatic facilities include the following:

- The creation of a significant number of family change facilities
- The expansion of the fitness centre
- An increase is storage space for the facility
- Providing for spectator facilities for events

The improvement of the accessibility of the general facility and the pool tanks

Acoustical Systems

It is observed that the acoustics in the Prince George Aquatics Centre facility are quite good. The noise level is acceptable for teaching, safety and play. The life guards and instructors easily communicate between each other and the users while maintaining a background level of activity noise to give the facility “life”.

The aquatics centre pool tank area acoustics are managed by a number of architectural and finish solutions. Most notable are the baffles strung across the ceiling which absorb excess sound. While the space has many hard surfaces, many of them are not flat but move in and out of the wall plane allowing for sound to be reflected back into the rooms at different angles. All of this creates a better acoustical solution. The fabric of the baffles in the ceiling do appear to be deteriorating and should be reviewed for replacement.

The support space acoustics of the offices, locker rooms, fitness centre, multipurpose rooms, lobby etc. are adequate and required no modification. The functions are served well by the current design.

We find the acoustics in the Prince George Aquatics Centre to be adequate for the performance of staff and safety aspects of the facility. Our professional recommendation is to review replacement of the existing acoustic baffles in the ceiling of the pool tanks.

Doors and Door Frames

The interior doors at the Prince George Aquatics Centre are primarily painted hollow metal doors in hollow metal frames with stainless steel kick plates mounted to the bottom of each door. The doors appear to be in very good condition without much deterioration given the moist conditions. The doors to the mechanical spaces are also painted hollow metal and in good condition. There is minor rusting and deterioration of the frames at the bases where doors are located directly off the pool deck.

The exterior doors are either glass storefront or painted hollow metal. These are in very good condition and operation except for some deterioration occurring at the base of the metal frames and in some cases at the header.

The door hardware appears to be in good condition and operation in all cases of doors, although the some of them do not meet the accessibility criteria, because they use the old fashioned door knobs instead of lever handles. This increases the difficulty for people accessibility requirements to comfortably, independently be able to move through the facility on their own.

We find the doors in the Prince George Aquatics Centre to be adequate for future use and do not recommend any changes except to provide accessible hardware.

Accessibility

Accessibility at the Aquatics Centre is a combination of compliant and non-compliant situations primarily on the interior. Some conditions are not code compliant.

Exterior

The main entrance is on a very accessible path into the facility. The accessible parking is located out in front of the main entrance. The path is generally level and compliant. The accessible parking is adequate with respect to code compliance, number of stalls, signage and meeting parking stall access standards.

The exterior door entrances are code compliant and provide equal access hardware. The entrance doors off the parking incorporate push button type accessible hardware to enable the door to automatically open with virtually little effort for those without the strength to pull it open.

Interior

Doors:

Some of the interior doors are not code compliant, and need to be equipped with accessible door hardware. Doors have, door knobs (round handles) instead of lever type. Entrances to some spaces do not have the appropriate clearance to the door jambs for accessible egress and entry.

Change Rooms/ Washrooms/ Staff Locker Rooms:

The public male and female change rooms do not provide accessible toilet stalls, showers, sinks or private changing cubicles. The required clearances to facilitate the accessibility of these elements are not there. The family change rooms do provide accessible change rooms, washroom, and showers although this requires a level of segregation from the rest of the public.

The public washrooms are generally accessible with only minor adjustments required to the sinks and mirrors.

The staff change rooms do comply for staff accessibility, and require accessible toilets, sinks, accessories, showers and changing spaces that can accommodate a wheelchair or other disabilities. The toilet cubicles are too small to accommodate a wheelchair and sometimes don't allow for a turning radius to exit the room as a whole. The sinks and counters required adjustments in height, under counter clearance and depth. Accessories such as mirrors, toilet paper dispensers, grab bars all require updating with respect to mounting heights.

General:

The entrance desk would benefit from having an accessible counter area directly facing the entrance to welcome disabled clientele.

Pool deck and tanks:

There is an accessible ramp into the leisure tank/wave pool. The pool deck does not comply with today's accessibility requirements with respect to visually impaired warning strips, change in colour of deck tiles at ramps or stairs. The tanks themselves are accessible, albeit cumbersome with equipment specially manufactured for disabled access.

Administration/ Support spaces/ Multi-purpose room:

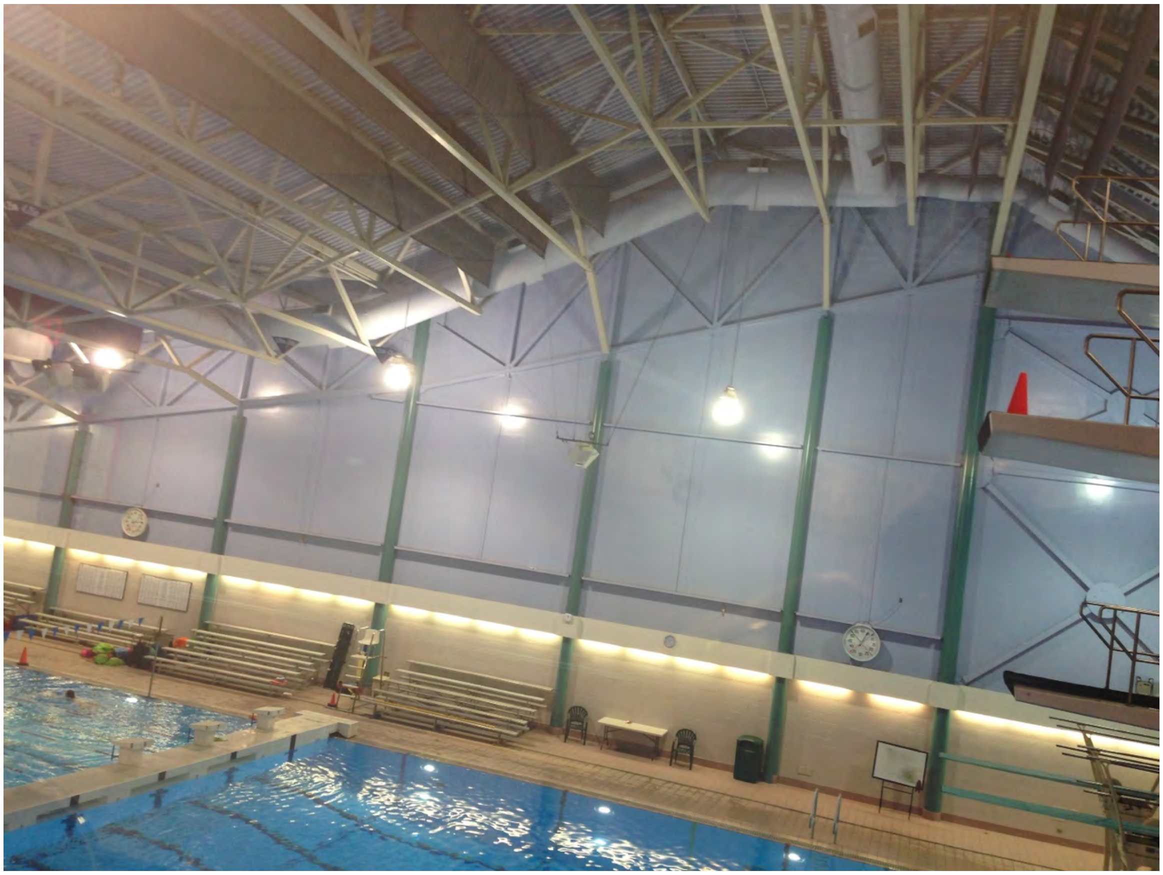
Review of these spaces identified the primary accessibility concerns being non-compliant door hardware and clearances at doors for opening and closing.

The accessibility review of the Prince George Aquatics Centre finds a portion of the facility is not compliant with today's codes and regulations. Our professional recommendation is that major renovations are required to the change rooms, staff locker rooms, doors clearances and hardware to bring it into the 21st Century compliance.

Prince George Aquatic Centre: Architectural Upgrade Costing – Major Components

Change room renovations	$2,106,000
Staff change room renovations to correct accessibility issues	$279,500
Building envelope repair	$1,548,000
Acoustical improvements	$390,000
Sub-total	*$4,323,500*
15% Construction Contingency	$648,525
Total	*$4,972,025*

11.2.2 Structural



This facility has a structural steel primary structure with masonry partition walls and masonry non-load bearing exterior walls. Drawings were not available and we understand that the building was completed in the 1990's.

The steel structure appears to be in good condition except for minor rusting at the base of the interior columns. This rust has resulted in the deterioration of the columns finishes at the base.

We recommended for the Prince George Aquatics Centre, that the finishes be removed and the rust brushed off or removed to sound material. A different finish design should be applied so as not to trap moisture between the steel and the applied finishes.

The exterior masonry veneer appears to be in good condition except for some cracking in isolated locations. This cracking should be repaired by repointing and/or epoxy injections.

Minor cracking was observed at the base of the exterior columns. This is due to the base concrete “collar” being too thin. This cracking is non-structural and the cracked concrete can be repaired or removed.

A walk through the basement did not reveal any deficiencies or deterioration in the underground concrete structure.

11.2.3 Mechanical and Electrical Systems

A site review was completed to examine the condition of the mechanical and electrical systems (air conditioning, plumbing, distribution, etc., and lights, communications, power, etc.) related to non-pool tank areas at the Prince George Aquatic Centre. In addition, previously completed reports (RJC 2010, AME, 2010, Tetra Tech, 2015, etc.) were reviewed for their findings. The mechanical/electrical systems for the pool tank areas are covered in Section 11.2.4.

All electrical items relate to normal ongoing minor and major maintenance and operation work. Repairs and replacement can be scheduled on a yearly basis during normal operations or yearly shutdowns. Costs for ongoing servicing of the Prince George Aquatic Centre are larger than that of the Four Season Pool simply due to its larger size.

Mechanical items are related to both ongoing minor and major maintenance and operation work and equipment replacement due to end-of-service-life conditions. As with electrical items, repairs and replacement work for minor and major maintenance and operation work can be scheduled on a yearly basis during normal operations or yearly shutdowns. The implementation of capital replacement items for end-of-service-life conditions will be more disruptive, but given that this facility is not as old as the Four Seasons Pool, this work can likely be scheduled to be completed during an extended annual shutdown period.

As per the electrical systems, there are no mechanical systems that cannot be upgraded or replaced in order to maintain the mechanical systems of the Prince George Aquatic Centre for its current operations. As with the electrical systems, mechanical costs for ongoing servicing of the Prince George Aquatic Centre are larger than that of the Four Season Pool simply due to its larger size.

Below is a summary of the total funds that require allocation year to year for ongoing and major mechanical and electrical system maintenance and major capital end-of-service-life conditions from 2016 to 2024.

Tetratech Summary by Year and Facility

Aquatic Centre	2016 Total	$136,186
Aquatic Centre	2017 Total	$74,553
Aquatic Centre	2018 Total	$60,701
Aquatic Centre	2019 Total	$243,351
Aquatic Centre	2020 Total	$42,092
Aquatic Centre	2021 Total	$60,606
Aquatic Centre	2022 Total	$481,265
Aquatic Centre	2023 Total	$414,369
Aquatic Centre	2024 Total	$63,893
AQUATIC CENTRE GRAND TOTAL		*$1,577,016*

Total electrical expenditures to 2024 - $368,337

Total mechanical expenditures to 2024 - $1,208,679

Below is a summary of mechanical and electrical work recommended. See Section 11.4 for a listing of all work and the costs associated with each work item for both aquatic centres.

Plumbing

Condition Notes:

Plumbing fixtures throughout the facility are in general of original installation, but are in general serviceable and in good condition. Infrared urinal fixture retrofits have been completed, metering lavatory valves are in place, original toilet flush valves are retained for the most part.

The plumbing drainage and hot and cold supply piping within finished spaces was generally inaccessible for review, but given the fairly low age of the facility and its general state of good repair, the system should be in good repair.

Recommendation Notes:

Of the original fixtures and trim remaining, there should be a plan to replace original units with more modern, water conserving fixtures, possible in concert with architectural upgrading.

HVAC /Controls

Condition Notes:

Generally, the systems are in good visual operating condition and appear well maintained. With continued service, inspection and upgrading as required, wholesale main system equipment replacement should not be required in the next 8 to 10 years.

The air handling units have been retrofitted for variable volume operation, heating pumps have been retrofitted to variable speed operation and controls revised to suit new controls.

There is an ongoing issue with a gummy particulate forming on filters, and when filters are bypassed due to collapsed filters, depositing on coils surfaces. This deposit prematurely loads filters and fouls the coil surfaces.

The heating system has been recently retrofitted with new boilers, revised piping, pumping and controls. There is some evidence of rooftop boiler flue degradation.

There is an ongoing issue with building pressurization in the main lobby and lobby entrance. Negative pressure in this area and the configuration of the vestibule heater combine to produce excessive frosting/icing in the vestibule and cold drafts in the lobby.

Recommendation Notes:

Short Term:
Samples of the particulate need to be laboratory analyzed for their composition, origin and a plan formulated to mitigate the damage from the particulate as long term degradation of the air system performance and physical condition of the air system is a risk. In the short term, filters with more substantial framing should be installed to avoid filter collapse and air bypass. A more frequent filter monitoring and replacement program should be implemented.

Rooftop boiler flues should be inspected in detail and replaced/upgraded as necessary.

Engineering and air balance study necessary to identify options/solutions of remediation of lobby and main entrance heating system configuration.

Long Term:
The Tetra Tech Report of 2015 has earmarked funds in miscellaneous, multiple years to replace and upgrade the mechanical systems. Some of the earlier recommended budgeted expenditures such as air handling unit replacements can likely be deferred, planned system upgrading of the system is prudent. It makes sense to redistribute some of these budgets to coincide with planned renovations, and further implementations of the 2010 AME Engineering Energy Conservation Report recommendations.

Lighting

Condition and Recommendation Notes:

The majority of facility lighting has been retrofitted from what was the original design fixtures but has not been upgrades to newer LED technologies.

Lighting controls are primarily low voltage Douglas system, with local control at a central control panel, future integration with the BMS may be desirable, integration with additional controls for daylighting and occupancy/vacancy could also improve energy efficiency.

Power distribution is generally modern, well instrumented and in good condition. Some upgrading of mechanical has modified the motor control with additional variable frequency drives.

The Tetra Tech Report of 2015 has earmarked funds in miscellaneous, multiple years to replace upgrade the electrical systems. It makes sense to redistribute some of these budgets to coincide with planned renovations.

An electrical energy conservation report could help lower operating cost and leverage the work plan through available utility grants and energy savings. The Energy Conservation Report could address implementation of renewable energy such as PV, migrating lighting sources to LED, reassessing lighting levels and updating conservation controls.

11.2.4 Aquatic Needs Assessment

intentionally blank for double sided printing

Prince George Aquatic Centre

Prince George, British Columbia

Aquatic Needs Assessment

Counsilman • Hunsaker
AQUATICS FOR LIFE

August 2016

Contents

A. Executive Summary

Dialog Design commissioned Counsilman Hunsaker to provide an aquatic needs assessment of the Prince George Aquatic Centre in March of 2016. Construction of the Prince George Aquatic Center finished in December of 1998. The facility boasts a 50-M competition pool, a recreation pool with a lazy river and a wave generator, and a spa with a sloped entry. Minor improvements have been made to the pools, the building, and mechanical systems over the years in order to keep the pools in working condition. Dialog Design commissioned this audit to assist in identifying items that are substandard or not operating as designed. Providing a safe and sanitary environment for the users of the pool is the highest priority for the Owner.

The facility is used for swim lessons for all ages, leisure swimming, competitive swimming and diving, water aerobics, general recreation, and therapy/rehabilitation.

A site visit to the Prince George Aquatic Centre, by Kevin Post and Connor Riley of Counsilman Hunsaker, was performed on the 22nd of March, 2016. The purpose of the site visit was to evaluate the existing pools, supporting building spaces, the respective mechanical systems and to provide an opinion of probable cost for items identified.

Overall, the Aquatic Centre is in good condition. It is obvious that a well trained staff has taken care of the pools and their associated mechanical systems. There are certain items that are not code compliant. These items should be addressed immediately for safety concerns.

All references to the regulations of the health department in this report refer to the B.C. Guidelines for Pool Design, Version 2, June 2014, Health Protection Branch Ministry of Health. These are the current swimming pool design standards for British Columbia. If a major renovation were to occur, all aspects of the pool and associated systems would need to be brought up to the current design standards. It is assumed that the all of the pool items were compliant with the existing code at the time of construction or the last major renovation. Other code references include the Federal Pool & Spa Safety Act (also known as the Virginia Graeme Baker Act), the Americans with Disabilities Act with specific reference to swimming pools, and the Federation Internationale de Natation Amateur (FINA) with regards to diving facility regulations. For simplicity in the report, all codes, regulations, and guidelines are referred to as “code”.

B. POOL INFORMATION

1. Lap Pool
   a. Dimensions – 52 m long x 18.6 m wide [170.6 ft x 61.0 ft]
   b. Surface Area – 967 m^2 [10,409 ft^2]
   c. Depth – Movable floor at the shallow end to 4.5 m [14.8 ft] at the deep end main drains
   d. Number of Lanes – 8
   e. Lane Width – 2.25 m [7.38 ft]
   f. Volume – 2,321 m^3 [613,160 gallons] (Per email from Northern Health)
   g. Perimeter – 141 m [463 ft]
2. Recreation Pool
   a. Dimensions – Varies
   b. Surface Area – 401 m^2 [4,316 ft^2]
   c. Depth – Zero-depth entry to 1.5 m [4.9 ft] at the deep end main drains
   d. Volume – ~265 m^3 [70,000 gallons] (volume as reported by operator)
   e. Perimeter – 105 m [344.5 ft]
3. Spa
   a. Dimensions – Varies
   b. Surface Area – 30 m^2 [323 ft^2]
   c. Depth – Sloped handicapped entry to 1 m [3.3 ft] deep
   d. Volume – ~18.9 m^3 [5,000 gallons] (volume as reported by operator)
   e. Perimeter – 37 m [121.4 ft]

*Note: Dimensions and volumes were taken from existing drawings and conversations with the operator, unless otherwise noted.

C. POOL MECHANICAL ITEMS

1. PIPING

CH Observations and Owner Comments:

- The exposed pool piping in the mechanical room was observed to be both Schedule 40 PVC and Schedule 80 PVC.
- Overhead/floor pipe supports and pipe hangers were observed to be in fair condition.
- The B.C. Guidelines for Pool Design calls for a maximum velocity of 3.05 m/s [10 ft/s] in pressure lines and 1.83 m/s [6 ft/s] in suction lines. Upon study of the existing flow conditions, one (1) of the piping systems is not compliant with the health department regulated velocity requirements.
  - The recreation pool recirculation pump is rated at 200 m^3/hr [881 GPM]. The digital flow meter was not working at the time of the site inspection, therefore it is assumed that the water is flowing at 200 m^3/hr [881 GPM]. The suction line is 8" and the pressure line is 6". By code, a maximum of 194 m^3/hr [854 GPM] is allowed to flow through an 8" suction line and a maximum of 184 m^3/hr [812 GPM] is allowed to flow through a 6" pressure line.
- The exposed mechanical room piping is not colour coordinated per code. Some of the piping is labeled with directional arrows, however not all of the piping is properly labeled. Per the B.C. Guidelines for Pool Design, "Piping related to pool operation should be properly identified through a standard system of colour coding, flow directional arrows and function labeling."
- Impact style flow meters were installed on the return lines of each recirculation system but they were not installed on all main drain or gutter lines.
  - According to the B.C. Guidelines for Pool Design, "A flow meter should be installed in either the main drain line or gutter/skimmer line to determine flow rates through the main drain and the proportion of recirculation flow through the gutters/skimmers."

- Digital flow meters were installed on the lap pool, recreation pool, and the spa return lines. However, the flow meters for the recreation pool and the spa were not displaying a flow reading at the time of the site visit.

Recommendations:

- Industry standard for all exposed pool piping outside of the pool shell is Schedule 80 PVC. The exposed Schedule 40 PVC piping, however, is in good shape. The next time the exposed piping is replaced, Counsilman-Hunsaker recommends to replace with Schedule 80 PVC.
- Valve back the recreation pool recirculation pump to ensure the water velocity in the pipes does not exceed the velocity allowed by code. A flow meter should be installed to confirm this.
- Provide colour coordination and directional flow arrows on all pool related piping per code.
- Install flow meters on all main drain lines or gutter/skimmer lines.
- Provide new digital flow meters for the recreation pool and spa.


Mechanical room piping

Leisure pool flow meter

2. PUMPS

CH Observations and Owner Comments:

- The mechanical room boasts a variety of different sized pumps manufactured by Bell & Gossett for water recirculation, feature flow, and hydrotherapy.
- The lap pool has a reported volume of 2,321 m³ [613,160 gallons] and two (2) recirculation pumps are responsible for water circulation. Each pump is rated at 227 m³/hr [1,000 GPM]. At the time of the site visit, the digital flow meter read

460 m³/hr [2,025 GPM] providing a turnover rate of 5.05 hours. This meets the maximum turnover period of 6 hours allowed by code for this type of pool.

- The recreation pool has a reported volume of 265 m³ [70,000 gallons]. Its recirculation pump is rated at 200 m³/hr [881 GPM] providing a turnover rate of 1.32 hours. This meets the maximum turnover period of 2 hours allowed by code for this type of pool.
- The spa has a reported volume of 18.9 m³ [5,000 gallons]. Its recirculation pump is rated at 63.4 m³/hr [280 GPM] providing a turnover rate of 0.3 hours. This meets the maximum turnover period of 30 minutes allowed by code for spas.
- Several of the vacuum and pressure gauges surrounding the pumps were either not working properly or completely broken at the time of the site visit.
- All pumps were provided with hair and lint strainers.
- All pumps and strainers were properly supported on concrete housekeeping pads.
- Minor surface corrosion was observed on several of the pumps.
- Recirculation and feature pumps were observed to be in good condition.
- Variable frequency drives (VFDs) were not observed to be installed on the pool pumps in the mechanical room. A VFD is a system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor.
    - In the swimming pool industry, it is commonplace to install VFDs on the recirculation pumps. The VFD will ramp up and down the electrical power supplied to the motor depending on the differing head pressures in the system; such as when the filter is dirty versus when it is clean. This ultimately results in an energy savings to the Owner.
    - Sometimes it is cost effective to install VFDs on feature pumps that need to be controlled beyond the install start-up and adjustment to the proper flow rate.
    - VFDs serve to protect the pumps by shutting down the systems if problems occur and preventing hard starts and stops by ramping up and down the motors as needed.

- On indoor pools that operate year round, VFDs can potentially recoup the cost in approximately 1-2 years.

Recommendations:

- Replace the broken pressure and vacuum gauges.
- Provide and install VFDs for use on all of the recirculation pumps.

Recirculation pump

Vacuum and pressure gauges

3. VALVES & FLANGES

CH Observations and Owner Comments:

- The valves located in the pool mechanical room are a combination of ball valves, butterfly valves, isolation valves, and check valves.
- Some of metallic components of the valves and flanges were observed to be experiencing minor surface corrosion issues.
- A majority of the valves in the mechanical room have identification tags but many appeared to be missing. A posted piping and valve schematic was not observed.

Recommendations:

- Ensure all valves are properly labeled with identification tags. Post a piping and valve chart system schematic in the pool mechanical room.

Butterfly valves

Valve

4. CHEMICAL TREATMENT

CH Observations and Owner Comments:

- The three (3) bodies of water utilize soda ash as the pH buffer, gas chlorine as the sanitizer, and UV units for supplemental disinfection.
- The soda ash (sodium carbonate) is stored in a chemical container on the pump pit floor.
  - Each pool draws soda ash from the same chemical container. The soda ash is pumped into each system via automatic chemical feeder pumps.
  - The soda ash is pumped directly into the surge tanks.
  - The soda ash is exposed to the mechanical room atmosphere to allow the chemical tubing into the chemical container.
  - The chemical container contains a pump nearby which continually mixes the solution.
- The gas chlorine for all three (3) pools is stored in a separate chemical room with access from the exterior of the building.
  - The gas chlorine is stored in pressurized tanks inside the chemical room.
  - Gas chlorine is a toxic gas and is extremely dangerous.
  - Although gas chlorine is an effective sanitizer, most pools have veered away from gas chlorine as a method of chemical treatment due to health hazards and fire marshal rating.
  - Chlorine gas is extremely corrosive and has been known to corrode all metal within an equipment room.
  - The chemical room was labeled but proper chemical hazard signs were not observed.
- A shower/eye wash unit is provided in the mechanical room. Safety items such as protective gloves and goggles are located on site.
- The Owners expressed interest in solid chlorine (calcium hypochlorite) to replace their existing gas chlorine system.
  - Calcium hypochlorite comes is solid tablets/briquettes. The tablets are placed in canisters and pool water is bypassed through the erosion feeders, dissolving the tablets and introducing chlorinated water back into the pool.

- Calcium hypochlorite is much safer than gas chlorine.
- Calcium hypochlorite is typically delivered in 5-gallon plastic containers that weigh approximately 50 lbs. The containers are not fire rated, however calcium hypochlorite is relatively safe to handle and store. The container must be sealed at all times as the tablets cannot come into contact with other chemicals. The combination of a high concentration of chlorine combined with calcium makes it very reactive. When it comes in contact with other chemicals, the reaction will release chlorine gas into the air and could possibly explode. When on fire, it will produce its own oxygen.

- All three (3) bodies of water have Strantrol System 4 chemical controllers in good working condition.
- Each recirculation line has a UV light system used for supplemental sanitation manufactured by ETS. All UV units appeared to be in good working condition.

Recommendations:

- For safety concerns, Counsilman-Hunsaker recommends to remove the gas chlorine systems and replace with solid chlorine (calcium hypochlorite). The solid chlorine will utilize the existing gas chlorine room.
  - Since soda ash raises the pool water pH, muriatic acid is recommended to replace the soda ash in order to lower the pH. Provide a similar acid system to the one at the Four Seasons Leisure Pool and store in the old ozone storage room.
  - Proper chemical hazard signs shall be affixed to the chemical room doors.
- While the chemical controller systems are functional, aquatic controllers have progressed significantly in the previous decade and replacement for newer models should be considered within the next few years.


Liquid chlorine

Gas chlorine

Chemical controller

UV system

5. Filters

<u>CH Observations and Owner Comments:</u>

- The lap pool is filtered by means of four (4) FF Series horizontal high rate sand filters manufactured by Kenloch Company.
    - The filters exterior coatings were observed to be fiberglass and the face piping was schedule 80 PVC.
    - Each commercial filter tank has a filter area of 4.18 m^2 [45 ft^2].
        - At the flowmeter provided flow rate of 460 m^3/hr [2,025 GPM], the approximate filtration rate is 27.5 m^3/hr/m^2 [11.25 GPM/ft^2].
    - The filter butterfly valves allow manual operation of the filter system.
    - The filters have manual air relief valves but no air relief valve drainage.
    - An interior filter inspection was not conducted at the time of the site inspection.
    - The filters are backwashed to a backwash sump located near the stairs to the pump pit. There is no backwash flow meter so the backwash flow rate could not be determined.
    - The sand was replaced and new laterals were installed in 2014.
    - Some of the filter footings are not securely anchored to the mechanical room floor.
    - One (1) of the influent pressure gauges was observed to be missing.
- The recreation pool is filtered by means of two (2) FF Series horizontal high rate sand filters manufactured by Kenloch Company.

- The filters exterior coatings were observed to be fiberglass and the face piping was schedule 80 PVC.
- Each commercial filter tank has a filter area of 3.16 m² [34.0 ft²].
  - At a flowrate of 200 m³/hr [881 GPM], the approximate filtration rate is 31.68 m³/hr/m² [12.96 GPM/ft²].
- The filter butterfly valves allow manual operation of the filter system.
- The filters have manual air relief valves but no air relief valve drainage.
- An interior filter inspection was not conducted at the time of the site inspection.
- The filters are backwashed to a backwash sump located near the stairs to the pump pit. There is no backwash flow meter so the backwash flow rate could not be determined.
- The sand was replaced and new laterals were installed in 2014.
- Some of the filter footings are not securely anchored to the mechanical room floor.

- The spa is filtered by means of two (2) FF Series vertical high rate sand filters manufactured by Kenloch Company.
  - The filter exterior coatings were observed to be fiberglass and the face piping was schedule 80 PVC.
  - Each commercial filter tank has a filter area of 1.16 m² [12.5 ft²].
    - At a flowrate of 63.6 m³/hr [280 GPM], the approximate filtration rate is 27.38 m³/hr/m² [11.2 GPM/ft²].
  - The filter butterfly valves allow manual operation of the filter system.
  - The filters have manual air relief valves but no air relief valve drainage. Calcium staining was observed around the air relief valves.
  - An interior filter inspection was not conducted at the time of the site inspection.
  - The filters are backwashed to a backwash sump located near the stairs to the pump pit. There is no backwash flow meter so the backwash flow rate could not be determined.
  - The sand was replaced and new laterals were installed in 2014.

- The filters are not securely anchored to the mechanical room floor.

Recommendations:

- Provide and install flow meters on all of the backwash lines for backwashing and draining the pool procedures. Refer to filter manufacturer for recommended backwash flowrates.
- Provide automatic air relief valves hard plumbed to the nearest floor drain to limit water from pooling on the mechanical room floor.
- All filter tanks should be securely anchored to a housekeeping pad or the pool mechanical room floor to limit vibrations and to provide seismic movement.

Manual air relief valve

Lap pool filters

6. POOL HEATING

CH Observations and Owner Comments:

- New high efficiency pool boilers were recently installed. The boilers are in good condition with no reported issues.

Recommendations:

- As the boilers are performing as designed, no recommendations are required at this time.

7. MECHANICAL ROOM

CH Observations and Owner Comments:

- The existing mechanical room is located in a convenient location conducive to each body of water. The mechanical room is in good condition with adequate space and clearance zones.
- The pump pit is recessed to allow for flooded suction pumps to be used in lieu of self-priming pumps.

Recommendations:

- As the mechanical room is in good condition with no reported issues, Counsilman-Hunsaker has no recommendations at this time.

8. MISCELLANEOUS

CH Observations and Owner Comments:

- The recreation pool has a wave generator that was recently replaced in 2013-2014 and appears to be in good working condition.
- ELC-800 water level controllers manufactured by AquatiControl were observed during the site visit.
  - The operator informed Counsilman-Hunsaker that all of the water level controller are broken.
  - Water is manually added to the pools after hours.

Recommendations:

- Provide new water level controllers with surge tank mounted sensing probes for each body of water. Water level controllers to be model ELC-810 by AquatiControl or a technically similar product. In order to achieve proper surface skimming, the water must be at rim flow at all times. With a manual feed system, the pool is below rim flow numerous times throughout normal operation. A water level controller will ensure the pool maintains rim flow at all times.

D. POOL ITEMS

1. STRUCTURE AND FINISH

CH Observations and Owner Comments:

- The lap pool shell is constructed out of cast in place concrete with a 2" x 2" ceramic tile finish on the pool floor and walls.
    - The tile finish on the interior shell of the pool appeared to be in overall good condition.
    - The horizontal tile band surrounding the pool was stained and tiles were broken in several locations.
    - During the site visit, there was no mention of water leaking from the shell and no obvious signs were observed.
- The recreation pool shell is constructed of cast in place concrete with a 2" x 2" ceramic tile finish on the walls and a plaster finish on the floor.
    - The tile finish on the pool walls appeared to be in fair condition.
        - Tiles were observed to be badly stained at the time of the site visit; especially at and above the waterline.
    - The plaster finish on the pool floor was observed to be delaminating in numerous locations.
        - The operator mentioned that they cannot find a product that adheres to the pool shell for a long period of time.
        - Counsilman-Hunsaker has had success with a product called Diamond Brite.
            - Diamond Brite is a plaster/marcite product that contains either quartz or small stones. It is troweled on very similar to plaster and some of the cream is washed off at the end to expose some of the material.
            - The lifespan of Diamond Brite is generally longer than of plaster. Industry experience has shown that Diamond Brite pools, if maintained in a wet or moist condition, will typically have a lifespan of 7 to 15 years. In most cases

achieving a 10 year life on a Diamond Brite surface is expected.

  - During the site visit, there was no mention of water leaking from the shell and no obvious signs were observed.

- The spa shell is constructed out of cast in place concrete with a 2" x 2" ceramic tile finish on the spa floor and walls.
  - The tile finish on the interior shell of the spa appeared to be in overall good condition.
  - The tile on the 6" high curb surrounding the spa was observed to be stained.
  - During the site visit, there was no mention of water leaking from the shell and no obvious signs were observed.

Recommendations:

- Repair the broken tile on the horizontal tile band surrounding the lap pool.
- Clean all exposed and waterline tile on a daily basis to combat staining. Staff should clean the tile with Permanon Pool & Spa Cleaner or a similar product.
- Counsilman-Hunsaker recommends to provide a new Diamond Brite finish to the recreation pool.
  - Completely remove the existing plaster finish down to the concrete shell. Prepare the surface for application of a new bonding coat and Diamond Brite finish per the manufacturer's recommendations.

Broken tile at lap pool


Stained tile in recreation pool

Chipped plaster finish in recreation pool

Stained tile at spa

2. Perimeter Overflow System

CH Observations and Owner Comments:

- The lap pool utilizes a deck level gutter as its perimeter overflow system.
  - The lap pool contains thirty-two (32) gutter dropouts that flow by gravity back to the surge tank. The gutter and dropout piping is sized appropriately to accommodate 100% of the pool's flowrate per code.
  - The gutter has perpendicular PVC grating covering its trough.
    - Certain sections of the gutter grating were observed to be in poor shape. Brown staining and scrape marks were present. These are most likely caused from the movable bulkhead.
  - The overflow gutter appears to be functioning as designed.
- The recreation pool's perimeter overflow system is comprised of skimmers, a small section of rollout out gutters with perpendicular PVC gutter grating, and recessed gutter troughs in the wall with PVC gutter dropout grates.
  - The recreation pool contains six (6) skimmers and nineteen (19) gutter dropouts. The overflow system is sized appropriately to accommodate 100% of the pool's flowrate per code.
  - The skimmer inlets are made of PVC grating which are all stained.
  - The perimeter overflow system appears to be functioning as designed.
- The spa contains a skimmer overflow system with total of nine (9) skimmers.
  - The skimmers appear to be functioning as designed.

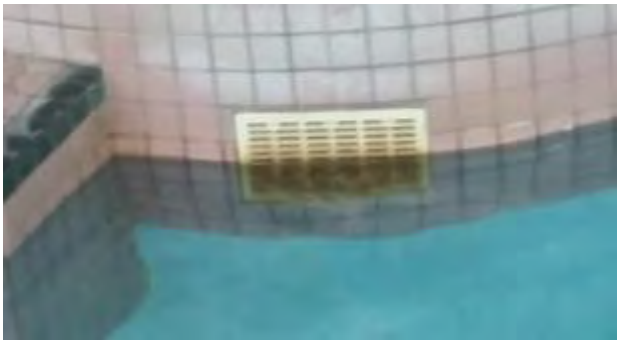
Recommendations:

- Acid wash the PVC gutter grating on the lap pool and the recreation pool. If the staining cannot be removed, recommend replacing for aesthetics purposes.

- Acid wash the skimmer inlet grating in the recreation pool. If the staining cannot be removed, recommend replacing for aesthetic purposes.


Stained gutter grating on lap pool

Scraped gutter grating on the lap pool


Stained skimmer inlet grating in recreation pool


Recessed gutter trough in recreation pool wall

3. MAIN DRAINS

CH Observations and Owner Comments:

- All of the pools at the Prince George Aquatic Centre have main drains located at their deepest location. The Virginia Graeme-Baker Pool and Spa Safety Act (VGBPSSA) was passed in the United States to prevent the tragic and hidden hazard of drain entrapments and eviscerations in pools and spas.
- According the B.C. Guidelines for Pool Design, "The act outlines provisions to minimize the risk of entrapment, including vacuum covers, pool barriers and main drain requirements. While the VGBPSSA is not law in B.C., the Ministry of Health supports the efforts to reduce suction hazards."
- All bodies of water had at least two (2) separated main drains per code.
- Without further investigation, it could not be confirmed at the time of the site visit if the main drain covers are compliant with the Pool Regulation.

Recommendations:

- Pool staff to confirm if the main drain covers are compliant with the Pool Regulation. If they are not, replace as needed.


Recreation pool main drain


Lap pool main drain

4. INLETS

<u>*CH Observations and Owner Comments:*</u>

- The B.C. Guidelines for Pool Design states the following regarding inlets, "Inlet fittings should: Be of a type whereby the rate of flow and directional angle can be adjusted to improve circulation. Be placed in the pool wall and spaced no more than 9 m (30 ft) apart measured from the perimeter of the pool or one fitting for each 45,460 L (12,000 U.S. gallons) of pool volume, whichever is more."
    - The lap pool contains fifty-four (54) floor inlets with adjustable PVC inlet coverings and six (6) wall inlets with adjustable PVC inlet coverings. Per code, the lap pool contains a sufficient number of inlets.
    - The recreation pool contains twenty-nine (29) adjustable PVC floor inlets. Per code, the recreation pool contains a sufficient number of inlets. The inlets are adequately spaced.
        - Two of the bubblers were observed to be broken at the time of the site visit. Bubblers are small feature pipes that are cut flush with the pool floor that spray water vertically. The cause of the malfunction could not be determined without further investigation.
    - The spa contains six (6) adjustable PVC wall inlets and three (3) adjustable PVC floor inlets. Per code, the spa contains a sufficient number of inlets. The inlets are adequately spaced.
        - The hydrotherapy jet inlets were observed to be in good working condition at the time of the site visit.

Recommendations:

- Determine the cause of the broken bubbler features and repair as necessary.

5. SAFETY LINES AND LAP LINES

CH Observations and Owner Comments:

- A four inch wide tile marking strip of contrasting colour is provided at the 2 m [6.5 ft] depth in the lap pool.
- A safety line with floats is provided in front of the wave generator in the recreation pool.
- Lap lines were observed in the pool and on the pool deck. The operator mentioned that these lines were only used for practice and the competition lap lines were stored elsewhere. The competition lap lanes were not observed during the site inspection.

Recommendations:

- No recommendations at this time.

6. INGRESS AND EGRESS

CH Observations and Owner Comments:

- It should be noted that Canada is not required to follow the ADA Accessibility Guidelines used in the United States. However, the B.C. Guidelines for Pool Design references the following, "Special considerations specific to pool accessibility that may not be covered in the B.C. Building Code should be designed following good design practices, such as the use of the ADA Accessibility Guidelines".
- The lap pool contains seven (7) sets of recessed steps with grab rails and one hydraulically powered handicapped lift affixed to the pool deck at the 2.5 m [8.2 ft] depth.
  - The handicapped lift was observed to be experiencing a good amount of surface corrosion. The working condition of the lift was not observed during the site visit.
  - Through observation during the site visit and the public meetings process, it is apparent that many elderly and handicapped persons use or want to use the lap pool but it is difficult for them to get in and out of it.

- The recreation pool contains multiple access points including two (2) ramps and one (1) set of stairs down to the zero depth entry, two (2) sets of stairs with stainless steel hand rails, and one (1) set of recessed steps and grab rails near the wave generator.
    - Through observation during the site visit and the public meetings process, it is apparent that the recreation pool is use for therapy purposes; especially the current channel.
- The spa contains a sloped entry with stainless steel handrails on either side as well as a set of stairs with stainless steel handrails on either side.
    - The sloped entry has a constant 1:10 slope. The ADA guidelines require a minimum slope of 1:12 for sloped entries.
- A number of the stainless steel rail goods at the Aquatic Center were displaying signs of corrosion at the time of the site visit. All rail goods displayed calcium staining.
    - Many escutcheon plates for rail goods were observed to be missing.

Recommendations:

- Provide a set of removable PVC stairs for use in the lap pool to assist elderly and handicapped persons in and out of the pool.
- Replace the corroding handicapped lift for the lap pool.
- In order to comply with the ADA regulations, it is recommended to provide an ADA compliant lift for the recreation pool.
- Replace all of the stainless steel rail goods displaying signs of corrosion.
- While it is difficult to completely prevent corrosion, cleaning all stainless steel rail goods on a regular basis will minimize the spread of corrosion.

Corroding rail goods

Corroding handicapped lift

7. BULKHEAD

CH Observations and Owner Comments:

- Two (2) motorized bulkheads manufactured by Precision Fibre Structures are provided in the lap pool.
  - These are the facility's second set of bulkheads; the previous bulkheads began to sag in the middle.
  - The bulkheads are staining and scraping the gutter grating and deck tile.
  - At this time, it is not mission critical to replace the bulkheads. However, the staff has expressed concerns with moving the bulkheads and how the motors continually break. The operator mentioned that when a motor breaks, the bulkhead is stuck in that location until a new motor is installed.

Recommendations:

- An alternative solution would be the use of fiberglass bulkheads that are not motor dependent. Counsilman-Hunsaker recommends to replace the bulkheads with Stark fiberglass bulkheads. Stark bulkheads have an internal inflatable bladder which allow them to be easily moved by one person on each end. Counsilman-Hunsaker has seen Stark bulkheads being used successfully on many projects. If not replaced in the near future, it is recommended to develop an inspection process for the current bulkheads in order to continually monitor the condition to allow for a timely planned replacement before complete failure.


Deep end bulkhead


Shallow end bulkhead

8. MOVABLE FLOOR

CH Observations and Owner Comments:

- The shallow end of the lap pool it contains a movable floor. The movable floor has the ability to change the depth of the water from 0 mm to 2000 mm [6.6 ft].
  - The movable floor takes up the entire width of the pool (18.6 m) [61 ft] and extends 9.5 m [31.2 ft] from the shallow end wall out towards the deep end.

- The floor is moved to different depth several times a day.
- It was not visually confirmed, but the operator mentioned that the floor is starting to crack and bulge in certain locations.

Recommendations:

- While the movable floor is functional at the moment, years of continually raising and lowering the floor are starting to take effect. For future success, Counsilman-Hunsaker recommends to commission an engineering inspection on the movable floor to determine the root of the problem. If the floor is beyond repair, it is recommended to provide and install a new movable floor.

Deep end bulkhead

Shallow end bulkhead

E. Pool Deck Items

1. Deck

CH Observations and Owner Comments:

- The deck surrounding the lap pool is in good condition. It is composed of 8" tiles with raised circular patterns for additional traction.
  - The raised traction circles provide good slip resistance.
  - Four (4) feet of deck clearance is maintained around the entire perimeter of the lap pool and around diving equipment per code.
- The deck surrounding the recreation pool and the spa is a concrete deck and appeared to be in good condition.
  - The topping material provided adequate slip resistance.
  - Four (4) feet of deck clearance is maintained around both bodies of water per code.

Recommendations:

- No recommendations at this time.

Lap pool deck tile

Spa deck plaster

2. Diving Boards and Platforms

CH Observations and Owner Comments:

- The lap pool contains two (2) 1M diving boards, two (2) 3M diving boards, and a 5M, 7.5M, and 10M platform. The diving boards and platforms are located at the deep end of the lap pool.
  - The diving boards, stands, and platforms appear to be in good condition with mild wear and tear.
- The dive tank is 4.5 m [14.8 ft] deep at the deepest part of the pool (main drains).

- o In British Columbia, water depths for spring boards and platforms are governed by the Federation Internationale de Natation Amateur (FINA)'s Facility Rules. For 10M platforms, FINA calls for a minimum water depth of 4.5 meters.

Recommendations:

- As the diving equipment is in good condition and all dimensions are compliant with FINA's facility rules, Counsilman-Hunsaker has no recommendations at this time.

3. BACKSTROKE FLAGS AND STANCHIONS

CH Observations and Owner Comments:

- At the time of the site visit, two (2) back stroke flags were hung for the 25 m swim course. Stainless steel stanchion posts were attached to either side of the backstroke flags.
  - o The backstroke flags were observed to be in fair condition.
  - o The stanchion posts were displaying serious signs of corrosion.
- Backstroke stanchion anchors were placed in the pool deck at various locations.

Recommendations:

- Replace all corroding stanchion posts.


Backstroke stanchion post


Backstroke flags

4. TIMING SYSTEM AND STARTING BLOCKS

CH Observations and Owner Comments:

- Three (3) starting blocks were observed to be anchored to the deep end bulkhead. The make and manufacturer of the starting blocks was not confirmed.
  - o The starting blocks appeared to be in good condition with no reported issues.
- An 8-lane timing scoreboard was observed on the wall in the natatorium.

- Miscellaneous timing equipment was stored in a nearby support space but not observed at the time of the site inspection.

Recommendations:

- The aquatic facility is capable of hosting highly competitive swimming and diving meets. The starting blocks and scoreboard are both in good working condition, however they are both basic models. If the facility wants to be on par with other comparable facilities that host highly competitive events, Counsilman-Hunsaker recommends the following to be considered:
  - The next time the bulkheads are replaced, it is recommended to upgrade the starting blocks to a product similar to the Olympian-HT by Keifer Swim Products.
  - Upgrade the timing system with a full color LED video display scoreboard. It should be noted that the timing system is in the process of being upgraded and due to be completed in November of 2016. The video display scoreboard has been identified in capital.

Starting blocks

Scoreboard

5. MISCELLANEOUS

CH Observations and Owner Comments:

- Various pieces of safety and maintenance equipment was observed throughout the facility. A complete inventory of these items was not taken at the time of the site visit.

Recommendations:

- It would be advisable to take inventory of the present safety and maintenance equipment to ensure compliance with all of the governing codes.

F. Opinion of Probable Cost

Disclaimer: The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Soil conditions and structure methods can have large impact on project cost. Opinion of probable cost include typical structural design approaches, the consultant defers to the structural consultant for added cost if additional structure enforcement are dictated by project Geotechnical Report. Cost also are indicative of the typical General Contractor and Pool Contactor relationship. Specifics on construction methods and associated cost will have to be studied by outside firms. Opinions of probable cost are representative only of the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Rating Definitions

Deficiency Priority

1 = Necessary and Critical
2 = Necessary and High Priority
3 = Recommended - but not critical or high priority
4 = Deferrable

Age Category

1 = Old (Last 1/4 of Life)
2 = Older Mid Life (Third 1/4 of Life)
3 = New Mid Life (Second 1/4 of Life)
4 = New/Like New (First 1/4 of Life)

Condition

1 = Unusable/Not Servicable/Hazardous
2 = Damaged and/or does not meet standard
3 = Non - compliant aspects but replacement not critical
4 = Minor wear/tear but meets standard
5 = Excellent, meets standard

Prince George Aquatic Centre - Opinion of Probable Cost

Recommendations

Item #	Item Description	Deficiency Priority	Age Category	Condition	Expeceted Life (Yrs)	Total	Notes
1	Consider replacing all exposed piping in the mechanical room with Schedule 80 PVC.	4	2	4	25	$196,250	
2	Provide colour coordination and directional flow arrows on all pool related piping per code.	2	N/A	N/A	50	$785	Regulatory guideline.
3	Install impact style flow meters on all main drain lines or gutter/skimmer lines.	3	N/A	N/A	25	$942	Regulatory guideline.
4	Provide new digital flow meters for the recreation pool and spa.	2	1	1	15	$4,710	Regulatory guideline.
5	Replace the broken pressure and vacuum gauges around each recirculation pump.	3	1	2	20	$1,178	
6	Provide and install VFDs on all of the recirculation pumps.	3	N/A	N/A	20	$16,485	Future cost savings recommendation.
7	Ensure each valve has a valve tag and post a piping and valve chart system schematic in the pool mechanical room.	3	N/A	N/A	50	$236	
8	Remove the gas chlorine systems and replace with solid chlorine (calcium hypochlorite). Proper chemical hazard signs shall be affixed to the chemical room doors.	3	2	4	20	$84,780	Safety consideration.
9	Provide a similar acid system to the one at the Four Seasons Leisure Pool.	3	2	4	20	$18,840	
10	Consider replacing the chemical controllers with newer models.	4	2	4	15	$44,745	
11	Provide and install impact style flow meters on all of the backwash lines for backwashing and draining the pool procedures.	3	N/A	N/A	25	$942	
12	Provide automatic air relief valves for each filter and hard plumb each to the nearest floor drain to limit water from pooling on the mechanical room floor.	3	N/A	N/A	15	$3,140	
13	Securely anchor all filters to a housekeeping pad or the pool mechanical room floor to limit vibrations and to provide seismic movement.	2	N/A	N/A	15	$314	
14	Provide new automatic water level controllers with surge tank mounted sensing probes for each body of water.	2	1	1	10	$28,260	
15	Replace the broken tile on the horizontal tile band surrounding the lap pool.	2	1	2	20	$550	
16	Provide a new cementitious finish to the recreation pool.	1	1	2	10	$114,319	
17	Acid wash the PVC gutter grating on the recreation pool.	4	3	4	25	$16	
18	Acid wash the skimmer inlet grating in the recreation pool. If the staining cannot be removed, recommend replacing.	4	3	4	25	$5	
19	Determine the cause of the broken bubbler features and repair as necessary.	3	1	2	25	$0	The cost is unkown without further investigation.
20	Provide a set of removable PVC stairs for use in the lap pool to assist elderly and handicapped persons in and out of the pool.	1	N/A	N/A	15	$9,420	
21	Replace the corroding handicapped pool lift for the lap pool and install a new handicapped pool lift for the recreation pool.	1	1	2	15	$18,840	
22	Replace all of the stainless steel rail goods displaying signs of corrosion.	2	1	2	15	$12,560	
23	Replace the bulkheads with a fiberglass model that has inflatable bladder.	3	2	4	20	$502,400	If not replaced in the near future, it is recommended to develop an inspection process for the current bulkheads in order to continually monitor the condition to allow for a timely planned replacement before complete failure.
24	Commission an engineering inspection on the movable floor to determine the root of the problem.	2	2	Unknown	20	$7,850	If the movable floor is beyond repair, it is recommended to provide and install a new movable floor.
25	Consider upgrading the starting blocks the next time the bulkheads are replaced.	4	2	4	15	$57,933	
26	Replace all corroding stanchion posts.	2	1	2	15	$2,355	
					Items Subtotal	**$931,603**	
					15% Contingency	**$139,740**	
					Total (2016 CAN)	**$1,071,343**	

11.3 Building Assessment: Four Seasons Pool

11.3.1 Tetra Tech EBA (2015)

This report has been edited by DIALOG to include only information related to the Four Seasons Pool and the Prince George Aquatic Centre.

The City of Prince George
City Hall, 1st Floor West, 1100 Patricia Boulevard
Prince George, BC
V2L 3V9

Civic Facilities Risk Framework and Condition Assessment

TETRA TECH EBA

704-V33303113-01
May 25, 2015

CIVIC FACILITIES RISK FRAMEWORK AND CONDITION ASSESSMENT



SUBMITTED BY:
Tetra Tech EBA Inc.
Suite 1000, 10th Floor, 885 Dunsmuir Street
Vancouver, BC V6C 1N5 Canada
Tel 604.685.0275 Fax 604.684.6241

CONTACT:
Gary Ruck, P.Eng.
Gary.Ruck@tetratech.com
Tel 778.945.5815 Mobile 905.550.1790

MAY 2015
ISSUED FOR USE
FILE: 704-V33303113-01

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

LIST OF FIGURES IN TEXT

APPENDIX SECTIONS

APPENDICES

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of City of Prince George and their agents. Tetra Tech EBA Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than City of Prince George, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement. Tetra Tech's General Conditions are provided in Appendix D of this report

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech) prepared this report for the City of Prince George Civic Facilities Risk Framework and Condition Assessment project. This first part of the project included the development of a Risk Framework for Facilities that will guide the City of Prince George (the City) in its evaluation of the relative priorities of capital and maintenance infrastructure projects and programs while also considering the delivery of its various services to the community. The second part of the project included a building condition assessment / audit (BCA) including architectural, structural, mechanical, electrical and fire / life safety systems for the following City facilities:

- Four Seasons Pool.
- Firehall No. 2 - Ospika.
- Coliseum (Arena).
- B. Harkins Library.
- Aquatic Centre.
- City Hall.
- Elksenter.

The following is a more detailed summary of the scope of work performed for this project and the outcomes of which are discussed in greater detail in subsequent sections of this report:

- Development of a Risk Assessment Framework that can be applied to the City's Civic Facilities using clearly articulated facility risk inputs which result in a risk rating score on a 0 – 100 scale. Risk is typically expressed as the product of the Probability of Failure (PoF) x Consequence of Failure (CoF) where PoF and CoF are expressed on a scale of 0 -10 where a high score denotes a high risk of failure.
- Conducting a workshop with City staff to outline the concept approach to the proposed Risk Framework and lead the City staff through a discussion to help populate the framework with the appropriate criteria and weighting, as applicable.
- Provide for each of the seven facilities that were assessed with individual Project Sheets where each Project Sheet includes the following key attributes:
  - The facility name.
  - The component description / title.
  - Key details of the proposed scope of component(s) to be renewed/replaced.
  - Recommended year of renewal.
  - Overall project risk rating.
  - Photo(s) of the component(s) to be renewed/replaced.
  - Proposed budget.

- Development of a summary 10-year unconstrained work plan budget outline for each facility covering the years 2015 to 2024 inclusive with each line in the summary representing one project in the proposed facilities renewal plan.
  - Identification of any key maintenance activities that are flagged as needing improvement as a result of the condition assessments.
  - Identification of any recommended key projects together with any associated timing and budget.

2.0 PROJECT BACKGROUND

There is a growing need by cities and municipalities to find better ways to prioritize their infrastructure asset maintenance, rehabilitation and replacement projects. As this infrastructure ages, it becomes increasingly more challenging to assign limited capital expenditures to the repair, rehabilitation or replacement of the assets. As such, the City has identified the need for a risk assessment framework to help guide the assessment of relative priorities of capital and maintenance infrastructure projects and programs while also considering the delivery of its various services to the community.

During the 2010 RIVA Pilot Study for Facilities, the City has taken initial steps in defining a facility criticality methodology that addresses the probability and consequence of asset failure which together defines asset risk. The risk assessment framework used in the RIVA Facilities Pilot Study defined the risk exposure posed by a given asset as the product of the criticality or consequences and probability of its failure.

Even without understanding when failure will occur, categorizing assets based on ”criticality” or “failure consequence” would allow the City to effectively target management strategies aimed at mitigating risk. This is especially important in the light of the significant backlog ($80.3 million[1]) in asset renewal evident from the City's 2013 Long Term Capital Planning spreadsheet. Using the data from this spreadsheet, for the seven civic facilities being assessed for this assignment, the reinvestment backlog is estimated to be approximately $36 million. This translates to an average annual expenditure of approximately $4 million when counted together with the project needs over the next 20 years, as presented in **Figure 1**.

[1] Adapted from the Civic Facilities Long Term Capital Planning Model. http://princegeorge.ca/cityservices/assetmanagement/Documents/Civic_Facilities_Long_Term_Capital_Planning_Jan-2013.xls. Accessed on February 11, 2015.

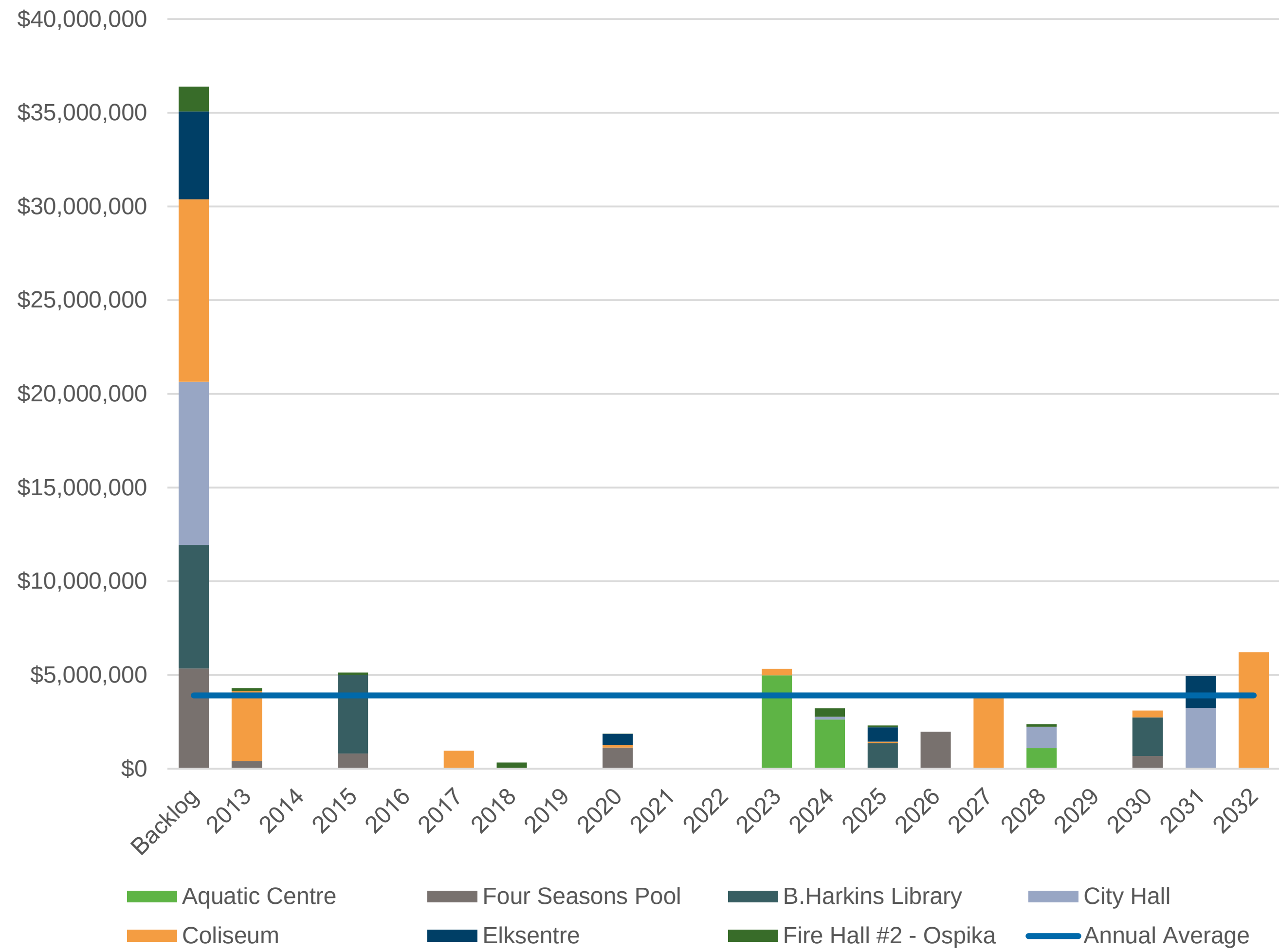


Figure 1: Civic Facilities Under Review - Required Capital Reinvestment Profile

One of the objectives of the condition assessment of the seven facilities is to improve the level of detail available for capital planning when compared to the existing planning model. The results of this assignment will identify the facility components which require renewal and / or replacement and their associated timing and budgets to assist in the City's Capital Expenditure Planning and re-investment priorities. As a result of the significant backlog shown on six of the seven facilities in the sample, it would be a useful check to see whether the City's expected service life assumptions are correct and whether the backlog across all City facilities is as severe as the preceding study indicated. Conversely, it would also serve as a check whether the relatively new Aquatic Centre (constructed in 1998) that currently now has backlog is indeed in such a relatively good condition as the initial study showed.

In all seven facilities a key determinant would not only be the condition of the assets but whether their functionality is in line with current building codes and whether the code upgrades are mandatory or optional. Finally, this study will also lay the groundwork for lessons learnt and to develop a consistent methodology (inspection process and scoring mechanism) to potentially be rolled out to other City facilities in the future.

The end result is that the City will be able to understand facility capital requirements across building systems and down to individual components, based on observed condition performance and asset remaining service life. This knowledge will impact the risk framework delineating where capital investment is needed most and shifting investment from a reactive to a proactive strategy. Investment alternatives can be compared at various funding levels to further define the amount of acceptable risk in the facility infrastructure.

Table 1: Condition Rating Definitions

Rating & System Condition Index (SCI)	SRM Needs	Rating Definition
Green (+) **SCI = 100**	Sustainment consisting of possible preventive maintenance (where applicable)	Entire component-section or component-section sample free of observable or known distress
Green **SCI = 93 - 99**	Sustainment consisting of possible preventive maintenance (where applicable) and minor repairs (corrective maintenance) to possibly few or some subcomponents	No component-section or sample serviceability or reliability reduction. Some, but not all, minor (non-critical) subcomponents may suffer from slight degradation or few major (critical) subcomponents may suffer from slight degradation.
Green (-) **SCI = 86 - 92**		Slight or no serviceability or reliability reduction overall to the component-section or sample. Some, but not all, minor (noncritical) subcomponents may suffer from minor degradation or more than one major (critical) subcomponent may suffer from slight degradation.
Amber (+) **SCI = 75 - 85**	Sustainment or restoration to any of the following: Minor repairs to several subcomponents; or Significant repair, rehabilitation, or replacement of one or more subcomponents, but not enough to encompass the component-section as a whole; or Combinations thereof	Component-section or sample serviceability or reliability is degraded, but adequate. A very few, major (critical) subcomponents may suffer from moderate deterioration with perhaps a few minor (non-critical) subcomponents suffering from severe deterioration.
Amber **SCI = 65 - 74**		Component-section or sample serviceability or reliability is definitely impaired. Some, but not a majority, major (critical) subcomponents may suffer from moderate deterioration with perhaps many minor (non-critical) subcomponents suffering from severe deterioration.
Amber (-) **SCI = 56 - 64**		Component-section or sample has significant serviceability or reliability loss. Most subcomponents may suffer from moderate degradation or a few major (critical) subcomponents may suffer from severe degradation.
Red (+) **SCI = 37 - 55**	Sustainment or restoration required consisting of major repair, rehabilitation, or replacement to the component-section as a whole.	Significant serviceability or reliability reduction in component–section or sample. A majority of subcomponents are severely degraded and others may have varying degrees of degradation.
Red **SCI = 11 - 36**		Severe serviceability or reliability reduction to the component-section or sample such that it is barely able to perform. Most subcomponents are severely degraded.
Red (-) **SCI = 0 - 10**		Overall component-section degradation is total. Few, if any, subcomponents salvageable. Complete loss of componentsection or sample serviceability.

3.4.2 Functionality (Suitability)

While physical condition is quite often the primary driver of facility renewal or replacement, other considerations such as a building's functionality is sometimes a more important driver for intervention. Functionality relates to a suitability to function as intended and required by the agency. The functionality state is distinct from, and determined independently from the physical condition state. The BUILDER functionality assessment overview considers 14 functionality issues including building location, building size and configuration, structural adequacy, access, Americans with Disabilities Act (ADA), anti-terrorism / force-protection (ATFP), building services, comfort, efficiency and obsolescence, environmental health, missing or improper components, aesthetics, maintainability and cultural resources.

Depending on whether the City decides to proceed with the implementation of BUILDER for the City's facilities, this methodology to assess functionality is built into the software and requires a range of fields to be populated for each facility. While it will be a worthwhile exercise to go through for each facility, in the short term it might be too cumbersome and data intensive and the City might consider a more simple functionality assessment methodology such as being used by the District of North Vancouver (DNV)[3]. In addition to physical condition, the DNV considers "Demand / Capacity" and "Functionality" in its overall condition assessment of facilities, as follows:

- Demand / Capacity: The capacity or location of the assets and its ability to meet service needs.
- Functionality: The ability of the assets to meet program, technology, regulatory and / or code requirements.

Each measure is rated according to a five point scale from "Very Good" to "Very Poor". The DNV methodology seemingly is easier to apply than the BUILDER methodology and at least in the short term it is recommended that the City applies a similar process to determine the functionality of its facilities.

3.5 Consequence of Failure

Consequences of failure reflect the relative impact of a given asset's failure, and a good portion of the Risk Framework's discussions centered on defining the impact of failure of facility assets. More specifically, the starting point for defining impact of failure were the triple bottom line criteria of economic, social and environmental impacts, with the key considerations for each criterion as broadly stated by the workshop participants, summarised in **Table 2**.

Table 2: Triple Bottom Line Considerations for Consequence of Failure

ECONOMIC **Impact of asset failure to the City or the community's finances**	**SOCIAL** **Impact of asset failure on the community**	**ENVIRONMENTAL** **Impact of asset failure on the environment**
▪ Liability: personal injury or property damage ▪ Cost to replace / refurbish ▪ Revenue impact (loss / gain) ▪ Staff displacement ▪ Economic impact to community / City / ▪ Why do people move here / attracting taxpayers ▪ Loss of reputation	▪ Loss of benefit / use ▪ Demographic affected: children, adults or seniors ▪ Income levels ▪ People with disabilities ▪ Elite athletes ▪ Social or health benefits ▪ Reputation ▪ Levels of service ▪ Utilization ▪ Emergency services (optional, mandatory, response, support, redundancy)	▪ Reputation ▪ Greenhouse gas (GHG) reduction ▪ Regulatory impacts ▪ Risk of exposure to e.g., the community and / or water ▪ Mandatory issues

[3] District of North Vancouver (2014): Asset Management Plan – Buildings. 2014 Revision.

The workshop participants agreed that the following criteria should be used to simplify the assessment of consequence of failure:

- Economic:
  - Cost to replace or refurbish.
  - Revenue impact.
- Social (use a five-point scale to rate from “Very Good” to “Very Poor”):
  - Community Impact: Develop a matrix for each facility indicating the programs offered at the facility versus the demographics (children, adults or seniors) in each program.
  - Event Impact: Impact on public / special events hosted at the facility.
  - Impact on Emergency Services: Impact on the role the facility plays in supporting the provision of emergency services.
  - Impact on Public Confidence: Impact on the public confidence / public value of the service / City reputation.
- Environmental: To act as a placeholder for now as the environmental impact of asset failure is undetermined at this stage.

3.6 Draft Facilities Risk Framework

Figure 2 presents a summary the draft Facilities Risk Framework showing the criteria, sub-criteria, rating scales and weightings to be used in deriving facility risk.

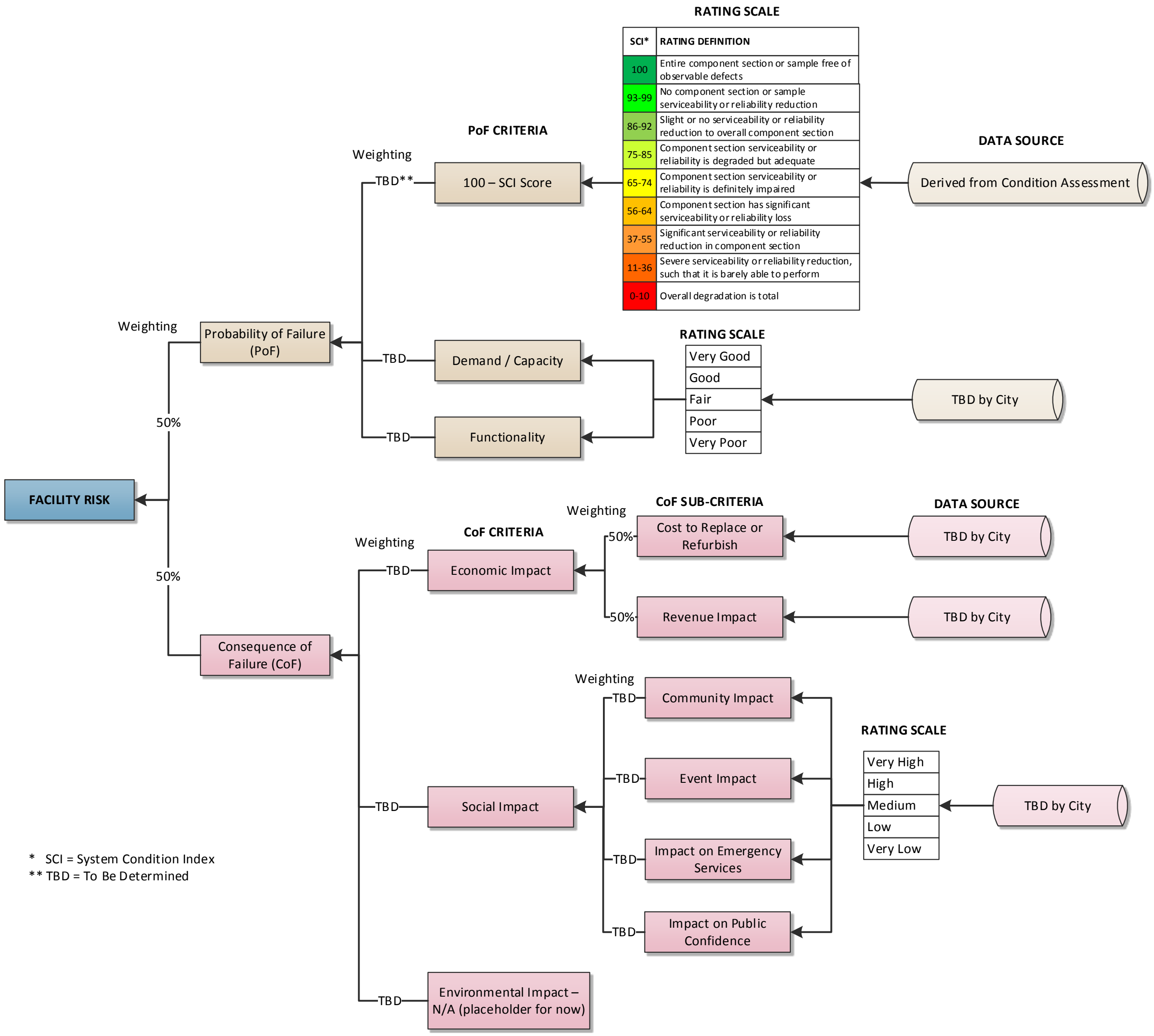


Figure 2: Draft Facilities Risk Framework

3.7 Exploration of CoF Criteria for Four City Facilities

To test the validity of the CoF criteria selected, the participants at the Risk Framework Workshop provided input for the derivation of CoF for four of the seven facilities that will be assessed for its condition as part of the project. The four facilities were chosen to approximately present the range of facilities that the City owns and the different types of services provided at the facilities. Of particular interest was the assessment of the Social impacts of facility / asset failure as different facilities rate differently in terms of the impact on the community or events as opposed to the impact on emergency services, e.g., Four Seasons Pool versus Fire Hall No. 2 Ospika.

Table 3 presents a summary of the high-level assessment of CoF (excluding Environmental) for the Four Seasons Pool, Fire Hall # 2 Ospika, City Hall and the B. Harkins Library.

Table 3: Exploration of CoF Criteria for Four City Facilities

FACILITY	ECONOMIC		SOCIAL			
	Cost to Replace	Revenue Impact	Community Impact	Event Impact	Emergency Services Impact	Public Confidence Impact
Four Seasons Pool	▪ $11 M	▪ $1 M / year	▪ Serves children, adults and seniors ▪ Provides a range of programs including swimming lessons, Aquafit classes, leadership (lifeguarding, first aid and lifesaving), swim club, drop-in recreation, schools and other ▪ Other includes rentals such as scuba, waterpolo, kayaking, underwater hockey and parties	▪ Public / City special events ▪ Halloween ▪ Competitions ▪ Youth triathlon	▪ N / A	▪ Consider the outputs from the Recreation Survey (Community Recreation Strategic Plan) ▪ If the facility is not available, is there redundancy / other options available?
Fire Hall # 2 Ospika	▪ $2.5 M	▪ $3.2 M labour and $0.5 M equipment and materials per year * ▪ Impact on fire insurance premiums ▪ Real estate freed up	▪ N / A	▪ N / A	▪ Number of 911 calls addressed by fire hall ▪ Response times ▪ Density of service area / catchment area / service radius ▪ Health impact costs ▪ Property damage avoided	▪ Perceived reduction in level of safety ▪ Relationship between Fire Hall No. 1 and 2 (emergency dispatch) ▪ Impact on fire insurance premiums / response times

City Hall	▪ $15.9 M	▪ Cost to rent equivalent office space (approx.. 4,700 m^2) ▪ Cost to relocate ▪ Need plan to collect revenue	▪ Impact on City services e.g., building inspections, bylaws, HR, payroll, benefits ▪ Impact depends on where City Hall relocates to; no. of visitors to City Hall	▪ Council meetings	▪ Emergency Operations Center (EOC) & relocation plan ▪ Mainframe ▪ Telepresence & corporate redundancy	▪ Communications ▪ Staff redeployment ▪ Emergency plan
B. Harkins Library	▪ $16.2 M	▪ 0.55 M / year	▪ Internet access ▪ Study centre ▪ Record repository ▪ Public research access ▪ Entertainment center ▪ Community gathering ▪ Special interest groups ▪ Minorities ▪ Some redundancy between UNBC and the School District	▪ N / A	▪ N / A	▪ Regional cultural center spanning the economic spectrum providing equal and free access

* Approximately 20% of the fire services budget (which is the $16M listed in the table right now) can be attributed to Fire Hall #2. However, in the event of facility failure the City would not likely be changing their fire services, but rather routing the labour and equipment through the other three halls. The true impact is very small, approximately $18,500 (2015 draft provisional financial plan) for specific operating and asset maintenance activities.

3.8 Risk Framework: Next Steps

According to ISO 31000, the risk management process consists of seven fundamentals as illustrated in **Figure 3**. Communication and Consultation, and Monitoring and Reviewing are undertaken throughout the process while the remaining five fundamentals usually occur in sequential order. As illustrated, the risk management process is iterative and should be subject to continuous improvement.

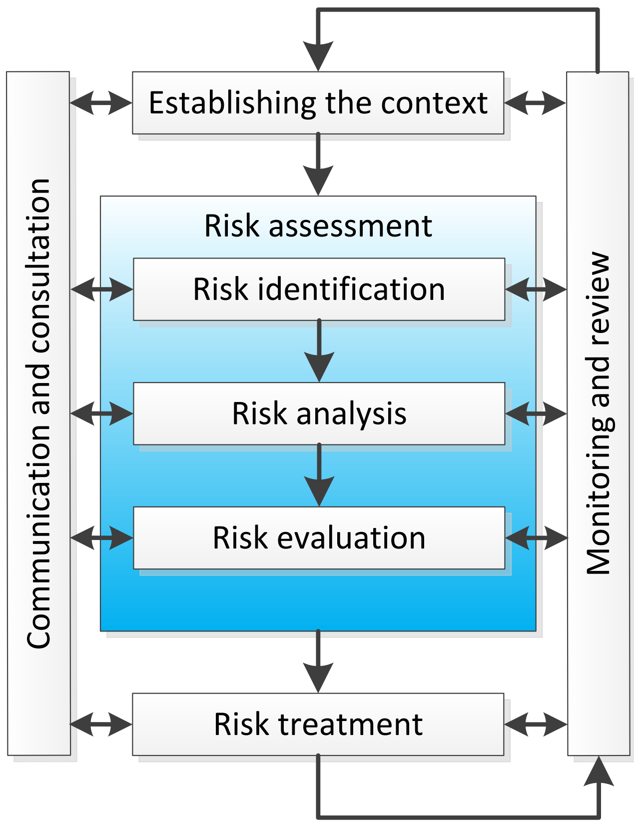


Figure 3: Seven Fundamentals of the Risk Management Process

Although the City has made good progress in defining a high-level risk framework for its Civic Facilities (*Establishing the Context* and *Risk Identification*), more work needs to be done to flesh out the PoF and CoF criteria for each facility (*Risk Analysis*), test and evaluate (*Risk Evaluation*) the results and develop risk treatment options. It is therefore recommended that the City develop a risk register for its Civic Facility risks, and potentially other asset-related risks. The IPWEA's NAMSPLUS has a useful risk register that provides tabular steps for risk identification, analysis, risk treatment and a risk treatment plan. Examples of application of the NAMSPLUS risk register can be found by clicking on the following hyperlinked documents:

- Kyogle Council (Australia) – Infrastructure Risk Management Plan: Appendix A.
- Bay Area Rapid Transit (BART) – Risk-Based Asset Management Plan: Slide 12.

4.0 FACILITY CONDITION ASSESSMENTS

4.1 Facility Condition Assessment Methodology

The field team that performed the facility condition assessments consisted of two inspectors who performed visual assessments of the accessible building systems within the seven buildings. Building systems and system components are organized in the BUILDER dataset according to the UNIFORMAT II classification (**Table 4**) governed by ASTM E1557-09. This ensures a standardized hierarchy and nomenclature for all component sections that can be tied to the RS Means unit costs which are referenced within the BUILDER database.

Table 4: UNIFORMAT II Classification of Building Elements

LEVEL 1 MAJOR GROUP ELEMENTS	LEVEL 2 GROUP ELEMENTS	LEVEL 3 INDIVIDUAL ELEMENTS
A. SUBSTRUCTURE	A10 Foundations	A1010 Standard Foundations
		A1020 Special Foundations
		A1030 Slab on Grade
	A20 Basement Construction	A2010 Basement Excavation
		A2020 Basement Walls
B. SHELL	B10 Superstructure	B1010 Floor Construction
		B1020 Roof Construction
	B20 Exterior Enclosure	B2010 Exterior Walls
		B2020 Exterior Windows
		B2030 Exterior Doors
	B30 Roofing	B3010 Roof Coverings
		B3020 Roof Openings
C. INTERIORS	C10 Interior Construction	C1010 Partitions
		C1020 Interior Doors
		C1030 Fittings
	C20 Stairs	C2010 Stair Construction
		C2020 Stair Finishes
	C30 Interior Finishes	C3010 Wall Finishes
		C3020 Floor Finishes
		C3030 Ceiling Finishes
D. SERVICES	D10 Conveying	D1010 Elevators & Lifts
		D1020 Escalators & Moving Walks
		D1090 Other Conveying Systems
	D20 Plumbing	D2010 Plumbing Fixtures
		D2020 Domestic Water Distribution

LEVEL 1 MAJOR GROUP ELEMENTS	LEVEL 2 GROUP ELEMENTS	LEVEL 3 INDIVIDUAL ELEMENTS
		D2030 Sanitary Waste
		D2040 Rain Water Drainage
		D2090 Other Plumbing Systems
	D30 HVAC	D3010 Energy Supply
		D3020 Heat Generating Systems
		D3030 Cooling Generating Systems
		D3040 Distribution Systems
		D3050 Terminal & Package Units
		D3060 Controls & Instrumentation
		D3070 Systems Testing & Balancing
		D3090 Other HVAC Systems & Equipment
	D40 Fire Protection	D4010 Sprinklers
		D4020 Standpipes
		D4030 Fire Protection Specialties
		D4090 Other Fire Protection Systems
	D50 Electrical	D5010 Electrical Service & Distribution
		D5020 Lighting and Branch Wiring
		D5030 Communications & Security
		D5090 Other Electrical Systems
E. EQUIPMENT & FURNISHINGS	E10 Equipment	E1010 Commercial Equipment
		E1020 Institutional Equipment
		E1030 Vehicular Equipment
		E1090 Other Equipment
	E20 Furnishings	E2010 Fixed Furnishings
		E2020 Movable Furnishings
F. SPECIAL CONSTRUCTION & DEMOLITION	F10 Special Construction	F1010 Special Structures
		F1020 Integrated Construction
		F1030 Special Construction Systems
		F1040 Special Facilities
		F1050 Special Controls and Instrumentation
	F20 Selective Building Demolition	F2010 Building Elements Demolition
		F2020 Hazardous Components Abatement

Visual assessments are non-destructive in nature and seek to quantify the current condition of each component according to performance. The inspectors also incorporated knowledge of the building system histories from conversations with the facility manager and from other documentation provided by the City. The assessment information generated by the inspectors in conjunction with the component install date or an estimated age helps BUILDER calculate a life-cycle curve for each component section. These calculated life-cycle curves are then used to estimate remaining service life (RSL) and to forecast timely future repair / replace actions with respect to cost.

During data collection, the two-person team typically divided the assessment workload into disciplines, with each individual handling a different set of building systems. For the City, one inspector handled mechanical, electrical and plumbing (MEP), which included visible and accessible HVAC, mechanical, electrical, plumbing and fire protection components both inside the building and outside close to the building perimeter. Where visible, condition for piping and fittings were collected according to system. The second inspector was responsible for the structural and architectural elements which consisted of visible foundations and superstructure, exterior enclosure, stairs and interior construction including finishes. Due to winter conditions and snow on the roofs, roofing was generally out of scope, but a few components such as downspouts or gutters were captured because they were visible from the ground and collected during the assessment of the exterior enclosure.

Digital photos of each component, along with any nameplate or distress photos if applicable, were taken and assigned to the component section recorded in the BUILDER inventory via handheld tablet computers. Hardcopy floorplans were also utilized in the field for orientation and notation purposes. Quality assurance (QA) activities occurred both in the field and back in the office to ensure that components were correctly classified according to their UNIFORMAT II Level 5 Subtype and that condition ratings were properly assigned. Photos are particularly useful during QA as they provide a visual check of observed distresses and in the case of HVAC and some electrical, nameplate information that is key to verifying the capacity and relative age of a piece of equipment. The capacity is important for assigning cost while the age works in conjunction with the current condition in predicting the future life-cycle curve.

4.1.1 Quality Control / Quality Assurance (QA / QC)

The project team employed the following QA / QC procedures to ensure accuracy and consistency of the facility data collected in the field:

- Both field inspectors completed office and field training to identify all data requirements for the project.
- A principal field inspector was onsite throughout the field assessment to review all data.
- A two-person team was utilized to ensure safety and provide a first level of quality control for field data.
- Application of Tetra Tech's tablet-based field assessment program that directly linked with BUILDER, thereby significantly improving quality and accuracy of facility inventories and assessments while increasing efficiencies in the field.
- The team had access to experienced subject matter experts to increase accuracy and cross-checking ability.
- Data passing field QA / QC was sent for peer review. Multiple analytical tools were used to identify data gaps, statistical anomalies, or potential inconsistencies.
- The final QA / QC step was a discipline lead data review to identify data trends and outliers that might have required further analysis.

4.2 Use of BUILDER to Develop Project Outputs

The facility inventory and condition data collected at the seven facilities were uploaded into the BUILDER Sustainment Management System. BUILDER was the primary tool for storing facility data and to generate project-related outputs such as inventory and condition reports, as well as to develop the ten-year work plan for the City. BUILDER uses as its primary condition measure a condition index (CI) rating on a 0 to 100 point scale (**Table 1**). The condition index for each component-section is computed from inspection data that records the type, severity, and density of each distress found. Deterioration curves developed from experience over time show the optimal point at which work should be done to avoid more costly rehabilitation projects later. Please refer to the following useful web links for more information on BUILDER:

- BUILDER User Manual: http://sms.cecer.army.mil/SitePages/BUILDER%20Downloads.aspx
- BUILDER training videos: http://sms.cecer.army.mil/SitePages/BUILDER%20Training.aspx

4.3 Building Condition Index (BCI) for Each Facility

The inspectors quantified the type and severity of each distress in the field, using the 0 to100 rating scale depicted in **Table 1**. Asset age and visual ratings were combined to form the condition index basis for each system component. All system components condition indices were aggregated to arrive at a condition index value for a particular building system. Likewise, the combination of each building system condition is used to determine an overall building condition index score. **Table 5** shows the Building Condition Index (BCI) for each facility and the System Condition Indices (SCI) which comprise each BCI. BCI and SCI are defined as follows:

- Building Condition Index (BCI): The BCI measures the condition of the building as a whole. It is computed by averaging the condition indices of the building's systems, weighted by the replacement costs of the systems.
- System CI (SCI): For each system, the SCI is computed by taking the average of its component CI's weighted by replacement cost.

Table 5: BCI and SCI for Each Facility ("ND" = No Data*)

Facility Number	Facility Name	BCI	SCI										
			Foundations	Superstructure	Exterior Enclosure	Roofing	Interior Construction	Stairs	Interior Finishes	Conveying	Plumbing	HVAC	Fire Protection	Electrical
1	Four Seasons Pool	84	82	87	65	ND	89	80	89	ND	80	84	88	91
2	Firehall No 2 - Ospika	90	88	94	89	ND	91	ND	90	88	91	91	ND	95
3	Coliseum (Arena)	80	88	86	88	ND	86	88	52	ND	84	91	ND	92
4	B. Harkins Library	88	ND	83	90	88	95	84	89	88	84	89	88	94
5	Aquatic Centre	90	ND	95	83	ND	94	95	78	ND	88	89	88	90
6	City Hall	90	88	94	88	88	95	92	89	88	84	79	88	92
7	Elksentre	89	ND	94	78	88	77	ND	85	ND	86	89	ND	88

"ND" = "No Data". Indicates that no components for that system were assessed or observed in the field.

4.3.1 Observations on the BCI and SCI

Barring a number of exceptions related to specific facility components, the general condition of the seven civic facilities as shown in **Table 5** might be better than expected, especially in the light of the size of the backlog indicated in the City's 2013 Long Term Capital Planning spreadsheet (see **Figure 1**). The following observations are made on the BCI an SCI of the seven civic facilities:

- The roofs of only three of the seven facilities were inspected because it was out of scope as a result of winter conditions and accessibility limitations. Roofing is therefore generally under-represented in the assessment of BCI and in all probability make the BCI look better than it actually is, especially for the Four Seasons Pool and the Coliseum that are already in the Amber (+) range. The City should therefore complete the outstanding roof inspections for the Four Seasons Pool, Firehall No 2 – Ospika, Coliseum and Aquatic Centre, once the weather conditions permit inspection of the roofs.

- Some systems, such as foundations, which are not fully accessible, were limited in the inventory to the portions that were visible in the field.

- One important trend to note is the presence of a high number of 88 - 90 SCI scores. BUILDER appears to calculate a higher than expected CI with only one inspection present. However, it should be noted that without additional inspections to supplement the life-cycle curve, most of these scores are in the lower green range and will most likely be trending into the amber within the next year or two. As such they can be seen to represent an opportunity to program for capital funds now so that repair projects can capitalize on a high return on investment in the near future. The upper amber range of the condition index is the typical "sweet-spot" predicted by the BUILDER life-cycle curves as the optimum time to reinvest in the facility.

- The exterior enclosure for the Four Seasons Pool is in general need of major repair or restoration as shown by the red BCI of 65.
- The interior finishes for the Coliseum show considerable deterioration because the building is apparently well-used by people wearing ice-skates outside the rink. Any restoration of interior finishes for the Coliseum would also need to take into account future wear and tear given the facility's intended use.

4.4 Unconstrained 10-Year Work Plan

The unconstrained (i.e., no budget limitation) 10-year work plan by Civic Facility is presented in tabular format in **Table 6** and graphical format in **Figure 4**. The 10-year average annual cost of the work plan is in the order of $1.2 million per year. Please refer to **Appendix A** for a detailed listing of the Unconstrained 10-Year Work Plan project by facility by year.

Table 6: Unconstrained 10-Year Work Plan

	1 - Four Seasons Pool	2 - Firehall No 2 - Ospika	3 - Coliseum (Arena)	4 - B. Harkins Library	5 - Aquatic Centre	6 - City Hall	7 - Elksentre	TOTAL
2015	$706,659	$149,932	$1,139,080	$151,666	$312,969	$377,629	$117,436	**$2,955,371**
2016	$82,021	$1,580	$101,174	$15,314	$149,598	$142,546	$16,543	**$508,775**
2017	$71,468	$26,510	$42,143	$178,859	$166,451	$40,586	$1,126	**$527,143**
2018	$203,296	$10,317	$201,247	$140,691	$100,096	$388,971	$46,589	**$1,091,207**
2019	$312,678	$50,632	$127,863	$160,499	$378,986	$74,145	$123,704	**$1,228,506**
2020	$18,825	$13,695	$222,566	$87,448	$54,655	$141,864	$28,190	**$567,243**
2021	$84,461	$8,986	$120,843	$169,337	$110,547	$238,619	$20,134	**$752,927**
2022	$39,165	$41,697	$366,443	$139,883	$492,050	$877,978	$13,265	**$1,970,482**
2023	$74,007	$5,666	$360,005	$95,506	$652,333	$91,583	$27,269	**$1,306,368**
2024	$246,340	$54,755	$211,748	$132,192	$127,845	$291,599	$54,925	**$1,119,404**
TOTAL	**$1,838,920**	**$363,770**	**$2,893,112**	**$1,271,396**	**$2,545,530**	**$2,665,520**	**$449,180**	**$12,027,426**

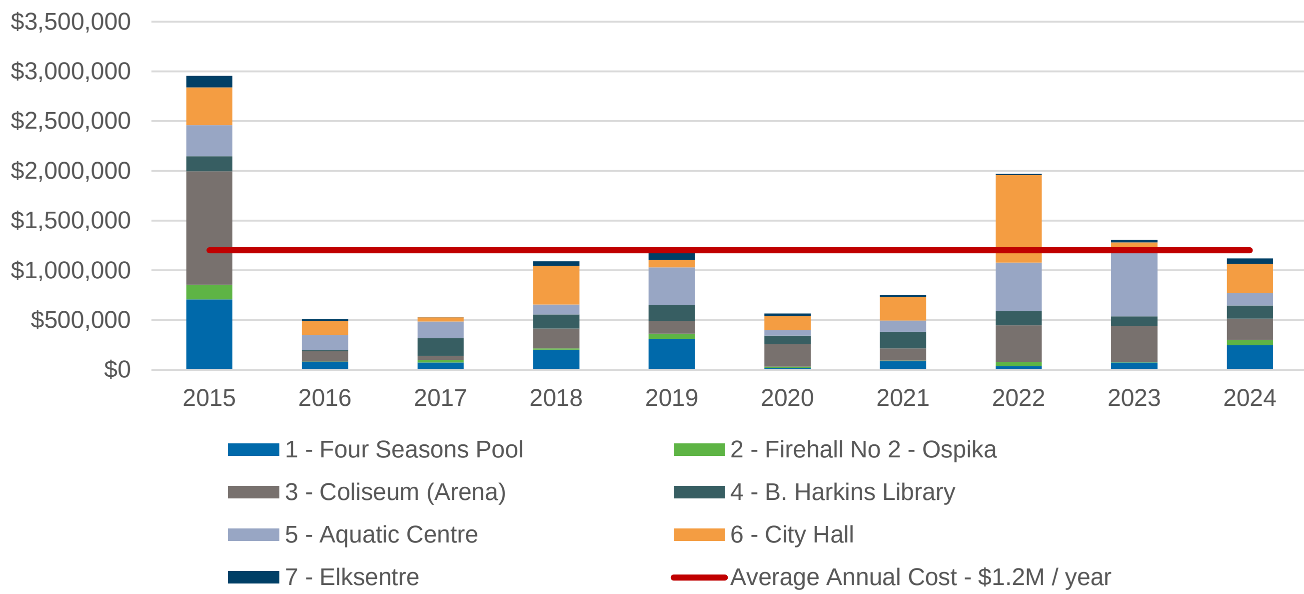


Figure 4: Unconstrained 10-Year Work Plan

For the work plan presented in **Appendix A**, costs have been upwardly adjusted by 25% to reflect conversion from the RS Means unit costs in US dollars to Canadian dollars. An annual inflation rate of 3.1% was applied across the projected 10-year horizon based upon the Canadian average rate of inflation for the period of 1981 to 2012, as per the "Civic Facilities Long Term Capital Planning Jan. 2013" spreadsheet.

4.5 BUILDER Reports

In addition to the unconstrained 10-year work plan in Appendix A, the following BUILDER reports are provided as outputs from the facility inspection process:

- Section Inventory Detail Report (**Appendix B**): Provides a detailed report by facility and system component, with associated component attributes.
- Condition Index Detail Report (**Appendix C**): Provides a detailed report by facility and system component, with associated condition ratings.

4.6 Digital Photos

Digital photos of each component, along with any nameplate or distress photos, where applicable, were taken via handheld tablet computers and assigned to the component section recorded in the BUILDER inventory. Hardcopy floorplans were also utilized in the field for orientation and notation purposes. Quality assurance activities occurred both in the field and back in the office to ensure that components were correctly classified according to their UNIFORMAT II Level 5 Subtype and that condition ratings were properly assigned. Photos are particularly useful during the quality assurance (QA) process as they provide a visual check of observed distresses, and in the case of HVAC and some electrical assets, recording of nameplate information that is key to verifying the capacity and relative age of a piece of equipment. The capacity is important for assigning cost while the age works in conjunction with the current condition in predicting the future life-cycle curve.

A set of digital photos, organised in folders by facility, is submitted with this report. The photo file naming convention enables the linking of photos with the particular asset component / nameplate / distress evidence, as shown in **Figure 5**.

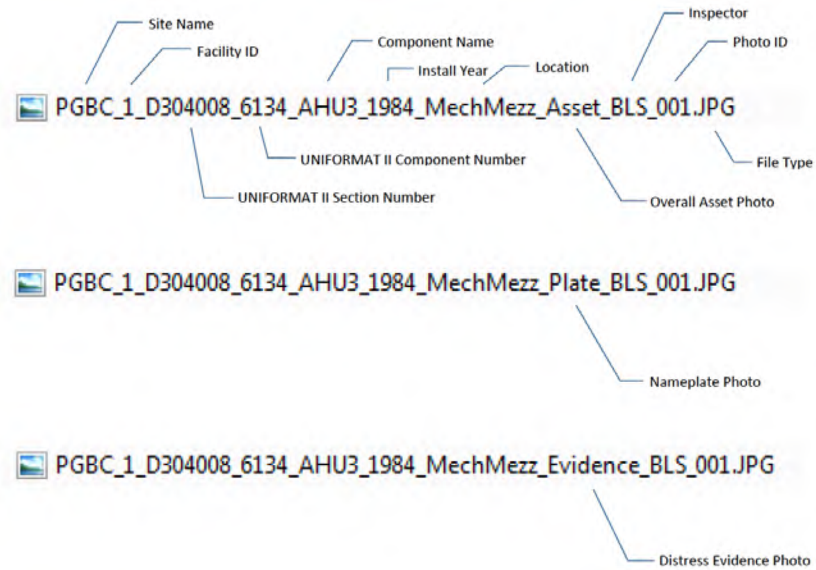


Figure 5: Photo File Naming Convention

5.0 RECOMMENDATIONS

Following this risk framework and condition assessment study of the 7 facilities, Tetra Tech has the following recommendations and potential next steps for the City:

- Conduct additional assessments. As additional condition data is gathered on the facilities, the City will start to understand the buildings from a performance perspective. This allows one to break the building performance into the individual building systems, therefore understanding performance by building system and overall performance of the building. As additional buildings are assessed, additional pieces are added to the entire building performance picture. When the City can fully see this picture, it allows for the development of a capital investment strategy and ensure it is aligned with the future master planning efforts over the long term.

- Tetra Tech suggests capturing the rest of the City's building portfolio, focusing on inhabited buildings first, then order of criticality of the uninhabited facilities if the City is not able to capture the remainder in one effort.

- Tetra Tech can train the City's personnel how to assess using BUILDER SMS if this is the tool the City plans to implement.

- Tetra Tech suggests the best software system is the one that answers the majority of questions the City is trying to answer from their built asset portfolio. If the City has a CMMS in place, a tool like BUILDER can be integrated with that system to manage the building portfolio from a life cycle perspective. A critical component is having a condition assessment tool that equally assesses assets in good condition (no or minimal deficiencies) as well as those in poor condition (severe deficiencies) and accounts for asset age and remaining service life. Otherwise, there is the danger of constantly chasing deficiencies and remaining in a reactive maintenance posture rather than proactively planning.

- The cost module should not be relied upon to provide costing detail for procurement of work. Therefore, the costing situations in these tools need to be evaluated and adjusted prior to developing scopes of work and forecasting final budgets. The existing cost module can certainly provide a good place to begin the estimate, and adjust up. The RS Means costs must be calibrated to the local conditions in Prince George and local availability of components and labour. This will ensure that the model costs are more indicative of the actual costs.

- Consideration should be given to further refine the draft facilities risk framework and include the CoF criteria so that Facility Risk can be used to help prioritize work activities across the City's facilities. Although the City has made good progress in defining a high-level risk framework for its Civic Facilities, more work needs to be done to flesh out the PoF and CoF criteria for each facility, test and evaluate the results and develop risk treatment options. It is therefore recommended that the City develop a risk register for its Civic Facility risks, and potentially other asset-related risks.

- Conduct a comparison to the City's 2013 Long Term Capital Planning spreadsheet with the data gathered in this assessment (and future assessments) to understand the variations and deviations among the key facility performance indicators such as Backlog, Annual Average Cost, BCI and FCI. This comparison was outside the scope of this project. The comparison would include validating the expected service lives of building components in the BUILDER software compared to the 2013 Study.

6.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Tetra Tech EBA Inc.

Prepared by:
Gary Ruck, P.Eng.
Asset Management Engineer
Direct Line: 778-945-5815
Gary.Ruck@tetratatech.com

Reviewed by:
Christian Babuin, P.Eng.
Project Director, Asset Management Group
Direct Line: 604-608-8903
Christian.Babuin@tetratech.com

APPENDIX A

UNCONSTRAINED 10-YEAR WORK PLAN

FACILITY	FUNDING FY	DESCRIPTION	Total
1 - Four Seasons Pool	2015	Repair B1010 FLOOR CONSTRUCTION Bm Grd1_C B101001 STRUCTURAL FRAME Beam/Girder - Concrete	$3,130
		Repair B2010 EXTERIOR WALLS Ex CL3_CIP B201001 EXTERIOR CLOSURE CIP Concrete	$9,108
		Replace A1030 SLAB ON GRADE Pit_FLB1 A103004 PITS AND BASES General	$652
		Replace A1030 SLAB ON GRADE Trench_FLB1 A103003 TRENCHES General	$3,911
		Replace B1010 FLOOR CONSTRUCTION Deck Slab1_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	$201,936
		Replace B1010 FLOOR CONSTRUCTION Ramp_FL1 B101006 RAMPS General	$65,724
		Replace B2010 EXTERIOR WALLS Ex CL1_Wsiding B201001 EXTERIOR CLOSURE Wood Cladding w/Stud Backup	$177,940
		Replace B2010 EXTERIOR WALLS Ex Sft1_RE_W B201007 EXTERIOR SOFFITS General	$109,296
		Replace B2030 EXTERIOR DOORS SD1_W B203001 SOLID DOORS Wood	$8,949
		Replace C1010 PARTITIONS HR1-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$1,263
		Replace C3010 WALL FINISHES WOther2-FLB1 C301090 OTHER WALL FINISHES General	$1,630
		Replace C3010 WALL FINISHES WWood3-FL1 C301005 WALL COVERINGS Wood	$70,639
		Replace C3010 WALL FINISHES WWood4-FL1 C301005 WALL COVERINGS Wood	$3,203
		Replace C3030 CEILING FINISHES COther1-FLB1 C303090 OTHER CEILING & CEILING FINISHES General	$70
		Replace D2010 PLUMBING FIXTURES Shower2-FL1 D201005 SHOWERS/TUBS Shower	$6,699
		Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS2_1970_Throughout bldg D202001 PIPES & FITTINGS CPVC <1" Pipe	$9,137
		Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS4_1970_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe	$7,105
		Replace D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$6,657
		Replace D5020 LIGHTING & BRANCH WIRING FluoL3-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$14,978
		Replace D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$3,328
		Replace D5090 OTHER ELECTRICAL SERVICES EmgL2-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$1,304
	2015 Total		$706,659
	2016	Repair B1010 FLOOR CONSTRUCTION Bm Grd1_C B101001 STRUCTURAL FRAME Beam/Girder - Concrete	$3,529
		Repair B2010 EXTERIOR WALLS Ex CL3_CIP B201001 EXTERIOR CLOSURE CIP Concrete	$10,219
		Repair D3040 DISTRIBUTION SYSTEMS CWP2_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" si	$3,935
		Replace D3040 DISTRIBUTION SYSTEMS AHU3_1984_Mech Mezz D304008 AIR HANDLING UNITS Central Station	$64,338
	2016 Total		$82,021
	2017	Repair C3010 WALL FINISHES WWood2-FLB1 C301005 WALL COVERINGS Wood	$3,063
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2010_Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical	$779
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2000_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$658
		Replace C1010 PARTITIONS HR1-FLM1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$554
		Replace C3020 FLOOR FINISHES FConTop2-FLB1 C302010 HARDENERS AND SEALERS Concrete Topping	$85
		Replace D3040 DISTRIBUTION SYSTEMS AHU1_1970_Mechrm D304008 AIR HANDLING UNITS Central Station	$66,329
	2017 Total		$71,468
	2018	Repair C1010 PARTITIONS SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	$312
		Repair C1020 INTERIOR DOORS MtlD1-FLB1 C102001 STANDARD INTERIOR DOORS Metal Door	$656
		Repair C1020 INTERIOR DOORS MtlD3-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	$1,279
		Repair C1020 INTERIOR DOORS MtlD5-FLM1 C102001 STANDARD INTERIOR DOORS Metal Door	$659
		Repair C1030 SPECIALTIES Divesys3M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$248
		Repair C1030 SPECIALTIES Divesys7M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$248
		Repair C1030 SPECIALTIES ShComp1_G-FLB1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Shower Compartment - Glass	$1,445
		Repair C1030 SPECIALTIES Slide1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$286
		Repair C3010 WALL FINISHES WOther1-FLB1 C301090 OTHER WALL FINISHES General	$737
		Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$3,228
		Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$1,900
		Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$7,120
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE3_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,781
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE4_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,781
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE5_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,781
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE6_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,781
		Repair D3020 HEAT GENERATING SYSTEMS CFW2_2010_Acidrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$410
		Repair D3040 DISTRIBUTION SYSTEMS HE1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM	$31,849
		Repair D3040 DISTRIBUTION SYSTEMS HE2_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$31,537
		Repair D3040 DISTRIBUTION SYSTEMS HE4_2008_Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$5,199
		Repair D3060 CONTROLS & INSTRUMENTATION DDC1_2011_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$649
		Repair D4010 FIRE ALARM AND DETECTION SYSTEMS DTECTR1_Throughout bldg D401001 FIRE ALARM DISTRIBUTION Fire detection systems, 50 detectors	$7,524
		Repair D4010 FIRE ALARM AND DETECTION SYSTEMS FACP1_2011_Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel	$1,781
		Replace B2020 EXTERIOR WINDOWS Wndw_W B202001 WINDOWS Wood Windows	$5,665
		Replace C3020 FLOOR FINISHES FOther1-FLB1_dup C302090 OTHER FLOORING & FLOOR FINISHES General	$232
		Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS3_1997_Throughout bldg D202001 PIPES & FITTINGS PVC 4"-6" Pipe	$93,210
	2018 Total		$203,296
	2019	Repair A1030 SLAB ON GRADE Str SlabOG_FLB1 A103002 STRUCTURAL SLAB ON GRADE General	$6,758
		Repair B2030 EXTERIOR DOORS SD2_S B203001 SOLID DOORS Steel	$2,472

FACILITY	FUNDING FY	DESCRIPTION	Total
		Repair C3030 CEILING FINISHES CAct2-FL1 C303001 ACOUSTICAL CEILING TILES & PANELS General	$14,533
		Repair C3030 CEILING FINISHES CActSusp2-FL1 C303005 SUSPENSION SYSTEMS General	$6,219
		Repair D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$1,161
		Repair D2010 PLUMBING FIXTURES WD1-FLB1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$297
		Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1_1997_Boilerrm D202002 VALVES & HYDRANTS Backflow Preventer - 2" pipe	$502
		Repair D2020 DOMESTIC WATER DISTRIBUTION BFP2_1997_Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 3" pipe	$1,265
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE1_1997_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE10_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE12_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,721
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE13_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,721
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE14_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,721
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE15_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,721
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE17_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE18_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE2_2010_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	$1,695
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE8_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE9_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,850
		Repair D2040 RAIN WATER DRAINAGE SP1_1997_Mech Hall D204003 RAINWATER DRAINAGE EQUIPMENT Sump Pump - Submersible	$157
		Repair D3020 HEAT GENERATING SYSTEMS CFW3_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$453
		Repair D3020 HEAT GENERATING SYSTEMS CFW4_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$453
		Repair D3040 DISTRIBUTION SYSTEMS CWP1_1997_Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size,	$7,028
		Repair D3040 DISTRIBUTION SYSTEMS CWP3_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6" si	$9,295
		Repair D3040 DISTRIBUTION SYSTEMS CWP4_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" si	$7,028
		Repair D3040 DISTRIBUTION SYSTEMS CWP5_2014_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2	$3,680
		Repair D3040 DISTRIBUTION SYSTEMS CWP6_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3" si	$4,402
		Repair D3040 DISTRIBUTION SYSTEMS CWP7_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" si	$7,028
		Repair D3040 DISTRIBUTION SYSTEMS HE3_1970_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$17,629
		Repair D3050 TERMINAL & PACKAGE UNITS UF1_1970_Mechrm D305001 UNIT VENTILATORS Fan System, Utility Set	$11,796
		Repair D3060 CONTROLS & INSTRUMENTATION AIRDRYER1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$2,468
		Repair D3060 CONTROLS & INSTRUMENTATION IAC1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$2,468
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MDP1_1970_Boilerrm D501002 SERVICE ENTRANCE EQUIPMENT Electrical Service - 3 Phase, 120/208 V, 800 A	$5,242
		Repair D5020 LIGHTING & BRANCH WIRING ExpL2-FLB1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$698
		Repair D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$865
		Replace C2010 STAIR CONSTRUCTION Poolsteps1_Other C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps	$65
		Replace C3010 WALL FINISHES WWood1-FL1 C301005 WALL COVERINGS Wood	$107,413
		Replace D3040 DISTRIBUTION SYSTEMS AHU2_1970_Mechrm D304008 AIR HANDLING UNITS Central Station	$70,495
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION SS2_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 30-100 Amp	$1,128
	2019 Total		$312,678
	2020	Repair C1010 PARTITIONS HR2-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$119
		Repair C1010 PARTITIONS HR3-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$196
		Repair C1020 INTERIOR DOORS GlzD2-FLB1 C102002 GLAZED INTERIOR DOORS General	$4,464
		Repair C1020 INTERIOR DOORS WDMF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$591
		Repair C1020 INTERIOR DOORS WDMF2-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$2,403
		Repair C1020 INTERIOR DOORS WDMF4-FLB1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$4,503
		Repair C1020 INTERIOR DOORS WDWF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	$195
		Repair C1030 SPECIALTIES TltPart1_P-FL1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Toilet Partitions - Plastic	$2,553
		Repair C3020 FLOOR FINISHES FConTop5-FLM1 C302010 HARDENERS AND SEALERS Concrete Topping	$139
		Repair D3050 TERMINAL & PACKAGE UNITS HUH1_1984_Boilerrm D305002 UNIT HEATERS Hydronic	$1,595
		Repair D3060 CONTROLS & INSTRUMENTATION DDC1_2011_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$429
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2010_Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical	$544
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2000_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$439
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB6_1987_Office D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$653
	2020 Total		$18,825
	2021	Repair B2010 EXTERIOR WALLS Ex CL6_Other B201001 EXTERIOR CLOSURE Other	$16,899
		Repair C1010 PARTITIONS Lifeguardstation1_Other C101002 DEMOUNTABLE PARTITIONS Other	$359
		Repair C1030 SPECIALTIES Springboard1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$293
		Repair C3010 WALL FINISHES WWood3-FL1 C301005 WALL COVERINGS Wood	$12,287
		Repair C3010 WALL FINISHES WWood4-FL1 C301005 WALL COVERINGS Wood	$557
		Repair C3020 FLOOR FINISHES FVinylShtF-FLB1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$1,897
		Repair D2010 PLUMBING FIXTURES Lav2-FLB1 D201003 LAVATORIES General	$1,907
		Repair D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$3,919
		Repair D2010 PLUMBING FIXTURES Shower3-FLB1 D201005 SHOWERS/TUBS Shower	$2,161
		Repair D2010 PLUMBING FIXTURES Urinal2-FLB1 D201002 URINALS General	$1,497

FACILITY	FUNDING FY	DESCRIPTION	Total
		Repair D2010 PLUMBING FIXTURES WaterClos2-FLB1 D201001 WATERCLOSETS General	$3,366
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$795
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB3_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$795
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB5_1984_Boilerrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$832
		Repair D5020 LIGHTING & BRANCH WIRING FluoL4-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$16,500
		Repair D5090 OTHER ELECTRICAL SERVICES EmgL3-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$1,144
		Replace C3010 WALL FINISHES WWood2-FLB1 C301005 WALL COVERINGS Wood	$19,253
	2021 Total		$84,461
	2022	Repair B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	$1,046
		Repair B2020 EXTERIOR WINDOWS SF1 B202002 STOREFRONTS General	$1,214
		Repair B2030 EXTERIOR DOORS SD3_W B203001 SOLID DOORS Wood	$4,669
		Repair C1020 INTERIOR DOORS FD1-FLB1 C102003 FIRE DOORS Fire Door - Swinging	$655
		Repair C1030 SPECIALTIES Slide1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$248
		Repair C3030 CEILING FINISHES CActSusp1-FLB1 C303005 SUSPENSION SYSTEMS General	$2,247
		Repair C3030 CEILING FINISHES COther2-FLB1 C303090 OTHER CEILING & CEILING FINISHES General	$65
		Repair D2010 PLUMBING FIXTURES DF1_FL1_1990 D201006 DRINKING FOUNTAINS AND COOLERS Drinking Fountain	$3,000
		Repair D2010 PLUMBING FIXTURES ES1_FLB1_2000 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$276
		Repair D2010 PLUMBING FIXTURES EW1_FLB1_2000 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$289
		Repair D2010 PLUMBING FIXTURES WD1-FLB1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$277
		Repair D5020 LIGHTING & BRANCH WIRING FluoL1-FLB1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$19,663
		Repair D5090 OTHER ELECTRICAL SERVICES EmgL1-FLB1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$1,227
		Replace C1010 PARTITIONS HR2-FLM1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$323
		Replace D3060 CONTROLS & INSTRUMENTATION DDC1_2011_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$3,966
	2022 Total		$39,165
	2023	Repair C1010 PARTITIONS FxdPart3-FLB1 C101001 FIXED PARTITIONS General	$17,607
		Repair C1020 INTERIOR DOORS MtlD4-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	$1,485
		Repair C1030 SPECIALTIES Divesys3M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$244
		Repair C1030 SPECIALTIES Divesys7M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	$244
		Repair C1030 SPECIALTIES ShComp1_G-FLB1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Shower Compartment - Glass	$1,425
		Repair C3010 WALL FINISHES WOther1-FLB1 C301090 OTHER WALL FINISHES General	$733
		Repair D3040 DISTRIBUTION SYSTEMS CWP2_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" si	$5,301
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2010_Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical	$542
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2000_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanica	$469
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC1_1970_Mechrm D501006 MOTOR CONTROL CENTERS General	$20,429
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC2_1970_Mech Hall D501006 MOTOR CONTROL CENTERS General	$20,429
		Replace B1010 FLOOR CONSTRUCTION Column2_C B101001 STRUCTURAL FRAME Column - Concrete	$915
		Replace B1010 FLOOR CONSTRUCTION Column3_C B101001 STRUCTURAL FRAME Column - Concrete	$1,373
		Replace D3020 HEAT GENERATING SYSTEMS CFW1_2013_Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$2,549
		Replace D3040 DISTRIBUTION SYSTEMS HWP1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP2_1997_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1_1970_Boilerrm D501004 PANELBOARDS Main lugs, 400 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION SS1_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 200 Amp	$65
	2023 Total		$74,007
	2024	Repair B1010 FLOOR CONSTRUCTION Deck Slab1_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	$37,043
		Repair C1010 PARTITIONS FxdPart1-FL1 C101001 FIXED PARTITIONS General	$12,603
		Repair C1010 PARTITIONS SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	$336
		Repair C1020 INTERIOR DOORS MtlD2-FLB1 C102001 STANDARD INTERIOR DOORS Metal Door	$773
		Repair C3010 WALL FINISHES WOther2-FLB1 C301090 OTHER WALL FINISHES General	$411
		Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$3,484
		Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$2,051
		Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$7,686
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE3_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,880
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE4_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,880
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE5_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,880
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE6_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,880
		Repair D3020 HEAT GENERATING SYSTEMS CFW2_2010_Acidrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$438
		Repair D3040 DISTRIBUTION SYSTEMS HE1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM	$34,299
		Repair D3040 DISTRIBUTION SYSTEMS HE2_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$33,292
		Repair D3040 DISTRIBUTION SYSTEMS HE4_2008_Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$7,335
		Repair D4010 FIRE ALARM AND DETECTION SYSTEMS FACP1_2011_Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel	$1,880
		Replace C3010 WALL FINISHES WWood3-FL1 C301005 WALL COVERINGS Wood	$92,974
		Replace C3010 WALL FINISHES WWood4-FL1 C301005 WALL COVERINGS Wood	$4,216
	2024 Total		$246,340

FACILITY	FUNDING FY	DESCRIPTION	Total
1 - Four Seasons Pool Total			$1,838,920
2 - Firehall No 2 - Ospika	2015	Replace A1030 SLAB ON GRADE Trench_C A103003 TRENCHES General	$14,667
		Replace B2030 EXTERIOR DOORS Wood E1 12x12 B203004 OVERHEAD AND ROLL-UP DOORS Wood, Electric, 12'x12'	$6,227
		Replace C3010 WALL FINISHES WOther1-FL1 C301090 OTHER WALL FINISHES General	$53,808
		Replace C3010 WALL FINISHES WOther2-FL1 C301090 OTHER WALL FINISHES General	$11,296
		Replace C3010 WALL FINISHES WOther3-FL1 C301090 OTHER WALL FINISHES General	$456
		Replace C3010 WALL FINISHES WOther4-FL1 C301090 OTHER WALL FINISHES General	$38,584
		Replace C3010 WALL FINISHES WOther5-FL1 C301090 OTHER WALL FINISHES General	$5,216
		Replace C3020 FLOOR FINISHES FVinyl3-FL1 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	$557
		Replace C3030 CEILING FINISHES COther1-FL1 C303090 OTHER CEILING & CEILING FINISHES General	$457
		Replace D2020 DOMESTIC WATER DISTRIBUTION WH1_2002_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Commercial, Gas - 155 MBH input, 150	$18,664
	2015 Total		$149,932
	2016	Replace C3020 FLOOR FINISHES FOther1-FL1_dup C302090 OTHER FLOORING & FLOOR FINISHES General	$1,580
	2016 Total		$1,580
	2017	Repair C1020 INTERIOR DOORS WDMF2-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$293
		Repair D3040 DISTRIBUTION SYSTEMS GES1_2000_Bay D304007 EXHAUST SYSTEMS Garage Exhaust Systems - Single exhaust, 3" outlet, 1 bay	$1,202
		Replace B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	$520
		Replace B2030 EXTERIOR DOORS Wood E2 14x14 B203004 OVERHEAD AND ROLL-UP DOORS Wood, Electric, 14'x14'	$8,576
		Replace D5020 LIGHTING & BRANCH WIRING FluoL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$15,919
	2017 Total		$26,510
	2018	Repair C3020 FLOOR FINISHES FVinyl5-FL1 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	$515
		Repair C3020 FLOOR FINISHES FVinylShtF-FL1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$615
		Replace C1020 INTERIOR DOORS WDWF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	$9,188
	2018 Total		$10,317
	2019	Repair B2010 EXTERIOR WALLS Ex Sft2_RE_M B201007 EXTERIOR SOFFITS General	$98
		Repair D1020 WEIGHT HANDLING EQUIPMENT CRANE1_1990_Stg Bay D102002 OVERHEAD CRANES General	$21,215
		Repair D2010 PLUMBING FIXTURES WD1-FL1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$516
		Repair D3020 HEAT GENERATING SYSTEMS F1_2014_Stg Bay D302002 FURNACES Gas, 150 MBH	$253
		Repair D3020 HEAT GENERATING SYSTEMS F2_2014_Clst D302002 FURNACES Gas, 150 MBH	$253
		Repair D3050 TERMINAL & PACKAGE UNITS UF1_1986_Supplyrm D305001 UNIT VENTILATORS Fan System, Utility Set	$12,276
		Replace C3020 FLOOR FINISHES FVinylShtF-FL1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$2,861
		Replace D3050 TERMINAL & PACKAGE UNITS FCU1_1970_FL1 D305003 FAN COIL UNITS Cab Mount, Two Pipe	$13,159
	2019 Total		$50,632
	2020	Repair B1020 ROOF CONSTRUCTION Canopy1 B102004 CANOPIES General	$3,504
		Repair D3040 DISTRIBUTION SYSTEMS GES1_2000_Bay D304007 EXHAUST SYSTEMS Garage Exhaust Systems - Single exhaust, 3" outlet, 1 bay	$804
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB3_1990_Stg Bay D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$664
		Replace D5020 LIGHTING & BRANCH WIRING FluoL2-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$8,723
	2020 Total		$13,695
	2021	Repair D2010 PLUMBING FIXTURES LaundSink1-FL1 D201004 SINKS Laundry Sink	$1,653
		Repair D2020 DOMESTIC WATER DISTRIBUTION WH1_2002_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Commercial, Gas - 155 MBH input, 150	$3,246
		Repair D3020 HEAT GENERATING SYSTEMS ET1_1970_Mechrm D302004 AUXILIARY EQUIPMENT Expansion Tank	$970
		Repair D3050 TERMINAL & PACKAGE UNITS FTR1_1986_FL1 D305004 FIN TUBE RADIATION Baseboard Heating - 1/2" Copper Tube	$396
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1_1986_Elecrm D501004 PANELBOARDS Main lugs, 120/240 V, 225 amp, NQOD	$907
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2_1986_Elecrm D501004 PANELBOARDS Main lugs, 120/240 V, 225 amp, NQOD	$907
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB4_1986_Hall D501004 PANELBOARDS Main lugs, 120/240 V, 225 amp, NQOD	$907
	2021 Total		$8,986
	2022	Repair B2030 EXTERIOR DOORS GD1 B203002 GLAZED DOORS General	$1,170
		Repair B2030 EXTERIOR DOORS SD1_S B203001 SOLID DOORS Steel	$2,384
		Repair B2030 EXTERIOR DOORS Stl Roll E1 12x12 B203004 OVERHEAD AND ROLL-UP DOORS Steel Rolling, Electric, 12'x12'	$3,739
		Repair C1020 INTERIOR DOORS FD2-FL1 C102003 FIRE DOORS Fire Door - Swinging	$362
		Repair C3010 WALL FINISHES WGyp1-FL1 C301003 GYPSUM WALLBOARD FINISHES General	$4,103
		Repair D3020 HEAT GENERATING SYSTEMS B1_2014_Mechrm D302001 BOILERS Gas, Hot Water	$19,583
		Repair D5020 LIGHTING & BRANCH WIRING Ext Lights2 D502002 LIGHTING EQUIPMENT Exterior Lighting	$751
		Repair D5020 LIGHTING & BRANCH WIRING FluoL4-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$9,606
	2022 Total		$41,697
	2023	Repair C1020 INTERIOR DOORS MtlD3-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	$723
		Repair D2010 PLUMBING FIXTURES WD1-FL1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$764
		Repair D2020 DOMESTIC WATER DISTRIBUTION FITTINGS2_1990_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 1"-2" Pipe	$217
		Repair D2020 DOMESTIC WATER DISTRIBUTION FITTINGS3_1990_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 1"-2" Pipe	$2,088
		Repair D3020 HEAT GENERATING SYSTEMS F1_2014_Stg Bay D302002 FURNACES Gas, 150 MBH	$313
		Repair D3020 HEAT GENERATING SYSTEMS F2_2014_Clst D302002 FURNACES Gas, 150 MBH	$313
		Repair D3040 DISTRIBUTION SYSTEMS GES1_2000_Bay D304007 EXHAUST SYSTEMS Garage Exhaust Systems - Single exhaust, 3" outlet, 1 bay	$859
		Replace C1010 PARTITIONS HR1-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$65

FACILITY	FUNDING FY	DESCRIPTION	Total
		Repair C3030 CEILING FINISHES CActSusp1-FL1 C303005 SUSPENSION SYSTEMS General	$5,936
		Repair C3030 CEILING FINISHES CActSusp2-FL2 C303005 SUSPENSION SYSTEMS General	$9,726
		Repair D2010 PLUMBING FIXTURES KitSink1-FL2 D201004 SINKS Kitchen Sink	$655
		Repair D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$1,174
		Repair D5020 LIGHTING & BRANCH WIRING FluoL2-FL2 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$56,096
		Repair D5020 LIGHTING & BRANCH WIRING FluoL3-FLB2 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$1,274
		Repair D5090 OTHER ELECTRICAL SERVICES EmgL3-FL2 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$749
		Replace C3010 WALL FINISHES WOther1-FL1 C301090 OTHER WALL FINISHES General	$15,620
		Replace C3020 FLOOR FINISHES FVinyl1-FL2 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	$161
		Replace C3020 FLOOR FINISHES FVinylShtF-FL2 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$25,183
		Replace D3060 CONTROLS & INSTRUMENTATION DDC1_2011_Mech Penthouse D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mec	$3,966
	2022 Total		$139,883
	2023	Repair B2010 EXTERIOR WALLS HR1 B201006 BALCONY WALLS & HANDRAILS Handrailing	$608
		Repair B2030 EXTERIOR DOORS SD1_S B203001 SOLID DOORS Steel	$1,180
		Repair B3010 ROOF COVERINGS Gutter1 B301005 GUTTERS & DOWNSPOUTS Gutters	$722
		Repair C1020 INTERIOR DOORS GlzD1-FL2 C102002 GLAZED INTERIOR DOORS General	$2,251
		Repair C1020 INTERIOR DOORS WDMF1-FL2 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$4,541
		Repair C1020 INTERIOR DOORS WDMF2-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	$1,892
		Repair C1020 INTERIOR DOORS WDWF1-FL2 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	$250
		Repair C1030 SPECIALTIES TltPart1_CS-FL2 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Toilet Partitions - Coated Steel	$924
		Repair C3020 FLOOR FINISHES FCpt8-FL1 C302005 CARPETING General	$2,198
		Repair C3020 FLOOR FINISHES FCptTile3-FL1 C302005 CARPETING Carpet Tile	$546
		Repair C3020 FLOOR FINISHES FCptTile4-FL1 C302005 CARPETING Carpet Tile	$65
		Repair D2020 DOMESTIC WATER DISTRIBUTION WS1_2000_Mech Penthouse D202003 DOMESTIC WATER EQUIPMENT Water Softener	$327
		Repair D3050 TERMINAL & PACKAGE UNITS FCU1_1980_Mech Penthouse D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$3,745
		Repair D3050 TERMINAL & PACKAGE UNITS FCU2_1980_Stairwell Elecrm D305003 FAN COIL UNITS Cab Mount, Two Pipe	$3,084
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2014_FL1 Elecrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechani	$627
		Replace B3010 ROOF COVERINGS Downspout1 B301005 GUTTERS & DOWNSPOUTS Downspouts	$275
		Replace C2010 STAIR CONSTRUCTION Mechsteps1_FL3 C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps - Wood	$65
		Replace D2010 PLUMBING FIXTURES SvcSink1-FL2 D201004 SINKS Service Sink	$6,970
		Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS1_1980_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe	$64,847
		Replace D3040 DISTRIBUTION SYSTEMS HWP3_2007_Mech Penthouse D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP4_2007_Mech Penthouse D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1_1980_Mech Penthouse D501004 PANELBOARDS Main lugs, 400 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2_1980_Mech Penthouse D501004 PANELBOARDS Main lugs, 400 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB8_1980_Stairwell Elecrm D501004 PANELBOARDS Main lugs, 600 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB9_1980_Stairwell Elecrm D501004 PANELBOARDS Main lugs, 600 amp	$65
	2023 Total		$95,506
	2024	Repair B2010 EXTERIOR WALLS HR4 B201006 BALCONY WALLS & HANDRAILS Handrailing	$497
		Repair B2030 EXTERIOR DOORS GD2 B203002 GLAZED DOORS General	$4,838
		Repair C1020 INTERIOR DOORS FD2-FL2 C102003 FIRE DOORS Fire Door - Swinging	$758
		Repair C1020 INTERIOR DOORS MtlD3-FLB2 C102001 STANDARD INTERIOR DOORS Metal Door	$2,251
		Repair C3010 WALL FINISHES WOther2-FL1 C301090 OTHER WALL FINISHES General	$526
		Repair C3010 WALL FINISHES WOther3-FL2 C301090 OTHER WALL FINISHES General	$1,668
		Repair C3010 WALL FINISHES WOther4-FLB2 C301090 OTHER WALL FINISHES General	$1,619
		Repair C3010 WALL FINISHES WOther5-FLB1 C301090 OTHER WALL FINISHES General	$1,610
		Repair C3010 WALL FINISHES WWood2-FLB1 C301005 WALL COVERINGS Wood	$299
		Repair C3020 FLOOR FINISHES FCptTile1-FL2 C302005 CARPETING Carpet Tile	$2,154
		Repair C3020 FLOOR FINISHES FCptTile2-FL1 C302005 CARPETING Carpet Tile	$3,197
		Repair D3050 TERMINAL & PACKAGE UNITS HP11_2006_Stairwell Elecrm D305006 PACKAGE UNITS Heat Pump, Water Source, Console - 3 ton	$1,501
		Repair D3060 CONTROLS & INSTRUMENTATION PNC1_1980_Mech Penthouse D306003 PNEUMATIC CONTROLS static pressure control for air handling unit, i	$2,739
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR1_1980_Mech Penthouse D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/20	$2,550
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR2_1980_Stairwell Elecrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/	$3,210
		Replace C3020 FLOOR FINISHES FCpt2-FL2 C302005 CARPETING General	$102,776
	2024 Total		$132,192
4 - B. Harkins Library Total			$1,271,396
5 - Aquatic Centre	2015	Repair D3040 DISTRIBUTION SYSTEMS CWP6_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$4,314
		Replace C3010 WALL FINISHES WOther1-FL1 C301090 OTHER WALL FINISHES General	$189,837
		Replace C3010 WALL FINISHES WWood1-FL1 C301005 WALL COVERINGS Wood	$8,501
		Replace C3020 FLOOR FINISHES FCpt1-FL1 C302005 CARPETING General	$4,179
		Replace D2020 DOMESTIC WATER DISTRIBUTION WH1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Residential, Electric	$3,539
		Replace D3040 DISTRIBUTION SYSTEMS AHU2_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$67,733
		Replace D3040 DISTRIBUTION SYSTEMS AHU7_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$34,865

FACILITY	FUNDING FY	DESCRIPTION	Total
	2015 Total		$312,969
	2016	Repair B2010 EXTERIOR WALLS Ex Sft1_C_W B201007 EXTERIOR SOFFITS General	$326
		Repair B2020 EXTERIOR WINDOWS SF1 B202002 STOREFRONTS General	$3,763
		Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1_1998_FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe	$1,096
		Repair D3040 DISTRIBUTION SYSTEMS CWP11_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3"	$3,384
		Repair D3040 DISTRIBUTION SYSTEMS CWP6_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$5,938
		Replace D3030 COOLING GENERATING SYSTEMS CU3_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	$3,722
		Replace D3030 COOLING GENERATING SYSTEMS CU5_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	$3,722
		Replace D3040 DISTRIBUTION SYSTEMS AHU4_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$35,943
		Replace D3040 DISTRIBUTION SYSTEMS AHU5_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$69,828
		Replace D3050 TERMINAL & PACKAGE UNITS FCU2_1998_Mechrm MEZZ D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$21,875
	2016 Total		$149,598
	2017	Repair B2010 EXTERIOR WALLS Ex CL2_EIFS B201001 EXTERIOR CLOSURE E.I.F.S.	$86,875
		Repair C1010 PARTITIONS HR2-FL2 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$65
		Repair D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$1,665
		Repair D2010 PLUMBING FIXTURES WC1_FL1_1998 D201006 DRINKING FOUNTAINS AND COOLERS Water Cooler	$527
		Repair D2020 DOMESTIC WATER DISTRIBUTION FITTINGS1_1980_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 2"-4" Pipe	$11,444
		Repair D3030 COOLING GENERATING SYSTEMS CU4_2003_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	$731
		Repair D3040 DISTRIBUTION SYSTEMS HE3_1998_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$22,005
		Repair D3040 DISTRIBUTION SYSTEMS HE4_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$13,119
		Repair D3040 DISTRIBUTION SYSTEMS HE5_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$13,119
		Repair D3060 CONTROLS & INSTRUMENTATION DDC1_2008_FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechani	$727
		Repair D3060 CONTROLS & INSTRUMENTATION DDC10_2000_Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mec	$654
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2000_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$654
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$775
		Repair D3060 CONTROLS & INSTRUMENTATION DDC4_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$775
		Repair D3060 CONTROLS & INSTRUMENTATION DDC5_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$775
		Repair D3060 CONTROLS & INSTRUMENTATION DDC6_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$775
		Repair D3060 CONTROLS & INSTRUMENTATION DDC7_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$654
		Repair D3060 CONTROLS & INSTRUMENTATION DDC8_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$654
		Repair D3060 CONTROLS & INSTRUMENTATION DDC9_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$654
		Repair D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$1,294
		Replace B2010 EXTERIOR WALLS Balc_Ladder1 B201006 BALCONY WALLS & HANDRAILS Ladder	$1,014
		Replace B2010 EXTERIOR WALLS HR1 B201006 BALCONY WALLS & HANDRAILS Handrailing	$3,945
		Replace D2010 PLUMBING FIXTURES WD1-FL1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$3,552
	2017 Total		$166,451
	2018	Repair B1010 FLOOR CONSTRUCTION Deck Slab2_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	$2,181
		Repair B2010 EXTERIOR WALLS Ex CL1_CMU B201001 EXTERIOR CLOSURE Concrete Block	$34,895
		Repair C3020 FLOOR FINISHES FCptTile1-FL1 C302005 CARPETING Carpet Tile	$343
		Repair C3020 FLOOR FINISHES FVinyl2-FL1 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	$592
		Repair C3020 FLOOR FINISHES FVinylShtF-FL1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$1,031
		Repair C3020 FLOOR FINISHES FVinylShtF-FL2 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$354
		Repair D3020 HEAT GENERATING SYSTEMS CFW3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$435
		Repair D3030 COOLING GENERATING SYSTEMS CU1_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21 ton, R-2	$1,811
		Repair D3030 COOLING GENERATING SYSTEMS CU2_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26 ton, R-2	$2,209
		Repair D3040 DISTRIBUTION SYSTEMS AHU1_1998_Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station	$13,370
		Repair D3040 DISTRIBUTION SYSTEMS HE6_2010_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$29,508
		Repair D3050 TERMINAL & PACKAGE UNITS FCU1_1998_FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$4,546
		Repair D3050 TERMINAL & PACKAGE UNITS HP1_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$4,411
		Repair D3050 TERMINAL & PACKAGE UNITS HP2_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$4,411
	2018 Total		$100,096
	2019	Repair B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	$2,859
		Repair B2030 EXTERIOR DOORS SD1_S B203001 SOLID DOORS Steel	$14,623
		Repair C1010 PARTITIONS SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	$11,437
		Repair C3020 FLOOR FINISHES FCpt1-FL1 C302005 CARPETING General	$573
		Repair C3020 FLOOR FINISHES FPaint1-FL1 C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES Paint	$1,797
		Repair D2010 PLUMBING FIXTURES ES1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$266
		Repair D2010 PLUMBING FIXTURES EW1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$279
		Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$2,841
		Repair D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$1,073
		Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$1,115
		Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$5,640
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862

FACILITY	FUNDING FY	DESCRIPTION	Total
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE10_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treat	$1,475
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE11_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treat	$1,475
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE12_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE13_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE14_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE15_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE16_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE17_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE18_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE19_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE2_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE20_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE21_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE22_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE23_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE24_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE3_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE4_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE5_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE6_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE7_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE8_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$1,862
		Repair D2020 DOMESTIC WATER DISTRIBUTION WTE9_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatm	$1,475
		Repair D3020 HEAT GENERATING SYSTEMS B1_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$18,256
		Repair D3020 HEAT GENERATING SYSTEMS B2_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$18,256
		Repair D3020 HEAT GENERATING SYSTEMS B3_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$18,256
		Repair D3020 HEAT GENERATING SYSTEMS CFW1_1998_FL1 Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$456
		Repair D3020 HEAT GENERATING SYSTEMS CFW2_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$456
		Repair D3040 DISTRIBUTION SYSTEMS CWP10_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5"	$7,070
		Repair D3040 DISTRIBUTION SYSTEMS CWP12_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4"	$5,151
		Repair D3040 DISTRIBUTION SYSTEMS CWP13_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1	$3,982
		Repair D3040 DISTRIBUTION SYSTEMS CWP14_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5"	$7,070
		Repair D3040 DISTRIBUTION SYSTEMS CWP15_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5"	$7,070
		Repair D3040 DISTRIBUTION SYSTEMS CWP16_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6"	$9,351
		Repair D3040 DISTRIBUTION SYSTEMS CWP4_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$3,982
		Repair D3040 DISTRIBUTION SYSTEMS CWP5_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$3,982
		Repair D3040 DISTRIBUTION SYSTEMS CWP7_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$3,982
		Repair D3040 DISTRIBUTION SYSTEMS CWP8_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$3,982
		Repair D3040 DISTRIBUTION SYSTEMS CWP9_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" s	$7,070
		Repair D3050 TERMINAL & PACKAGE UNITS CF1_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$10,833
		Repair D3050 TERMINAL & PACKAGE UNITS CF2_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$10,833
		Repair D3050 TERMINAL & PACKAGE UNITS CF3_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 10,000 CFM	$21,400
		Repair D3050 TERMINAL & PACKAGE UNITS CF4_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 1500 CFM	$3,526
		Repair D3050 TERMINAL & PACKAGE UNITS CF5_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$10,833
		Repair D3050 TERMINAL & PACKAGE UNITS CF6_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$10,833
		Repair D3050 TERMINAL & PACKAGE UNITS CF7_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	$11,936
		Repair D3050 TERMINAL & PACKAGE UNITS CF8_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 7500 CFM	$18,150
		Repair D3050 TERMINAL & PACKAGE UNITS CF9_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	$11,936
		Repair D3050 TERMINAL & PACKAGE UNITS HUH1_1998_Mech Areas D305002 UNIT HEATERS Hydronic	$11,561
		Repair D3050 TERMINAL & PACKAGE UNITS HUH2_2007_Mechrm MEZZ D305002 UNIT HEATERS Hydronic	$3,025
		Repair D3050 TERMINAL & PACKAGE UNITS UF1_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Utility Set	$13,152
		Repair D3060 CONTROLS & INSTRUMENTATION IAC1_1998_FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$2,487
		Repair D4030 STANDPIPE SYSTEMS RISER1_1998_FL1 Mechrm D403001 STANDPIPE EQUIPMENT & PIPING Riser - 4" diam	$2,746
		Repair D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$6,774
		Repair D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$11,985
		Repair D5020 LIGHTING & BRANCH WIRING LedL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$8,539
		Repair D5090 OTHER ELECTRICAL SERVICES EmgL1-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$3,981
		Replace D3040 DISTRIBUTION SYSTEMS HWP3_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2"	$65
	2019 Total		$378,986
	2020	Repair D2020 DOMESTIC WATER DISTRIBUTION ST1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Galvanized steel, 500 gallon, 36	$3,260
		Repair D3020 HEAT GENERATING SYSTEMS ET1_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 305 gal	$2,168
		Repair D3020 HEAT GENERATING SYSTEMS ET5_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	$472
		Repair D3020 HEAT GENERATING SYSTEMS ET6_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	$472

FACILITY	FUNDING FY	DESCRIPTION	Total
		Repair D3040 DISTRIBUTION SYSTEMS CWP1_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$4,033
		Repair D3040 DISTRIBUTION SYSTEMS CWP2_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$4,033
		Repair D3040 DISTRIBUTION SYSTEMS CWP3_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$4,033
		Repair D3040 DISTRIBUTION SYSTEMS HE1_2011_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$4,744
		Repair D3060 CONTROLS & INSTRUMENTATION DDC1_2008_FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechani	$507
		Repair D3060 CONTROLS & INSTRUMENTATION DDC10_2000_Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mec	$439
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2000_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$439
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$544
		Repair D3060 CONTROLS & INSTRUMENTATION DDC4_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$544
		Repair D3060 CONTROLS & INSTRUMENTATION DDC5_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$544
		Repair D3060 CONTROLS & INSTRUMENTATION DDC6_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$544
		Repair D3060 CONTROLS & INSTRUMENTATION DDC7_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$439
		Repair D3060 CONTROLS & INSTRUMENTATION DDC8_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$439
		Repair D3060 CONTROLS & INSTRUMENTATION DDC9_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$439
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1_1998_FL1 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB10_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB3_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB4_1998_Elecrm MEZZ D501004 PANELBOARDS Other	$14,492
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB5_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB6_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB9_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$783
		Repair D5020 LIGHTING & BRANCH WIRING LedL2-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$2,508
		Replace C1010 PARTITIONS HR1-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$399
		Replace C2010 STAIR CONSTRUCTION MechSteps_FL1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps - Concrete	$65
		Replace D3030 COOLING GENERATING SYSTEMS CU4_2003_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	$4,205
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 400 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB7_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp	$65
		Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB8_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp	$65
	2020 Total		$54,655
	2021	Repair C3010 WALL FINISHES WWood1-FL1 C301005 WALL COVERINGS Wood	$1,479
		Repair C3020 FLOOR FINISHES FCptTile1-FL1 C302005 CARPETING Carpet Tile	$391
		Repair D3040 DISTRIBUTION SYSTEMS AHU3_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	$26,998
		Repair D3040 DISTRIBUTION SYSTEMS AHU6_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	$26,998
		Repair D3040 DISTRIBUTION SYSTEMS HE2_2010_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$6,415
		Replace B2010 EXTERIOR WALLS Ex Sft1_C_W B201007 EXTERIOR SOFFITS General	$1,938
		Replace B2020 EXTERIOR WINDOWS SF1 B202002 STOREFRONTS General	$22,363
		Replace C3020 FLOOR FINISHES FCpt1-FL1 C302005 CARPETING General	$5,019
		Replace C3020 FLOOR FINISHES FVinyl2-FL1 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	$5,620
		Replace C3020 FLOOR FINISHES FVinylShtF-FL1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$9,775
		Replace C3020 FLOOR FINISHES FVinylShtF-FL2 C302004 RESILIENT FLOOR FINISHES Composition Sheet	$3,356
		Replace D3040 DISTRIBUTION SYSTEMS HWP1_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP2_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP4_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2"	$65
	2021 Total		$110,547
	2022	Repair B2030 EXTERIOR DOORS GD2 B203002 GLAZED DOORS General	$2,337
		Repair C1020 INTERIOR DOORS FD1-FL2 C102003 FIRE DOORS Fire Door - Swinging	$366
		Repair C1020 INTERIOR DOORS WDWF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	$501
		Repair C3020 FLOOR FINISHES FConTop1-FLB1 C302010 HARDENERS AND SEALERS Concrete Topping	$149
		Repair C3020 FLOOR FINISHES FConTop2-FL1 C302010 HARDENERS AND SEALERS Concrete Topping	$1,846
		Repair C3030 CEILING FINISHES CActSusp1-FL1 C303005 SUSPENSION SYSTEMS General	$4,896
		Repair C3030 CEILING FINISHES CActSusp2-FL2 C303005 SUSPENSION SYSTEMS General	$204
		Repair D4020 FIRE SUPP WATER SUPPLY / EQUIP FPBFP1_1998_FL1 Mechrm D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT Backflow Preventer - 4"	$1,501
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC1_1998_FL1 Mechrm D501006 MOTOR CONTROL CENTERS General	$19,886
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC2_1998_Elecrm MEZZ D501006 MOTOR CONTROL CENTERS General	$19,886
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC3_1998_Mechrm MEZZ-2 D501006 MOTOR CONTROL CENTERS General	$19,886
		Replace C1010 PARTITIONS HR2-FL2 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	$484
		Replace D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$13,521
		Replace D2010 PLUMBING FIXTURES WC1_FL1_1998 D201006 DRINKING FOUNTAINS AND COOLERS Water Cooler	$4,278
		Replace D3040 DISTRIBUTION SYSTEMS HE3_1998_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$178,715
		Replace D3040 DISTRIBUTION SYSTEMS HE4_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$106,542
		Replace D3040 DISTRIBUTION SYSTEMS HE5_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$106,542
		Replace D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$10,508
	2022 Total		$492,050

FACILITY	FUNDING FY	DESCRIPTION	Total
	2023	Repair B1010 FLOOR CONSTRUCTION Deck Slab2_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	$1,999
		Repair C1020 INTERIOR DOORS MtlD2-FL2 C102001 STANDARD INTERIOR DOORS Metal Door	$2,950
		Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1_1998_FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe	$1,496
		Repair D2020 DOMESTIC WATER DISTRIBUTION ST2_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60	$4,684
		Repair D2020 DOMESTIC WATER DISTRIBUTION ST3_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60	$4,684
		Repair D3030 COOLING GENERATING SYSTEMS CU1_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21 ton, R-2	$1,660
		Repair D3030 COOLING GENERATING SYSTEMS CU2_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26 ton, R-2	$2,025
		Repair D3040 DISTRIBUTION SYSTEMS AHU1_1998_Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station	$12,256
		Repair D3040 DISTRIBUTION SYSTEMS CWP11_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3"	$4,617
		Repair D3040 DISTRIBUTION SYSTEMS CWP6_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/	$4,152
		Repair D3050 TERMINAL & PACKAGE UNITS FCU1_1998_FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$4,167
		Repair D3060 CONTROLS & INSTRUMENTATION DDC1_2008_FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechani	$518
		Repair D3060 CONTROLS & INSTRUMENTATION DDC10_2000_Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mec	$469
		Repair D3060 CONTROLS & INSTRUMENTATION DDC2_2000_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$469
		Repair D3060 CONTROLS & INSTRUMENTATION DDC3_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$542
		Repair D3060 CONTROLS & INSTRUMENTATION DDC4_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$542
		Repair D3060 CONTROLS & INSTRUMENTATION DDC5_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$542
		Repair D3060 CONTROLS & INSTRUMENTATION DDC6_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechan	$542
		Repair D3060 CONTROLS & INSTRUMENTATION DDC7_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$469
		Repair D3060 CONTROLS & INSTRUMENTATION DDC8_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$469
		Repair D3060 CONTROLS & INSTRUMENTATION DDC9_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mech	$469
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR1_1998_FL1 Mechrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V	$1,967
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR2_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208	$2,270
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR3_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208	$1,186
		Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION SG1_1998_Elecrm MEZZ D501004 PANELBOARDS Switchgear - 1200 Amp	$11,371
		Replace B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	$22,784
		Replace B2030 EXTERIOR DOORS SD1_S B203001 SOLID DOORS Steel	$116,518
		Replace C1010 PARTITIONS SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	$91,135
		Replace C3020 FLOOR FINISHES FCptTile1-FL1 C302005 CARPETING Carpet Tile	$1,948
		Replace C3020 FLOOR FINISHES FPaint1-FL1 C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES Paint	$14,648
		Replace D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$22,638
		Replace D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$8,552
		Replace D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$8,885
		Replace D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$44,943
		Replace D3040 DISTRIBUTION SYSTEMS HWP5_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2"	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP6_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2"	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP7_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2"	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP8_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2	$65
		Replace D3040 DISTRIBUTION SYSTEMS HWP9_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2	$65
		Replace D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$55,231
		Replace D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$97,717
		Replace D5020 LIGHTING & BRANCH WIRING LedL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$68,038
		Replace D5090 OTHER ELECTRICAL SERVICES EmgL1-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$32,459
	2023 Total		$652,333
	2024	Repair C3010 WALL FINISHES WOther1-FL1 C301090 OTHER WALL FINISHES General	$47,842
		Repair C3030 CEILING FINISHES COther1-FL1 C303090 OTHER CEILING & CEILING FINISHES General	$4,923
		Repair D2010 PLUMBING FIXTURES ES1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$216
		Repair D2010 PLUMBING FIXTURES EW1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$227
		Repair D3020 HEAT GENERATING SYSTEMS CFW3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$461
		Repair D3040 DISTRIBUTION SYSTEMS AHU2_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$12,425
		Repair D3040 DISTRIBUTION SYSTEMS AHU7_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$6,396
		Repair D3040 DISTRIBUTION SYSTEMS HE6_2010_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$34,822
		Repair D3050 TERMINAL & PACKAGE UNITS HP1_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$4,673
		Repair D3050 TERMINAL & PACKAGE UNITS HP2_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$4,673
		Replace C3010 WALL FINISHES WWood1-FL1 C301005 WALL COVERINGS Wood	$11,189
	2024 Total		$127,845
5 - Aquatic Centre Total			$2,545,530
6 - City Hall	2015	Repair D2010 PLUMBING FIXTURES KitSink1-FLB1 D201004 SINKS Kitchen Sink	$738
		Replace C3010 WALL FINISHES WOther2-FLB1 C301090 OTHER WALL FINISHES General	$8,819
		Replace C3010 WALL FINISHES WOther5-FL1 C301090 OTHER WALL FINISHES General	$4,972
		Replace C3020 FLOOR FINISHES FCpt2-FL1 C302005 CARPETING General	$55,722
		Replace C3020 FLOOR FINISHES FOther1-FLB1 C302090 OTHER FLOORING & FLOOR FINISHES General	$2,608
		Replace C3030 CEILING FINISHES COther1-FLB1 C303090 OTHER CEILING & CEILING FINISHES General	$861

APPENDIX B

SECTION INVENTORY DETAIL REPORT

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: BFP1_1997_Boilerrm D202002 VALVES & HYDRANTS Backflow Preventer - 2" pipe
ID (Tag) Number:
Make:
Model: 40208T2
Serial Number: AFI59
Year Installed:
Date Manufactured:
Capacity (Size): 2 INCH
Warranty Date(1):
Warranty Company(1):
Manufacturer: APOLLO
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments:

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: BFP2_1997_Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 3" pipe
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 3 INCH
Warranty Date(1):
Warranty Company(1):
Manufacturer: WATTS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments:

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS1_2011_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Throughout bldg
Comments:

---

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS2_1970_Throughout bldg D202001 PIPES & FITTINGS CPVC <1" Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS3_1997_Throughout bldg D202001 PIPES & FITTINGS PVC 4"-6" Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS4_1970_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool	SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE1_1997_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** NSS10F0808
Serial Number: NSSD1010806 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 800 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** NEMATO COMPOSITES INC
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE10_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE11_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** **Model:** SP134
Serial Number: A18580N **Year Installed:** **Date Manufactured:** **Capacity (Size):** 100 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE12_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make: TRITON II
Model: TR140C
Serial Number: 0116318140024P
Year Installed:
Date Manufactured: 14-Nov-2014
Capacity (Size): 141 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: PENTAIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE13_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make: TRITON II
Model: TR140C
Serial Number: 01163221300018
Year Installed:
Date Manufactured: 18-Nov-2013
Capacity (Size): 141 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: PENTAIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE14_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make: TRITON II
Model: TR140
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 106 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: PENTAIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE15_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** TRITON II **Model:** TR140C
Serial Number: 0116316140029N **Year Installed:** **Date Manufactured:** 12-Nov-2014 **Capacity (Size):** 141 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** PENTAIR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE16_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** **Model:** SP134
Serial Number: A18580L **Year Installed:** **Date Manufactured:** **Capacity (Size):** 100 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE17_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE18_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE2_2010_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** **Model:** SP508
Serial Number: A19522A **Year Installed:** **Date Manufactured:** **Capacity (Size):** 800 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE3_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** NFS42A310
Serial Number: NFSD111306 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 465 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** NEMATO COMPOSITES INC
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments: [26JAN15_BLS_TT] Base labeled: MPF-1

---

1 - Four Seasons Pool

SOW City of Prince George (PGBC)

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE4_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make:
Model: NFS42A310
Serial Number: NFSD111323
Year Installed:
Date Manufactured:
Capacity (Size): 465 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: NEMATO COMPOSITES INC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments: [26JAN15_BLS_TT] Base labeled: MPF-2

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE5_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make:
Model: NFS34A193
Serial Number: NFSD111327
Year Installed:
Date Manufactured:
Capacity (Size): 289.5 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: NEMATO COMPOSITES INC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments: [26JAN15_BLS_TT] Base labeled: LPF-2

System: D20 PLUMBING
Component: D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE6_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number:
Make:
Model: NFS34A193
Serial Number: NFSD111322
Year Installed:
Date Manufactured:
Capacity (Size): 289.5 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: NEMATO COMPOSITES INC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments: [26JAN15_BLS_TT] Base labeled: LPF-1

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE7_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** **Model:** SP256
Serial Number: A19236AZ **Year Installed:** **Date Manufactured:** **Capacity (Size):** 365 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE8_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE9_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Hall
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool SOW City of Prince George (PGBC)

System: D20 PLUMBING ***Component:*** D2040 RAIN WATER DRAINAGE
Section Description: SP1_1997_Mech Hall D204003 RAINWATER DRAINAGE EQUIPMENT Sump Pump - Submersible
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mech Hall
Comments:

System: D30 HVAC ***Component:*** D3020 HEAT GENERATING SYSTEMS
Section Description: CFW1_2013_Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** 01-May-2013 ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** PULSATRON
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm
Comments:

System: D30 HVAC ***Component:*** D3020 HEAT GENERATING SYSTEMS
Section Description: CFW2_2010_Acidrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number: ***Make:*** ***Model:*** LPH6SAPTC3XXX
Serial Number: 9801101395 ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** PULSATRON
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Acidrm
Comments: [26JAN15_BLS_TT] Base labeled: P-9

City of Prince George (PGBC)

1 - Four Seasons Pool	SOW City of Prince George (PGBC)

System: D30 HVAC ***Component:*** D3020 HEAT GENERATING SYSTEMS
Section Description: CFW3_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mech Hall
Comments:

System: D30 HVAC ***Component:*** D3020 HEAT GENERATING SYSTEMS
Section Description: CFW4_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mech Hall
Comments:

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU1_1970_Mechrm D304008 AIR HANDLING UNITS Central Station
ID (Tag) Number: ***Make:*** ***Model:*** AHB160M
Serial Number: T91712 ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** RECOLD
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm
Comments: [26JAN15_BLS_TT] Belt: B49-2

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU2_1970_Mechrm D304008 AIR HANDLING UNITS Central Station
ID (Tag) Number: **Make:** **Model:** AHB200M
Serial Number: T91711 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** RECOLD
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments: [26JAN15_BLS_TT] Belt: B74-2

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU3_1984_Mech Mezz D304008 AIR HANDLING UNITS Central Station
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** MARK HOT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Mezz
Comments: [26JAN15_BLS_TT] Filter: 36X50X2-2, 24X24X4

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP1_1997_Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number: **Make:** 4280 SERIES **Model:** 6X4X10
Serial Number: C470297 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 750 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ARMSTRONG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments: [26JAN15_BLS_TT] Base labeled: P-1, 20 HP motor

---

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP2_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM
ID (Tag) Number:
Make: 4030 SERIES
Model: 4X3X10
Serial Number: C470665
Year Installed:
Date Manufactured:
Capacity (Size): 400 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: ARMSTRONG
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP3_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6" size, 25 HP, to 1550 GPM
ID (Tag) Number:
Make:
Model: 15316BC
Serial Number: 48108
Year Installed:
Date Manufactured:
Capacity (Size): 1500 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP4_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 15 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

---

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP5_2014_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make: WHISPERFLO
Model: WFK4
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 1 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: PENTAIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP6_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3" size, 5 HP, to 225 GPM
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 5 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP7_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make:
Model: 15314BC
Serial Number: 48103153
Year Installed:
Date Manufactured:
Capacity (Size): 630 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments: [26JAN15_BLS_TT] 15 HP motor

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM
ID (Tag) Number: **Make:** ALFA LAVAL **Model:** CB30058L
Serial Number: 19647693 **Year Installed:** **Date Manufactured:** 21-Jun-2011 **Capacity (Size):** 615 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BHE
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Boilerrm
Comments: [26JAN15_BLS_TT] Base labeled: HX-105

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE2_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Boilerrm
Comments:

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE3_1970_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HE4_2008_Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM
ID (Tag) Number:
Make:
Model: B300M
Serial Number: 08G209016
Year Installed:
Date Manufactured: 01-Jan-2008
Capacity (Size): 10.57 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: AIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HWP1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction
ID (Tag) Number:
Make:
Model: UPS8D160F
Serial Number: 96402920
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: GRUNDFOS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments: [26JAN15_BLS_TT] Base labeled: P-1

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HWP2_1997_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 7.5 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments:

---

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: HUH1_1984_Boilerrm D305002 UNIT HEATERS Hydronic
ID (Tag) Number: **Make:** **Model:** H7
Serial Number: V11860 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ENGINEERED AIR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Boilerrm
Comments:

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: UF1_1970_Mechrm D305001 UNIT VENTILATORS Fan System, Utility Set
ID (Tag) Number: **Make:** **Model:** AF65
Serial Number: T9164 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** RECOLD
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: AIRDRYER1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** DEVILBISS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

---

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC1_2011_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number:
Make:
Model: 67B824801246
Serial Number: 71979782011
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: KAMSTRUP
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments:

System: D30 HVAC
Component: D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC2_2010_Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: JOHNSON CONTROLS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments:

System: D30 HVAC
Component: D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC3_2000_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: JOHNSON CONTROLS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: IAC1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General
ID (Tag) Number: **Make:** **Model:** PLCK5530
Serial Number: PLP119715310 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** PLP
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

System: D40 FIRE PROTECTION **Component:** D4010 FIRE ALARM AND DETECTION SYSTEMS
Section Description: DTECTR1_Throughout bldg D401001 FIRE ALARM DISTRIBUTION Fire detection systems, 50 detectors
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

System: D40 FIRE PROTECTION **Component:** D4010 FIRE ALARM AND DETECTION SYSTEMS
Section Description: FACP1_2011_Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Boilerrm
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool | SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: IXFMR1_2011_Acidrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 30 kVA
ID (Tag) Number:
Make:
Model: RC30HBXB
Serial Number: C91209
Year Installed:
Date Manufactured:
Capacity (Size): 30 KVA
Warranty Date(1):
Warranty Company(1):
Manufacturer: BEAVER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Acidrm
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MCC1_1970_Mechrm D501006 MOTOR CONTROL CENTERS General
ID (Tag) Number:
Make: SR-27
Model: 189106964
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: KLOCKNER-MOELLER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MCC2_1970_Mech Hall D501006 MOTOR CONTROL CENTERS General
ID (Tag) Number:
Make: FIVE STAR
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 600 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: WESTINGHOUSE
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MDP1_1970_Boilerrm D501002 SERVICE ENTRANCE EQUIPMENT Electrical Service - 3 Phase, 120/208 V, 800 A
ID (Tag) Number:
Make: POW-R-LINE
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 800 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: WESTINGHOUSE
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB1_1970_Boilerrm D501004 PANELBOARDS Main lugs, 400 amp
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 400 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: WESTINGHOUSE
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Boilerrm
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB2_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 225 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: FEDERAL PACIFIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm
Comments:

City of Prince George (PGBC)

1 - Four Seasons Pool | SOW City of Prince George (PGBC)

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB3_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** FEDERAL PACIFIC
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm
Comments:

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB4_2011_Acidrm D501004 PANELBOARDS Main lugs, 120/240 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:** NQ442L2
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** SQUARE D
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Acidrm
Comments:

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB5_1984_Boilerrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** WESTINGHOUSE
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Boilerrm
Comments: [26JAN15_BLS_TT] Base labeled: PANEL E

City of Prince George (PGBC)

1 - Four Seasons Pool

SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB6_1987_Office D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 225 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Office
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: SS1_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 200 Amp
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 200 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: FEDERAL PACIFIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: SS2_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 30-100 Amp
ID (Tag) Number:
Make: NOVA LINE
Model: NU363
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 100 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: WESTINGHOUSE
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mech Hall
Comments:

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: BFP1_1998_FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe
ID (Tag) Number: **Make:** **Model:** 909
Serial Number: 489304 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 4 INCH
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** WATTS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS1_1980_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 2"-4" Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: FITTINGS2_2011_Throughout bldg D202001 PIPES & FITTINGS PVC 4"-6" Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Throughout bldg
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D20 PLUMBING ***Component:*** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: ST1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Galvanized steel, 500 gallon, 36" diameter,126" L.O.A.
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: 379812 ***Year Installed:*** ***Date Manufactured:*** 01-Jan-1998 ***Capacity (Size):*** 500 GAL
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING ***Component:*** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: ST2_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60" diameter, 93" L.O.A.
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 1000 GAL
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** MARTIN
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: TK-1

System: D20 PLUMBING ***Component:*** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: ST3_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60" diameter, 93" L.O.A.
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 1000 GAL
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** MARTIN
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: TK-2

---

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WH1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Residential, Electric
ID (Tag) Number: **Make:** SK300 **Model:** SK320
Serial Number: 100820705 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** PNE
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF48V
Serial Number: 78012 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 187 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-7

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE10_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** ETS **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE11_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** ETS **Model:** SP7312
Serial Number: A20206 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1940 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE12_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE13_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE14_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE15_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE16_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE17_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE18_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE19_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE2_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF48V
Serial Number: 78011 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 187 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-8

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE20_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE21_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE22_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE23_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE24_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE3_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF6088
Serial Number: 0298001 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 510 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-5

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE4_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF6088
Serial Number: 0298003 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 510 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-6

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE5_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF60115
Serial Number: 0298004 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 675 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-4

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE6_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF60115
Serial Number: 0198014 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 675 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-3

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE7_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF60115
Serial Number: 0198009 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 675 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-2

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE8_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment
ID (Tag) Number: **Make:** **Model:** FF60115
Serial Number: 0198015 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 675 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** KENLOCH
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: PF-1

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D20 PLUMBING **Component:** D2020 DOMESTIC WATER DISTRIBUTION
Section Description: WTE9_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment
ID (Tag) Number: **Make:** ETS **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ATG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D30 HVAC **Component:** D3020 HEAT GENERATING SYSTEMS
Section Description: B1_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number: **Make:** **Model:** CFC7001800125HW
Serial Number: 16010180110038 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1800 MBH
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CLEAVER BROOKS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-3

System: D30 HVAC **Component:** D3020 HEAT GENERATING SYSTEMS
Section Description: B2_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number: **Make:** **Model:** CFC7001800125HW
Serial Number: 16010180110039 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1800 MBH
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CLEAVER BROOKS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-4

City of Prince George (PGBC)

5 - Aquatic Centre	SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: B3_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number:
Make:
Model: CFC7001800125HW
Serial Number: 16010180110037
Year Installed:
Date Manufactured:
Capacity (Size): 1800 MBH
Warranty Date(1):
Warranty Company(1):
Manufacturer: CLEAVER BROOKS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-5

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: B4_2014_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number:
Make:
Model: CFC7001800125HW
Serial Number: 16010180110414
Year Installed:
Date Manufactured:
Capacity (Size): 1800 MBH
Warranty Date(1):
Warranty Company(1):
Manufacturer: CLEAVER BROOKS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-2

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: B5_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number:
Make:
Model: CFC7001800125HW
Serial Number: 1601018110416
Year Installed:
Date Manufactured: 01-Jan-2010
Capacity (Size): 1800 MBH
Warranty Date(1):
Warranty Company(1):
Manufacturer: CLEAVER BROOKS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-1

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: B6_2014_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH
ID (Tag) Number:
Make:
Model: CFC7001800125HW
Serial Number: 16010180110415
Year Installed:
Date Manufactured:
Capacity (Size): 1800 MBH
Warranty Date(1):
Warranty Company(1):
Manufacturer: CLEAVER BROOKS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: B-6

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: CFW1_1998_FL1 Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: CFW2_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: T-7

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: CFW3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater
ID (Tag) Number:
Make:
Model: MF200
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 6 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AXIOM
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments:

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET1_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 305 gal
ID (Tag) Number:
Make:
Model: 1200L
Serial Number:
Year Installed:
Date Manufactured: 01-Jan-1997
Capacity (Size): 317 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AMTROL
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: T-3

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET2_2013_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 24 gal
ID (Tag) Number:
Make:
Model: SX40V
Serial Number: 13204210
Year Installed:
Date Manufactured:
Capacity (Size): 20 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AMTROL
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments:

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 15 gal
ID (Tag) Number:
Make: EXTROL
Model: SX30V
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 14 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AMTROL
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments:

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET4_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Glycol system

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET5_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal
ID (Tag) Number:
Make: EXTROL
Model: AX80V
Serial Number:
Year Installed:
Date Manufactured: 01-Jan-1997
Capacity (Size): 44.5 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AMTROL
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: T-4

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3020 HEAT GENERATING SYSTEMS
Section Description: ET6_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal
ID (Tag) Number:
Make: EXTROL
Model: AX80V
Serial Number:
Year Installed:
Date Manufactured: 01-Jan-1997
Capacity (Size): 44.5 GAL
Warranty Date(1):
Warranty Company(1):
Manufacturer: AMTROL
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments:

System: D30 HVAC
Component: D3030 COOLING GENERATING SYSTEMS
Section Description: CU1_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21 ton, R-22
ID (Tag) Number:
Make:
Model: CUB2120
Serial Number: 25582CU4
Year Installed:
Date Manufactured:
Capacity (Size): 21 TON
Warranty Date(1):
Warranty Company(1):
Manufacturer: ENGINEERED AIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Roof
Comments: [29JAN15_BLS_TT] Base labeled: CU-4, Refrigerant: HCFC-22, Class II controlled compound

---

System: D30 HVAC
Component: D3030 COOLING GENERATING SYSTEMS
Section Description: CU2_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26 ton, R-22
ID (Tag) Number:
Make:
Model: CUB2520
Serial Number: 25582CU2
Year Installed:
Date Manufactured:
Capacity (Size): 25 TON
Warranty Date(1):
Warranty Company(1):
Manufacturer: ENGINEERED AIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Roof
Comments: [29JAN15_BLS_TT] Refrigerant: HCFC-22, Class II controlled compound

---

City of Prince George (PGBC)

5 - Aquatic Centre	SOW City of Prince George (PGBC)

System: D30 HVAC ***Component:*** D3030 COOLING GENERATING SYSTEMS
Section Description: CU3_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22
ID (Tag) Number: ***Make:*** ***Model:*** HS290609J
Serial Number: 5898D49562 ***Year Installed:*** ***Date Manufactured:*** 01-Apr-1998 ***Capacity (Size):*** 5 TON
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** LENNOX
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Roof
Comments: [29JAN15_BLS_TT] Refrigerant: HCFC-22, Class II controlled compound

---

System: D30 HVAC ***Component:*** D3030 COOLING GENERATING SYSTEMS
Section Description: CU4_2003_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22
ID (Tag) Number: ***Make:*** ***Model:*** ACC060SA
Serial Number: E032232239 ***Year Installed:*** ***Date Manufactured:*** 02-Jun-2003 ***Capacity (Size):*** 5 TON
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** ICP
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Roof
Comments: [13FEB15_BJ_TT] Refrigerant: HCFC-22, Class II controlled compound

---

System: D30 HVAC ***Component:*** D3030 COOLING GENERATING SYSTEMS
Section Description: CU5_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22
ID (Tag) Number: ***Make:*** ***Model:*** HS290609J
Serial Number: 5898D49565 ***Year Installed:*** ***Date Manufactured:*** 01-Apr-1998 ***Capacity (Size):*** 5 TON
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** LENNOX
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Roof
Comments: [29JAN15_BLS_TT] Refrigerant: HCFC-22, Class II controlled compound

---

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D30 HVAC | **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU1_1998_Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station
ID (Tag) Number: | **Make:** | **Model:**
Serial Number: | **Year Installed:** | **Date Manufactured:** | **Capacity (Size):**
Warranty Date(1): | **Warranty Company(1):** | **Manufacturer:** ENGINEERED AIR
Warranty Date(2): | **Warranty Company(2):** | **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: AHU-2

System: D30 HVAC | **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU2_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM
ID (Tag) Number: | **Make:** | **Model:** LM8C
Serial Number: B25582AHU5 | **Year Installed:** | **Date Manufactured:** 09-Feb-1998 | **Capacity (Size):** 12000 CFM
Warranty Date(1): | **Warranty Company(1):** | **Manufacturer:** ENGINEERED AIR
Warranty Date(2): | **Warranty Company(2):** | **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-5, Filter: 20X25X2-4, 16X20X2-2, Belt: B78

System: D30 HVAC | **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU3_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV
ID (Tag) Number: | **Make:** | **Model:** LM32C
Serial Number: B25582AHU1 | **Year Installed:** | **Date Manufactured:** 18-Feb-1998 | **Capacity (Size):** 48000 CFM
Warranty Date(1): | **Warranty Company(1):** | **Manufacturer:** ENGINEERED AIR
Warranty Date(2): | **Warranty Company(2):** | **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-1, Belt: B132-4

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU4_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM
ID (Tag) Number: ***Make:*** ***Model:*** LM2C
Serial Number: B25582AHU6 ***Year Installed:*** ***Date Manufactured:*** 09-Feb-1998 ***Capacity (Size):*** 3000 CFM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** ENGINEERED AIR
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-6, Filter: 24X24X2-1, Belt: B35-1

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU5_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM
ID (Tag) Number: ***Make:*** ***Model:*** LM10C
Serial Number: B25582AHU8 ***Year Installed:*** ***Date Manufactured:*** 09-Feb-1998 ***Capacity (Size):*** 14000 CFM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** ENGINEERED AIR
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-8, Belt: B75-1

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: AHU6_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV
ID (Tag) Number: ***Make:*** ***Model:*** LM32C
Serial Number: B25582AHU3 ***Year Installed:*** ***Date Manufactured:*** 18-Feb-1998 ***Capacity (Size):*** 48000 CFM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** ENGINEERED AIR
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-3

---

5 - Aquatic Centre   SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: AHU7_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM
ID (Tag) Number:
Make:
Model: LM3C
Serial Number: B25582AHU7
Year Installed:
Date Manufactured: 04-Feb-1998
Capacity (Size): 4500 CFM
Warranty Date(1):
Warranty Company(1):
Manufacturer: ENGINEERED AIR
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: AHU-7

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP1_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make:
Model: JC07CIC
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 0.75 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: FRANKLIN ELECTRIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP10_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make:
Model: 1531BF4BC
Serial Number: 700065
Year Installed:
Date Manufactured:
Capacity (Size): 735 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-5

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP11_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3" size, 5 HP, to 225 GPM
ID (Tag) Number: ***Make:*** ***Model:*** 1531BF21/2BB
Serial Number: 700064 ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 230 GPM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** BELL & GOSSETT
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP12_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM
ID (Tag) Number: ***Make:*** ***Model:*** 1531BF3ACBF
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 325 GPM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** BELL & GOSSETT
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP13_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: 2090845 ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** BELL & GOSSETT
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-3

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP14_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make: 1510 SERIES
Model: 5E10.25BF
Serial Number: 2093735
Year Installed:
Date Manufactured:
Capacity (Size): 1000 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP15_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make: 1510 SERIES
Model: 5E10.25BF
Serial Number: 2093736
Year Installed:
Date Manufactured:
Capacity (Size): 1000 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSET
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP16_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6" size, 25 HP, to 1550 GPM
ID (Tag) Number:
Make:
Model: TBA1630T13
Serial Number: B140289
Year Installed:
Date Manufactured:
Capacity (Size): 30 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: HAUCK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

---

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP2_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make:
Model: JC07CIC
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 0.75 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: FRANKLIN ELECTRIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP3_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make:
Model: JC07CIC
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 0.75 HP
Warranty Date(1):
Warranty Company(1):
Manufacturer: FRANKLIN ELECTRIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP4_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make:
Model: 1531BF11/4AC
Serial Number: 700071
Year Installed:
Date Manufactured:
Capacity (Size): 60 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP5_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1 HP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-17

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP6_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:** 1531BF2AC
Serial Number: 700069 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 100 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-5

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: CWP7_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1 HP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-16

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP8_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number:
Make: 1510 SERIES
Model: 1-1/2AB5.375BF
Serial Number: 2090888
Year Installed:
Date Manufactured:
Capacity (Size): 20 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: P-20

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: CWP9_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM
ID (Tag) Number:
Make: 1510 SERIES
Model:
Serial Number: 2090913
Year Installed:
Date Manufactured:
Capacity (Size): 1000 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HE1_2011_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM
ID (Tag) Number:
Make:
Model: B300M
Serial Number: 11G210023
Year Installed:
Date Manufactured: 01-Jan-2011
Capacity (Size): 10.57 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: AIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

---

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE2_2010_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM
ID (Tag) Number: **Make:** **Model:** B1000M
Serial Number: 09G238048 **Year Installed:** **Date Manufactured:** 01-Jan-2010 **Capacity (Size):** 25.1 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** AIC
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE3_1998_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type
ID (Tag) Number: **Make:** **Model:** GPX151
Serial Number: 70787901 **Year Installed:** **Date Manufactured:** 01-Jan-1998 **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HE4_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube
ID (Tag) Number: **Make:** **Model:** AQX103041
Serial Number: 87240 **Year Installed:** **Date Manufactured:** 01-Feb-1998 **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ARMSTRONG
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: HX-2

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HE5_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube
ID (Tag) Number:
Make:
Model: THWX103041
Serial Number: 87239
Year Installed:
Date Manufactured: 01-Feb-1998
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: ARMSTRONG
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: HX-1

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HE6_2010_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type
ID (Tag) Number:
Make:
Model: LC11060HBUM
Serial Number: 10L1983531002
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: AIC
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: HX3

System: D30 HVAC
Component: D3040 DISTRIBUTION SYSTEMS
Section Description: HWP1_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM
ID (Tag) Number:
Make:
Model: 4x9.1/2
Serial Number: 70013A
Year Installed:
Date Manufactured:
Capacity (Size): 341 GPM
Warranty Date(1):
Warranty Company(1):
Manufacturer: BELL & GOSSETT
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: PP-3, Inline pump

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP2_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM
ID (Tag) Number: **Make:** **Model:** 4x9.1/2
Serial Number: 70013B **Year Installed:** **Date Manufactured:** **Capacity (Size):** 341 GPM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: PP-4, Inline pump

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP3_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 1.5 HP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** BELL & GOSSETT
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: P4

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP4_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:** UPS321602
Serial Number: 96407083 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GRUNDFOS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP5_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:** UPS5080/4F
Serial Number: 96404967 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GRUNDFOS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: P1

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP6_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GRUNDFOS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: P-6

System: D30 HVAC **Component:** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP7_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GRUNDFOS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: P7

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP8_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 1.5 HP
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** BELL & GOSSETT
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ-2
Comments:

System: D30 HVAC ***Component:*** D3040 DISTRIBUTION SYSTEMS
Section Description: HWP9_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 48 GPM
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** BELL & GOSSETT
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ-2
Comments: [13FEB15_BJ_TT] 1.5 HP motor

System: D30 HVAC ***Component:*** D3050 TERMINAL & PACKAGE UNITS
Section Description: CF1_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: EF-9

---

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF2_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer:
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: EF-5

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF3_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 10,000 CFM
ID (Tag) Number:
Make:
Model: 245SQIB
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 13800 CFM
Warranty Date(1):
Warranty Company(1):
Manufacturer: LOREN COOK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: RF-5, Belt: A65-1

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF4_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 1500 CFM
ID (Tag) Number:
Make:
Model: 90SQIB
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 1600 CFM
Warranty Date(1):
Warranty Company(1):
Manufacturer: LOREN COOK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: EF-1, Belt:4L350]-1

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF5_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: LOREN COOK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: RF-4, Belt: A44-1

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF6_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size):
Warranty Date(1):
Warranty Company(1):
Manufacturer: LOREN COOK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: RF-6

System: D30 HVAC
Component: D3050 TERMINAL & PACKAGE UNITS
Section Description: CF7_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM
ID (Tag) Number:
Make:
Model: 135SQIB
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 2865 CFM
Warranty Date(1):
Warranty Company(1):
Manufacturer: LOREN COOK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: EF-2, Belt: A40-1

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: CF8_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 7500 CFM
ID (Tag) Number: **Make:** **Model:** 180SQIB
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 6375 CFM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** LOREN COOK
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: EF-3, Belt: A84-1

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: CF9_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM
ID (Tag) Number: **Make:** **Model:** 135SQIB
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):** 2865 CFM
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** LOREN COOK
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: EF-4, Belt: A38-1

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: FCU1_1998_FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: AHU-10

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: FCU2_1998_Mechrm MEZZ D305003 FAN COIL UNITS Duct Mount, 2 Pipe
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: AHU-9

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: HP1_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton
ID (Tag) Number: **Make:** **Model:** GTW120R08NBSSA
Serial Number: 110201586 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 10 TON
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GEOSTAR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Refrigerant: HFC-410A, Base labeled: HPUMP2

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: HP2_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton
ID (Tag) Number: **Make:** **Model:** GTW120R08NBSSA
Serial Number: 110201585 **Year Installed:** **Date Manufactured:** **Capacity (Size):** 10 TON
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GEOSTAR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: HPUMP1

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: HUH1_1998_Mech Areas D305002 UNIT HEATERS Hydronic
ID (Tag) Number: **Make:** **Model:** 11-1
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** ENGINEERED AIR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mech Areas
Comments:

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: HUH2_2007_Mechrm MEZZ D305002 UNIT HEATERS Hydronic
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** REZNOR
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3050 TERMINAL & PACKAGE UNITS
Section Description: UF1_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Utility Set
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** LOREN COOK
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: RF-8, Belt: A67-1

---

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D30 HVAC ***Component:*** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC1_2008_FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** JOHNSON CONTROLS
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D30 HVAC ***Component:*** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC10_2000_Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** JOHNSON CONTROLS
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Office Commrm
Comments:

System: D30 HVAC ***Component:*** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC2_2000_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** JOHNSON CONTROLS
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC3_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** JOHNSON CONTROLS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC4_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** JOHNSON CONTROLS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC5_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** JOHNSON CONTROLS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

---

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC6_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** JOHNSON CONTROLS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC7_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC8_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:**
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: DDC9_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** JOHNSON CONTROLS
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: IAC1_1998_FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General
ID (Tag) Number: **Make:** **Model:** ASLP9A
Serial Number: Q000741 **Year Installed:** **Date Manufactured:** **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** GARDNER DENVER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D30 HVAC **Component:** D3060 CONTROLS & INSTRUMENTATION
Section Description: IAC2_2014_FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General
ID (Tag) Number: **Make:** **Model:** BMQT54VT
Serial Number: UTZ650917 **Year Installed:** **Date Manufactured:** 18-Nov-2013 **Capacity (Size):**
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** QUINCY
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D40 FIRE PROTECTION ***Component:*** D4020 FIRE SUPP WATER SUPPLY / EQUIP
Section Description: FPBFP1_1998_FL1 Mechrm D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT Backflow Preventer - 4"
ID (Tag) Number: ***Make:*** ***Model:*** 2000SS
Serial Number: 2JM1317 ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 4 INCH
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:*** AMES
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D40 FIRE PROTECTION ***Component:*** D4030 STANDPIPE SYSTEMS
Section Description: RISER1_1998_FL1 Mechrm D403001 STANDPIPE EQUIPMENT & PIPING Riser - 4" diam
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):*** 4 INCH
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1 Mechrm
Comments:

System: D40 FIRE PROTECTION ***Component:*** D4040 SPRINKLERS
Section Description: FPSS1_1998_FL1 D404001 SPRINKLERS AND RELEASING DEVICES Dry Pipe Systems
ID (Tag) Number: ***Make:*** ***Model:***
Serial Number: ***Year Installed:*** ***Date Manufactured:*** ***Capacity (Size):***
Warranty Date(1): ***Warranty Company(1):*** ***Manufacturer:***
Warranty Date(2): ***Warranty Company(2):*** ***Control Type/Make:***
Location: FL1
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: IXFMR1_1998_FL1 Mechrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 75 kVA
ID (Tag) Number:
Make:
Model: BA75JP/E3R/Z
Serial Number: C61324
Year Installed:
Date Manufactured:
Capacity (Size): 75 KVA
Warranty Date(1):
Warranty Company(1):
Manufacturer: REX POWER MAGNETICS
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: IXFMR2_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 75 kVA, K-4 rated
ID (Tag) Number:
Make:
Model: DR75JMK4E3R
Serial Number: A87912
Year Installed:
Date Manufactured:
Capacity (Size): 75 KVA
Warranty Date(1):
Warranty Company(1):
Manufacturer: REX MANUFACTURING
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: IXFMR3_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 30 kVA
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured:
Capacity (Size): 30 KVA
Warranty Date(1):
Warranty Company(1):
Manufacturer: REX MANUFACTURING
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MCC1_1998_FL1 Mechrm D501006 MOTOR CONTROL CENTERS General
ID (Tag) Number:
Make: 2100 SERIES
Model:
Serial Number:
Year Installed:
Date Manufactured: 01-Dec-1997
Capacity (Size): 600 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER/WESTINGHOUSE
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: FL1 Mechrm
Comments: [29JAN15_BLS_TT] Base labeled: MCC 1B

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MCC2_1998_Elecrm MEZZ D501006 MOTOR CONTROL CENTERS General
ID (Tag) Number:
Make: SERIES 2100
Model:
Serial Number:
Year Installed:
Date Manufactured: 01-Dec-1997
Capacity (Size): 600 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Elecrm MEZZ
Comments: [29JAN15_BLS_TT] Base labeled: MCC A1

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: MCC3_1998_Mechrm MEZZ-2 D501006 MOTOR CONTROL CENTERS General
ID (Tag) Number:
Make: 2100 SERIES
Model:
Serial Number:
Year Installed:
Date Manufactured: 01-Dec-1997
Capacity (Size): 600 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: MCC 1C

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB1_1998_FL1 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 27-Jan-1998 **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: FL1 Mechrm
Comments:

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB10_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 14-Jan-1998 **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Hall
Comments: [29JAN15_BLS_TT] Lighting relay panel

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB2_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 400 amp
ID (Tag) Number: **Make:** POW-R-LINE C **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 27-Jan-1998 **Capacity (Size):** 400 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Elecrm MEZZ
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB3_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured: 27-Jan-1998
Capacity (Size): 225 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Elecrm MEZZ
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB4_1998_Elecrm MEZZ D501004 PANELBOARDS Other
ID (Tag) Number:
Make:
Model: S830150.3KDS
Serial Number: 9785511
Year Installed:
Date Manufactured:
Capacity (Size): 145 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: ELECTROTEK
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Elecrm MEZZ
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB5_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured: 27-Jan-1998
Capacity (Size): 225 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Mechrm MEZZ-2
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB6_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 14-Jan-1998 **Capacity (Size):** 225 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Mechrm MEZZ-2
Comments: [29JAN15_BLS_TT] Base labeled: MAIN LIGHTING CONTROL PANEL

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB7_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 27-Jan-1998 **Capacity (Size):** 400 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Hall
Comments:

System: D50 ELECTRICAL **Component:** D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB8_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp
ID (Tag) Number: **Make:** **Model:**
Serial Number: **Year Installed:** **Date Manufactured:** 27-Jan-1998 **Capacity (Size):** 400 AMP
Warranty Date(1): **Warranty Company(1):** **Manufacturer:** CUTLER HAMER
Warranty Date(2): **Warranty Company(2):** **Control Type/Make:**
Location: Hall
Comments:

City of Prince George (PGBC)

5 - Aquatic Centre	SOW City of Prince George (PGBC)

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: PB9_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured: 27-Jan-1998
Capacity (Size): 225 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Hall
Comments:

System: D50 ELECTRICAL
Component: D5010 ELECTRICAL SERVICE & DISTRIBUTION
Section Description: SG1_1998_Elecrm MEZZ D501004 PANELBOARDS Switchgear - 1200 Amp
ID (Tag) Number:
Make:
Model:
Serial Number:
Year Installed:
Date Manufactured: 01-Jan-1998
Capacity (Size): 1000 AMP
Warranty Date(1):
Warranty Company(1):
Manufacturer: CUTLER HAMMER
Warranty Date(2):
Warranty Company(2):
Control Type/Make:
Location: Elecrm MEZZ
Comments:

APPENDIX C

CONDITION INDEX DETAIL REPORT

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI) [Last Insp / Current Estimated]	Last Inspection Date
A10 FOUNDATIONS							
A1030 SLAB ON GRADE	Pit_FLB1 A103004 PITS AND BASES General	84	82	82	88 / 88		11-Feb-2015
A1030 SLAB ON GRADE	Slab on Grd_ A103001 STANDARD SLAB ON GRADE General	84	82	82	95 / 95		26-Jan-2015
A1030 SLAB ON GRADE	Slab on Grd_ A103001 STANDARD SLAB ON GRADE General	84	82	82	88 / 88		26-Jan-2015
A1030 SLAB ON GRADE	Str SlabOG_FLB1 A103002 STRUCTURAL SLAB ON GRADE General	84	82	82	80 / 80		26-Jan-2015
A1030 SLAB ON GRADE	Trench_FLB1 A103003 TRENCHES General	84	82	82	88 / 88		11-Feb-2015
B10 SUPERSTRUCTURE							
B1010 FLOOR CONSTRUCTION	Bm Grd1_C B101001 STRUCTURAL FRAME Beam/Girder - Concrete	84	87	87	71 / 71		31-Jan-2015
B1010 FLOOR CONSTRUCTION	Column1_C B101001 STRUCTURAL FRAME Column - Concrete	84	87	87	88 / 88		12-Feb-2015
B1010 FLOOR CONSTRUCTION	Column2_C B101001 STRUCTURAL FRAME Column - Concrete	84	87	87	50 / 50		12-Feb-2015
B1010 FLOOR CONSTRUCTION	Column3_C B101001 STRUCTURAL FRAME Column - Concrete	84	87	87	50 / 50		12-Feb-2015
B1010 FLOOR CONSTRUCTION	Deck Slab1_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	84	87	87	50 / 49		26-Jan-2015
B1010 FLOOR CONSTRUCTION	Ramp_FL1 B101006 RAMPS General	84	87	87	95 / 95		11-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW1_C B101002 STRUCTURAL INTERIOR WALLS Concrete	84	87	87	50 / 50		26-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW1_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95		26-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW10_C B101002 STRUCTURAL INTERIOR WALLS Concrete	84	87	87	95 / 95		11-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW11_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95		11-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW2_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95	95 /	27-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW3_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95	95 /	31-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW5_C B101002 STRUCTURAL INTERIOR WALLS Concrete	84	87	87	95 / 95	95 /	31-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW6_C B101002 STRUCTURAL INTERIOR WALLS Concrete	84	87	87	88 / 88		10-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW7_C B101002 STRUCTURAL INTERIOR WALLS Concrete	84	87	87	95 / 95	95 /	10-Feb-2015

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
B1010 FLOOR CONSTRUCTION	Str IntW8_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95		11-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW9_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	84	87	87	95 / 95		11-Feb-2015
B1020 ROOF CONSTRUCTION	Column1_M B102001 STRUCTURAL FRAME Column - Metal	84	87	90	88 / 88		27-Jan-2015
B1020 ROOF CONSTRUCTION	Column2_M B102001 STRUCTURAL FRAME Column - Metal	84	87	90	95 / 95		27-Jan-2015
B1020 ROOF CONSTRUCTION	Column3_C B102001 STRUCTURAL FRAME Column - Concrete	84	87	90	95 / 95		27-Jan-2015
B20 EXTERIOR ENCLOSURE							
B2010 EXTERIOR WALLS	Ex CL1_Wsiding B201001 EXTERIOR CLOSURE Wood Cladding w/Stud Backup	84	65	63	30 / 30		27-Jan-2015
B2010 EXTERIOR WALLS	Ex CL2_MPanel B201001 EXTERIOR CLOSURE Metal Panel	84	65	63	95 / 95		27-Jan-2015
B2010 EXTERIOR WALLS	Ex CL3_CIP B201001 EXTERIOR CLOSURE CIP Concrete	84	65	63	71 / 71		27-Jan-2015
B2010 EXTERIOR WALLS	Ex CL4_CMU B201001 EXTERIOR CLOSURE Concrete Block	84	65	63	88 / 88	88 /	27-Jan-2015
B2010 EXTERIOR WALLS	Ex CL5_CBoard B201001 EXTERIOR CLOSURE Cementitous Boards / Panels	84	65	63	95 / 95		27-Jan-2015
B2010 EXTERIOR WALLS	Ex CL6_Other B201001 EXTERIOR CLOSURE Other	84	65	63	88 / 88	71 /	28-Jan-2015
B2010 EXTERIOR WALLS	Ex Sft1_RE_W B201007 EXTERIOR SOFFITS General	84	65	63	50 / 50		28-Jan-2015
B2010 EXTERIOR WALLS	Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	84	65	63	95 / 95		28-Jan-2015
B2020 EXTERIOR WINDOWS	SF1 B202002 STOREFRONTS General	84	65	79	95 / 95		28-Jan-2015
B2020 EXTERIOR WINDOWS	Wndw_W B202001 WINDOWS Wood Windows	84	65	79	50 / 50		28-Jan-2015
B2020 EXTERIOR WINDOWS	Wndw2_Al B202001 WINDOWS Aluminum Windows	84	65	79	88 / 88		28-Jan-2015
B2030 EXTERIOR DOORS	GD1 B203002 GLAZED DOORS General	84	65	82	95 / 95		28-Jan-2015
B2030 EXTERIOR DOORS	SD1_W B203001 SOLID DOORS Wood	84	65	82	10 / 10		28-Jan-2015
B2030 EXTERIOR DOORS	SD2_S B203001 SOLID DOORS Steel	84	65	82	88 / 88		28-Jan-2015
B2030 EXTERIOR DOORS	SD3_W B203001 SOLID DOORS Wood	84	65	82	95 / 95	88 /	28-Jan-2015
C10 INTERIOR CONSTRUCTION							
C1010 PARTITIONS	FxdPart1-FL1 C101001 FIXED PARTITIONS General	84	89	88	88 / 88		12-Feb-2015
C1010 PARTITIONS	FxdPart2-FL1 C101001 FIXED PARTITIONS General	84	89	88	95 / 95		12-Feb-2015
C1010 PARTITIONS	FxdPart3-FLB1 C101001 FIXED PARTITIONS General	84	89	88	88 / 88		12-Feb-2015
C1010 PARTITIONS	HR1-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	84	89	88	88 / 88		26-Jan-2015
C1010 PARTITIONS	HR1-FLM1 C101004 INTERIOR GUARDRAILS & SCREENS	84	89	88	80 / 80		26-Jan-2015

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
	Guardrail						
C1010 PARTITIONS	HR2-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	84	89	88	95 / 95		26-Jan-2015
C1010 PARTITIONS	HR2-FLM1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	84	89	88	95 / 95		26-Jan-2015
C1010 PARTITIONS	HR3-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	84	89	88	95 / 95		26-Jan-2015
C1010 PARTITIONS	IntWndw1-FL1 C101005 INTERIOR WINDOWS Interior Windows	84	89	88	95 / 95	95 /	26-Jan-2015
C1010 PARTITIONS	IntWndw2-FL1 C101005 INTERIOR WINDOWS Interior Windows	84	89	88	95 / 95		26-Jan-2015
C1010 PARTITIONS	Lifeguardstation1_Other C101002 DEMOUNTABLE PARTITIONS Other	84	89	88	95 / 95	95 /	27-Jan-2015
C1010 PARTITIONS	SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	84	89	88	88 / 88		26-Jan-2015
C1020 INTERIOR DOORS	FD1-FLB1 C102003 FIRE DOORS Fire Door - Swinging	84	89	88	88 / 88		26-Jan-2015
C1020 INTERIOR DOORS	GlzD2-FLB1 C102002 GLAZED INTERIOR DOORS General	84	89	88	88 / 88		27-Jan-2015
C1020 INTERIOR DOORS	MtlD1-FLB1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	80 / 80		26-Jan-2015
C1020 INTERIOR DOORS	MtlD2-FLB1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	88 / 88		26-Jan-2015
C1020 INTERIOR DOORS	MtlD3-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	80 / 80	88 /	26-Jan-2015
C1020 INTERIOR DOORS	MtlD4-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	88 / 88	95 /	26-Jan-2015
C1020 INTERIOR DOORS	MtlD5-FLM1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	80 / 80		26-Jan-2015
C1020 INTERIOR DOORS	MtlD6-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	84	89	88	95 / 95	95 /	26-Jan-2015
C1020 INTERIOR DOORS	WDMF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	84	89	88	88 / 88	88 /	26-Jan-2015
C1020 INTERIOR DOORS	WDMF2-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	84	89	88	88 / 88		26-Jan-2015
C1020 INTERIOR DOORS	WDMF3-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	84	89	88	80 / 80		26-Jan-2015
C1020 INTERIOR DOORS	WDMF4-FLB1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	84	89	88	88 / 88		27-Jan-2015
C1020 INTERIOR DOORS	WDMF5-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	84	89	88	95 / 95		11-Feb-2015
C1020 INTERIOR DOORS	WDWF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	84	89	88	88 / 88		26-Jan-2015

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
C1020 INTERIOR DOORS	WDWF2-FLB1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	84	89	88	95 / 95		27-Jan-2015
C1030 SPECIALTIES	Bench1-FL1 C103090 OTHER INTERIOR SPECIALTIES Ladder	84	89	92	95 / 95		27-Jan-2015
C1030 SPECIALTIES	Divesys3M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	84	89	92	88 / 88		27-Jan-2015
C1030 SPECIALTIES	Divesys7M1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	84	89	92	88 / 88		27-Jan-2015
C1030 SPECIALTIES	Ladder1-FL1 C103090 OTHER INTERIOR SPECIALTIES Ladder	84	89	92	88 / 88		26-Jan-2015
C1030 SPECIALTIES	Pool ladder1-FL1 C103090 OTHER INTERIOR SPECIALTIES Ladder	84	89	92	88 / 88		27-Jan-2015
C1030 SPECIALTIES	Pool ladder2-FL1 C103090 OTHER INTERIOR SPECIALTIES Ladder	84	89	92	95 / 95		27-Jan-2015
C1030 SPECIALTIES	ShComp1_G-FLB1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Shower Compartment - Glass	84	89	92	88 / 88		27-Jan-2015
C1030 SPECIALTIES	Slide1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	84	89	92	88 / 88		27-Jan-2015
C1030 SPECIALTIES	Springboard1_Other C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Other	84	89	92	95 / 95		27-Jan-2015
C1030 SPECIALTIES	TltPart1_P-FL1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Toilet Partitions - Plastic	84	89	92	88 / 88		26-Jan-2015
C1030 SPECIALTIES	TltPart2_P-FLB1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Toilet Partitions - Plastic	84	89	92	95 / 95		27-Jan-2015
C20 STAIRS							
C2010 STAIR CONSTRUCTION	Ex Str129_C C201001 INTERIOR AND EXTERIOR STAIRS Exterior Stairs - Concrete (12 Riser Flight)	84	80	80	60 / 60		11-Feb-2015
C2010 STAIR CONSTRUCTION	Ex Str247_C C201001 INTERIOR AND EXTERIOR STAIRS Exterior Stairs - Concrete (24 Riser Flight)	84	80	80	60 / 60		27-Jan-2015
C2010 STAIR CONSTRUCTION	Ex Str248_C C201001 INTERIOR AND EXTERIOR STAIRS Exterior Stairs - Concrete (24 Riser Flight)	84	80	80	60 / 60		28-Jan-2015
C2010 STAIR CONSTRUCTION	IntStr1_M-FLM1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Stairs - Metal (12 Riser Flight)	84	80	80	95 / 95		26-Jan-2015
C2010 STAIR CONSTRUCTION	IntStr2_M-FL1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Stairs - Metal (12 Riser Flight)	84	80	80	95 / 95		26-Jan-2015
C2010 STAIR CONSTRUCTION	IntStr3_C-FL1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Stairs - Concrete (24 Riser Flight)	84	80	80	95 / 95		26-Jan-2015
C2010 STAIR CONSTRUCTION	IntStr4_C-FLB1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Stairs - Concrete (12 Riser Flight)	84	80	80	95 / 95		27-Jan-2015
C2010 STAIR CONSTRUCTION	Poolsteps1_Other C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps	84	80	80	95 / 95		27-Jan-2015

City of Prince George (PGBC)

1 - Four Seasons Pool | SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
C2010 STAIR CONSTRUCTION	Spectatorsteps1_Other C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps	84	80	80	95 / 95		27-Jan-2015
C30 INTERIOR FINISHES							
C3010 WALL FINISHES	WCer1-FL1 C301004 TILE & TERRAZZO WALL FINISHES Tile	84	89	91	88 / 88		31-Jan-2015
C3010 WALL FINISHES	WGyp1-FL1 C301003 GYPSUM WALLBOARD FINISHES General	84	89	91	95 / 95	95 /	31-Jan-2015
C3010 WALL FINISHES	WGyp2-FL1 C301003 GYPSUM WALLBOARD FINISHES General	84	89	91	95 / 95	95 /	11-Feb-2015
C3010 WALL FINISHES	WOther1-FLB1 C301090 OTHER WALL FINISHES General	84	89	91	88 / 88		10-Feb-2015
C3010 WALL FINISHES	WOther2-FLB1 C301090 OTHER WALL FINISHES General	84	89	91	100 / 0		01-Jan-1970
C3010 WALL FINISHES	WWood1-FL1 C301005 WALL COVERINGS Wood	84	89	91	95 / 95		31-Jan-2015
C3010 WALL FINISHES	WWood2-FLB1 C301005 WALL COVERINGS Wood	84	89	91	88 / 88		10-Feb-2015
C3010 WALL FINISHES	WWood3-FL1 C301005 WALL COVERINGS Wood	84	89	91	88 / 88	88 /	11-Feb-2015
C3010 WALL FINISHES	WWood4-FL1 C301005 WALL COVERINGS Wood	84	89	91	88 / 88		11-Feb-2015
C3020 FLOOR FINISHES	FCer1-FL1 C302001 TILE FLOOR FINISHES Ceramic Tile	84	89	89	88 / 88		28-Jan-2015
C3020 FLOOR FINISHES	FCer2-FL1 C302001 TILE FLOOR FINISHES Ceramic Tile	84	89	89	88 / 88		11-Feb-2015
C3020 FLOOR FINISHES	FCer3-FL1 C302001 TILE FLOOR FINISHES Ceramic Tile	84	89	89	95 / 95		11-Feb-2015
C3020 FLOOR FINISHES	FConTop2-FLB1 C302010 HARDENERS AND SEALERS Concrete Topping	84	89	89	95 / 95	95 /	27-Jan-2015
C3020 FLOOR FINISHES	FConTop2-FLB1 C302010 HARDENERS AND SEALERS Concrete Topping	84	89	89	71 / 71		26-Jan-2015
C3020 FLOOR FINISHES	FConTop3-FL1 C302010 HARDENERS AND SEALERS Concrete Topping	84	89	89	95 / 95	95 /	28-Jan-2015
C3020 FLOOR FINISHES	FConTop4-FL1 C302010 HARDENERS AND SEALERS Concrete Topping	84	89	89	95 / 95	95 /	11-Feb-2015
C3020 FLOOR FINISHES	FConTop5-FLM1 C302010 HARDENERS AND SEALERS Concrete Topping	84	89	89	88 / 88		11-Feb-2015
C3020 FLOOR FINISHES	FOther1-FLB1_dup C302090 OTHER FLOORING & FLOOR FINISHES General	84	89	89	100 / 50		01-Jan-1970
C3020 FLOOR FINISHES	FRubber1-FLB1 C302004 RESILIENT FLOOR FINISHES Rubber Sheet	84	89	89	95 / 95		10-Feb-2015
C3020 FLOOR FINISHES	FRubber2-FLM1 C302004 RESILIENT FLOOR FINISHES Rubber Sheet	84	89	89	95 / 95		11-Feb-2015
C3020 FLOOR FINISHES	FTerr1-FL1 C302002 TERRAZZO FLOOR FINISHES General	84	89	89	88 / 88		31-Jan-2015
C3020 FLOOR FINISHES	FTerr2-FLB1 C302002 TERRAZZO FLOOR FINISHES General	84	89	89	88 / 88		10-Feb-2015

City of Prince George (PGBC)

1 - Four Seasons Pool | SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI) [Last Insp / Current Estimated]	Last Inspection Date
C3020 FLOOR FINISHES	FVinylShtF-FLB1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	84	89	89	95 / 95		10-Feb-2015
C3030 CEILING FINISHES	CAct1-FLB1 C303001 ACOUSTICAL CEILING TILES & PANELS General	84	89	86	95 / 95		27-Jan-2015
C3030 CEILING FINISHES	CAct2-FL1 C303001 ACOUSTICAL CEILING TILES & PANELS General	84	89	86	80 / 80		31-Jan-2015
C3030 CEILING FINISHES	CActSusp1-FLB1 C303005 SUSPENSION SYSTEMS General	84	89	86	95 / 95		12-Feb-2015
C3030 CEILING FINISHES	CActSusp2-FL1 C303005 SUSPENSION SYSTEMS General	84	89	86	88 / 88		12-Feb-2015
C3030 CEILING FINISHES	CGyp1-FL1 C303002 GYPSUM WALLBOARD CEILING FINISHES General	84	89	86	95 / 95	95 /	26-Jan-2015
C3030 CEILING FINISHES	CGyp2-FLB1 C303002 GYPSUM WALLBOARD CEILING FINISHES General	84	89	86	95 / 95		10-Feb-2015
C3030 CEILING FINISHES	CGyp3-FL1 C303002 GYPSUM WALLBOARD CEILING FINISHES General	84	89	86	88 / 88		11-Feb-2015
C3030 CEILING FINISHES	CGyp4-FL1 C303002 GYPSUM WALLBOARD CEILING FINISHES General	84	89	86	95 / 95		11-Feb-2015
C3030 CEILING FINISHES	COther1-FLB1 C303090 OTHER CEILING & CEILING FINISHES General	84	89	86	100 / 28		01-Jan-1970
C3030 CEILING FINISHES	COther2-FLB1 C303090 OTHER CEILING & CEILING FINISHES General	84	89	86	88 / 88		10-Feb-2015
C3030 CEILING FINISHES	CWood1-FL1 C303004 WOOD CEILINGS General	84	89	86	95 / 95	95 /	31-Jan-2015
C3030 CEILING FINISHES	CWood2-FLB1 C303004 WOOD CEILINGS General	84	89	86	95 / 95	88 /	10-Feb-2015
C3030 CEILING FINISHES	CWood3-FL1 C303004 WOOD CEILINGS General	84	89	86	88 / 88		11-Feb-2015
C3030 CEILING FINISHES	CWood4-FL1 C303004 WOOD CEILINGS General	84	89	86	95 / 95		11-Feb-2015
D20 PLUMBING							
D2010 PLUMBING FIXTURES	DF1_FL1_1990 D201006 DRINKING FOUNTAINS AND COOLERS Drinking Fountain	84	80	92	95 / 95		26-Jan-2015
D2010 PLUMBING FIXTURES	ES1_FLB1_2000 D201090 OTHER PLUMBING FIXTURES Emergency Shower	84	80	92	95 / 95		26-Jan-2015
D2010 PLUMBING FIXTURES	EW1_FLB1_2000 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	84	80	92	95 / 95		26-Jan-2015
D2010 PLUMBING FIXTURES	KitSink1-FLB1 D201004 SINKS Kitchen Sink	84	80	92	95 / 95		27-Jan-2015
D2010 PLUMBING FIXTURES	Lav1-FL1 D201003 LAVATORIES General	84	80	92	88 / 88		26-Jan-2015
D2010 PLUMBING FIXTURES	Lav2-FLB1 D201003 LAVATORIES General	84	80	92	95 / 95		27-Jan-2015
D2010 PLUMBING FIXTURES	Shower1-FL1 D201005 SHOWERS/TUBS Shower	84	80	92	95 / 95		26-Jan-2015
D2010 PLUMBING FIXTURES	Shower2-FL1 D201005 SHOWERS/TUBS Shower	84	80	92	95 / 95		26-Jan-2015

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D2010 PLUMBING FIXTURES	Shower3-FLB1 D201005 SHOWERS/TUBS Shower	84	80	92	95 / 95		27-Jan-2015
D2010 PLUMBING FIXTURES	SvcSink1-FL1 D201004 SINKS Service Sink	84	80	92	88 / 88		26-Jan-2015
D2010 PLUMBING FIXTURES	Urinal1-FL1 D201002 URINALS General	84	80	92	88 / 88		26-Jan-2015
D2010 PLUMBING FIXTURES	Urinal2-FLB1 D201002 URINALS General	84	80	92	95 / 95		27-Jan-2015
D2010 PLUMBING FIXTURES	WaterClos1-FL1 D201001 WATERCLOSETS General	84	80	92	88 / 88		26-Jan-2015
D2010 PLUMBING FIXTURES	WaterClos2-FLB1 D201001 WATERCLOSETS General	84	80	92	95 / 95		27-Jan-2015
D2010 PLUMBING FIXTURES	WD1-FLB1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	84	80	92	95 / 95		27-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	BFP1_1997_Boilerrm D202002 VALVES & HYDRANTS Backflow Preventer - 2" pipe	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	BFP2_1997_Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 3" pipe	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS1_2011_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS2_1970_Throughout bldg D202001 PIPES & FITTINGS CPVC <1" Pipe	84	80	72	30 / 30		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS3_1997_Throughout bldg D202001 PIPES & FITTINGS PVC 4"-6" Pipe	84	80	72	50 / 50		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS4_1970_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 4"-6" Pipe	84	80	72	30 / 30		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE1_1997_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE10_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE11_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE12_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	95 / 95		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE13_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	95 / 95		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE14_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	95 / 95		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE15_2014_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	95 / 95		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE16_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE17_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015

1 - Four Seasons Pool SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D2020 DOMESTIC WATER DISTRIBUTION	WTE18_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE2_2010_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE3_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE4_2011_Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE5_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE6_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE7_2011_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE8_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE9_1997_Mech Hall D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	84	80	72	88 / 88		26-Jan-2015
D2040 RAIN WATER DRAINAGE	SP1_1997_Mech Hall D204003 RAINWATER DRAINAGE EQUIPMENT Sump Pump - Submersible	84	80	88	88 / 88		26-Jan-2015
D30 HVAC							
D3020 HEAT GENERATING SYSTEMS	CFW1_2013_Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	84	84	88	88 / 88		26-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW2_2010_Acidrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	84	84	88	88 / 88		26-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW3_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater	84	84	88	88 / 88		26-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW4_1997_Mech Hall D302004 AUXILIARY EQUIPMENT Chemical Feedwater	84	84	88	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU1_1970_Mechrm D304008 AIR HANDLING UNITS Central Station	84	84	83	71 / 71		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU2_1970_Mechrm D304008 AIR HANDLING UNITS Central Station	84	84	83	80 / 80		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU3_1984_Mech Mezz D304008 AIR HANDLING UNITS Central Station	84	84	83	60 / 60		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP1_1997_Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP2_1997_Mech Hall D304006 CHILLED WATER	84	84	83	80 / 80		26-Jan-2015

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
	DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM						
D3040 DISTRIBUTION SYSTEMS	CWP3_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6" size, 25 HP, to 1550 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP4_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP5_2014_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	84	84	83	95 / 95		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP6_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3" size, 5 HP, to 225 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP7_1997_Mech Hall D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE2_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE3_1970_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE4_2008_Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP1_2011_Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction	84	84	83	88 / 88		26-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP2_1997_Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM	84	84	83	88 / 88		26-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	HUH1_1984_Boilerrm D305002 UNIT HEATERS Hydronic	84	84	88	88 / 88		26-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	UF1_1970_Mechrm D305001 UNIT VENTILATORS Fan System, Utility Set	84	84	88	88 / 88		26-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	AIRDRYER1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	84	84	88	88 / 88		26-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC1_2011_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	84	84	88	95 / 95		26-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC2_2010_Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	84	84	88	88 / 88		26-Jan-2015

City of Prince George (PGBC)

1 - Four Seasons Pool SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D3060 CONTROLS & INSTRUMENTATION	DDC3_2000_Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	84	84	88	88 / 88		26-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	IAC1_1997_Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	84	84	88	88 / 88		26-Jan-2015
D40 FIRE PROTECTION							
D4010 FIRE ALARM AND DETECTION SYSTEMS	DTECTR1_Throughout bldg D401001 FIRE ALARM DISTRIBUTION Fire detection systems, 50 detectors	84	88	88	88 / 88		26-Jan-2015
D4010 FIRE ALARM AND DETECTION SYSTEMS	FACP1_2011_Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel	84	88	88	88 / 88		26-Jan-2015
D50 ELECTRICAL							
D5010 ELECTRICAL SERVICE & DISTRIBUTION	IXFMR1_2011_Acidrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 30 kVA	84	91	88	95 / 95		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MCC1_1970_Mechrm D501006 MOTOR CONTROL CENTERS General	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MCC2_1970_Mech Hall D501006 MOTOR CONTROL CENTERS General	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MDP1_1970_Boilerrm D501002 SERVICE ENTRANCE EQUIPMENT Electrical Service - 3 Phase, 120/208 V, 800 A	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB1_1970_Boilerrm D501004 PANELBOARDS Main lugs, 400 amp	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB2_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB3_1970_Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB4_2011_Acidrm D501004 PANELBOARDS Main lugs, 120/240 V, 225 amp, NQOD	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB5_1984_Boilerrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB6_1987_Office D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	SS1_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 200 Amp	84	91	88	88 / 88		26-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	SS2_1997_Mech Hall D501004 PANELBOARDS Safety Switch, 30-100 Amp	84	91	88	60 / 60		26-Jan-2015
D5020 LIGHTING & BRANCH WIRING	ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	84	91	94	95 / 95		26-Jan-2015
D5020 LIGHTING & BRANCH WIRING	ExpL2-FLB1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	84	91	94	88 / 88		10-Feb-2015

City of Prince George (PGBC)

1 - Four Seasons Pool — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI) [Last Insp / Current Estimated]	Last Inspection Date
D5020 LIGHTING & BRANCH WIRING	Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	84	91	94	88 / 88		28-Jan-2015
D5020 LIGHTING & BRANCH WIRING	FluoL1-FLB1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	84	91	94	95 / 95		26-Jan-2015
D5020 LIGHTING & BRANCH WIRING	FluoL3-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	84	91	94	88 / 88		26-Jan-2015
D5020 LIGHTING & BRANCH WIRING	FluoL4-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	84	91	94	95 / 95		11-Feb-2015
D5020 LIGHTING & BRANCH WIRING	FluoL4-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	84	91	94	95 / 95		26-Jan-2015
D5020 LIGHTING & BRANCH WIRING	HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	84	91	94	95 / 95		26-Jan-2015
D5090 OTHER ELECTRICAL SERVICES	EmgL1-FLB1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	84	91	95	95 / 95		26-Jan-2015
D5090 OTHER ELECTRICAL SERVICES	EmgL2-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	84	91	95	95 / 95		26-Jan-2015
D5090 OTHER ELECTRICAL SERVICES	EmgL3-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	84	91	95	95 / 95		26-Jan-2015

5 - Aquatic Centre SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI) [Last Insp / Current Estimated]	Last Inspection Date
B10 SUPERSTRUCTURE							
B1010 FLOOR CONSTRUCTION	Bm Grd1_M B101001 STRUCTURAL FRAME Beam/Girder - Metal	90	95	95	95 / 95		29-Jan-2015
B1010 FLOOR CONSTRUCTION	Column1_M B101001 STRUCTURAL FRAME Column - Metal	90	95	95	95 / 95		29-Jan-2015
B1010 FLOOR CONSTRUCTION	Deck Slab1_LGS B101003 FLOOR DECKS AND SLABS Deck - Light Gauge Steel	90	95	95	95 / 95		29-Jan-2015
B1010 FLOOR CONSTRUCTION	Deck Slab2_CBJ B101003 FLOOR DECKS AND SLABS Deck - Composite w/Bar Joists	90	95	95	88 / 88		29-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW1_C B101002 STRUCTURAL INTERIOR WALLS Concrete	90	95	95	80 / 80		29-Jan-2015
B1010 FLOOR CONSTRUCTION	Str IntW2_CMU B101002 STRUCTURAL INTERIOR WALLS CMU	90	95	95	95 / 95	95 /	15-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW3_C B101002 STRUCTURAL INTERIOR WALLS Concrete	90	95	95	95 / 95	95 /	15-Feb-2015
B1010 FLOOR CONSTRUCTION	Str IntW4_C B101002 STRUCTURAL INTERIOR WALLS Concrete	90	95	95	95 / 95		15-Feb-2015
B1020 ROOF CONSTRUCTION	Bm Grd2_M B102001 STRUCTURAL FRAME Beam/Girder - Metal	90	95	95	95 / 95		29-Jan-2015
B1020 ROOF CONSTRUCTION	Column2_M B102001 STRUCTURAL FRAME Column - Metal	90	95	95	88 / 88		29-Jan-2015
B1020 ROOF CONSTRUCTION	Column3_M B102001 STRUCTURAL FRAME Column - Metal	90	95	95	95 / 95	95 /	29-Jan-2015
B1020 ROOF CONSTRUCTION	Deck2_S B102003 ROOF DECKS AND SLABS Deck - Steel	90	95	95	95 / 95		29-Jan-2015
B1020 ROOF CONSTRUCTION	Deck3_S B102003 ROOF DECKS AND SLABS Deck - Steel	90	95	95	95 / 95		29-Jan-2015
B1020 ROOF CONSTRUCTION	Tr Jst2_M B102001 STRUCTURAL FRAME Truss/Joist - Metal	90	95	95	95 / 95		29-Jan-2015
B1020 ROOF CONSTRUCTION	Tr Jst3_M B102001 STRUCTURAL FRAME Truss/Joist - Metal	90	95	95	95 / 95		29-Jan-2015
B20 EXTERIOR ENCLOSURE							
B2010 EXTERIOR WALLS	Balc_Ladder1 B201006 BALCONY WALLS & HANDRAILS Ladder	90	83	80	95 / 95		29-Jan-2015
B2010 EXTERIOR WALLS	Ex CL1_CMU B201001 EXTERIOR CLOSURE Concrete Block	90	83	80	80 / 80		29-Jan-2015
B2010 EXTERIOR WALLS	Ex CL2_EIFS B201001 EXTERIOR CLOSURE E.I.F.S.	90	83	80	80 / 80		29-Jan-2015
B2010 EXTERIOR WALLS	Ex Sft1_C_W B201007 EXTERIOR SOFFITS General	90	83	80	80 / 80		29-Jan-2015
B2010 EXTERIOR WALLS	Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	90	83	80	95 / 95		29-Jan-2015
B2010 EXTERIOR WALLS	HR1 B201006 BALCONY WALLS & HANDRAILS Handrailing	90	83	80	95 / 95		29-Jan-2015
B2020 EXTERIOR WINDOWS	SF1 B202002 STOREFRONTS General	90	83	83	80 / 80		29-Jan-2015
B2020 EXTERIOR WINDOWS	Wndw1_Al B202001 WINDOWS Aluminum Windows	90	83	83	88 / 88		29-Jan-2015
B2030 EXTERIOR DOORS	GD1 B203002 GLAZED DOORS General	90	83	94	95 / 95		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI) [Last Insp / Current Estimated]	Last Inspection Date
B2030 EXTERIOR DOORS	GD2 B203002 GLAZED DOORS General	90	83	94	88 / 88		29-Jan-2015
B2030 EXTERIOR DOORS	SD1_S B203001 SOLID DOORS Steel	90	83	94	95 / 95		29-Jan-2015
C10 INTERIOR CONSTRUCTION							
C1010 PARTITIONS	HR1-FL1 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	90	94	95	88 / 88		29-Jan-2015
C1010 PARTITIONS	HR2-FL2 C101004 INTERIOR GUARDRAILS & SCREENS Guardrail	90	94	95	88 / 88		29-Jan-2015
C1010 PARTITIONS	IntWndw1-FL1 C101005 INTERIOR WINDOWS Interior Windows	90	94	95	95 / 95		29-Jan-2015
C1010 PARTITIONS	SF1-FL1 C101006 GLAZED PARTITIONS & STOREFRONTS General	90	94	95	95 / 95		29-Jan-2015
C1020 INTERIOR DOORS	FD1-FL2 C102003 FIRE DOORS Fire Door - Swinging	90	94	94	88 / 88		29-Jan-2015
C1020 INTERIOR DOORS	GlzD1-FL1 C102002 GLAZED INTERIOR DOORS General	90	94	94	95 / 95		29-Jan-2015
C1020 INTERIOR DOORS	MtlD1-FL1 C102001 STANDARD INTERIOR DOORS Metal Door	90	94	94	95 / 95		29-Jan-2015
C1020 INTERIOR DOORS	MtlD2-FL2 C102001 STANDARD INTERIOR DOORS Metal Door	90	94	94	88 / 88		29-Jan-2015
C1020 INTERIOR DOORS	WDMF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Metal Frame	90	94	94	95 / 95		29-Jan-2015
C1020 INTERIOR DOORS	WDWF1-FL1 C102001 STANDARD INTERIOR DOORS Wood Door/Wood Frame	90	94	94	88 / 88		29-Jan-2015
C1030 SPECIALTIES	Ladder1-FL1 C103090 OTHER INTERIOR SPECIALTIES Ladder	90	94	92	88 / 88		29-Jan-2015
C1030 SPECIALTIES	TltPart1_CS-FL1 C103001 COMPARTMENTS, CUBICLES & TOILET PARTITIONS Toilet Partitions - Coated Steel	90	94	92	95 / 95		29-Jan-2015
C20 STAIRS							
C2010 STAIR CONSTRUCTION	IntStr1_C-FL1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Stairs - Concrete (24 Riser Flight)	90	95	95	95 / 95		29-Jan-2015
C2010 STAIR CONSTRUCTION	MechSteps_FL1 C201001 INTERIOR AND EXTERIOR STAIRS Interior Steps - Concrete	90	95	95	88 / 88		29-Jan-2015
C30 INTERIOR FINISHES							
C3010 WALL FINISHES	WCer1-FL1 C301004 TILE & TERRAZZO WALL FINISHES Tile	90	78	47	95 / 95		15-Feb-2015
C3010 WALL FINISHES	WGyp1-FL1 C301003 GYPSUM WALLBOARD FINISHES General	90	78	47	95 / 95	95 /	15-Feb-2015
C3010 WALL FINISHES	WGyp2-FL2 C301003 GYPSUM WALLBOARD FINISHES General	90	78	47	95 / 95		15-Feb-2015

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
C3010 WALL FINISHES	WOther1-FL1 C301090 OTHER WALL FINISHES General	90	78	47	100 / 21		01-Jan-1998
C3010 WALL FINISHES	WWood1-FL1 C301005 WALL COVERINGS Wood	90	78	47	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FCer1-FL1 C302001 TILE FLOOR FINISHES Ceramic Tile	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FConTop1-FLB1 C302010 HARDENERS AND SEALERS Concrete Topping	90	78	95	88 / 88		15-Feb-2015
C3020 FLOOR FINISHES	FConTop2-FL1 C302010 HARDENERS AND SEALERS Concrete Topping	90	78	95	88 / 88		15-Feb-2015
C3020 FLOOR FINISHES	FConTop3-FL2 C302010 HARDENERS AND SEALERS Concrete Topping	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FCpt1-FL1 C302005 CARPETING General	90	78	95	60 / 60		15-Feb-2015
C3020 FLOOR FINISHES	FCptTile1-FL1 C302005 CARPETING Carpet Tile	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FOther1-FL1 C302090 OTHER FLOORING & FLOOR FINISHES General	90	78	95	100 / 95		01-Jan-1998
C3020 FLOOR FINISHES	FPaint1-FL1 C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES Paint	90	78	95	95 / 95	95 /	15-Feb-2015
C3020 FLOOR FINISHES	FRubber1-FL1 C302004 RESILIENT FLOOR FINISHES Rubber Sheet	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FVinyl2-FL1 C302004 RESILIENT FLOOR FINISHES Vinyl Tile	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FVinylShtF-FL1 C302004 RESILIENT FLOOR FINISHES Composition Sheet	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FVinylShtF-FL2 C302004 RESILIENT FLOOR FINISHES Composition Sheet	90	78	95	95 / 95		15-Feb-2015
C3020 FLOOR FINISHES	FWood1-FL1 C302003 WOOD FLOORING General	90	78	95	95 / 95		15-Feb-2015
C3030 CEILING FINISHES	CAct1-FL1 C303001 ACOUSTICAL CEILING TILES & PANELS General	90	78	94	95 / 95		15-Feb-2015
C3030 CEILING FINISHES	CAct2-FL2 C303001 ACOUSTICAL CEILING TILES & PANELS General	90	78	94	95 / 95		15-Feb-2015
C3030 CEILING FINISHES	CActSusp1-FL1 C303005 SUSPENSION SYSTEMS General	90	78	94	95 / 95		19-Feb-2015
C3030 CEILING FINISHES	CActSusp2-FL2 C303005 SUSPENSION SYSTEMS General	90	78	94	95 / 95		19-Feb-2015
C3030 CEILING FINISHES	CGyp1-FL1 C303002 GYPSUM WALLBOARD CEILING FINISHES General	90	78	94	95 / 95		15-Feb-2015
C3030 CEILING FINISHES	COther1-FL1 C303090 OTHER CEILING & CEILING FINISHES General	90	78	94	100 / 91		01-Jan-1998
C3030 CEILING FINISHES	CWood1-FL1 C303004 WOOD CEILINGS General	90	78	94	95 / 95		15-Feb-2015
D20 PLUMBING							
D2010 PLUMBING FIXTURES	ES1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Shower	90	88	94	88 / 88		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D2010 PLUMBING FIXTURES	EW1_FL1_1998 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	90	88	94	88 / 88		29-Jan-2015
D2010 PLUMBING FIXTURES	KitSink1-FL1 D201004 SINKS Kitchen Sink	90	88	94	95 / 95		29-Jan-2015
D2010 PLUMBING FIXTURES	Lav1-FL1 D201003 LAVATORIES General	90	88	94	95 / 95		29-Jan-2015
D2010 PLUMBING FIXTURES	Shower1-FL1 D201005 SHOWERS/TUBS Shower	90	88	94	95 / 95		29-Jan-2015
D2010 PLUMBING FIXTURES	SvcSink1-FL1 D201004 SINKS Service Sink	90	88	94	88 / 88		29-Jan-2015
D2010 PLUMBING FIXTURES	Urinal1-FL1 D201002 URINALS General	90	88	94	95 / 95		29-Jan-2015
D2010 PLUMBING FIXTURES	WaterClos1-FL1 D201001 WATERCLOSETS General	90	88	94	95 / 95		29-Jan-2015
D2010 PLUMBING FIXTURES	WC1_FL1_1998 D201006 DRINKING FOUNTAINS AND COOLERS Water Cooler	90	88	94	88 / 88		29-Jan-2015
D2010 PLUMBING FIXTURES	WD1-FL1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	90	88	94	95 / 95		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	BFP1_1998_FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe	90	88	87	80 / 80		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS1_1980_Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 2"-4" Pipe	90	88	87	80 / 80		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	FITTINGS2_2011_Throughout bldg D202001 PIPES & FITTINGS PVC 4"-6" Pipe	90	88	87	95 / 95		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	ST1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Galvanized steel, 500 gallon, 36" diameter,126" L.O.A.	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	ST2_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60" diameter, 93" L.O.A.	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	ST3_1998_Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE, 940 gallon, 60" diameter, 93" L.O.A.	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WH1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Residential, Electric	90	88	87	30 / 30		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE1_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE10_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE11_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE12_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D2020 DOMESTIC WATER DISTRIBUTION	WTE13_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE14_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE15_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE16_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE17_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE18_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE19_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE2_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE20_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE21_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE22_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE23_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE24_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE3_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE4_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE5_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE6_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE7_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE8_1998_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	90	88	87	88 / 88		29-Jan-2015
D2020 DOMESTIC WATER DISTRIBUTION	WTE9_2007_FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment - Ultraviolet Treatment	90	88	87	88 / 88		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre	SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D30 HVAC							
D3020 HEAT GENERATING SYSTEMS	B1_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	B2_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	B3_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	B4_2014_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	100 / 100		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	B5_2010_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	100 / 99		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	B6_2014_Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	90	89	94	100 / 100		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW1_1998_FL1 Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW2_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	CFW3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET1_1998_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 305 gal	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET2_2013_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 24 gal	90	89	94	88 / 90		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET3_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 15 gal	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET4_2011_Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET5_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	90	89	94	88 / 88		29-Jan-2015
D3020 HEAT GENERATING SYSTEMS	ET6_1998_Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	90	89	94	88 / 88		29-Jan-2015
D3030 COOLING GENERATING SYSTEMS	CU1_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21 ton, R-22	90	89	88	88 / 88		29-Jan-2015
D3030 COOLING GENERATING SYSTEMS	CU2_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26 ton, R-22	90	89	88	88 / 88		29-Jan-2015
D3030 COOLING GENERATING SYSTEMS	CU3_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	90	89	88	88 / 88		29-Jan-2015
D3030 COOLING GENERATING SYSTEMS	CU4_2003_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	90	89	88	88 / 88		29-Jan-2015
D3030 COOLING GENERATING SYSTEMS	CU5_1998_Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5 ton, R-22	90	89	88	88 / 88		29-Jan-2015

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D3040 DISTRIBUTION SYSTEMS	AHU1_1998_Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU2_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU3_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU4_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU5_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU6_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	AHU7_1998_Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP1_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	95 / 95		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP10_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP11_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 3" size, 5 HP, to 225 GPM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP12_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP13_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP14_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP15_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP16_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 6" size, 25 HP, to 1550 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP2_2013_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	95 / 95		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP3_2013_FL1 Mechrm D304006 CHILLED WATER	90	89	87	95 / 95		29-Jan-2015

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
	DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM						
D3040 DISTRIBUTION SYSTEMS	CWP4_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP5_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP6_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	71 / 71		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP7_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP8_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	CWP9_1998_FL1 Mechrm D304006 CHILLED WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 5" size, 15 HP, to 1000 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE1_2011_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	90	89	87	95 / 95		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE2_2010_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	90	89	87	95 / 95		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE3_1998_FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE4_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE5_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HE6_2010_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP1_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP2_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size, 7-1/2 HP, to 350 GPM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP3_1998_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	71 / 71		29-Jan-2015

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D3040 DISTRIBUTION SYSTEMS	HWP4_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	80 / 80		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP5_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP6_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP7_2011_Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP8_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3040 DISTRIBUTION SYSTEMS	HWP9_1998_Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-1/2" size, 3 HP, to 150 GPM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF1_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF2_1998_Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF3_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 10,000 CFM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF4_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 1500 CFM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF5_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF6_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF7_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF8_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 7500 CFM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	CF9_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	FCU1_1998_FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	FCU2_1998_Mechrm MEZZ D305003 FAN COIL UNITS Duct Mount, 2 Pipe	90	89	87	60 / 60		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	HP1_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	90	89	87	88 / 88		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre SOW City of Prince George (PGBC)

System Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D3050 TERMINAL & PACKAGE UNITS	HP2_2011_Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	HUH1_1998_Mech Areas D305002 UNIT HEATERS Hydronic	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	HUH2_2007_Mechrm MEZZ D305002 UNIT HEATERS Hydronic	90	89	87	88 / 88		29-Jan-2015
D3050 TERMINAL & PACKAGE UNITS	UF1_1998_Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Utility Set	90	89	87	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC1_2008_FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC10_2000_Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC2_2000_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC3_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC4_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC5_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC6_2010_Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC7_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC8_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	DDC9_2000_Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit), mechanical room, 16 point contr	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	IAC1_1998_FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	90	89	91	88 / 88		29-Jan-2015
D3060 CONTROLS & INSTRUMENTATION	IAC2_2014_FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	90	89	91	100 / 100		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre | SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D40 FIRE PROTECTION							
D4020 FIRE SUPP WATER SUPPLY / EQUIP	FPBFP1_1998_FL1 Mechrm D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT Backflow Preventer - 4"	90	88	88	88 / 88		29-Jan-2015
D4030 STANDPIPE SYSTEMS	RISER1_1998_FL1 Mechrm D403001 STANDPIPE EQUIPMENT & PIPING Riser - 4" diam	90	88	88	88 / 88		29-Jan-2015
D4040 SPRINKLERS	FPSS1_1998_FL1 D404001 SPRINKLERS AND RELEASING DEVICES Dry Pipe Systems	90	88	88	88 / 88		29-Jan-2015
D50 ELECTRICAL							
D5010 ELECTRICAL SERVICE & DISTRIBUTION	IXFMR1_1998_FL1 Mechrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 75 kVA	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	IXFMR2_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 75 kVA, K-4 rated	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	IXFMR3_1998_Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V primary 120/208 V secondary, 30 kVA	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MCC1_1998_FL1 Mechrm D501006 MOTOR CONTROL CENTERS General	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MCC2_1998_Elecrm MEZZ D501006 MOTOR CONTROL CENTERS General	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	MCC3_1998_Mechrm MEZZ-2 D501006 MOTOR CONTROL CENTERS General	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB1_1998_FL1 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB10_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB2_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 400 amp	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB3_1998_Elecrm MEZZ D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB4_1998_Elecrm MEZZ D501004 PANELBOARDS Other	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB5_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB6_1998_Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB7_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB8_1998_Hall D501004 PANELBOARDS Main lugs, 400 amp	90	90	88	88 / 88		29-Jan-2015

City of Prince George (PGBC)

5 - Aquatic Centre — SOW City of Prince George (PGBC)

System / Component	Section Description	Building CI (BCI)	System CI (SCI)	Comp CI (BCCI)	Section CI(CSCI) [Last Insp / Current Estimated]	Section Paint CI(CCI)	Last Inspection Date
D5010 ELECTRICAL SERVICE & DISTRIBUTION	PB9_1998_Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	90	90	88	88 / 88		29-Jan-2015
D5010 ELECTRICAL SERVICE & DISTRIBUTION	SG1_1998_Elecrm MEZZ D501004 PANELBOARDS Switchgear - 1200 Amp	90	90	88	88 / 88		29-Jan-2015
D5020 LIGHTING & BRANCH WIRING	ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	90	90	95	95 / 95		15-Feb-2015
D5020 LIGHTING & BRANCH WIRING	Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	90	90	95	88 / 88		29-Jan-2015
D5020 LIGHTING & BRANCH WIRING	HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	90	90	95	95 / 95		15-Feb-2015
D5020 LIGHTING & BRANCH WIRING	LedL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	90	90	95	95 / 95		29-Jan-2015
D5020 LIGHTING & BRANCH WIRING	LedL2-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	90	90	95	95 / 95		15-Feb-2015
D5090 OTHER ELECTRICAL SERVICES	EmgL1-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	90	90	95	95 / 95		15-Feb-2015

11.3.2 Building Science Engineering (2012)

Building Science Engineering Ltd.
9733 - 89 Avenue, Edmonton, AB T6E 2S1 - Tel/Fax: 780 437-5800 - Cell: 780 905-5637
E-mail: chris@bse.ab.ca

August 6, 2012

City of Prince George
1100 Patricia Boulevard
Prince George, British Columbia
V2L 3V9

Attention: Leland Hanson

Subject: Four Seasons Pool – Building Enclosure

Thank you for your time and assistance in access the above building to evaluate our involvement in the retrofit. As I noted Richard Ogle will be the lead on this project but because I was in Prince George regarding the New RCMP Building we thought it would be appropriate to see firsthand what the issues might be.

Building Science Engineering Ltd. (BSE) was established in 1997 and is located in Edmonton, Alberta. The company provides design, investigation, testing and inspection services related to the building envelope. Currently there are three partners in the firm: Richard Ogle, MSc. P.Eng, Rob Pacholok, MSc. P.Eng., Kelly Kruger, P.Eng. and Chris Makepeace B. Tech, C.E.T.

Richard Ogle will be in contact to review the particulars of the project and submit a proposal.

In the meantime there is the issue of the east mansard roof/wall above the lower roof of the change room and offices.

In Part 5 of the National Code titled "Environmental Separation" there is under Section 5.4 titled *Air Leakage* the requirement for an air barrier. This barrier is meant to be air impermeable, structural, and continuous to prevent the passage of the exterior environment into the building environment [infiltration] and to prevent the passage of air from the interior environment to the exterior [exfiltration]. This is a very critical requirement in high humidity buildings as the potential of condensation occurring when warm moist air comes in contact with cold surfaces within the construction can accelerate the deterioration of the components.

While a vapour retarder is also noted in Section 5.5 *Vapour Diffusion* it has been realized by most of the building science community that air leakage is a far greater transporter of moisture into the construction and therefore a greater threat to deterioration and issues resulting from condensation in the construction.

The Four Seasons Pool was built in two parts (1960's and late1980's). The understanding of this requirement in building construction was not totally recognized by many. It was felt that inclusion of a vapour barrier was all that was needed. It was not recognized the wind, stack effect and mechanical pressurization provided forces that greatly increased moisture movement through the construction elements rather than through the molecules of the elements of the construction. This is especially a problem in high humidity buildings such as pools, museums, archives, libraries, etc.

Why then has this pool not deteriorated more than it has? While one could monitor the construction surfaces for temperature, it can be from our experiences on the wide variety of buildings that have had condensation issues, speculated that the building enclosure components are well above the dew point of the air that is passing through the enclosure. Some condensation has occurred but the building is so leaky the deterioration due to moisture condensing on the surfaces has been relatively short. The City has prolonged the service life by imputing a great deal of energy to heat the building and the enclosure components especially during the winter.

This does not mean there is no deterioration just less than one might expect. The fibrous batt insulation has been filtering the air (much like a furnace filter) as the air is pushed through it. There is some infiltration but mostly exfiltration in the mansard construction.


1


2

Photo 1, 2: A piece of fibrous batt insulation on the deck removed to show that the normal air pockets [provides insulation resistance] of the batt have been filled with dirt.


3


4

Photo 3, 4: Shows the mansard construction of the east and north walls. Interior polyethylene vapour barrier, 2 X 8 dimensional supports fastened to a structural steel framing, 1 X 8 planking. On the exterior is building paper and cedar shingles. Note the staining of the wood. The shingle fasteners penetrating the planking are corroded from exposure to moisture [chlorine?].

As discussed this project is scheduled for construction documentation packaging this year and tendering and construction next year. When reviewing the construction, we noted that the east cladding of the mansard above the change area roof was in particularly poor condition. Many shingles were resting on the SBS roofing. In several areas one could see to the interior batt insulation through where shingles had detached and the building paper had deteriorated. In the winter snow will drift against this wall and rain water draining over the surface now is very likely to enter the building.

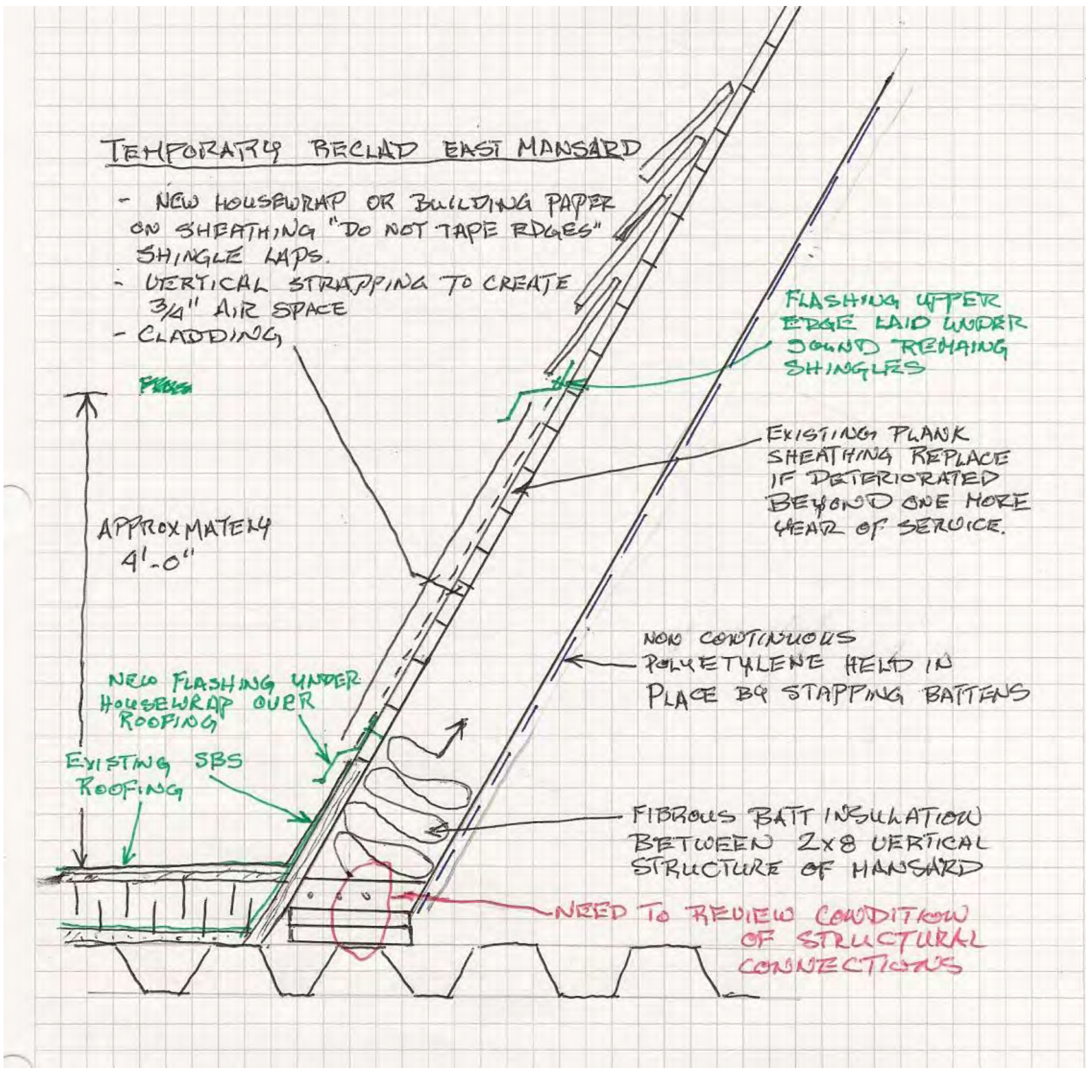
Photo 5: East Mansard roof above change areas. Red line indicates minimum area of temporary remedial repair.

6

7

Photo 6, 7: The shingles have come lose and have deteriorated to the point where they are not fastened properly and are not providing the water penetration protection they were designed to provide.

Something needs to be done in the interim to minimize water entry. We recommend therefore that the shingles and building paper be removed to a height of at least four feet above the termination of the upstanding SBS termination. An evaluation of whether the existing planking can be used for this temporary fix can be made. If the planking is still structurally sound enough for one more year of support then a breathable housewrap could be applied to the exterior [install in large pieces in a shingle fashion but **do not** tape the joints]. Provide vertical strapping at the vertical support [2 X 8] then apply a cheap cladding of metal or board product. Provide flashings under the shingles above this area and at the bottom. This fix is not intended to resolve any of the existing problems other than to prevent snow melt and rain water from entering the building in the short term before the retrofit begins next year.



At the same time it would be appropriate to remove the lower planking if possible to determine the condition of the roof membrane transition and possibly open a small area just below the upper roof tie in. The concern here is the condition of the metal, and strapping plates for the tie in of the 2 x 8 dimensional lumber members as the solution discussed would be to move the air seal and insulation external of the structure in a PERSIST design solution. At some point in the development of the documents for this project it would be necessary to open up the transition for the roof to the mansard to ensure nothing is missed in the documents. It may be appropriate to do that investigation work at the same time.

If you have any questions please contact Richard Ogle or myself.

Sincerely,

Christopher L. Makepeace

11.3.3 Read Jones Christoffersen (RJC) (2010)

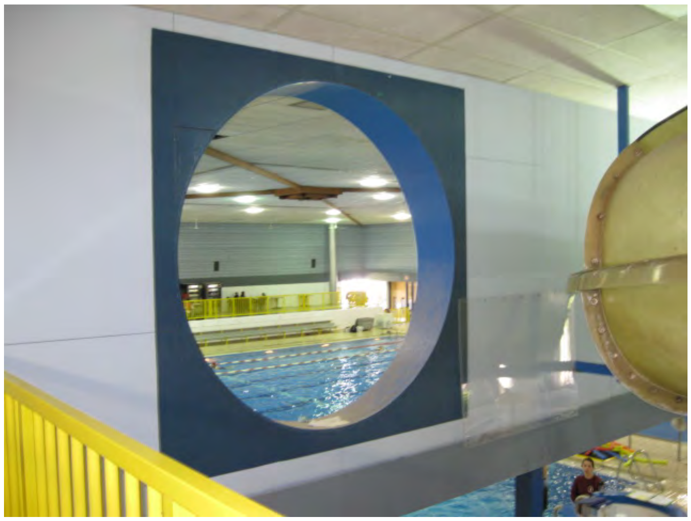
intentionally blank for double sided printing

Read Jones Christoffersen
Consulting Engineers

Four Seasons Swimming Pool

Moisture Transfer Investigation

700 Dominion Street
Prince George, BC



Prepared for:

City of Prince George
Leisure Services
1100 Patricia Boulevard
Prince George, BC V2L 3V9

ATTN: Leland Hanson, Civic Facilities Construction Supervisor

Prepared by:

Read Jones Christoffersen Ltd.
Suite 301, 155 Skinner St.
Nanaimo, BC V9R 5E8

May 21, 2010
RJC No: NAN.103149.0001

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Terms of Reference

.1 Engagement

As requested by Mr. Leland Hanson, Read Jones Christoffersen Ltd. (RJC) has completed an investigation into the water transfer problems reported by the owner's representatives at the swimming pool. The primary purpose of this review was to determine the probable causes of water transferring through the soffit of the mansard roofs around the building.

.2 Scope of Work

A brief description of the work undertaken by RJC is as follows:

- Review of the existing drawings.
- Visual review of the mansard roof and upper roof assembly from inside and outside the building, including access into the mansard roof space.
- Review of cut tests in interior walls and roofing assemblies.

.3 Site Visit Summary

The site reviews of the Four Seasons were carried out by John Hofman of RJC on May 12, 2010, Mr. Leland Hanson and the swimming pool maintenance personnel provided assistance with site access, cutting and repairing of the recesses.

The weather at the time of our site visit was sunny. The temperature varied from 12˚Celsius in the morning to 19˚Celcius in the afternoon with a relative humidity of 31%. The temperature inside the pool area of the building was measured at 27˚Celcius with a relative humidity of 68%. The temperature in the main entrance lobby was 18˚Celcius with a 30% relative humidity.

.4 Limits of Commission

This report documents the site observations made of the current condition the mansard roof and wall assemblies and has been prepared in accordance with generally accepted engineering practices. No warranties, either expressed or implied, are made as to the professional services provided under the terms of our scope of work and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the roof and deck assemblies. RJC's opinion cannot be extended to portions of the building that were not reviewed.

Structural comments are provided where applicable, but are limited to the as-found condition of structural members only. A structural design review was not conducted as it was not part of RJC's scope of work. Similarly, review of building performance in areas such as seismic adequacy, mechanical, electrical, and fire safety systems, means of egress, and identification of mould-like substances were also outside RJC's scope of work.

Neither RJC, nor any company with which it is affiliated, nor any of their respective directors, employees, agents, servants or representatives shall in any way be liable for any claim, whether in contract or in tort including negligence, arising out of or relating in any way to mould, mildew or other fungus, including the actual, alleged or threatened existence, effects, ingestion, inhalation, abatement, testing, monitoring, remediation, enclosure, decontamination, repair, or removal, or the actual or alleged failure to detect mould, mildew or other fungus.

1.2 Site and Building Description

Four the purpose of this report Dominion Street is running in a north-south direction. The building is located in the downtown area of Prince George, surrounded by open grassed areas and a parking lot on the west side.

Other buildings in the adjacent city blocks are of similar height or higher than the subject building.

The original building and administration office was built in 1970. The recreational pool with a water slide was added in 1985. The pools and the basement areas surrounding the pool are below ground level and were constructed of poured in place concrete.

North East Corner

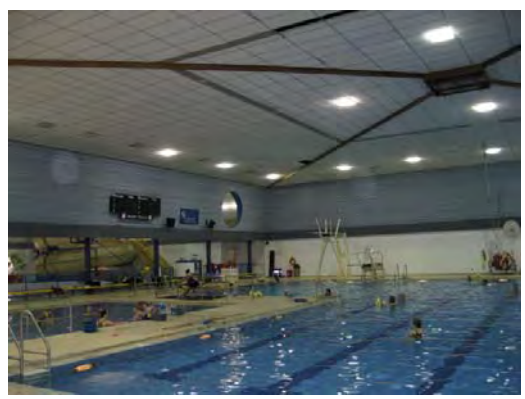
A system of structural steel beams, columns and open web steel joists supports the roofs and walls of the building.

The upper section of the building walls is built of a combination of wood framing and structural steel in the shape of a mansard roof. Concrete block masonry form the lower section of the exterior walls. The roof over the office and change room areas is lower than the roof over the pool area. The exterior block walls in the office and change room areas are furred out and finished with gypsum wall board.

Concrete block walls in the pool areas are for the most part exposed and finished with paint. The roofing over the 1985 addition is a built-up roof with a thin layer of pea-gravel, possibly the original membrane. The roofing over the original 1970 pool and the administration area are roofed over with a two ply bituminous membrane.

The mansard roofs are shingled with cedar shakes. The age difference of these shakes between the original building and the recreational pool addition is quite obvious, as the shakes on the older roof are cupping, bulging and becoming dislodged.

Interior view of 1985 addition



Interior view of original building

2.0 SITE REVIEWS, OBSERVATIONS AND DISCUSSIONS

The mansard roof assessment conducted by RJC included a visual review of building components from interior and exterior environments, looking for signs of moisture ingress and moisture induced deterioration. Exploratory recesses cut into interior and exterior walls confirmed wall assemblies and were used to determine the condition of hidden wall components. The following is a summation of information presented in Appendix A. Wall sections details are depicted in of Appendix B, copied from the original construction drawings with annotations to outline the essential building envelope elements.

2.1 Mansard Wall Assemblies

Our interior review consisted of a visual review of interior finished assemblies, as well as exploratory recesses in the plywood interior sheathing used at the mezzanine level of the 1985 addition. Generally, no anomalies were observed in these recesses. Removal of the polyethylene membrane and fiberglass insulation that cover the mansard wood framing in both the original 1970 building and the 1985 addition revealed extensive staining on the wood stud framing and the shiplap sheathing. However the structural condition of these wood components at the locations reviewed was not compromised, as the wood was firm; wood deterioration was not found.

Some surface corrosion was observed on structural steel components inside the mansard assemblies, however, in our opinion is of little consequence to the structural integrity to these elements.

No corrosion or oxidation of the galvanized surfaces was observed on the bottom of the metal roof decking where it was visible in some locations in both the original building and in the addition.

Other than the polyethylene vapour retarder which has some holes in it, there is no membrane or continuous sheathing that serves as a an air barrier in the mansard roof assembly. The polyethylene was found to be cut and loosely lapped in many locations and is bridging about 2 feet between the vertical framing members; and thus cannot be considered to be structurally supported. Essentially the mansard walls and mansard soffits of this building have no air barrier and only a deficient vapour retarder. Hence, hot high-humidity air from the pool area travels virtually unimpeded through the mansard wall assembly from the heated portion of the building into the cold parts of the roof.

This warm air condensates on colder surfaces, that are particularly pronounced in the winter time when the outdoor temperatures are below freezing. Water is likely to collect at the bottom of the mansard roof space and freeze, as shown on the photographs provided by the owner's representatives. When this ice thaws during warmer weather or in the spring, the ice melts and water runs down the soffits and the exterior surface of the building walls. It appears that the wood components that become wet from condensation will dry out fast enough to prevent wood rot, even after 40 years of service on the original building.

Air leakage through wall assemblies is a major cause of heat loss in buildings; therefore the main function of an air barrier in colder climates is to prevent loss of heated interior air to the outside. In the mansard roofs, the warm air escapes through the gaps in the polyethylene membrane, through the insulation, the joints in the shiplap, the roofing felt and the cedar shakes. The thermal insulation in the mansard is for the most part provided by the 4" thick fiberglass batts. This provides a thermal insulation value of R10 or so, but could be significantly less if the fiberglass batts are wet from condensation. It could be argued that the thermal insulation of the mansard assembly is almost insignificant by current standards.

2.2 Concrete Block Wall Assemblies

The exterior walls below the mansard roofs are for the most part constructed of concrete block masonry units that provide weather resistance and structural strength. Various arrangements of these block walls are shown on the original architectural drawings. The thermal insulation in these walls called for on the original drawings is minimal. The drawings do not provide information on the details and continuity of the vapour retarders and air barriers that are critical to the performance of a building envelope. This would include attention to continuity of the vapour retarders and the air barriers at interfaces between different wall types, notably the top of the mansard roof and the flat roof or between the soffit of the mansard and the top of the blockwall.

The other exterior wall type is a wood framed parapet along the exterior of the office area. It is shown in the wall section on page 6 of Appendix B. Photograph 26 in Appendix A shows ice formation on the interior side of the wood framing. It was reported that this parapet wall became unstable and was subsequently replaced with a new assembly. This was constructed as an exterior insulated wall with bituminous membrane to serve as air/vapour barrier and clad with rigid insulation and hardi-plank siding.

The photograph 27 shows the floor of the janitor room which also forms part of the office/administration building. Snow or ice can be observed in the corner between the floor and the wall. The wall section on page 6 of Appendix B shows that this concrete floor is cantilevered out, and that it is not protected by thermal insulation. It is probable that the ice formation was caused by condensate that froze during cold weather.

Windows form part of a building envelope system with typical thermal resistance values between R2 to R3. The Four Season Swimming Pool has few windows in exterior walls, thus the heat loss that can be attributed to windows in this building is probably not very significant. Photograph 8 shows a detail of a wood framed window that is nearing the end of its service life.

2.3 Roof Assemblies

During our site visit a cut test was made in the roofing membrane for each of the 1985 and 1970 buildings. The materials exposed in these cuts did not match the information provided on the original architectural drawings. The following observations were of interest:

- The built-up roofing membrane on the 1985 addition was found to be in reasonable condition, considering the 25 year service life. Some rows of bubbles are indicative that increased maintenance is to be anticipated and that one should budget for a new roofing membrane within the next 5 years or so. Replacing or over-roofing would also provide an opportunity to consider significantly more thermal insulation than the existing 2" thick expanded polystyrene.

- The lack of a vapour retarder membrane in the two-ply bituminous roof membrane on the 1970 building proves again that a a vapour barrier is a definite requirement to prevent humid air from entering into the roofing assembly. This deficiency was manifested by the water absorbed into the fibre board located at the top of the assembly directly below the membrane. It is probable that this freezes during the winter time and dry out again in the summer time, otherwise the fibre board would have been deteriorated.

- The thermal insulation value of this roofing assembly is not very high and is diminished by the humid conditions in the insulation. When replacing this roof, increased thermal insulation and an effective air and vapour barrier should be installed to conserve energy and reduce heating costs.

3.0 CONCLUSIONS, RECOMMENDATIONS

The main building envelope elements of the Four Seasons Swimming Pool Building have met most of the performance expectations for many years, by 1980 standards. Problems caused by excess water in cladding components that developed as a result of deficient air and vapour barriers resulted in maintenance and repair costs in soffits and walls, but did not significantly impair the function of this facility or cause extensive deterioration.

Increased awareness for the need to conserve energy minimizing the impact on our environment, the depletion of natural resources and the likelihood that the cost of energy could dramatically increase in the future, necessitates an upgrade of the building envelope components. To meet current standards and building codes an effective air and vapour barrier strategy in conjunction with adequate thermal insulation provisions in a rejuvenated building envelope should be considered.

There is an opportunity to combine these efforts with an architectural "face lift" to achieve a new and contemporary look to this public amenity.

To arrive at an optimum amount of thermal insulation for the walls and roofs of this building, an energy study is recommended. To achieve these goals, RJC would be pleased to collaborate with the client's architect and mechanical engineering consultant in developing concepts and designs for a new building envelope.

3.1 Mansard Roof

We recommend that the mansard roof renovation includes an exterior insulated assembly with an air/vapour barrier (AVB) that can be applied to the shiplap siding. A layer of rigid insulation, ether Extruded Styrofoam or a Polyisocyanurate thermal insulation product would be applied to the AVB. A metal cladding with concealed fasteners will provide a water shedding surface. A conceptual sketch of such a system is provided in Appendix C.

3.2 Concrete Blockwalls

To increase the thermal resistance of the concrete block walls we recommend that an Exterior Insulated Finish System (EIFS) or other insulated cladding system be applied. EIFS systems are available under several proprietary trade names and are comprised of and AVB applied directly to the block wall, with a Expanded Polystyrene rigid insulation finished with a thin layer of acrylic stucco set in a fiberglass mesh. Alternatively an insulated wall with other cladding system can be designed, similar to the mansard roof assembly discussed above. The block wall does not need modifications that disturb the vermiculite products that may contain asbestos, in the block wall cavities. The dew point is likely to occur outboard of the AVB. The latter can be effectively tied in with the AVB of the mansard roof section described above, for continuity of the air barrier system.

The combination of these upgrades (blockwall and mansard) could significantly reduce the energy loss through the walls as the thermal insulation value will increase significantly and the air leakage can be controlled. A conceptual sketch of such a system is provided in Appendix C.

3.3 Upper Roofs

It appears that the roofing on both buildings probably has some service life left. Depending on available financing and budgetary constraints, they could be maintained with short term repairs as needed, and replaced as a stand-alone project or in conjunction with the walls as described above. To conserve energy and reduce heating costs, a new roofing assembly that includes adequate thermal insulation and an efficient AVB strategy should be selected.

An example of such a roofing system would be, starting at the base on top of the metal deck would include the following components:

- A fire rated gypsum wall board
- An air/vapour barrier
- Rigid insulation
- Fibre board or protection board
- Two-ply bituminous membrane with a UV protection.

4.0 OPINIONS OF PROBABLE COST

The Opinions of Probable Cost are presented by RJC to provide an expectation as to the magnitude of costs required to complete the recommended remediation work. The opinions provided are based on conceptual repair methods, recently obtained broad unit rates, and past experience with similar projects. A detailed estimate of costs has not been provided, as it would require the preparation of plans, details, specifications and schedules to achieve a quantified summary of projected costs.

Opinions of Probable Costs are based on RJC's review of the present condition of the building and are given in first quarter 2010 dollars. Deferral of the work may result in increased repair costs. Please note that the cost of remediation could vary greatly depending upon the materials and architectural features chosen and deterioration uncovered during the remediation work.

The following summarizes the probable cost for each of the main envelope repairs or upgrades.

.1 Mansard Roof

Provide an exterior insulated metal roof system replacing the existing cedar shake roof and insulation; approximately 11,200 square feet at $60/square foot

❖ Opinion of Probable Cost: $ 672,000.00

The service life of such a wall/roof system is approximately 30 years.

..2 Concrete Block Walls

Provide an EIFS cladding system on the exterior of the Concrete block masonry walls all around the building; approximately 7752 square feet at $30/square foot

❖ Opinion of Probable Cost: $ 193,800.00

The service life of such a system in the Prince George climatic conditions is approximately 25 years.

.3 Upper Roofs

Provide a new roofing assembly replacing the existing roofs, including the roof over the administration building; approximately 23,116 square feet at $30/square foot

- Opinion of Probable Cost: $ 693,480.00

The service life of such a roof system is approximately 25 years.

These figures are provided for planning and/or budget purposes only. The owners should add a contingence of about 15% to cover the cost of eventualities, such as repairs and replacement of deteriorated materials that may be encountered during construction. An allowance of 10% should be made for the cost of administration and engineering consultants, and applicable taxes should be added as well.

5.0 CLOSING COMMENTS

We trust this meets your current requirements. RJC remains available to assist you with any of the recommendations presented in this report and follow up with detailed designs and specifications for tender and construction. Please contact the undersigned should you have any questions regarding the contents of this report.

READ JONES CHRISTOFFERSEN LTD.

Prepared by:	Reviewed by:
John Hofman, P. Eng. Project Engineer Building Science and Restoration	Leslie Peer, PhD, P.Eng.,BEP, FEC, RRC LEED AP Principal, RJC Vancouver

JH/blw

APPENDIX A

OBSERVATIONS AND PHOTOGRAPHS

This photograph of the north elevation shows the mansard roof above the concrete block masonry wall. The narrow strip at the base is the top of the poured in place concrete basement wall with large grilles. A berm of landscaping covers the base of these walls. The level of the basement floor is close to street level.	 Photograph 1
The vertical projection of the mansard roof is approximately 20′, the blockwall is 9′ and the concrete foundation wall protruding above the top of the landscaping berm is about 4′. This photograph shows the west elevation.	 Photograph 2
This photograph shows a close up of the soffit of the mansard roof to block wall interface. Excessive water staining can be observed on the shiplap soffit boards and on the painted surface of the wall. All the surfaces were dry at the time of our site visit.	 Photograph 3

This section of the building is the 1985 addition. This photograph shows the south east corner of the building with the soffit of the mansard roof, the wood framed window and the concrete blockwall. The boards of the soffit are stained and are warping and twisting. One board was partially removed during our site visit. The soffit boards are attached to a layer of 5/8" thick plywood sheathing. This plywood appeared to be pressure treated, as it had a greenish colour. The moisture content on the sheathing was measured as 23% at the time of our visit.	 Photograph 4
The mansard roof section for this section of wall was constructed as an attic that is vented to the exterior using small 2" Ø vents at approximately 8' on centre. A wood framed stud wall with fiberglass batt insulation is provided in line with the blockwall. On the interior side along the east wall of the 1985 addition is the mechanical heating plant, the sauna and a hot pool. This will produce high humidity air all year. Refer to Page 2 of Appendix B.	 Photograph 5
Close-up view of a *soffit* vent.	 Photograph 6

This light fixture was removed in the past as the fixture casing is corroded. It is located in the soffit along the east wall of the 1985 addition above an exterior exit door, close to a sauna room. Water stains can be observed on the wood boards in this location.	 Photograph 7
The wood framed window on the south east corner of the building is deteriorated and in need of replacement	 Photograph 8
The light fixture casing was removed to provide a view inside the soffit space. The building wall with fiberglass insulation is shown to the left of this photograph. It is supported on a steel angle iron to span across the door opening. Past the door it lines up with the concrete blockwall. The wood stud framing supports the soffit of the mansard roof. Staining on the wood above the angle iron indicates that water runs down the wall. The sheathing of the soffit is stained below the interior projection of this wall, to the left of the angle iron. The plywood sheathing appears to be "clean" to the right hand side of the angle iron.	 Photograph 9

This photo shows the interior of the soffit space that runs the length of the east wall along the administration building. To the left in this photograph, the steel columns and horizontal wood slats can be observed that provide a visual separation with the pool area, but allow air movement between the spaces. On the right hand side of the photograph is the polyethylene vapour barrier that covers the 2x8 wood framing and the 4" fiberglass insulation of the mansard roof. The steel roof deck of the administration building is also the floor of this soffit space. Refer to Page 3 of Appendix B.

Photograph 10

In the top of this photograph the horizontal slats between mansard soffit area and the pool area are visible.

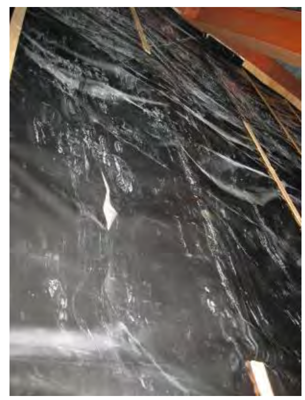
The entire mansard soffit space of the original 1970 building is part of the interior heated swimming pool area.

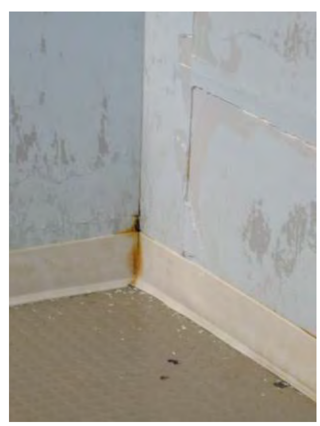
Photograph 11

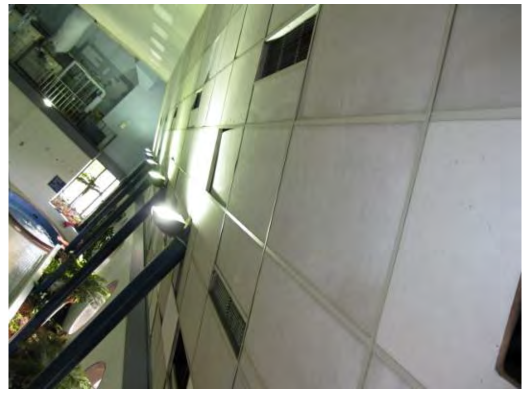
The interior concrete blockwall below the decorative wall with wood slats is provided with many vertical slots or open joints between blocks, allowing air to pass through the block wall to the mansard soffit spaces.

Photograph 12

This photograph shows the top of the interior concrete blockwall looking down from the soffit space floor. Excessive accumulation of lint can be observed here similar that found in dryer exhausts.	 Photograph 13
The vapour barrier of the mansard roof is cut and damaged in many places throughout the perimeter of the original swimming pool building. This allows humid air from the pool area to escape into the wall assembly where it condensates on cold surfaces such as the wood stud framing and the interior side of the shiplap planking that the roof shingles are attached to.	 Photograph 14
If the fiberglass insulation is removed the shiplap planking of the mansard roof becomes exposed. These planks are water stained in many locations. However, the wood components in the walls of this facility were observed to be firm. We did not find wood rot or structural deterioration in the locations that were exposed during our site review.	 Photograph 15

The most severe water staining can be observed at the base of the mansard roof where it meets the metal deck that forms the floor of the mansard attic space. (The whites in this photograph is glare)	 Photograph 16
During our review of the interior mansard space we walked the entire east, north and west wall of the original 1970 building. Similar features were observed consistently throughout. Most notably tearing and cuts in the vapour barrier, water stains on wood framing and a high humidity as the warm humid air from the pool area fills this space. We did not find any wet or deteriorated wood anywhere. Light surface corrosion of steel framing components was also observed in the plane of the mansard roof wall assembly. Refer to page 4 of Appendix B.	 Photograph 17
This is one of several photos supplied by the owner's representatives showing icy conditions at the base of the mansard roof framing reportedly observed during mid winter conditions.	 Photograph 18

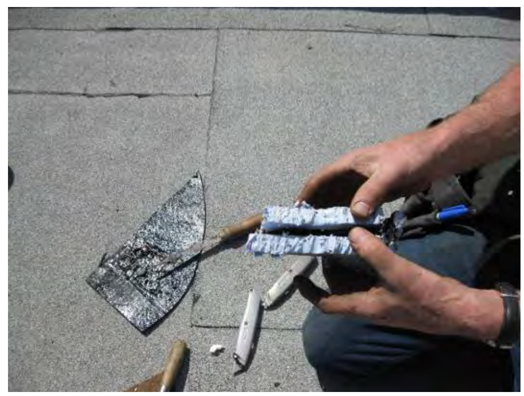
A recess was cut in the west wall of the 1985 addition, about 5' above the mezzanine floor. This wall assembly is comprised of painted plywood sheathing, polyethylene and fiberglass batt insulation between wood stud framing. The plywood sheathing on the other side of the insulation appeared clean; no anomalies were observed at this recess. The mansard roof soffit area at this location is similar to a vented attic space. Refer to page 2 of Appendix B	 Photograph 19
A light fixture below the recess of the previous photograph shows corrosion and water staining indicating that water runs from the exterior attic space to the interior.	 Photograph 20
Rust stains can be observed at the base of the same wall assembly behind the mansard roof along the west side of the 1985 addition. This photograph is in the corner of the mezzanine of the southwest area of the 1985 addition. The construction of the east and west walls of the 1985 addition are similar in that the lower section of the mansard roof is enclosing an exterior attic space. Air leakage through this assembly or the wall above, causes condensation that drips down to the soffit.	 Photograph 21

The south exterior wall of the 1985 addition is framed like a sloped ceiling on the inside creating a space for plenums between this T-bar system and the mansard roof on the exterior. Here, the mansard roof space is part of the interior pool area. Refer to page 5 of Appendix B.	 Photograph 22
This photo shows the interior side of the mansard roof along the south wall. The vapour barrier is cut and ripped with many holes for the warm and humid interior air to escape and condensate on cold surfaces. Tracks of excessive water staining on wood framing and on the polyethylene membrane can be observed.	 Photograph 23
This is looking down in the mansard roof space of the same south wall, where the sloped ceiling grid and the mansard roof framing meet at the top of the exterior concrete wall. Refer to page 5 of Appendix B.	 Photograph 24

View of the interior side of the basement wall. The upper part of this wall was originally insulated with 1" thick rigid insulation. Reportedly this insulation was removed as it was a perceived fire hazard. No other anomalies were observed in the basement.	 Photograph 25
This photograph supplied by the owner's representatives, shows the formation of snow and ice in the ceiling space of the office area, along the interior side of the roof parapet. This space is not separated from the pool area with air/vapor barriers. Refer to page 6 of Appendix B.	 Photograph 26
This photo was supplied by the owner's representatives. It shows snow/ice formation on the floor of the janitor room. This section of structural floor is cantilevered over the foundation wall and thus is exposed to the elements without thermal insulation. Warm interior air will condensate on these cold surfaces and freeze. Refer to page 6 of Appendix B.	 Photograph 27

General view of the built-up roofing over the 1985 addition. This roof is still in serviceable condition, although some areas of bubbles are visible. Replacement of this roof should be considered within the next 5 years or so.	 Photograph 28
A cut test shows that 4 ply roofing felt was used over fibre board ("donna-cona") and 2" of expanded polystyrene insulation ("pop-corn" board).	 Photograph 29
This roofing assembly was protected with a continuous bituminous vapour barrier that is reinforced with a woven fabric. It is probable that this is the original roofing of the 1985 addition, although the drawings provided call for a two ply membrane and do not mention a vapour barrier.	 Photograph 30

Roof over the original swimming pool building. This is a 2-ply bituminous torched on roof. It was reported that this roof is a replacement of the original 1970 assembly. The darker stained area in the centre of the roof was dry at the time of our site review. It is the low area in the middle where a row of roof drains is located.	 Photograph 31
A cut was made through the cap sheet at the location of a "bubble" in the membrane. The plastic cover sheet is visible in this photograph. It should have been removed during the torch-on application to make the membrane stick to the base sheet.	 Photograph 32
This photograph shows the fibre-board underlay is saturated with water, acting like a sponge.	 Photograph 33

After removal of the insulation it turns out that the white expanded polystyrene insulation was added to the original rigid insulation which was probably part of the original 1970 built up roofing assembly.	 Photograph 34
The original insulation was comprised of 2 layers of 3/4" thick extruded polystyrene boards. There was no vapour barrier between the original insulation and the steel decking. It is probable that the warm and humid air of the pool area migrated to the top of the roofing assembly where it would condensate on a cold surface. Water thus generated becomes trapped and is absorbed by the fibre board.	 Photograph 35
Close up of the 40 year old cedar shake roofing at the junction of the mansard roof and the roof of the lower administration building. These shakes appear to be nearing the end of their service life.	 Photograph 36

APPENDIX B

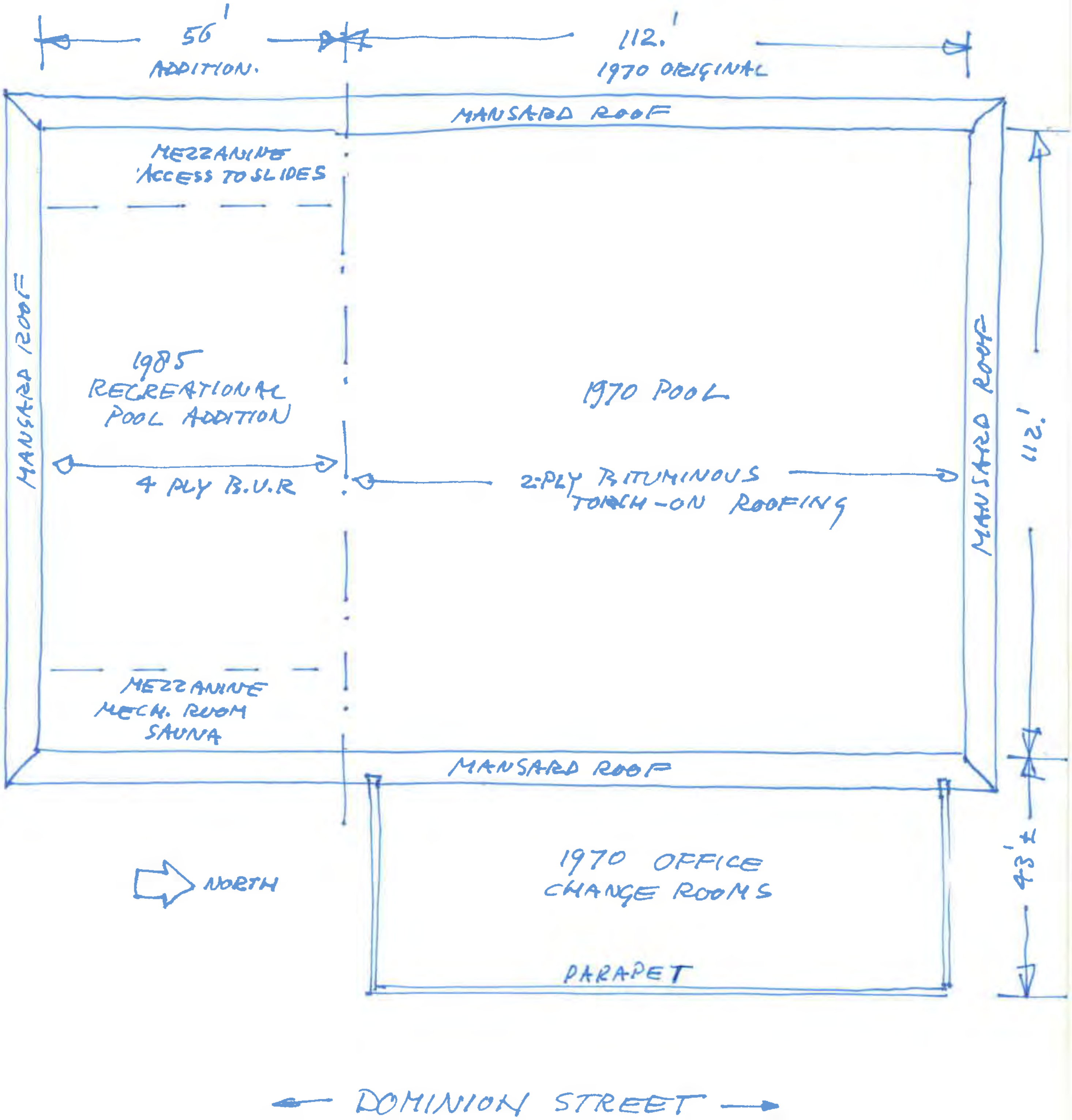
SKETCHES OF WALL DETAILS

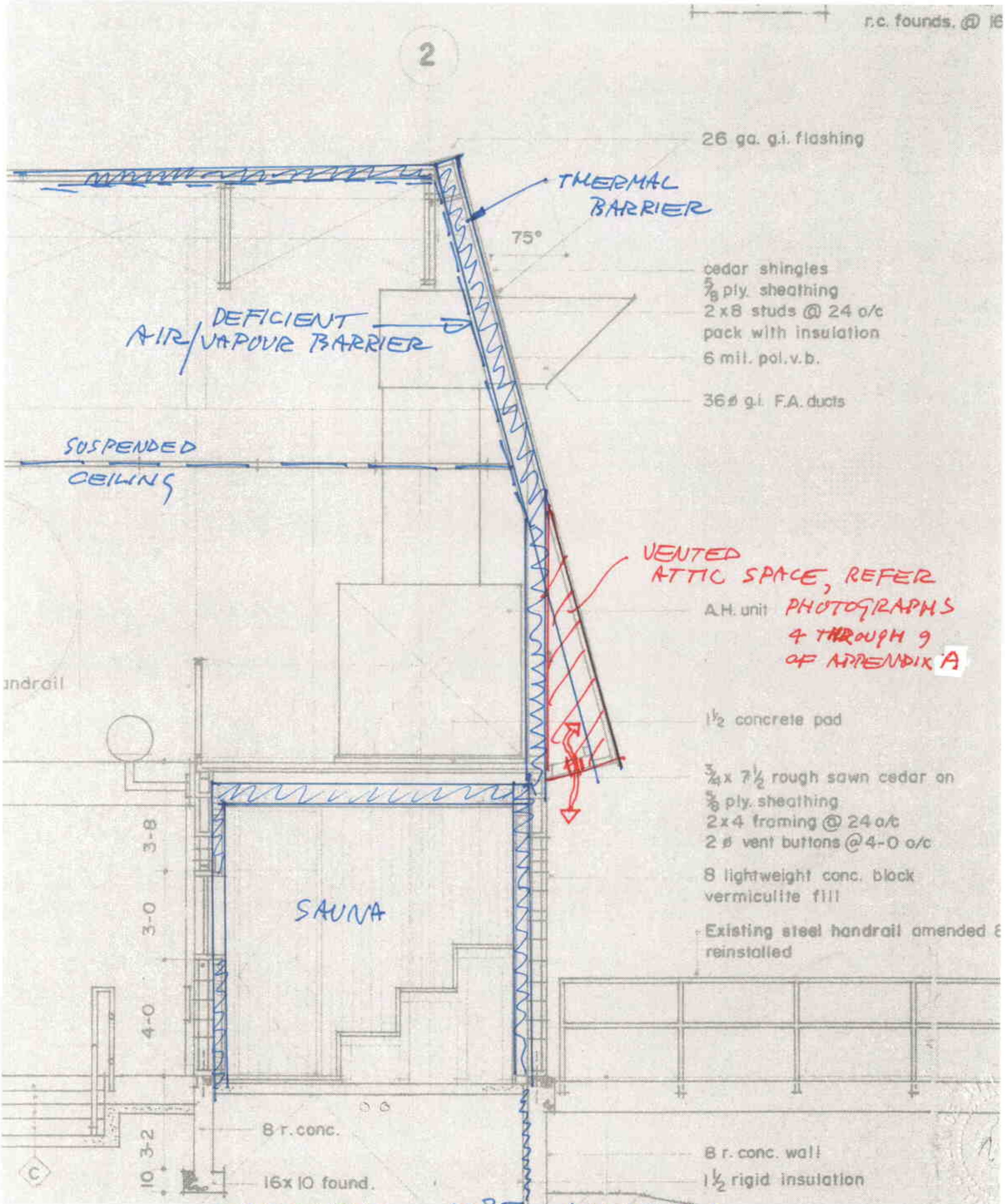
Read Jones Christoffersen
Consulting Engineers

Project	FOUR SEASONS	Job Number	103149
Date	MAY 2010	Page	of
Designer			1 mm. = 1'-0"

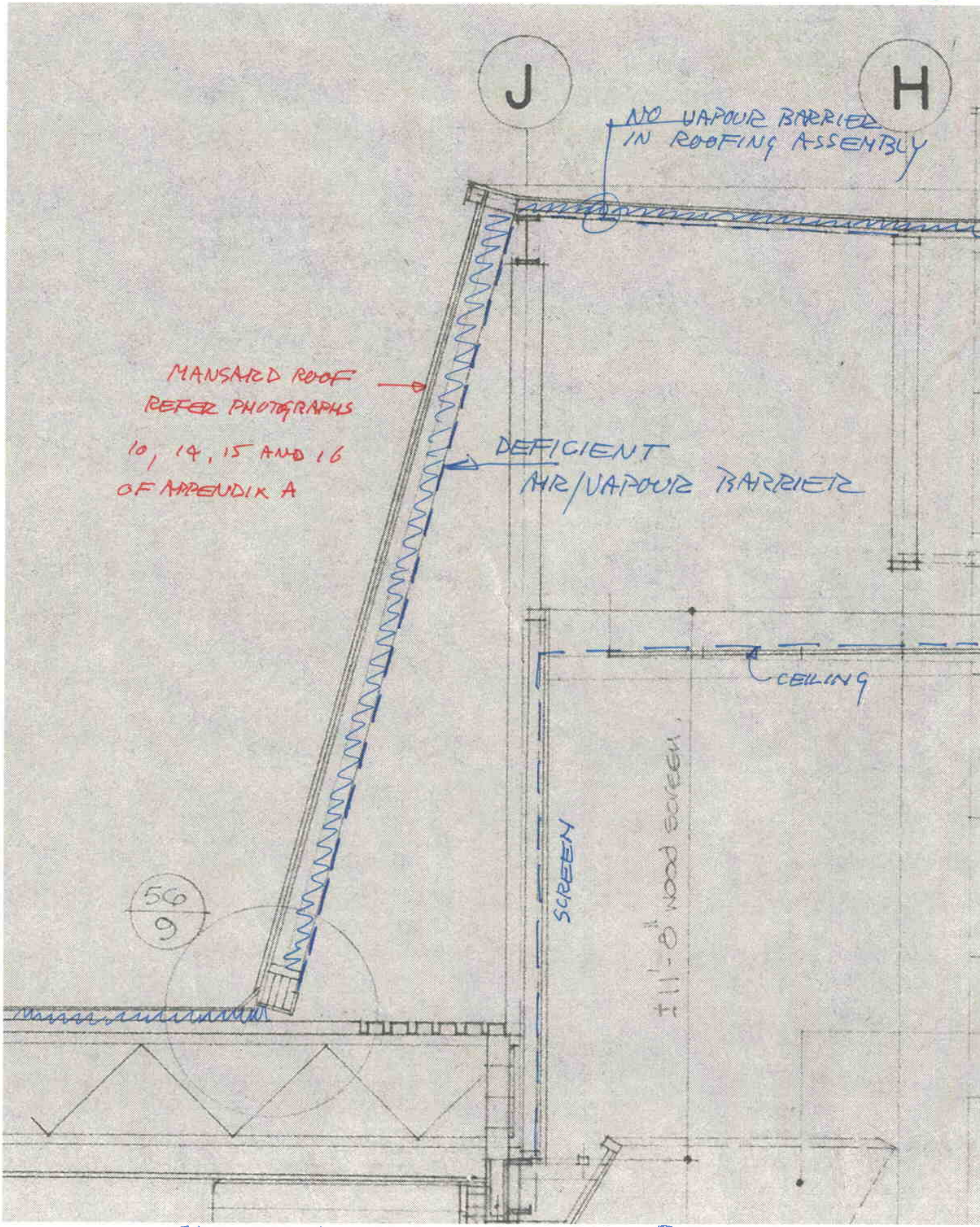
1

BUILDING PLAN

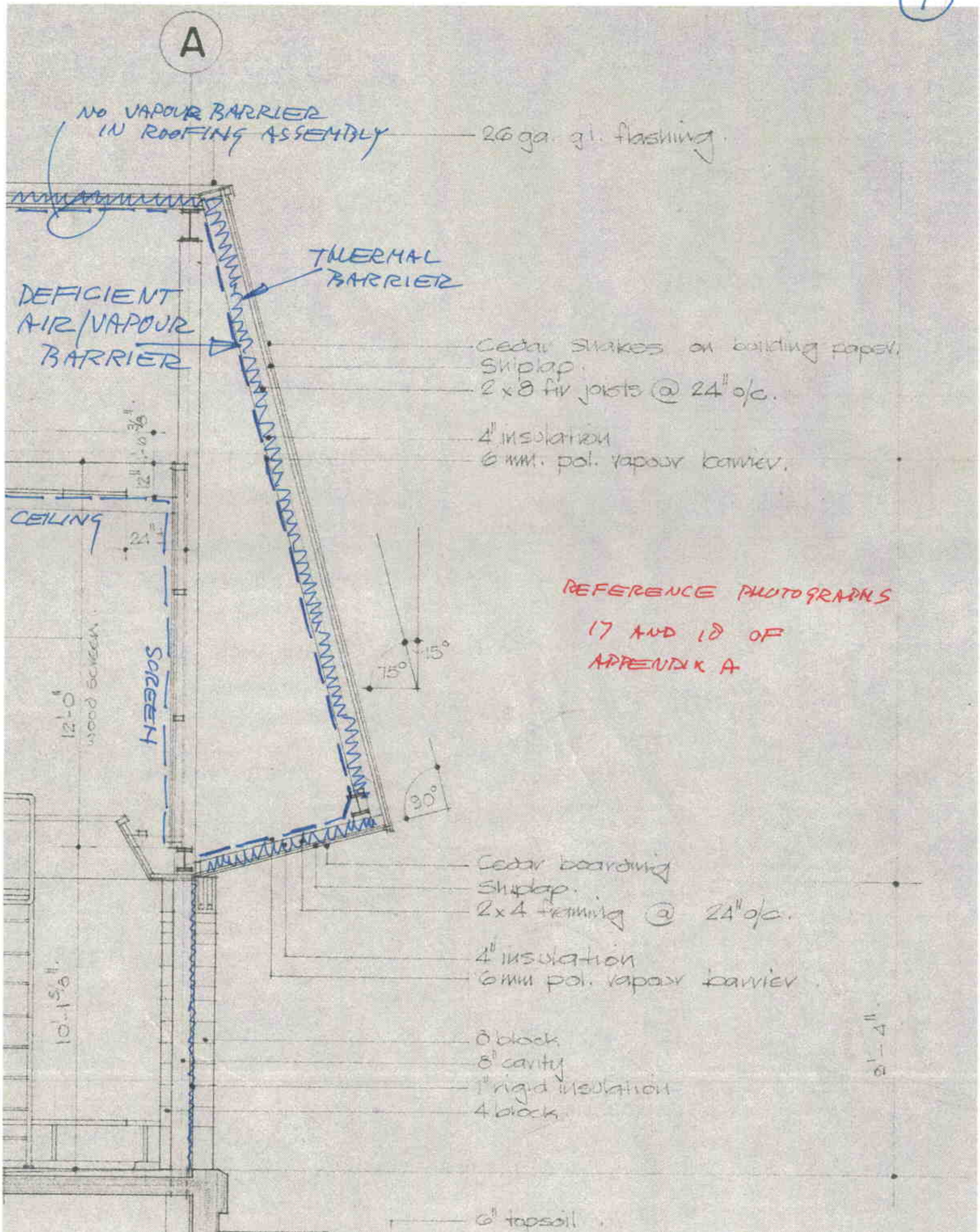




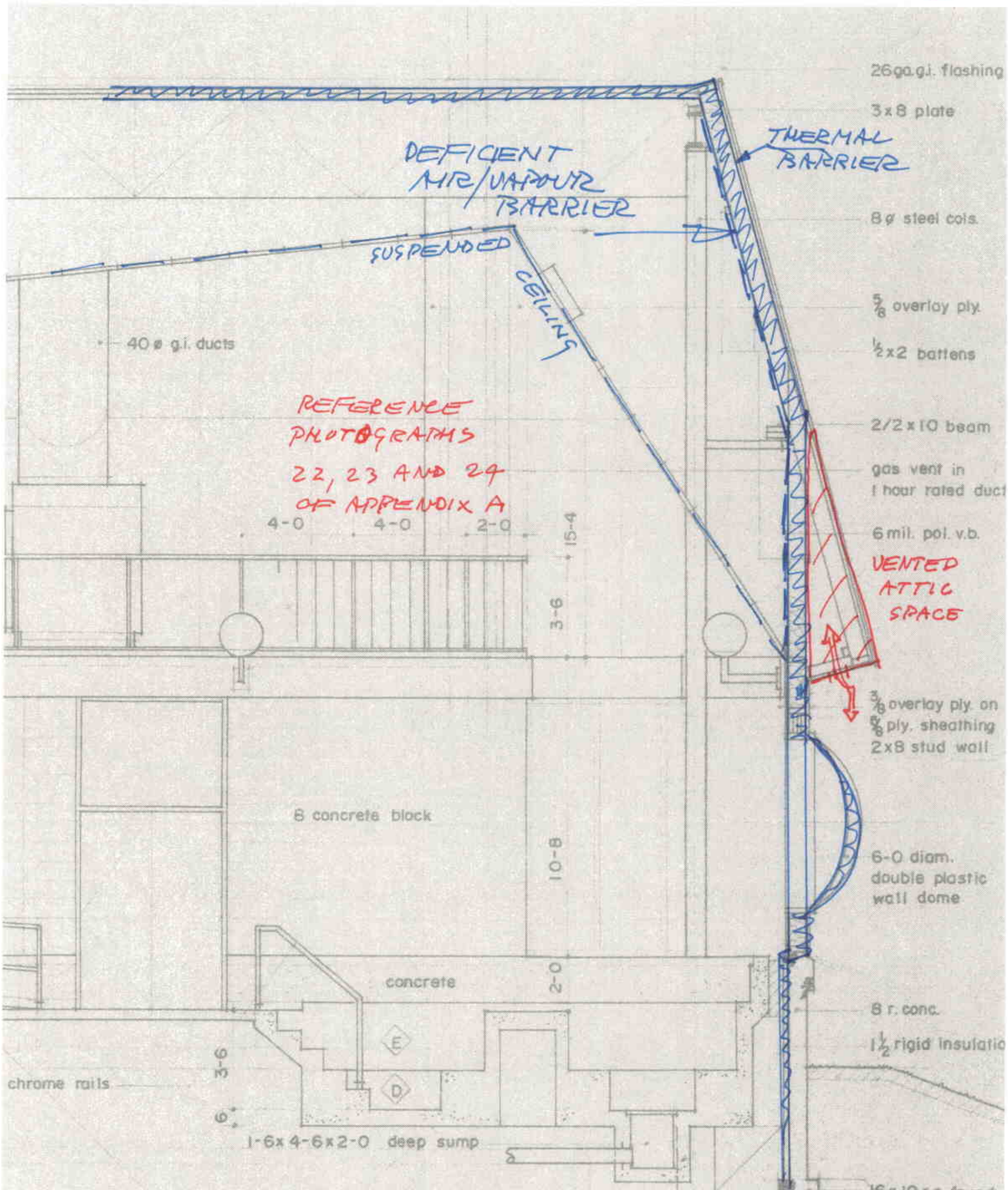
EAST WALL 1985 ADDITION.



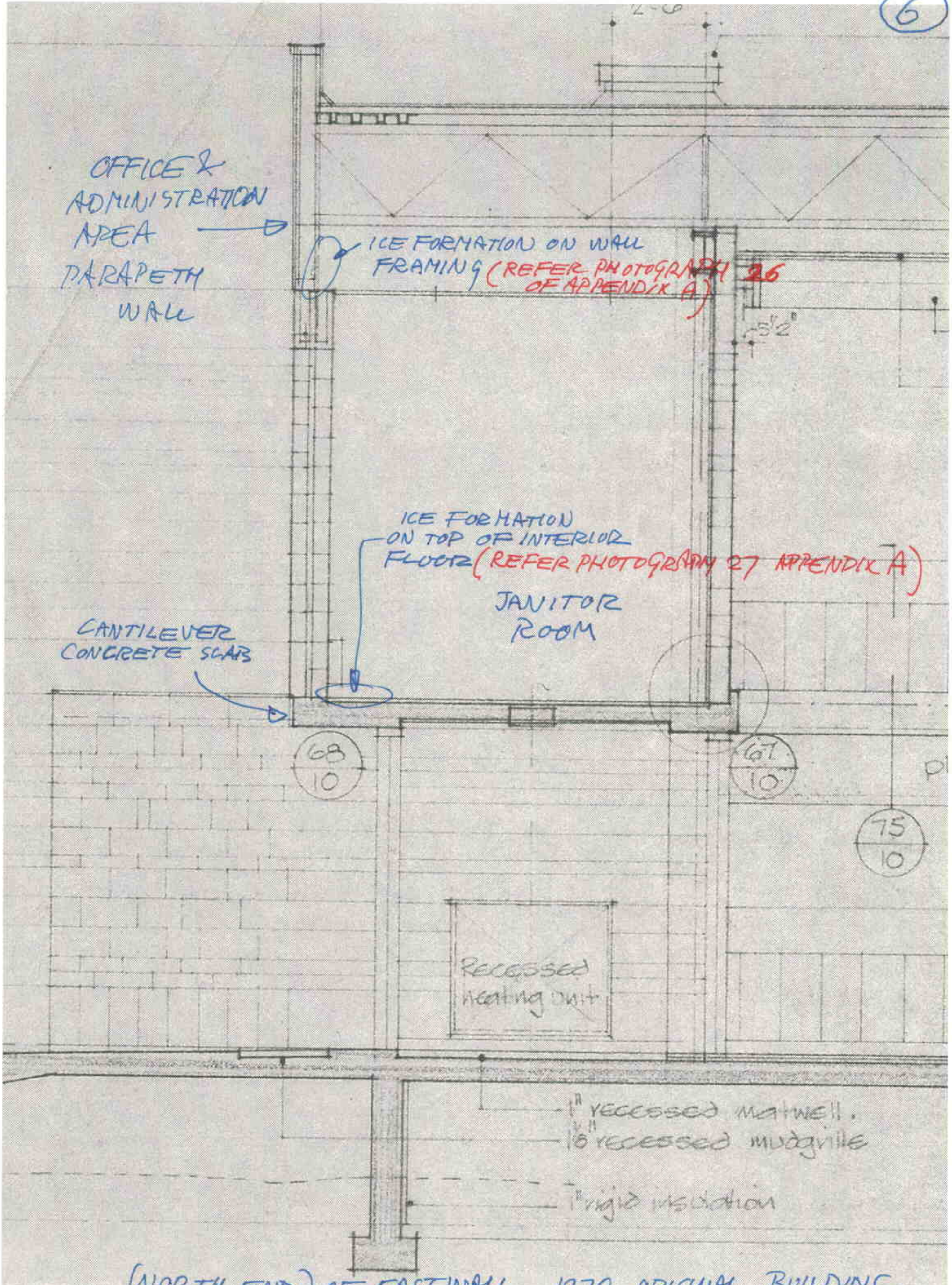
EAST WALL 1970 ORIGINAL BUILDING



WEST WALL OF ORIGINAL 1970 BUILDING
(NORTH WALL SIMILAR)



SOUTH WALL 1985 ADDITION



(NORTH END) OF EAST WALL 1970 ORIGINAL BUILDING.

APPENDIX C

SKETCHES OF BASIC CONCEPTS

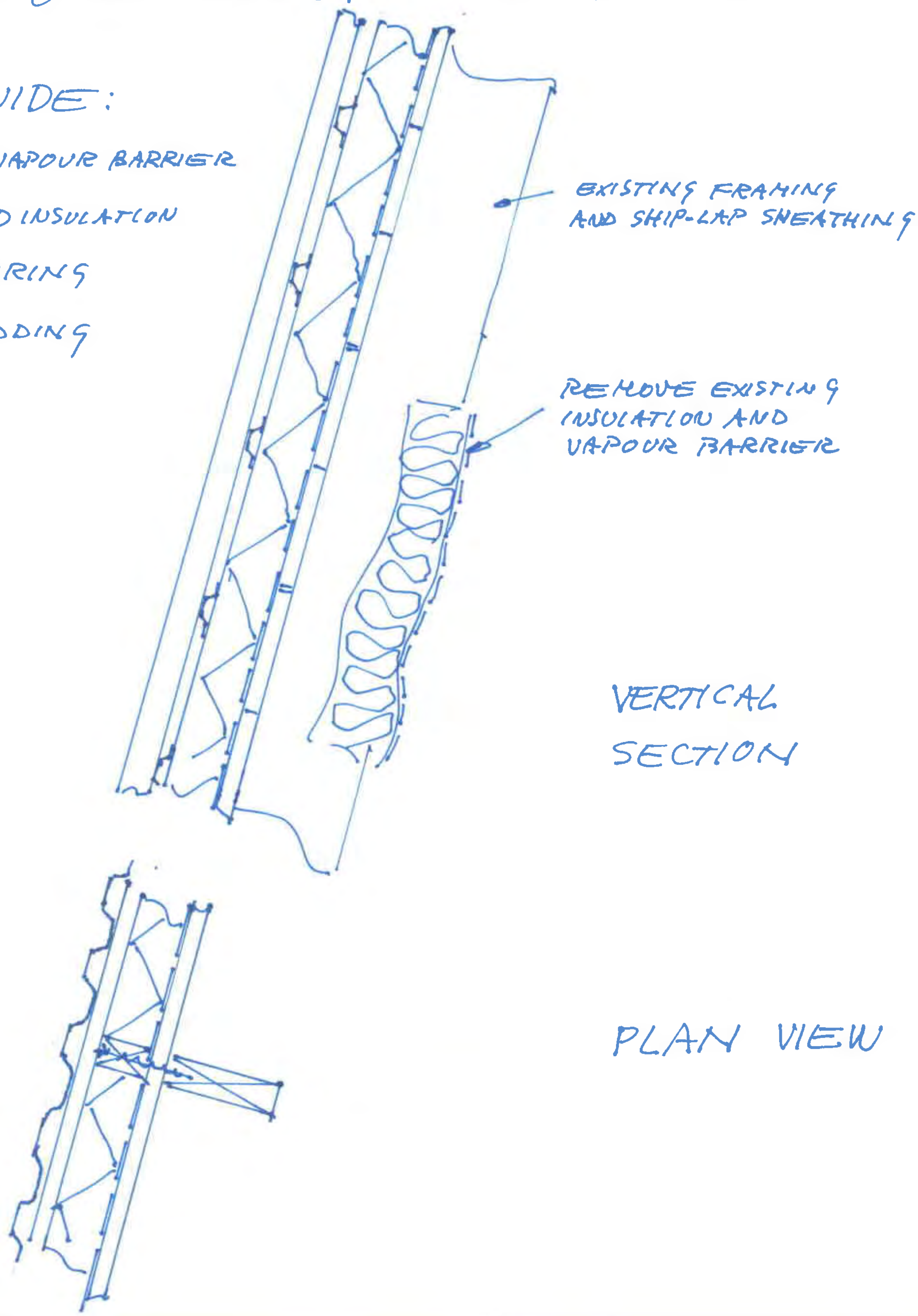
Read Jones Christoffersen
Consulting Engineers

Project	FOUR SEASONS - PRINCE GEORGE	Job Number	103149
Date	MAY 21 - 2010	Page	1 of 2
Designer	JEH. APPENDIX - C.		1:10

PROPOSED CONCEPTS FOR MANSARD

PROVIDE:

- AIR/VAPOUR BARRIER
- RIGID INSULATION
- FURRING
- CLADDING



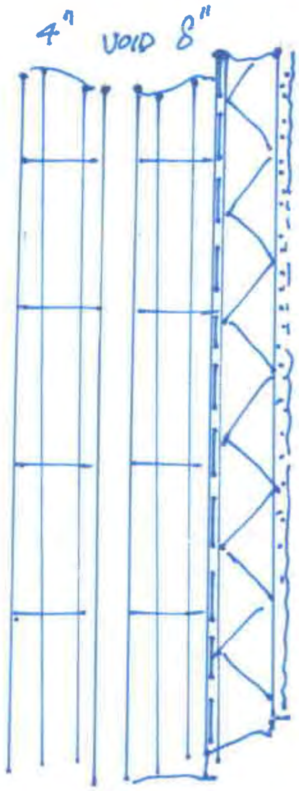
VERTICAL SECTION

PLAN VIEW

rjc Read Jones Christoffersen
Consulting Engineers

Project FOUR SEASONS - PRINCE GEORGE	Job Number 103149
Date MAY 21 - 2010	Page 2 of 2
Designer JEH. APPENDIX. C	1:10

PROPOSED CONCEPTS FOR EXTERIOR CONCRETE AND CONCRETE MASONRY WALLS.



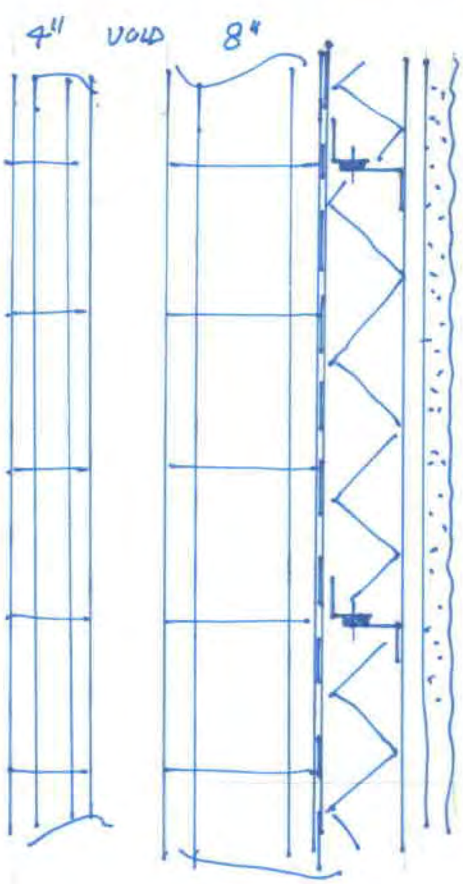
- EXISTING OFFICE AREA WALLS SHOWN

PROVIDE:

- AIR/VAPOUR BARRIER
- RIGID INSULATION
- ACRYLIC FINISH.

} E.I.F.S. SYSTEM

ALTERNATIVELY PROVIDE AN EXTERIOR INSULATED RAINSCREEN SYSTEM.



- EXISTING POOL AREA WALLS SHOWN.

PROVIDE:

- AIR/VAPOUR BARRIER
- METAL GIRTS (HOR.)
- FURRING (VERT.)
- CLADDING

} EXTERIOR INSULATED RAINSCREEN SYSTEM.

ALTERNATIVELY PROVIDE AN E.I.F.S SYSTEM.

11.3.4 AME Group (2010)

AME Group
Consulting Professional Engineers

Victoria Office:
204 – 31 Bastion Square
Victoria, B. C. V8W 1J1
Ph. 250-382-5999
Fax 250-382-5998

Vancouver Office:
501 - 134 Abbott Street
Vancouver, BC, V6B 2K4
p. 604-684-5995
f. 604-684-5993

CITY OF PRINCE GEORGE
CIVIC FACILITIES
ENERGY UPGRADE

FOUR SEASONS POOL
&
AQUATIC CENTRE

Prepared For:

The City of Prince George
Civic Facilities Division
1100 Patricia Boulevard
Prince George, BC V2L 3V9

Attn: **Leland Hanson**
Civic Facilities
(lhanson@city.pg.bc.ca)

Prepared By:
Greg Tarnopolsky, EIT, LEED AP

Peer Review and Responsible Professional Engineer:
Rob Walter, AScT, LEED AP
Tom Wilson, P.Eng, LEED AP

______________________ ______________
Signature Date

AME Project No. 000a-117-10
May 6, 2010

EXECUTIVE SUMMARY

The AME Group has been contracted to perform an Energy Study for two municipally operated pool hall facilities in Prince George, BC. The study outlines the Energy Conservation Measures (ECMs) that are recommended to address energy use concerns of the two facilities. The chosen ECMs are to be implemented during the annual shutdown to the greatest extent possible. Calculations for energy savings are based on the best available information at the time. These values are used with the capital cost estimates (as provided by Venture Pacific) to determine the net present value of each ECM and their payback period: The results of the study are as follows:

	Annual Savings			Capital Premium	Life Expec.	Payback		NPV	IRR
Measure Name	kWh	GJ	$	$	[yrs]	Simple	Disc.	$	%
ECM-1.1: AHU Replacement	49,744	2,931	24,960	333,300	20	13.4	21.4	(19,639)	6.3%
ECM-1.2: DDC Controls	8,071	129	1,406	187,500	20	133.4	-	(169,837)	12.0%
ECM-1.3: Solar Hot Water Preheat	(2,400)	477	3,517	160,000	25	45.5	-	(105,333)	-0.6
ECM-1.4: District Heating	-	-	-	155,000	-	-	-	-	-
ECM-1.5: VFDs on Heating Water Pumps	54,000	(248)	927	6,600	20	7.1	8.8	5,044	15.0
ECM-1.6: Plumbing Fixtures	-	176	1,346	2,400	20	1.8	1.9	14,514	59.2
ECM-2.1: AHU Heat Recovery and Dehumidification	63,460	4,988	41,371	605,300	20	14.6	25.3	(85,412)	5.2
ECM-2.2: DDC Controls	23,568	219	2,901	187,500	20	64.6	-	(151,042)	-7.4%
ECM-2.3: Solar Hot Water Preheat	(1,800)	363	2,676	120,000	25	44.8	-	(86,376)	-4.8
ECM-2.4: Boiler Replacement	-	2,188	16,694	(9,000)	20	-	-	(218,790)	N/A
ECM-2.5: VFDs on Heating Water Pumps	54,000	(248)	927	11,000	20	11.9	17.7	644	7.7
ECM-2.6: UV	7,300	-	381	-	20	-	-	-	-
ECM-2.7: VFD on Wave Pool Pump	27,215	(125)	467	8,200	20	17.6	38.7	(2,333)	3.3

ECM-2.8: Plumbing Fixtures	-	176	1,346	3,800	20	2.8	3.1	13,144	38.0
Bundle (without Solar)	**287,358**	**10,187**	**92,725**	**1,491,600**	**20**	**16.1**	**30.9**	**(326,370)**	**4.2**

Based on the results of the lifecycle costing it is recommended to implement the Bundle. This would save approximately 287,358kWh/10,187GJ per year over the baseline case and take 16.1 years to payback.

1.0 INTRODUCTION

The AME Group has been contracted to perform an Energy Study for two municipally owned and operated existing natatoriums, the Four Seasons Pool and the Aquatic Centre, both located within Prince George, BC. This project stems from the City's Request for Proposal P10-04 (Consulting Services for Dehumidification, Heat Recovery and Sustainable Energy Systems for Two Municipal Pools – City of Prince George).

The project scope includes three general phases including:

1. Preparing a recommendations report (this document)
2. Designing and preparing documentation for implementation of the Energy Conservation Measures (ECMs)
3. Construction

Funding for this project is from RINC Aquatic grants which require project completion by March 31, 2011.

This report outlines findings from a site visit (April 8, 2010) and provides recommendations to address plant/building/pool issues related to dehumidification, heat recovery and sustainable energy systems. In addition, provision will be made for the Four Seasons Pool to be connected to the city's future District Energy System. The tentative date for this connection is the summer of 2011.

2.0 EXISTING BUILDING INFORMATION

2.1 Four Seasons Pool

"The Four Seasons Pool is 42,779ft^2, was built in 1969 and expanded to include the leisure pool in 1984 and houses three different pools. The main pool is a 6-lane 25-metre pool with attached 12-foot dive tank. Adjacent to the main pool is a tot's pool with third pool being a leisure pool. Currently the Four Seasons pool has one large Cleaver Brook boiler (4,185,000 Btu) that is controlled by an integral step controller which sequentially fires the boiler modules to maintain the supply water temperature at set point, and a boiler bank (7 Hydrotherms 210,000 Btu each) in the expanded area."[1]

The natatorium is served by two air-handling units (AHUs). The first Air Handler (AHU-1) consists of "both supply and exhaust fans. This supply section includes a filter section, face and bypass preheat coils and heating coil with a summer bypass. The fan provides 8,500cfm on a year round basis. The exhaust fan is two-speed. Low speed or "winter operation" exhausts 9,800cfm, of which 300cfm is exhausted to the Chlorine Room and the remainder to outside. High speed or "summer operation" is rated 14,700cfm. An emergency bypass duct is provided for emergency use. Should the boiler break down, the emergency bypass operation closes all fresh air and exhaust ducts and allows the recirculation to 8,500cfm air to maintain air movement only."[2]

The leisure pool (Phase 2) is served by the third air handler (AHU-3)[3]. This air handler consists of the same components as AHU-1. "The unit supplies and exhausts 9,500cfm under "winter" operation and 14,000cfm under "summer" operation. An emergency bypass damper is also provided in this system to allow 9,500cfm of recirculation with no fresh air in the event of boiler failure."[4]

There is currently no means to recover heat from the exhaust airstream from either AHU-1 or AHU-3. This was proposed for AHU-3 but never implemented.

Dehumidification is done solely by bringing in dry outdoor air.

Numerous pumps are used to circulate the water through the heating system, filtration system and to operate the Leisure Pool water features.

All of the existing swimming pool filtration systems contain sand filters and chlorine gas chemical treatment.

The dryside of the building is heated via an overhead air distribution with two localised in-duct reheat coils. The Changeroom, Fitness, Foyer and Admin Areas are ventilated by

---

[1] Information as provided in the City of Prince George Request for Proposal P10-04.
[2] *Four Seasons Leisure Centre - Energy Audit, Ventilation System Review and Report on Energy Savings.* Dix & Associates. July 5, 1990. P. 5.
[3] AHU-2 serves the existing dry space (offices, changerooms, fitness).
[4] *Four Seasons Leisure Centre - Energy Audit, Ventilation System Review and Report on Energy Savings.* Dix & Associates. July 5, 1990. P. 6.

an individual unit (AHU-2). The unit consists of a supply fan that is "similar to system No. 1 but supplies 5,400cfm. 2,000cfm is fed to the office and exercise area through a reheat coil and 3,400cfm through another reheat coil serves the upper floor, dressing rooms etc. A roof mounted fan serving the upper and lower washrooms and the dressing room exhausts 3,500cfm. The remaining 1,900cfm of supply air ex-filtrates to outside or the Pool area."[5]

There is currently no centralized Building Management System (BMS). Electric controls are operated manually as required.

The building has experienced structural problems. The lower portions of support columns within the leisure pool expansion were replaced in 2009 due to visible corrosion and deterioration. This appeared to be the result of water damage due to planter watering. The original roofing structure has been replaced and updated vapour barrier installed and doesn't appear to show structural damage. The leisure expansion roof has not been replaced and may show some structural damage. There are significant corrosion issues showing on the leisure pool AHU, and minor corrosion showing on the leisure pool boilers (due to water spill damage).

2.2 Aquatics Centre

"The Aquatics Centre was built in 1998 and is 52,000ft2 housing three pools, the main pool, leisure pool and swirl pool. The main tank has eight lanes and is 52-metres in length with a movable floor with depths ranging from 0-1.8 metres in the shallow portion of the tank. The main tank holds about 2.8 million litres of water. The leisure pool includes a wave pool and swirl pool which is about 28 metres in length. Two Cleaver Brooks boilers (water tube boilers that are 6,000,000 Btu each) heat the pool water, with the heated water transfer occurring through three plate and frame heat exchangers, with three way control valves located on the heating water side of the heat exchanger."[6]

The natatorium is served by three 30,000cfm AHUs. These units contain a supply and return fan, mixed-air section, filters and hot-water heating coil. There is a glycol run-around loop for exhaust air heat recovery in each unit but according to the building operations staff, the system was never in use.

The air handling units are controlled to maintain the temperature and relative humidity of the pool hall during both occupied and unoccupied hours. During the occupied hours, the unit modulates the percentage of fresh air in the supply airstream from a minimum of 20% to a maximum of 100%. This is based on the outdoor air temperature.

Dehumidification is done solely by bringing in more dry outdoor air.

---

[5] *Four Seasons Leisure Centre - Energy Audit, Ventilation System Review and Report on Energy Savings.* Dix & Associates. July 5, 1990. P. 5.
[6] Information as provided in the City of Prince George Request for Proposal P10-04.

The boilers have been historically problematic with internal corrosion issues due to flue gas condensation. This problem seems to have been corrected by increasing the supply water temperature and properly sealing the panels (Cannepp Service).

Corrosion is also apparent on the leisure pool heat exchanger.

Numerous pumps are used to circulate the water through the heating system, filtration system and to operate the Leisure Pool water features.

All of the existing swimming pool filtration systems contain high-rate sand filters and chlorine gas chemical treatment. Secondary treatment ozone generation complete with storage tanks all housed in a separate room are not in use.

The dryside of the building (Multipurpose, Weight, Offices, Foyer/Cafeteria, Mech rooms) are served by zone air handling units. These include heating coils and DX cooling coils are required.

All mechanical and electrical systems are controlled by a central DDC Building Management System (BMS).

3.0 ENERGY STUDY ANALYSIS

3.1 Energy Conservation Measures (ECMs)

The following Table outlines the proposed ECMs that target the scope of this project:

Four Seasons Pool

	Description	Savings Targeted
ECM-1.1	**AHU Heat Recovery and Dehumidification** AHU-1 (Lap pool): Heat recovery off exhaust air and dehumidification coil in supply air stream. Heat pump on low-temp heating loop. Low-temp pre-heat coils. VFD on fans and reduce to 4 air changes per hour (ACH) during unoccupied hours. AHU-3 (Leisure pool): Heat recovery off exhaust air and dehumidification coil in supply air stream. Heat pump on low-temp heating loop. Low temp pre-heat coils. VFD on fans and reduce to 4 air changes per hour (ACH) during unoccupied hours. Separate O/A intake and E/A relief by minimum 10 feet. Provide enclosure for AHU-2 to minimize exposure to corroding pool hall air. AHU-2 (Office/Admin): VFD on supply fan with CO2 sensors for demand control ventilation during low occupied hours.	Elec. & Gas
ECM-1.2	**DDC Controls** Install new DDC controls to the existing HVAC system.	Elec. & Gas
ECM-1.3	**Solar Hot Water Preheat** Install solar collectors on the roof to preheat domestic hot water or building low-temperature loop.	Gas
ECM-1.4	**District Heating** Configure heating plant to accept district heating piping.	-
ECM-1.5	**VFDs on Heating Water Pumps** Install variable speed drive on the existing heating water pump to reduce the electrical consumption under part load conditions.	Elec
ECM-1.6	**Shower Heads** Install low-flow shower heads to reduce domestic hot water consumption.	Gas

Aquatics Centre

	Description	Savings Targeted
ECM-2.1	**AHU Heat Recovery and Dehumidification** AHU-1 (Lap Pool Hall): Commission existing glycol run-around loop. Install dehumidification coil in supply air stream. Heat pump on low-temp heating loop. Low-temp pre-heat coils. VFD on fans and reduce to 4 ACH during unoccupied hours. AHU-2 (Lap Pool Hall): Commission existing glycol run-around loop. Install dehumidification coil in supply air stream. Heat pump on low-temp heating loop. Low-temp pre-heat coils. VFD on fans and reduce to 4 ACH during unoccupied hours. AHU-3 (Leisure Pool Hall): Commission existing glycol run-around loop. Install dehumidification coil in supply air stream. Heat pump on low-temp heating loop. Low-temp pre-heat coils. VFD on fans and reduce to 4 ACH during unoccupied hours.	Elec. & Gas
ECM-2.2	**DDC Controls** Re-commission the existing HVAC system to ensure all points are operating to specification and to upgraded plant design.	Elec. & Gas
ECM-2.3	**Solar Hot Water Preheat** Install solar collectors on the roof to preheat domestic hot water or building low-temperature loop.	Gas
ECM-2.4	**Boiler Replacement** Replace corroded boiler with high-efficiency condensing boiler on the existing high temperature heating water loop. Boiler in good condition to remain in series. Configure heat exchangers and coils to return at 120-140°F.	Gas
ECM-2.5	**VFDs on Heating Water Pumps** Install variable speed drives on the existing parallel heating water pumps to reduce the electrical consumption under part load conditions. Cycle pumps during unoccupied hours.	Elec.
ECM-2.6	**UV Generator** Shut off equipment during unoccupied hours.	Elec.
ECM-2.7	**VFDs on Leisure Pool Pumps** Install variable speed drive on the existing Leisure pool pump to reduce the electrical consumption under part load conditions.	Elec.
ECM-2.8	**Shower Heads** Install low-flow shower heads to reduce domestic hot water consumption.	Gas

3.2 Baseline energy use

A full energy model is not within the scope of this project. As such, estimations on baseline energy use must be made. Fortunately there are records of both electricity and gas consumption for the past three (3) years of operation (Appendix A). Without measurement equipment in place over the majority of large equipment it is difficult to get an exact idea of how much each end use (ex heating, pumps and fans, lighting, etc) will consume over a typical year. For this we break down the building end-uses into typical percentages based on building type (aquatic) and heating plant (standard efficiency boilers).[7]

In 2009 the energy consumption (in $ dollars) for the Four Seasons Pool and Aquatics Centre was the following:

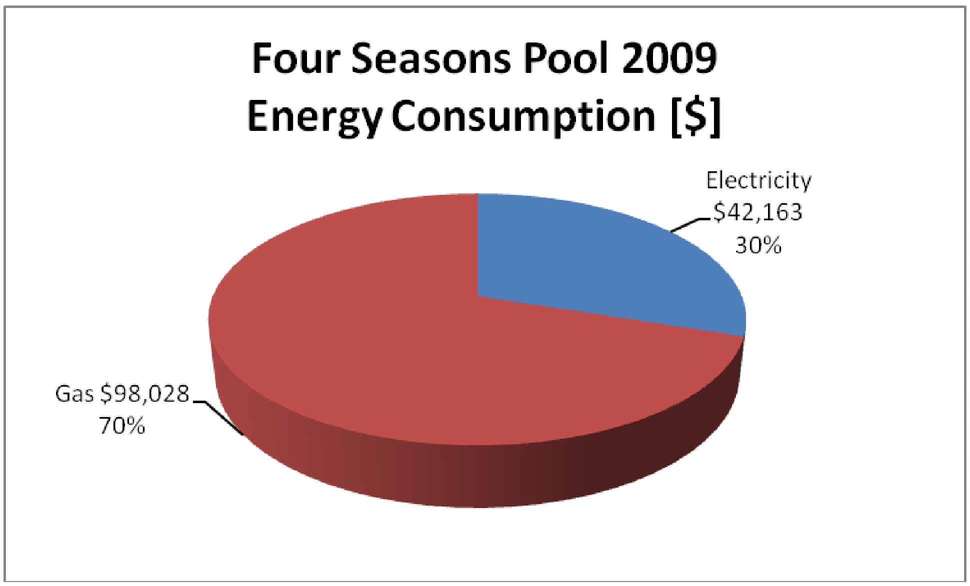


Figure 3.1: Energy Consumption in Dollars for Four Seasons Pool

[7] Typical consumption values have been based on previous energy models as administered by the AME Group, and reported breakdown from *Four Seasons Leisure Centre - Energy Audit, Ventilation System Review and Report on Energy Savings.* Dix & Associates. July 5, 1990. P. 7.

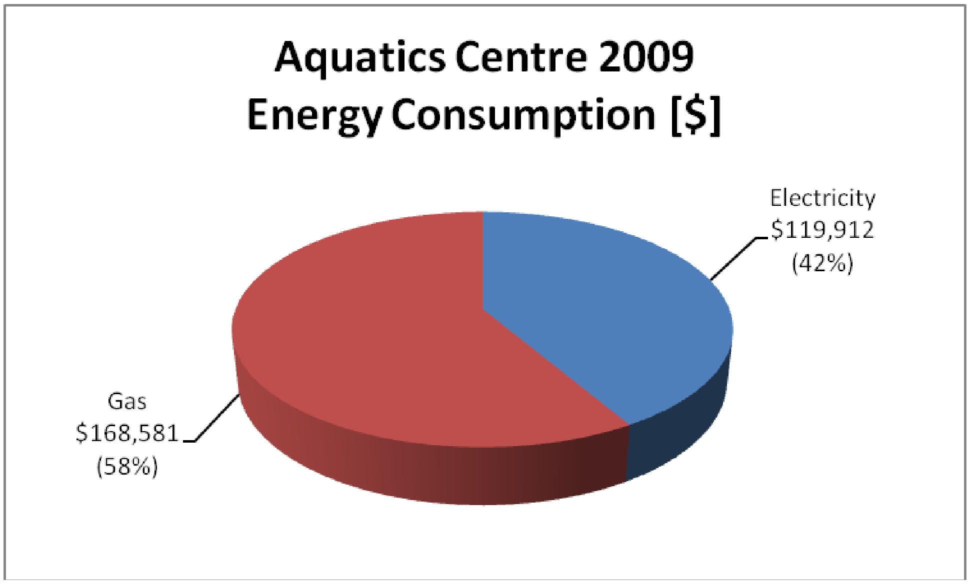


Figure 3.2: Energy Consumption in Dollars for Aquatic Centre

We further break this energy consumption by end-use as follows:

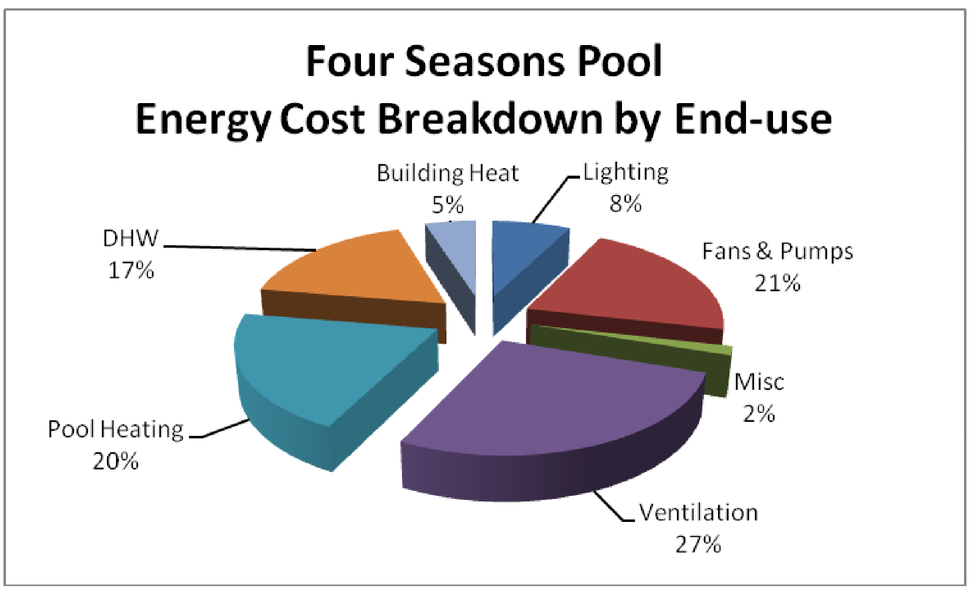


Figure 3.3: Energy Cost Breakdown for Four Seasons Pool

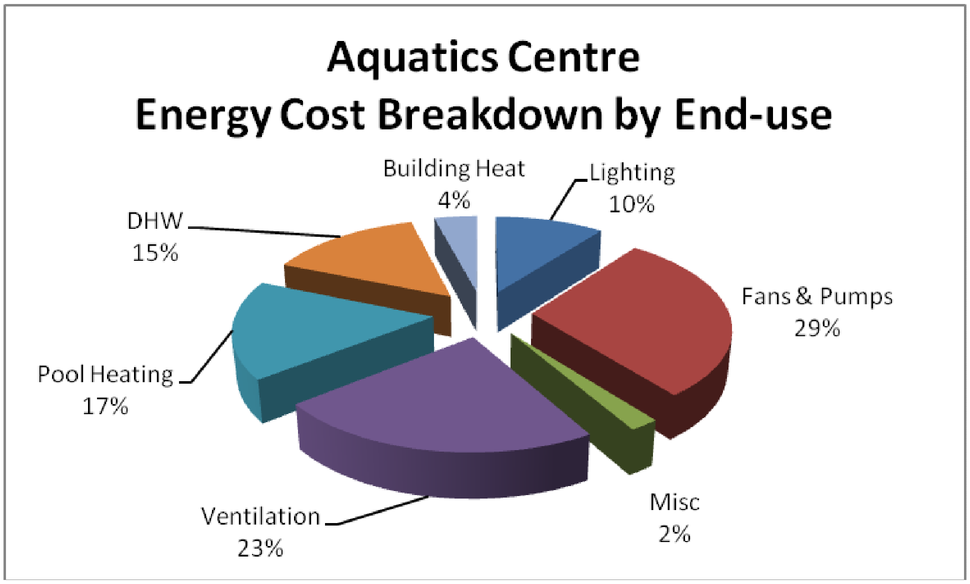


Figure 3.4: Energy Cost Breakdown for Aquatic Centre

Based on the above information we can estimate the energy consumption in kWh/GJ for each end-use.

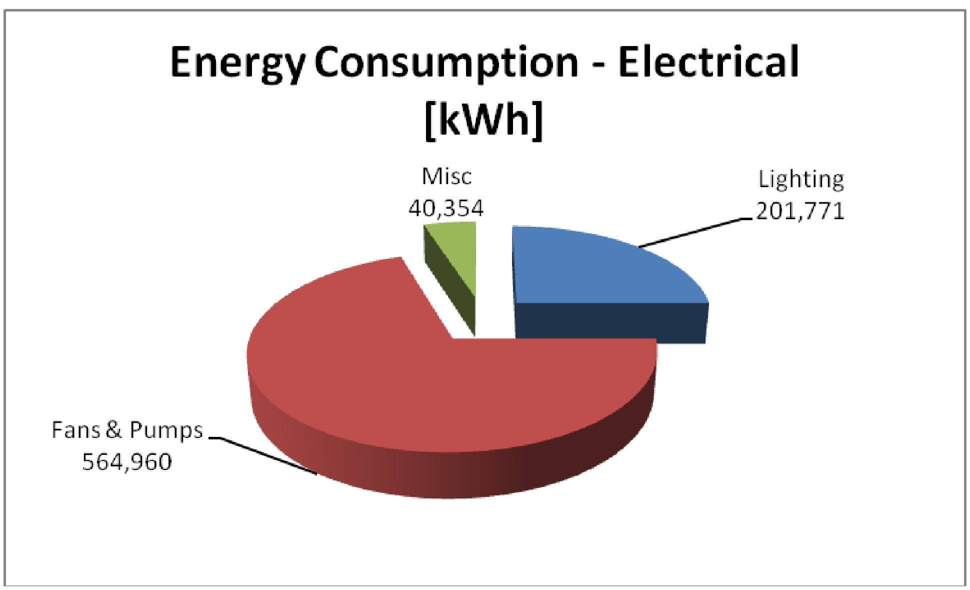


Figure 3.5: Energy Consumption (Electrical) for Four Seasons Pool

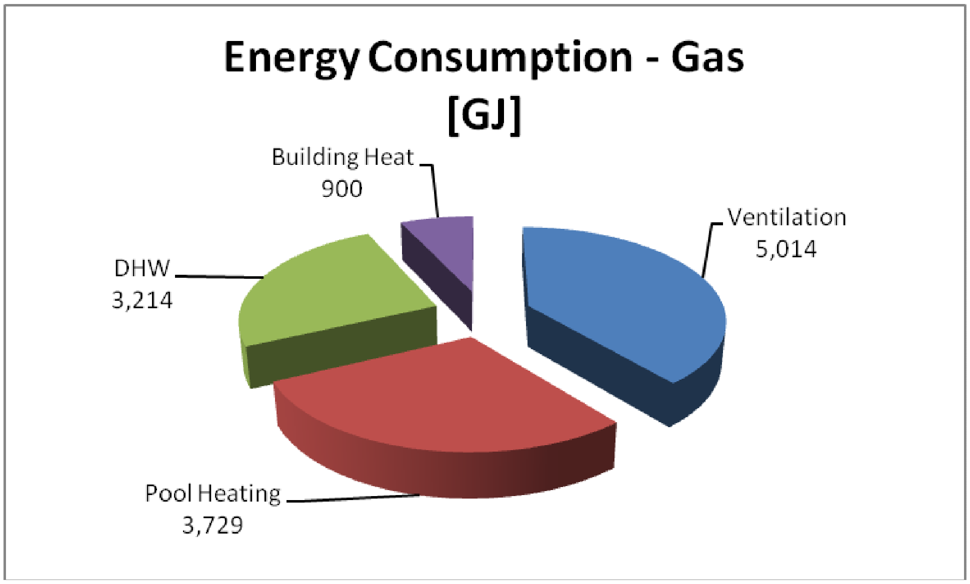


Figure 3.6: Energy Consumption (Gas) for Four Seasons Pool

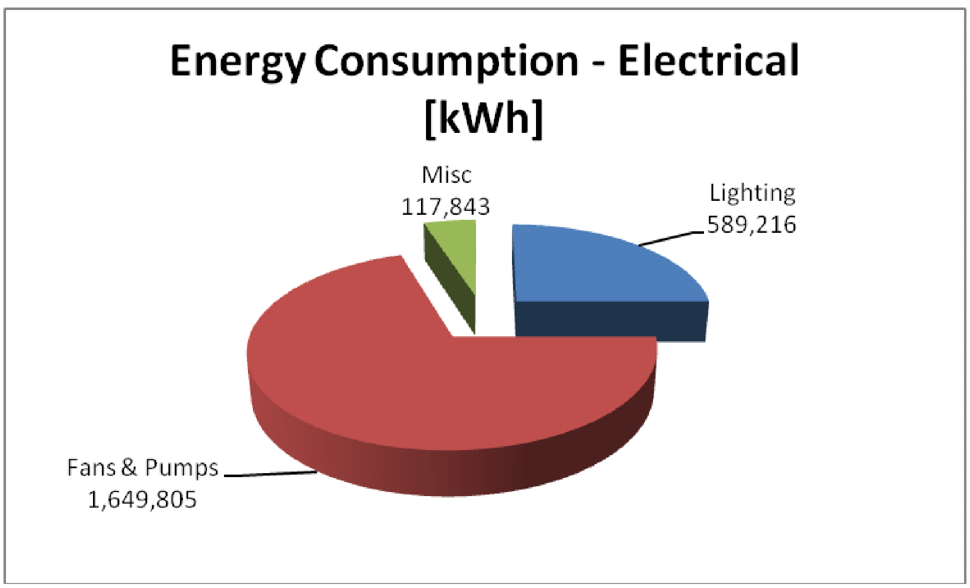


Figure 3.7: Energy Consumption (Electrical) for Aquatic Centre

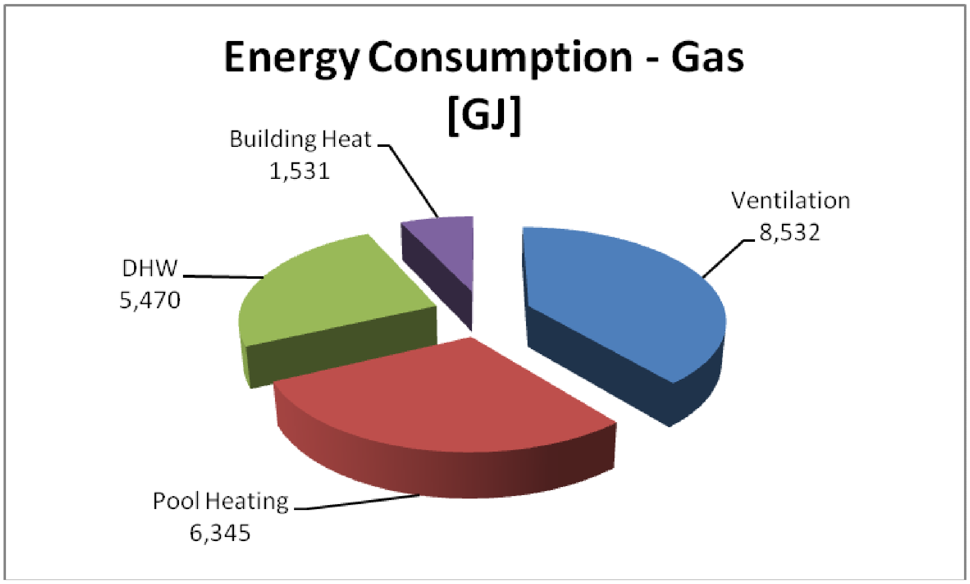


Figure 3.8: Energy Consumption (Gas) for Aquatic Centre

4.0 ENERGY CONSERVATION MEASURE ANALYSIS

FOUR SEASONS POOL

4.1 ECM-1.1: AHU Replacement

The current lap pool hall air handling unit (AHU-1) was originally installed in 1969. While still in operation the simple replacement of the unit would most likely save energy due to equipment efficiency increases over the past 50 years. Due to its age we are recommending the unit be replaced. This would be the baseline cost. The proposed system involves upgrading the baseline system to include heat recovery, dehumidification, and VFDs on the fans (which could cut back during unoccupied hours). The current volume of air moved through the space does not meet the current recommendations for Air Changes per Hour (ACH) as outlined in the 2007 ASHRAE Handbook – HVAC Applications. The calculated air change volume is 4,500cfm therefore requiring 27,000cfm of airflow to meet the recommended 6 ACH. At this volume the supply and return duct work will need to be re-sized and re-installed. This is beneficial as previous reports have recommended this to promote air quality in the space.

The existing leisure pool hall air handling unit (AHU-3) was originally installed in 1986. This unit is in below-average condition as it is exposed to the corrosive pool hall air environment. We are recommending replacing this unit. The new unit should be enclosed and the routing of the outdoor air intake and exhaust louvers be spread apart. The proposed unit would include heat recovery, dehumidification, and VFDs on the fans. The amount of airflow in the Leisure space meets the recommended 6 ACH so there is no need for updating the ductwork.

To estimate annual energy savings we use the same ECM from similar energy retrofit projects. We can use a conservative estimation of 23% gas savings and 6% electrical savings for each unit.

Capital Cost premium is based on costing numbers as provided by Venture Pacific. The value is the difference between the baseline (replacing the existing units with a like unit to current recommended air volumes) and the proposed (replacing the existing units with the proposed units).

Life expectancy is typical for this type of equipment.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
49,744	2,931	24,960	333,300	20	13.4	21.4	(19,639)	6.3%

Table 4.1: ECM-1.1 Lifecycle Cost

This ECM shows good energy savings. At a capital premium of $333,300 it would take approximately 13 years for this measure to payback. This number is probably less in practicality as conservative estimates have been used for both energy savings and capital costs. The payback would be even less if grant money for efficiency measures like this are applicable.

4.2 ECM-1.2: DDC Controls

This ECM involves installing new DDC controls (system and points) to the existing electric controls system. The new system will be able to accurately control the major air handling units and heating loop systems leading to optimization through schedules and set-points.

It is difficult to estimate how much energy may be saved from installing a new DDC system. A conservative estimate of 1% (both gas and electric) is used for calculations.

Capital premium is the cost of installing the new equipment.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
8,071	129	1,406	187,500	20	133.4	-	(169,837)	-12.0%

Table 4.2: ECM-1.2 Lifecycle Cost

This estimate does not take into consideration potential synergistic savings, for example accurately controlling the amount of fresh air intake affects both heating and dehumidification. Although the payback for this measure is very high, with the systems being proposed we are highly recommending installing DDC system to control them.

4.3 ECM-1.3: Solar Hot Water Preheat

This measure uses roof-mounted solar hot water collectors (flat plate) to preheat domestic hot water and dump to the pool whenever possible. Swimming pools are excellent for solar hot water collectors as the temperature of the pool is relatively low compared to the output of the collector, and the volume of water in the pool is so large it is effectively an infinite sink. There are governmental grants available for this type of conservation measure (including the Federal ecoEnergy and Provincial SolarBC) helping to bring the capital cost premium (and payback) down.

To estimate the energy savings from this measure we first need to know the number of collectors. This is decided upon by analysing 4 different scenarios.

1. Based on maximizing funding.
2. Based on available roof space.
3. Based on DHW consumption.
4. Based on pool heating.

Before determining the number of collectors that would be required by the system we determine what would be practical. As Solar grants will typically fund 25% of the cost up to $40,000 we determine the upper limit on spending. This would be $160,000. At $4,000 per panel (including installation costs) it is not recommended to install more than 40 collectors or no additional funding will be available.

The second limiting factor is roof space available for panels. The solar altitude of the sun in Prince George at winter solstice is approximately 12.6°. At this angle we would need to space the rows of collectors at a minimum 28' (8.5m). We are also limited by code to stay within 10' (3.0m) of the roof edge. With these restrictions it is determined we can fit a maximum of 48 panels on the Four Seasons roof (facing due south).

The number of collectors (for scenarios 3 and 4) are determined by energy modeling software (RETScreen). The results (refer to Appendix B) are as follows:

For DHW preheat: 140 Collectors recommended (for full DHW pre-heat)
For Pool heating: 102 Collectors recommended (for full pool heat)

The recommended number of collectors for full DHW and/or pool heat is far above what capacity can be installed on the roof. We therefore recommend installing 40 panels (the maximum that can fit on the roof and still available for grants).

Capital cost premium is based on $4,000/panel (including piping and installation). This number could be reduced after the extent of the re-roofing project (separate to this project) is known. For example the installation of sleepers could be carried into the roofing project.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
(2,400)	477	3,517	160,000	25	45.5	-	(105,333)	-0.6

Table 4.3: ECM-1.3 Lifecycle Cost

At this capital cost the payback on the solar system is quite long. However if full government funding was available ($80,000) the payback would drop down to 22 years. This measure provides clean, free energy and can showcase the building's commitment to sustainability.

4.4 ECM-1.4: District Heating

The city of Prince George is shifting towards a centralized (district) heating loop. Buildings connected to this loop would pull heat as required. As such, this measure isn't an ECM on a local sense because the building would consume the same amount of energy before and after the implementation. However, the system is flexible in the source of heat which is important in shifting towards more sustainable forms such as centralized biomass plants.

The Four Seasons Pool is looking to connect to the district heating loop around the summer of 2011.

Because there is no energy savings associated with this measure, there is no life-cycle costing available.

The estimated capital cost to connect to the district heating loop would be approximately $155,000. This cost includes high temp piping, VFD circ pump, sensors, valving, heat exchanger and BTU meter to monitor the building's use.

4.5 ECM-1.5: VFDs on Heating Water Pumps

This ECM involves putting a Variable Frequency Drive (VFD) on the main heating water pump. The pump flow and head can then exactly match the operating conditions instead of over pumping and throttling back with valves. To estimate the energy savings we use previous energy reduction calculations and proportion based on motor horsepower.

Capital premium is the cost of adding VFD.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
54,000	(248)	927	6,600	20	7.1	8.8	5,044	15.0

Table 4.4: ECM-1.5 Lifecycle Cost

There is an increase in natural gas use because of the heat imparted to the fluid from passing through the pump. As the pump power has decreased the heating needs to be made up. At a 7 year payback this ECM is recommended.

4.6 ECM-1.6: Plumbing Fixtures

The current shower heads have a rated flow of 2.5gpm. We recommend installing new shower heads at 1.5gpm to reduce the amount of domestic hot water use. The estimated consumption savings is:

Current: 200 bathers/day @ 2.5gpm, 3.5min =	1750 Gal (1.23 GJ)
Proposed: 200 bathers/day @ 1.5gpm, 3.5min =	1050 Gal (0.74 GJ)
Savings	700 Gal (0.49 GJ)

With the building in use for 360 days/year = 176.4 GJ

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
-	176	1,346	2,400	20	1.8	1.9	14,514	59.2

Table 4.5: ECM-1.6 Lifecycle Cost

This measure pays for itself very quickly. Reducing domestic hot water consumption through low-flow heads conserves both energy and water and is recommended.

AQUATIC CENTRE

4.7 ECM-2.1: AHU Heat Recovery and Dehumidification

The current air handling units serving the Lap pool hall and Leisure pool hall are in good condition and do not need to be replaced.

We are recommending putting VFDs on the supply and return fans and cutting back air volumes to 4 ACH (from current 6 ACH) during unoccupied hours.

All three units have heat recovery capability in place in the form of a glycol run-around loop, pulling heat from exhaust air which is used to preheat incoming outdoor air. This heat recovery was not in use during the site visit and commented on that the circ pump driving this loop is never running. This could be a controls issue and should be highlighted during the re-commissioning as part of ECM-2.2. As this system is already in place we do not recommend any changes.

For dehumidification a coil would need to be placed in the airstream to pull out the required amount of water (due to pool evaporation). Winter outdoor air (being quite dry) helps to dehumidify during occupied hours. During unoccupied hours the evaporation rate is less (due to no splashing or water movement) and therefore requires less dehumidification, however the dehumidification is done solely by the coil (running in 100% re-circulation). The current AHUs will have to be modified to fit the new equipment within its shell. This includes adding the new dehumidification coil (and pan), moving the heating coil downstream and changing the supply fan to a plug-type fan to accommodate space requirements.

The dehumidification coils are connected to the evaporator side of a water-to-water heat pump. The condenser side is connected to a low-temperature heating loop (as the output of the heat pump is limited to approx 120°F (48.9°C). This low-temperature heating loop would be used for heating coils where permissible. As mentioned in ECM-2.4 this low-temperature loop would be connected to the high-temperature loop by a heat exchanger should there be a call for heat and the heat pump is inactive.

To estimate annual energy savings we use the same ECM from similar energy retrofit projects. We can use a conservative estimation of 23% gas savings and 6% electrical savings for each unit.

Capital Cost premium is based on costing numbers as provided by Venture Pacific. Life expectancy is typical for this type of equipment.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
63,460	4,988	41,371	605,300	20	14.6	25.3	(85,412)	5.2

Table 4.6: ECM-2.1 Lifecycle Cost

Similar to ECM-1.1, this ECM shows good energy savings. At a capital premium of $605,300 it would take approximately 15 years for this measure to payback. As with ECM-1.1 we would expect the payback to be less in practicality due to conservative estimates.

4.8 ECM-2.2: DDC Controls

This ECM is more of an optimization measure than a retrofit measure. It involves re-commissioning the controls system to the newly configured systems. As part of this procedure the Contractor shall review all the existing points (sensors) and sequence of operation to ensure the existing systems (that aren't upgraded as part of this project).

An important requirement of this ECM is to ensure the existing glycol run-around loop is working properly.

The savings and capital premium are calculated similarly to ECM-1.2.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
23,568	219	2,901	187,500	20	64.6	-	(151,042)	-7.4%

Table 4.7: ECM-2.2 Lifecycle Cost

At 65 years this measure has a very long payback. However as with ECM-1.2 we feel this measure is underestimated in terms of energy savings especially because this measure should ensure the current glycol run-around loop heat recovery is working properly.

4.9 ECM-2.3: Solar Hot Water Replacement

The roof of the Aquatic Centre slopes up to the south causing issues for the placement of solar collectors to avoid falling within a shadow. At this angle we can only place a single row of collectors towards the north of the main roof to avoid being shaded. Staying within the safety limits of the roof edge there is approximately 145' (44.2m) to place a row of collectors. Using 4' (1.2m) width per panel and an extra 2' (0.6m) every 3 panels with can fit 30 panels in this row. This is good as it is under the optimal 40 panel limit to receive maximum government funding.[8]

A RETScreen analysis was done to determine the calculated energy savings from 30 panels. It was found to save 332.6 GJ/year.

The lifecycle costing of this measure is shown below:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
(1,800)	363	2,676	120,000	25	44.8	-	(86,376)	-4.8

Table 4.8: ECM-2.3 Lifecycle Cost

Similar to ECM-1.3 this measure takes a long time to payback without any financial incentives. With government funding of $80,000 the payback would drop to 20 years.

4.10 ECM-2.4: Boiler Replacement

The Aquatics Centre boilers have been historically problematic with internal corrosion issues due to flue gas condensation. This problem seems to have been corrected by increasing the supply water temperature and properly sealing the panels (Cannepp Service).

There is currently one boiler in good condition and one in below average condition. We are recommending changing the second boiler (B-2) to a (series of) condensing boiler(s). While more efficient than the current standard boiler the issue with installing a condensing boiler is the output temperature. The boilers require lower operating temperatures to condense. To do this we install this boiler in series before the high temperature boiler (B-1). The loop will then act as low-temperature during the summer (when heating demand is less) and high temperature in the winter and shoulder seasons. A schematic of the proposed heating loop system is as follows:

8 Based on 25% grant up to $40,000. Collectors priced at $4,000.

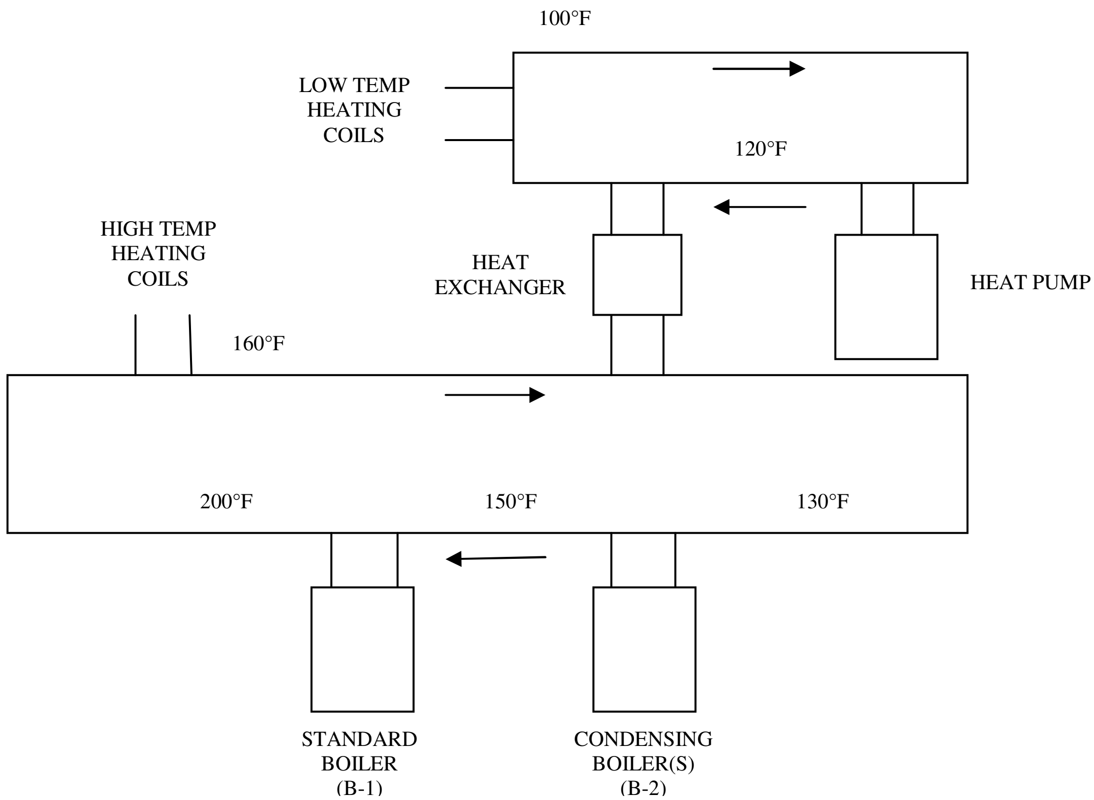


Figure 4.1: Heating Water Loops

The capital premium includes the change from standard boiler (as baseline replacement) to condensing boilers. The low temperature loop (including heat exchanger and heat pump) costs are included in ECM-2.1. It does not include capital to replace existing or provide new points as required.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
-	2,188	16,694	(9,000)	20	-	-	(218,790)	N/A

Table 4.9: ECM-2.4 Lifecycle Cost

The capital premium for this measure is actually negative as the cost of the proposed (more efficient condensing boiler) case is less expensive than the baseline (equal replacement) cost. The additional costs of tying the high and low temp loops are covered under ECM-2.1.

4.11 ECM-2.5: VFDs on Heating Water Pumps

This ECM involves putting a Variable Frequency Drive (VFD) on the main heating water pumps. The pump flow and head can then exactly match the operating conditions instead of over pumping and throttling back with valves. Using VFD on the largest horsepower pumps will have the greatest affect on overall energy consumption.

Capital premium is the cost of adding VFD.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
54,000	(248)	927	11,000	20	11.9	17.7	644	7.7

Table 4.10: ECM-2.5 Lifecycle Cost

The capital premium is higher for this ECM than ECM-1.5 because the heating water pumps are duplexed. At a 12 year payback this ECM is recommended.

4.12 ECM-2.6: UV Generator

The current operation of the UV Generator is 24 hours per day. We are recommending not running this equipment during unoccupied hours. This will save electrical costs without compromising water quality. As the capital cost of this ECM is essentially $0, there is no payback and therefore recommended.

4.13 ECM-2.7: VFD on Wave Pool Pump

This ECM involves installing VFD on the Leisure Pool Pump. The current pump is 25hp and runs 24hrs/day. We can reduce the turnover rate during the unoccupied hours and still have adequate filtration.

We can see the calculated payback, NPV and IRR in the following table:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
27,215	(125)	467	8,200	20	17.6	38.7	(2,333)	3.3

Table 4.11: ECM-2.7 Lifecycle Cost

Although this ECM has a slightly long payback time we recommend it to reduce electrical consumption.

4.14 ECM-2.8: Shower Heads

The current shower heads have a rated flow of 2.5gpm. This head (Symmons 4-150 Senior Institutional) is available with a flow restrictor to 2.0 or 1.5gpm. We recommend installing the 1.5gpm flow restrictor to reduce the amount of domestic hot water use. The estimated consumption savings is:

Current: 200 bathers/day @ 2.5gpm, 3.5min =	1750 Gal (1.23 GJ)
Proposed: 200 bathers/day @ 1.5gpm, 3.5min =	1050 Gal (0.74 GJ)
Savings	700 Gal (0.49 GJ)

With the building in use for 360 days/year = 176.4 GJ

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
-	176	1,346	3,800	20	2.8	3.1	13,144	38.0

Table 4.12: ECM-2.8 Lifecycle Cost

As explained in ECM-1.6 this measure is recommended in saving both gas and water.

4.15 Bundle (without Solar)

Using all the proposed ECMs (not including Solar), we have the following:

Annual Savings			Capital Cost [$]	Life Expec.	Payback		NPV	IRR
kWh	GJ	$	$	Years	Simple	Discounted	$	%
287,358	10,187	92,725	1,491,600	20	16.1	30.9	(326,370)	4.2

Table 4.13: Four Seasons Bundle Lifecycle Cost

The overall proposed measures (not including solar) has a payback of approximately 16 years. As mentioned before we feel in actuality this number would be less as energy savings are conservatively low and capital costs are conservatively high.

5.0 BUDGET COSTING

The overall preliminary budget numbers are as follows:

Net Building Cost	$2,414,600
General Requirements - 15%	$362,190
CM Fees - 3% + $10,500	$93,804
Design & Pricing Allowance - 10%	$277,679
Construction Allowance - 10%	$277,679
Sub Total	$3,425,952
Design Fees - 12%	$411,114
Total Budget	**$3,837,066**

6.0 CONCLUSIONS

Many different factors affect actual energy use of a building, including occupancy schedules and densities, weather, thermostat settings, lighting use, equipment use, equipment setup and maintenance. Due to the large number of variables, it is not expected that the actual building energy use will align exactly with the predicted energy use. The purpose of the energy calculations during the project design phase is to compare and evaluate the proposed system design with alternative solutions.

For the Four Seasons Pool and Aquatic Centre in Prince George, BC energy savings calculations were made to predict savings of various proposed energy conservation measures (ECMs). The results show significant energy savings from dehumidification and low-temp loop heated by a heat recovery chiller. Installing VFDs on pumps and fans will reduce energy use while still keeping the facility in proper running condition. DDC controls are used to optimize all these systems to perform at the highest efficiency possible.

While relatively long in terms of payback the overall proposed bundle of ECMs is recommended. The bundle payback of 16 years (not including solar) is expected to be shorter in actuality as energy savings are conservatively low and capital costs are conservatively high. This number also excludes any grants or available funding that would decrease the capital costs.

Although solar installations typically have a long payback there are still numerous benefits including reduction in natural gas consumption and providing a visible sign that the facility is committed to pursuing sustainable practices.

APPENDIX A

HISTORICAL UTILITY DATA

Aquatcis Centre

Square Foot =52,000

Electricity - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07		
Demand	331	307	344	314	320	302	329	267	333	379	334	343		
Demand Charge	$1,633.83	$1,514.79	$1,681.76	$1,524.44	$1,530.96	$1,471.89	$1,618.97	$1,093.18	$1,627.00	$1,679.99	$1,648.49	$1,689.83	$ 18,715.13	
Energy Consumption (kWh)	207267.12	188053.48	200049.69	192117.71	152001.32	190573.51	189873.97	169669.98	165939.52	173432.00	176130.22	189926.85	2195035.37	
Total Electrical Consumption Costs (CND $)	$ 7,278.89	$ 6,468.39	$ 7,207.88	$ 6,905.47	$ 7,071.40	$ 6,826.11	$ 6,845.30	$ 6,156.05	$ 6,033.21	$ 6,491.70	$6,833.63	$ 6,859.30	$ 80,977.33	
Rate Rider	$ -	$ 158.29	$ 176.16	$ 167.14	$ 170.98	$ 164.54	$ 167.63	$ 155.51	$ 157.71	$ 167.27	$ 172.42	$ 176.02	1833.67	
Innovation Clean Energy Levy	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 32.18	$ 34.13	$ 35.17	$ 35.93	$ 137.41	
Power Factor	96	91	91	91	90	90	90	87	87	87	88	86		
Power Factor Surcharge	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 100.79	$ 303.29	$ 273.04	$ 218.03	$ 338.71		
													$ 101,663.54	$ 0.046

Electricity - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08		
Demand	330	332	346	333	349	324	320	349	313	319	330	343		
Demand Charge	$1,638.64	$1,644.28	$1,645.15	$1,633.19	$1,806.48	$1,692.04	$1,671.10	$1,836.00	$1,635.18	$1,643.22	$1,691.29	$1,794.12	$ 20,330.69	
Energy Consumption (kWh)	191536.84	186268.90	198725.18	195840.00	207609.77	183670.19	189635.68	187880.26	167319.00	173075.40	193313.16	202134.53	2277008.91	
Total Electrical Consumption Costs (CND $)	$ 6,880.34	$ 6,715.45	$ 7,139.01	$ 7,408.49	$ 7,821.94	$ 7,070.95	$ 7,267.77	$ 7,247.52	$ 6,474.32	$ 6,680.80	$ 7,409.94	$ 7,746.54	$ 85,863.07	
Rate Rider	$ 173.29	$ 165.62	$ 179.99	$ 64.93	$ 88.17	$ 43.43	$ 44.31	$ 45.01	$ 40.17	$ 41.38	$ 45.35	$ 45.97	977.62	
Innovation Clean Energy Levy	$ 35.35	$ 33.79	$ 37.24	$ 38.83	$ 40.91	$ 34.92	$ 35.62	$ 36.10	$ 32.30	$ 33.26	$ 36.46	$ 36.95	$ 431.73	
Power Factor	87	92	82	82	97	97	97	97	97	98	98	98		
Power Factor Surcharge	$ 223.49	$ -	$ 294.70	$ 552.89	$ -	$ -	$ -		$ -	$ -	$ -			
													$ 107,603.11	$ 0.047

Electricity - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09		
Demand	318	310	330	317	375	373	370	371	331	335	338	324		
Demand Charge	$1,662.20	$1,623.58	$1,730.98	$1,713.71	$2,095.36	$2,032.90	$2,001.81	$2,021.81	$1,821.46	$1,849.36	$1,864.00	$1,770.61	$ 22,187.78	
Energy Consumption (kWh)	193091.91	178341.41	196974.16	192227.26	205003.94	204246.72	212698.22	212701.22	181440.00	186453.18	196730.82	196954.74	2356863.58	
Total Electrical Consumption Costs (CND $)	$ 7,374.35	$ 6,847.44	$ 7,590.80	$ 7,521.33	$ 8,230.22	$ 9,003.33	$ 9,559.05	$ 9,563.05	$ 7,303.80	$ 7,491.83	$ 7,881.78	$ 7,881.56	$ 96,248.54	
Rate Rider	$ 41.18	$ 41.99	$ 57.89	$ 93.55	$ 102.37	$ 101.42	$ 101.00	$ 102.37	$ 90.48	$ 92.62	$ 96.66	$ 95.76	1017.29	
Innovation Clean Energy Levy	$ 33.21	$ 33.76	$ 37.21	$ 36.96	$ 41.35	$ 41.25	$ 41.00	$ 42.33	$ 36.55	$ 37.42	$ 39.05	$ 38.69	$ 458.78	
Power Factor	98	98	98	98	97	97	96	96	97	98	97	97		
Power Factor Surcharge	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
													$ 119,912.39	$ 0.051

Natural Gas

Terasen Gas - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	
Energy (GJ) - Transportation Firm Demand	108.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00	1296.00
Energy (GJ) - Transportation Firm	2643.000	2409.800	2525.200	2093.800	1830.800	1388.100	1090.300	1136.400	1212.200	1722.900	2024.000	1820.700	21897.20
Energy (kWh)	734172.540	669394.244	701450.056	581615.764	508559.624	385586.418	302863.534	315669.192	336724.916	478587.162	562226.720	505754.046	6082604.22
Cost - Transportation Firm Demand	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	$ 1,462.64	17551.68
Cost - Transportation Firm	$ 1,324.14	$ 1,207.31	$ 1,265.13	$ 1,048.99	$ 917.23	$ 695.44	$ 546.24	$ 569.34	$ 607.31	$ 863.17	$ 1,014.02	$ 912.17	10970.49
Basic Charge	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	6504.00
Administration Charge	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	864.00
Franchise Fee	$ 105.09	$ 101.48	$ 103.26	$ 96.58	$ 92.51	$ 85.66	$ 81.05	$ 81.76	$ 82.94	$ 90.84	$ 95.50	$ 92.36	1109.03
Total Cost with Basic Charge, Admin and Franchise Fee	$ 3,505.87	$ 3,385.43	$ 3,445.03	$ 3,222.21	$ 3,086.38	$ 2,857.74	$ 2,703.93	$ 2,727.74	$ 2,766.89	$ 3,030.65	$ 3,186.16	$ 3,081.17	36999.20
													$ 36,999.20

Terasen Gas - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	
Energy (GJ) - Transportation Firm Demand	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	1332.00
Energy (GJ) - Transportation Firm	2084.100	2022.300	2237.200	1968.000	1485.500	1187.600	1045.800	1033.600	1105.200	1586.100	1703.100	2794.000	20252.50
Energy (kWh)	578921.298	561754.494	621449.416	546671.040	412642.190	329891.528	290502.324	287113.408	307002.456	440586.858	473087.118	776117.320	5625739.45
Cost - Transportation Firm Demand	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	$ 1,529.14	18349.680
Cost - Transportation Firm	$ 1,046.22	$ 1,017.22	$ 1,125.56	$ 972.19	$ 733.84	$ 586.67	$ 516.63	$ 510.60	$ 546.27	$ 783.53	$ 841.33	$ 1,380.19	$ 10,060.25
Basic Charge	$ 551.00	$ 551.00	$ 551.00	$ 551.00	$ 551.00	$ 551.00	$ 385.70	$ 551.00	$ 551.00	$ 551.00	$ 551.00	$ 551.00	$ 6,446.70
Administration Charge	$ 73.00	$ 73.00	$ 73.00	$ 73.00	$ 73.00	$ 73.00	$ 51.10	$ 73.00	$ 73.00	$ 73.00	$ 73.00	$ 73.00	$ 854.10
Franchise Fee	$ 98.87	$ 97.97	$ 101.32	$ 96.58	$ 89.22	$ 84.67	$ 880.68	$ 82.32	$ 83.41	$ 90.74	$ 92.53	$ 109.18	$ 1,907.49
Total Cost with Basic Charge, Admin and Franchise Fee	$ 3,298.23	$ 3,268.33	$ 3,380.02	$ 3,221.91	$ 2,976.20	$ 2,824.48	$ 3,363.25	$ 2,746.06	$ 2,782.82	$ 3,027.41	$ 3,087.00	$ 3,642.51	$ 37,618.22
													$ -

Terasen Gas - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	
Energy (GJ) - Transportation Firm Demand	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	
Energy (GJ) - Transportation Firm	2543.200	2363.600	2667.400	2260.800	1928.700	1188.400	1047.500	1244.100	1172.100	1671.800	1739.500	2050.600	21877.70
Energy (kWh)	706450.096	656560.808	740950.372	628005.024	535754.286	330113.752	290974.550	345586.098	325585.938	464392.604	483198.310	569615.668	6077187.51
Cost - Transportation Firm Demand	$ 1,335.60	$ 1,335.60	$ 1,335.00	$ 1,335.60	$ 1,318.95	$ 1,318.95	$ 1,318.95	$ 1,318.95	$ 1,381.95	$ 1,318.95	$ 1,318.95	$ 1,318.95	15956.40
Cost - Transportation Firm	$ 1,350.44	$ 1,255.07	$ 1,416.00	$ 1,416.39	$ 1,004.85	$ 619.16	$ 545.75	$ 648.18	$ 610.66	$ 871.01	$ 906.28	$ 1,068.36	11712.150
Basic Charge	$ 594.00	$ 594.00	$ 594.00	$ 594.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 7,072.00
Administration Charge	$ 79.00	$ 79.00	$ 79.00	$ 79.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 940.00
Franchise Fee	$ 103.80	$ 100.85	$ 105.00	$ 105.84	$ 92.36	$ 80.44	$ 78.17	$ 81.33	$ 80.17	$ 88.22	$ 89.31	$ 94.32	$ 1,099.81
Total Cost with Basic Charge, Admin and Franchise Fee	$ 3,462.84	$ 3,364.52	$ 3,529.00	$ 3,530.83	$ 3,081.16	$ 2,683.55	$ 2,607.87	$ 2,713.46	$ 2,737.78	$ 2,943.18	$ 2,979.54	$ 3,146.63	$ 36,780.36
													$ 36,780.36

Direct Energy - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	
Energy (GJ)	2643.000	2409.800	2525.200	2093.800	1830.800	1388.100	1090.300	1136.400	1212.200	1722.900	2024.000	1820.700	21897.20
Energy (kWh)	734172.540	669394.244	701450.056	581615.764	508559.624	385586.418	302863.534	315669.192	336724.916	478587.162	562226.720	505754.046	6082604.22
Purchase Price /GJ	8.1900	8.3500	7.9800	7.6900	7.6400	7.5800	7.4900	7.1161	6.8793	7.6746		7.7003	84.29
Cost - Excludes PST and Levy	$ 21,646.17	$ 20,121.83	$ 20,151.10	$ 16,101.32	$ 13,987.31	$ 10,521.80	$ 8,166.35	$ 8,086.78	$ 8,339.06	$ 13,222.63	$ 14,500.00	$ 14,019.94	168864.29
Energy management Fee	$ 264.30	$ 240.98	$ 252.52	$ 209.38	$ 183.08	$ 138.81	$ 109.03	$ 113.64	$ 121.22	$ 172.29	$ 170.00	$ 182.07	2157.32
BC ICE Levy	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 52.89	$ 54.00	$ 56.08	162.97
BC Carbon Tax	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	0.00
Total	$ 21,910.47	$ 20,362.81	$ 20,403.62	$ 16,310.70	$ 14,170.39	$ 10,660.61	$ 8,275.38	$ 8,200.42	$ 8,460.28	$ 13,447.81	$ 14,724.00	$ 14,258.09	**$ 171,184.58**

Direct Energy - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	
Energy (GJ)	2084.100	2022.300	2237.200	1968.000	1485.500	1187.600	1045.800	1033.600	1105.200	1586.100	1703.100	2794.000	20252.50
Energy (kWh)	578921.298	561754.494	621449.416	546671.040	412642.190	329891.528	290502.324	287113.408	307002.456	440586.858	473087.118	776117.320	5625739.45
Purchase Price /GJ	7.8627	7.8465	8.0469	8.249	7.6878	7.9445	7.8510	7.7218	7.3712	7.7709	8.2625	8.2957	94.91
Cost - Excludes PST and Levy	$ 16,386.66	$ 15,867.92	$ 18,006.55	16234.230	$ 11,420.18	$ 9,434.89	$ 8,210.62	$ 7,981.25	$ 8,151.12	$ 12,325.37	$ 14,071.93	$ 23,177.22	161267.94
Energy management Fee	$ 206.41	$ 202.23	$ 223.77	$ 196.80	$ 148.55	$ 118.76	$ 104.58	$ 103.36	$ 110.58	$ 158.61	$ 170.31	$ 279.39	2023.35
BC ICE Levy	$ 65.55	$ 63.47	$ 72.03	$ 64.94	$ 45.68	$ 37.74	$ 32.84	$ 31.92	$ 32.60	$ 49.30	$ 56.29	$ 92.71	645.07
BC Carbon Tax	$ -	$ -	$ -	$ -	$ -	$ -	$ 518.95	$ 513.29	$ 548.84	$ 787.66	$ 845.76	$ 1,387.45	4601.95
Total	$ 16,658.62	$ 16,133.62	$ 18,302.35	$ 16,495.97	$ 11,614.41	$ 9,591.39	$ 8,866.99	$ 8,629.82	$ 8,843.14	$ 13,320.94	$ 15,144.29	$ 24,936.77	**$ 168,538.31**

Direct Energy - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	
Energy (GJ)	2543.200	2363.600	2667.400	2260.800	1928.700	1188.400	1047.500	1244.100	1172.100	1671.800	1739.500	2050.600	21877.70
Energy (kWh)	706450.096	656560.808	740950.372	628005.024	535754.286	330113.752	290974.550	345586.098	325585.938	464392.604	483198.310	569615.668	6077187.51
Purchase Price /GJ	7.8548	7.5351	7.0358	7.2993	6.7036	7.5754	7.3906	7.0063	7.9055	7.4042	3.9528	6.1189	83.78
Cost - Excludes PST and Levy	$ 19,976.45	$ 17,809.86	$ 18,767.31	$ 16,502.32	$ 12,929.22	$ 9,002.60	$ 7,741.66	$ 8,716.54	$ 9,265.98	$ 12,378.27	$ 6,875.90	$ 12,547.42	152513.53
Energy management Fee	$ 254.32	$ 236.36	$ 266.74	$ 226.08	$ 192.87	$ 118.54	$ 104.75	$ 124.41	$ 117.21	$ 167.18	$ 260.93	$ 307.59	2376.98
BC ICE Levy	$ 79.91	$ 71.24	$ 75.07	$ 66.01	$ 51.72	$ 36.01	$ 30.97	$ 34.87	$ 37.06	$ 49.51	$ 27.50	$ 50.19	610.06
BC Carbon Tax	$ 1,262.95	$ 1,173.76	$ 1,324.63	$ 1,122.71	$ 957.79	$ 590.16	$ 780.28	$ 926.73	$ 873.10	$ 1,245.32	$ 1,295.75	$ 1,527.49	13080.67
Total	$ 21,573.63	$ 19,291.22	$ 20,433.75	$ 17,917.12	$ 14,131.60	$ 9,747.31	$ 8,657.66	$ 9,802.55	$ 10,293.35	$ 13,840.28	$ 8,460.08	$ 14,432.69	**$ 168,581.24**

Notes:

2008 was a leap year

TOTAL (2007)	$ 309,847.32
TOTAL (2008)	$ 313,759.64
TOTAL (2009)	$ 325,273.99

4 Seasons Pool
Square Foot = 27,893

Electricity - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07		
Demand	166.88	168.50	130.50	109.07	121.99	129.81	124.39	123.14	128.73	137.05	138.36	135.89		
Demand Charge	$ 306.34	$ 289.27	$ 338.07	$ 266.33	$ 303.61	$ 339.51	$ 316.69	$ 311.77	$ 336.17	$ 357.16	$ 361.78	$ 359.02	$ 3,885.72	
Energy Consumption (kWh)	60446.01	64640.00	77600.00	74869.33	76410.67	72335.00	73771.67	73823.33	72870.00	75087.53	65289.64	63286.14	850429.32	
Total Electrical Consumption Costs (CND $)	$ 2,585.42	$ 2,658.38	$ 3,107.64	$ 2,999.27	$ 3,133.86	$ 2,916.23	$ 2,979.43	$ 2,983.39	$ 2,931.81	$ 3,041.76	$ 2,719.94	$ 2,624.34	$ 34,681.47	
Rate Rider		$ 59.04	$ 69.01	$ 65.40	$ 67.88	$ 65.21	$ 66.01	$ 66.00	$ 65.45	$ 68.06	$ 61.72	$ 59.75	713.53	
Innovation Clean energy Fund Levy	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 13.35	$ 13.87	$ 12.59	$ 12.19	$ 52.00	
Power Factor	95	93	93	93	93	93	93	93	93	94	93	93		
Power Factor Surcharge	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00		
													$ 39,332.72	$ 0.046

Electricity - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08		
Demand	143.49	137.97	137.00	129.50	143.93	128.50	133.77	133.71	124.70	141.66	141.03	138.69		
Demand Charge	$ 380.05	$ 364.35	$ 361.08	$ 346.37	$ 403.83	$ 357.62	$ 372.14	$ 372.45	$ 349.19	$ 397.73	$ 383.60	$ 377.06	$ 4,465.47	
Energy Consumption (kWh)	70102.56	67111.36	77230.34	67280.00	76133.50	70711.00	72060.87	72010.00	68646.46	77191.90	69144.08	58560.85	846182.92	
Total Electrical Consumption Costs (CND $)	$ 2,875.89	$ 2,759.41	$ 2,900.39	$ 2,929.43	$ 3,289.72	$ 3,047.83	$ 3,117.44	$ 3,113.32	$ 2,949.13	$ 3,316.79	$ 2,953.79	$ 2,569.42	$ 35,822.56	
Rate Rider	$ 65.21	$ 62.52	$ 65.32	$ 16.40	$ 18.49	$ 17.03	$ 17.46	$ 17.44	$ 16.51	$ 18.60	$ 37.27	$ 35.29	387.54	
Innovation Clean energy Fund Levy	$ 13.31	$ 12.76	$ 13.32	$ 13.42	$ 14.87	$ 13.71	$ 20.99	$ 14.01	$ 13.28	$ 14.95	$ 12.98	$ 11.95	$ 169.55	
Power Factor	94	94	93	94	94	94	94	94	93	93	93	93		
Power Factor Surcharge	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00		
													$ 40,845.12	$ 0.048

Electricity - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09		
Demand	138.08	122.12	67.61	135.00	138.86	118.00	118.00	129.06	126.31	127.50	125.32	135.86		
Demand Charge	$ 383.92	$ 337.38	$ 368.12	$ 380.33	$ 397.32	$ 341.76	$ 348.17	$ 370.66	$ 364.06	$ 364.45	$ 358.21	$ 392.84	$ 4,407.22	
Energy Consumption (kWh)	66306.48	66724.52	73026.97	68421.17	68700.26	65200.74	66867.00	69557.20	68713.73	69760.00	62805.06	61002.16	807085.29	
Total Electrical Consumption Costs (CND $)	$ 2,932.72	$ 1,969.67	$ 3,529.81	$ 3,451.68	$ 3,381.13	$ 3,325.48	$ 3,410.61	$ 3,162.95	$ 3,114.17	$ 3,171.64	$ 2,904.15	$ 2,867.26	$ 37,221.27	
Rate Rider	$ 16.61	$ 16.15	$ 9.25	$ 35.00	$ 35.86	$ 30.00	$ 70.00	$ 35.37	$ 34.83	$ 35.41	$ 32.66	$ 32.64	383.78	
Innovation Clean energy Fund Levy	$ 13.35	$ 12.98	$ 7.45	$ 15.00	$ 14.48	$ 15.00	$ 15.00	$ 13.35	$ 14.07	$ 3.49	$ 13.20	$ 13.19	$ 150.56	
Power Factor	95	94	94	94	94	94	94	94	93	94	94	95		
Power Factor Surcharge	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00		
													$ 42,162.83	$ 0.052

Natural Gas

Terasen Gas - Rate 25 - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07			
Energy (GJ) - Transportation Firm Demand	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	1248.00		748.8
Energy (GJ)	2524.10	2214.80	2050.30	1539.60	1034.50	689.70	639.20	795.90	1288.50	1712.80	2316.30	2703.90	19509.60		11705.76
Energy m3	66775.13	58592.59	54240.74	40730.16	27367.72	18246.03	16910.05	21055.56	34087.30	45312.17	61277.78	71531.75	516126.98		309676.19
Energy kWh	701138.889	615222.222	569527.778	427666.667	287361.111	191583.333	177555.556	221083.333	357916.667	475777.778	643416.667	751083.333	5419333.333		3251600
Cost - Transportation Firm Demand	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 1,408.47	$ 16,901.64		10140.984
Cost - Transportation Firm	$ 1,264.57	$ 1,109.61	$ 1,027.20	$ 771.34	$ 518.28	$ 345.54	$ 320.24	$ 398.75	$ 645.54	$ 858.11	$ 1,160.47	$ 1,354.65	$ 9,774.30		5864.58
Basic Charge	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 542.00	$ 6,504.00		3902.4
Administration Charge (Gas Commodity Charge -2006 only)	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 72.00	$ 864.00		518.4
Franchise Fee	$ 101.57	$ 96.78	$ 94.23	$ 86.32	$ 78.50	$ 73.17	$ 72.39	$ 74.81	$ 82.44	$ 89.01	$ 98.35	$ 104.35	$ 1,051.92		631.152
Total Cost with Basic Charge, Admin and Franchise Fee	$ 3,388.61	$ 3,228.86	$ 3,143.90	$ 2,880.13	$ 2,619.25	$ 2,441.18	$ 2,415.10	$ 2,496.03	$ 2,750.45	$ 2,969.59	$ 3,281.29	$ 3,481.47	**$ 35,095.86**	$ 1.80	**$ 21,057.52**

Terasen Gas - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08			
Energy (GJ) - Transportation Firm Demand	104.00	104.00	104.00	104.000	104.000	104.000	104.000	104.000	104.000	104.000	104.000	104.00	1248.00		748.8
Energy (GJ)	2881.60	2456.00	2223.00	1801.00	912.00	750.00	711.00	751.00	1086.00	1674.00	1972.30	2799.70	20017.60		12010.56
Energy m3	76232.80	64973.54	58809.52	47645.50	24126.98	19841.27	18809.52	19867.72	28730.16	44285.71	52177.25	74066.14	529566.14		317739.682
Energy kWh	**800444.444**	**682222.222**	**617500.000**	**500277.778**	**253333.333**	**208333.333**	**197500.000**	**208611.111**	**301666.667**	**465000.000**	**547861.111**	**777694.444**	5560444.444		3336266.67
Cost - Transportation Firm Demand		$ 1,432.70	$ 1,432.70							$ 1,432.70	$ 1,008.89	$ 1,432.70	$ 6,739.69		4043.814
Cost - Transportation Firm		$ 1,118.17	$ 889.45							$ 826.71	$ 974.37	$ 1,383.05	$ 5,191.75		3115.05
Basic Charge		$ 551.00	$ 551.00							$ 551.00	$ 551.00	$ 551.00	$ 2,755.00		1653
Administration Charge (Gas Commodity Charge -2006 only)		$ 73.00	$ 73.00							$ 73.00	$ 73.00	$ 73.00	$ 365.00		219
Franchise Fee		$ 98.11	$ 91.04							$ 89.10	$ 86.86	$ 106.29	$ 471.40		282.84
Total Cost with Basic Charge, Admin and Franchise Fee		**$ 3,272.98**	**$ 3,037.19**	**$ 2,880.13**	**$ 2,619.00**	**$ 2,441.00**	**$ 2,414.00**	**$ 2,496.00**	**$ 2,750.00**	**$ 2,972.51**	**$ 2,694.12**	**$ 3,546.04**	**$ 31,122.97**	$ 1.55	**$ 18,673.78**

Terasen Gas - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09			
Energy (GJ) - Transportation Firm Demand	116.00	116.00	116.00	116.00	116.00	116.00	116.00	116.00	116.00	116.00	116.00	116.00	1392.00		835.2
Energy (GJ)	2784.30	2581.60	2533.40	1713.30	1115.50	751.50	696.40	856.60	1146.70	2074.10	2206.10	2968.40	21427.90		12856.74
Energy m3	73658.73	68296.30	67021.16	45325.40	29510.58	19880.95	18423.28	22661.38	30335.98	54870.37	58362.43	78529.10	566875.66		340125.396
Energy kWh	773416.667	717111.111	703722.222	475916.667	309861.111	208750.000	193444.444	237944.444	318527.778	576138.889	612805.556	824555.556	5952194.444		3571316.67
Cost - Transportation Firm Demand	$ 1,721.44	$ 1,721.44	$ 1,721.44	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 1,699.98	$ 20,464.14		12278.484
Cost - Transportation Firm	$ 1,478.46	$ 1,370.83	$ 1,345.24	$ 892.63	$ 581.18	$ 391.53	$ 362.82	$ 446.29	$ 597.43	$ 1,080.61	$ 1,149.38	$ 1,546.54	$ 11,242.94		6745.764
Basic Charge	$ 594.00	$ 594.00	$ 594.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 587.00	$ 7,065.00		4239
Administration Charge (Gas Commodity Charge -2006 only)	$ 79.00	$ 79.00	$ 79.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 78.00	$ 939.00		563.4
Franchise Fee	$ 119.68	$ 116.35	$ 115.56	$ 100.66	$ 91.04	$ 85.18	$ 84.29	$ 86.87	$ 91.54	$ 106.47	$ 108.60	$ 120.87	$ 1,227.11		736.266
Total Cost with Basic Charge, Admin and Franchise Fee	$ 3,992.58	$ 3,881.62	$ 3,855.24	$ 3,358.27	$ 3,037.20	$ 2,841.69	$ 2,812.09	$ 2,898.14	$ 3,053.95	$ 3,552.06	$ 3,622.96	$ 4,032.39	**$ 40,938.19**	$ 1.91	**$ 24,562.91**

Direct Energy - 2007	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07			
Energy (GJ)	2524.10	2214.80	2050.30	1539.60	1034.50	689.70	639.20	795.90	1288.50	1712.80	2316.30	2703.90	19509.60		11705.76
Energy m3	66775.13	58592.59	54240.74	40730.16	27367.72	18246.03	16910.05	21055.56	34087.30	45312.17	61277.78	71531.75	516126.98		309676.19
Energy kWh	701138.89	615222.22	569527.78	427666.67	287361.11	191583.33	177555.56	221083.33	357916.67	475777.78	643416.67	751083.33	5419333.33		3251600
Purchase Price /GJ	8.1900	8.3500	7.9800	7.6900	7.6400	7.5800	7.4900	7.1161	6.8793	7.6746		7.7003	84.29		50.57418
Cost - Excludes PST and Levy	$ 20,672.38	$ 18,493.58	$ 16,361.39	$ 11,839.52	$ 7,903.58	$ 5,227.93	$ 4,787.61	$ 5,663.73	$ 8,863.95	$ 13,145.12		$ 20,820.84	133779.63		80267.778
Energy management Fee	$ 252.41	$ 221.48	$ 205.03	$ 153.96	$ 103.45	$ 68.97	$ 63.92	$ 79.59	$ 128.85	$ 171.28		$ 270.39	1719.33		$ 1,031.60
BC ICE Levy	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 52.58		$ 83.28	135.86		$ 81.52
BC Carbon Tax	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	0.00		$ -
Total Costs	$ 20,924.79	$ 18,715.06	$ 16,566.42	$ 11,993.48	$ 8,007.03	$ 5,296.90	$ 4,851.53	$ 5,743.32	$ 8,992.80	$ 13,368.98	$ -	$ 21,174.51	**$ 135,634.82**	$ 6.95	**$ 81,380.89**

Direct Energy - 2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08			
Energy (GJ)	2881.60	2456.00	2223.00	1801.00	912.00	750.00	711.00	751.00	1086.00	1674.00	1972.30	2799.70	20017.60		12010.56
Energy m3	76232.80	64973.54	58809.52	47645.50	24126.98	19841.27	18809.52	19867.72	28730.16	44285.71	52177.25	74066.14	529566.14		317739.682
Energy kWh	800444.44	682222.22	617500.00	500277.78	253333.33	208333.33	197500.00	208611.11	301666.67	465000.00	547861.11	777694.44	5560444.44		3336266.67
Purchase Price /GJ	7.8627	8.0469	8.2491	7.6878	7.9445	7.8510	7.7218	7.3712	7.7709	7.7709	8.2625		86.54		51.92358
Cost - Excludes PST and Levy	$ 22,657.17	$ 17,888.26	$ 14,852.51	$ 7,008.94	$ 5,957.58	$ 5,580.52	$ 5,795.21	$ 8,007.38	$ 13,004.54	$ 13,004.54	$ 16,296.21	$ 22,957.54	153010.40		91806.24
Energy management Fee	$ 288.16	$ 222.30	$ 180.05	$ 91.17	$ 74.99	$ 71.08	$ 75.05	$ 108.63	$ 167.35	$ 167.35	$ 197.23	$ 229.58	1872.94		$ 1,123.76
BC ICE Levy	$ 90.63	$ 71.55	$ 59.41	$ 28.04	$ 23.83	$ 22.32	$ 23.18	$ 32.03	$ 52.02	$ 52.02	$ 65.18	$ 91.83	612.04		$ 367.22
BC Carbon Tax	$ -	$ -	$ -	$ -	$ -	$ 352.98	$ 372.70	$ 539.46	$ 831.06	$ 831.06	$ 979.44	$ 1,399.00	5305.70		$ 3,183.42
Total Costs	$ 23,035.96	$ 18,182.11	$ 15,091.97	$ 7,128.15	$ 6,056.40	$ 6,026.90	$ 6,266.14	$ 8,687.50	$ 14,054.97	$ 14,054.97	$ 17,538.06	$ 24,677.95	**$ 160,801.08**	$ 8.03	**$ 96,480.65**

Direct Energy - 2009	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09			
Energy (GJ)	2784.30	2581.60	2533.40	1713.30	1115.50	751.50	696.40	856.60	1146.70	2074.00	2206.10	2968.40	21427.80		12856.68
Energy m3	73658.73	68296.30	67021.16	45325.40	29510.58	19880.95	18423.28	22661.38	30335.98	54867.72	58362.43	78529.10	566873.01		340123.809
Energy kWh	773416.67	717111.11	703722.22	475916.67	309861.11	208750.00	193444.44	237944.44	318527.78	576111.11	612805.56	824555.56	5952166.67		3571300
Purchase Price /GJ	7.8548	7.5351	7.0358	7.2993	6.7036	7.5754	7.3906	7.0063	7.9055	7.4042	3.9528	6.1189	83.78		50.26938
Cost - Excludes PST and Levy	$ 21,870.26	$ 19,452.51	$ 17,824.51	$ 12,505.94	$ 7,477.86	$ 5,692.91	$ 5,146.82	$ 6,001.60	$ 9,065.18	$ 15,356.97	$ 8,720.27	$ 18,163.34	147278.17		88366.902
Energy management Fee	$ 278.43	$ 258.16	$ 253.34	$ 171.33	$ 111.55	$ 75.15	$ 69.64	$ 85.66	$ 114.67	$ 207.41	$ 330.92	$ 445.26	2401.52		$ 1,440.91
BC ICE Levy	$ 87.48	$ 77.81	$ 71.30	$ 50.02	$ 29.91	$ 22.77	$ 20.59	$ 24.01	$ 36.26	$ 61.43	$ 34.88	$ 72.65	589.11		$ 353.47
BC Carbon Tax	$ 1,382.68	$ 1,282.02	$ 1,258.09	$ 850.82	$ 553.96	$ 373.19	$ 518.75	$ 638.08	$ 854.18	$ 1,545.00	$ 1,643.32	$ 2,211.16	13111.25		$ 7,866.75
Total Costs	$ 23,618.85	$ 21,070.50	$ 19,407.24	$ 13,578.11	$ 8,173.28	$ 6,164.02	$ 5,755.80	$ 6,749.35	$ 10,070.29	$ 17,170.81	$ 10,729.39	$ 20,892.41	**$ 163,380.05**	$ 7.62	**$ 98,028.03**

Notes:
2008 was a leap year
4 seasons pool natural gas is on a shared meter with the main fire hall, coliseum and city hall. It is assumed that the 4 seasons pool uses 60% of the natural gas

TOTAL (2007)	$ 141,771.13
TOTAL (2008)	$ 155,999.55
TOTAL (2009)	$ 164,753.77

APPENDIX B

PAYBACK ANALYSIS

BC Hydro Power Smart New Construction Program
Economic Analysis Spreadsheet

Project:	**Four Seasons Pool**
Owner:	City of Prince George
Analysis by:	AME Group

Analysis parameters

		Elec Consump	0.0522	$/kWh
Escalation rate (energy & maint. Costs)	2.00%	Elec Demand	8.02	$/kW
Discount rate	7.00%	Gas Consump	7.63	$/GJ

Measures

Enter the cost and savings for each measure, relative to the baseline. Both electrical and fuel savings should be included.
Enter any increase in energy consumption as a negative value.

	Measure Name	Annual Savings					Capital	Life	Payback		NPV	IRR
		kWh	kW	GJ	$	Maint. $	Cost	Expectancy	Simple	Discounted		
1	ECM-1.1: Dehumidification and Heat Recovery	49,744		2,931	$ 24,960	$ -	$ 333,300	20	13.4	21.4	$ (19,639)	6.3%
2	ECM-1.2: DDC Controls	8,071		129	$ 1,406	$ -	$ 187,500	20	133.4	-	$ (169,837)	-12.0%
3	ECM-1.3: Solar Hot Water Preheat	(2,400)		477	$ 3,517	$ -	$ 160,000	30	45.5	-	$ (105,333)	-0.6%
4	ECM-1.4: District Heating	-		-	$ -	$ -	$ 155,000	20	NA	NA	$ (155,000)	NA
5	ECM-1.5: VFDs on Heating Water Pumps	54,000		(248)	$ 927	$ -	$ 6,600	20	7.1	8.8	$ 5,044	15.0%
6	ECM-1.6: Shower Heads	-		176	$ 1,346	$ -	$ 2,400	20	1.8	1.9	$ 14,514	59.2%
7	ECM-2.1: Dehumidification and Heat Recovery	63,460		4,988	$ 41,371	$ -	$ 605,300	20	14.6	25.3	$ (85,412)	5.2%
8	ECM-2.2: DDC Controls	23,568		219	$ 2,901	$ -	$ 187,500	20	64.6	-	$ (151,042)	-7.4%
9	ECM-2.3: Solar Hot Water Preheat	(1,800)		363	$ 2,676	$ -	$ 120,000	20	44.8	-	$ (86,376)	-4.8%
10	ECM-2.4: Boiler Replacement	-		2,188	$ 16,694	$ -	$ (9,000)	20	-	-	$ 218,790	NA
11	ECM-2.5: VFDs on Heating Water Pumps	54,000		(248)	$ 927	$ -	$ 11,000	20	11.9	17.7	$ 644	7.7%
12	ECM-2.6: UV Generator	7,300		-	$ 381	$ -	$ -	20	-	-	$ 4,789	NA
13	ECM-2.7: VFD on Leisure Pool Pump	27,215		(125)	$ 467	$ -	$ 8,200	20	17.6	38.7	$ (2,333)	3.3%
14	ECM-2.8: Shower Heads	-		176	$ 1,346	$ -	$ 3,800	20	2.8	3.1	$ 13,114	38.0%
15									NA	NA	$ -	NA

Bundles

Enter the total costs and savings for the measures when bundled together. Bundled savings will include interactions between measures.
You may wish to look at more than one bundle in order to examine the overall cost effectiveness.

	Measures in Bundle	Savings					Cost	Life	Payback		NPV	IRR
		kWh	kW	GJ	$	Maint. $	$	Expectancy	Simple	Discounted		
1	Four Seasons Bundle	111,815		2,988	$ 28,638		$ 684,800	20	23.9	-	$ (324,919)	0.3%
2	Aquatic Centre Bundle	175,543		7,198	$ 64,087		$ 806,800		12.6	19.4	$ (806,800)	#NUM!
3	Overall Bundle	287,358		10,187	$ 92,725		$ 1,491,600	20	16.1	30.9	$ (326,370)	4.2%
4					$ -				NA	NA	$ -	NA
5					$ -				NA	NA	$ -	NA

APPENDIX C

RETSCREEN ANALYSIS

RETScreen Energy Model - Heating project

Heating project

Technology		**Solar water heater**			
Load characteristics					
Application		Swimming pool			
		Hot water			

	Unit	Base case	Proposed case		
Load type		Other			
Daily hot water use	L/d	47,765	47,765		
Temperature	°F	120	120		
Operating days per week	d	7	7		
Percent of month used					
Supply temperature method		Formula			
Water temperature - minimum	°F	33.8			
Water temperature - maximum	°F	46.0			

	Unit	Base case	Proposed case	Energy saved	Incremental initial costs
Heating	MWh	911.7	911.7	0%	

Resource assessment

Solar tracking mode		Fixed			
Slope	°	55.0			
Azimuth	°	0.0			

Show data

Solar water heater

Type	Glazed			$ 120,000	*See technical note*
Manufacturer	Heliodyne				*See product database*
Model	Gobi 408				
Gross area per solar collector	m²	3.00			
Aperture area per solar collector	m²	2.77			
Fr (tau alpha) coefficient		0.74			
Fr UL coefficient	(W/m²)/°C	4.57			
Temperature coefficient for Fr UL	(W/m²)/°C²	0.000			
Number of collectors		30	239		
Solar collector area	m²	89.88			
Capacity	kW	58.19			
Miscellaneous losses	%	3.0%			

Balance of system & miscellaneous

Storage		Yes
Storage capacity / solar collector area	L/m²	93
Storage capacity	L	7,731.1
Heat exchanger	yes/no	Yes
Heat exchanger efficiency	%	95.0%
Miscellaneous losses	%	4.0%
Pump power / solar collector area	W/m²	8.00
Electricity rate	$/kWh	0.051

Summary

Electricity - pump	MWh	1.8
Heating delivered	MWh	60.4
Solar fraction	%	7%

Heating system

		Base case	Proposed case		
Project verification					
Fuel type		Natural gas - GJ	Natural gas - GJ		
Seasonal efficiency		60%	60%		
Fuel consumption - annual	GJ	5,470.3	5,107.7	GJ	
Fuel rate	$/GJ	7.630	7.630	$/GJ	
Fuel cost	$	41,738	38,971		

Emission Analysis

Base case electricity system (Baseline) Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
Canada	All types	0.196		0.196

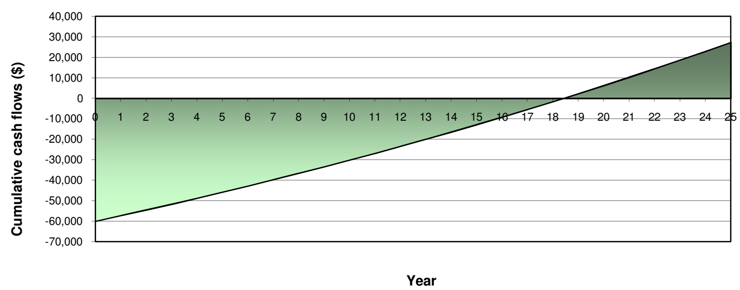
GHG emission					
Base case	tCO2	272.0			
Proposed case	tCO2	254.3			
Gross annual GHG emission reduction	tCO2	17.7			
GHG credits transaction fee	%				
Net annual GHG emission reduction	tCO2	17.7	is equivalent to	3.6	Cars & light trucks not used

GHG reduction income		
GHG reduction credit rate	$/tCO2	

Financial Analysis

Financial parameters			
Inflation rate	%	2.0%	
Project life	yr	25	
Debt ratio	%		
Initial costs			
Heating system	$	120,000	100.0%
Other	$		0.0%
Total initial costs	$	120,000	100.0%
Incentives and grants	$	60,000	50.0%
Annual costs and debt payments			
O&M (savings) costs	$	0	
Fuel cost - proposed case	$	39,065	
Other	$		
Total annual costs	$	39,065	
Annual savings and income			
Fuel cost - base case	$	41,738	
Other	$		
Total annual savings and income	$	41,738	
Financial viability			
Pre-tax IRR - assets	%	2.9%	
Simple payback	yr	22.4	
Equity payback	yr	18.4	

Cumulative cash flows graph



RETScreen Energy Model - Heating project

Heating project

Technology		Solar water heater			
Load characteristics					
Application		Swimming pool			
		Hot water			

	Unit	Base case	Proposed case
Load type		Other	
Daily hot water use	L/d	28,060	28,060
Temperature	°F	120	120
Operating days per week	d	7	7

Percent of month used

Supply temperature method		Formula
Water temperature - minimum	°F	33.8
Water temperature - maximum	°F	46.0

	Unit	Base case	Proposed case	Energy saved	Incremental initial costs
Heating	MWh	535.6	535.6	0%	

Resource assessment

Solar tracking mode		Fixed
Slope	°	55.0
Azimuth	°	0.0

Show data

Solar water heater

Type	Glazed			$ 180,000	*See technical note*
Manufacturer	Heliodyne				*See product database*
Model	Gobi 408				
Gross area per solar collector	m²	3.00			
Aperture area per solar collector	m²	2.77			
Fr (tau alpha) coefficient		0.74			
Fr UL coefficient	(W/m²)/°C	4.57			
Temperature coefficient for Fr UL	(W/m²)/°C²	0.000			
Number of collectors		40	140		
Solar collector area	m²	119.84			
Capacity	kW	77.59			
Miscellaneous losses	%	3.0%			

Balance of system & miscellaneous

Storage		Yes
Storage capacity / solar collector area	L/m²	31
Storage capacity	L	3,436.0
Heat exchanger	yes/no	Yes
Heat exchanger efficiency	%	95.0%
Miscellaneous losses	%	4.0%
Pump power / solar collector area	W/m²	8.00
Electricity rate	$/kWh	0.051

Summary

Electricity - pump	MWh	2.1
Heating delivered	MWh	71.3
Solar fraction	%	13%

Heating system

Project verification		Base case	Proposed case		
Fuel type		Natural gas - GJ	Natural gas - GJ		
Seasonal efficiency		60%	60%		
Fuel consumption - annual	GJ	3,213.6	2,785.9	GJ	
Fuel rate	$/GJ	7.630	7.630	$/GJ	
Fuel cost	$	24,519	21,256		

Emission Analysis

Base case electricity system (Baseline)

Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
Canada	All types	0.196		0.196

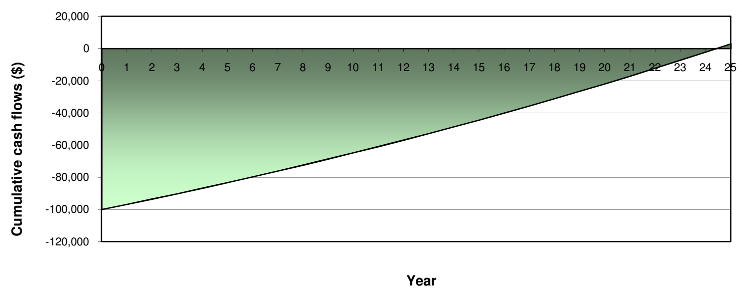
GHG emission					
Base case	tCO2	159.8			
Proposed case	tCO2	138.9			
Gross annual GHG emission reduction	tCO2	20.8			
GHG credits transaction fee	%				
Net annual GHG emission reduction	tCO2	20.8	is equivalent to	4.2	Cars & light trucks not used

GHG reduction income		
GHG reduction credit rate	$/tCO2	

Financial Analysis

Financial parameters			
Inflation rate	%	2.0%	
Project life	yr	25	
Debt ratio	%		
Initial costs			
Heating system	$	180,000	100.0%
Other	$		0.0%
Total initial costs	$	180,000	100.0%
Incentives and grants	$	80,000	44.4%
Annual costs and debt payments			
O&M (savings) costs	$	0	
Fuel cost - proposed case	$	21,365	
Other	$		
Total annual costs	$	21,365	
Annual savings and income			
Fuel cost - base case	$	24,519	
Other	$		
Total annual savings and income	$	24,519	
Financial viability			
Pre-tax IRR - assets	%	0.2%	
Simple payback	yr	31.7	
Equity payback	yr	24.4	

Cumulative cash flows graph



11.3.5 Energy Advantage (2008)

ENERGY AUDIT REPORT

for

City of Prince George

JUNE, 2008

CITY OF
PRINCE GEORGE

Presented by:

Energy Advantage Inc.
5420 North Service Road, Suite #501
Burlington, ON L7L 6C7
Tel.: (905) 319-1717
Fax: (905) 319-7980
www.energyadvantage.com

CITY OF PRINCE GEROGE

ENERGY AUDIT REPORT

TABLE OF CONTENTS

1. INTRODUCTION

A series of twelve energy audits were performed on municipal buildings for the City of Prince George. The facilities audited are:

1. City Hall
2. Coliseum
3. Library
4. Four Seasons
5. Fire Hall #1
6. Civic Center
7. RCMP
8. Art Gallery
9. Aquatic Center
10. Kin Center
11. CN Center
12. 18th ave. Yard

This report describes the findings and recommendations of these energy audits. This report is a follow-up report to the audits performed by Lou Roussinos of TFM Consultants International on behalf of Energy Advantage.

These follow-up audits allowed evaluating that large savings opportunities are present in the two natatoriums and that significant saving opportunities are available in 8 of the 10 other facilities audited. The other two facilities show good performances but and demonstrate only limited potential as far as energy reduction.

A total of 74 energy conservation measures were identified for the twelve facilities. Taken together, these measures represent the following maximum benefits for the City of Prince George[1]:

- Captured 391 000 $ /year in energy cost reduction, which amounts to 25 % of the estimated 2007 total energy spend for the 12 facilities audited
- Realized a 3 years simple payback on a required capital investment of 1 155 000 $, without the effect of possible incentive funding.
- Achieved a total energy consumption reduction estimated at 9 340 000 ekWh per year.
- Cost avoidance. The net permanent reduction in energy consumption represents a reduction by 28% in total annual energy consumption for these buildings.

[1] Some measures are non-additive and were excluded in the summation. Possible cumulative impact between measures are not accounted for.

1.1 Next Steps

The next steps towards the achievement of these energy management program benefits consist of the following:

1. Development of retrofit project funding for implementation (either through the internal capital budgeting process, or via third party financing).
2. Verification of the implementation costs associated with the recommended measures. This is done via solicitation of proposals from installation contractors.
3. The preparation and submittal of incentive funding applications.
4. Determination of how the project management will be performed (either in-house or third party).
5. Project implementation.
6. Post-installation monitoring and verification of the actual cost savings captured.

2. METHODOLOGY

The information contained in this report was collected and produced using five steps:

- Review of the initial audits performed by Lou Roussinos.
- Evaluation of utility invoices, which were provided by the client.
- Interviews with onsite building operations staff members.
- Onsite inspection of mechanical systems and equipment.
- The development of a building energy consumption models and/or of hourly simulation models, specific to each facility, and incorporating local weather data for 2007. The use of such models enables the energy engineering team to evaluate various scenarios of potential energy conservation measures, and measure the direct and indirect (i.e. the ripple effects) impact on energy consumption and/or building performance of the proposed measure.

For each measures, the estimated implementation cost and savings are obtained in order to calculate the ROI.

Energy Advantage Inc. acknowledges, with thanks, the assistance and cooperation of City of Prince George personnel with this energy audit.

3. PROFILES OF THE FACILITIES

3.1 Summary of the facilities

A total of twelve buildings have been audited. The analysis for these facilities have been completed. The initial work in the analysis process consist in determining the baseline performance of the buildings. The energy performance for the facilities can be expressed by the energy use per unit floor area or energy use index (EUI). This metric can be compared to typical value that will vary depending on the vocation. The summary of the performance of these buildings in terms of this metric is presented in Table 1. It must be noted that the floor area is approximate since these were obtained from the partial plans available at the time of the visits as well as data provided by the city. However, in some instances theses areas did not match. Values from the blue prints were used in these cases. Also, it can be mentioned that only partial energy data was available for the Two Rivers Art Gallery, as natural gas data was not provided. Therefore, measures evaluated with regard to natural gas for this facility are more approximate.

Table 1: Summary of the 12 buildings audited in terms of Total Energy Use and Energy Use Index (EUI) per unit floor area

		Total Energy Use (ekWh)				EUI (ekWh/ft2)		
Facility	**Est. area ft2**	**Electric**	**Gas**	**Total**	**% of total**	**Electric**	**Gas**	**Total**
City Hall	58 802	824 400	830 172	1 654 572	4.9%	14.0	14.1	**28.1**
Coliseum	57 092	826 080	602 450	1 428 530	4.3%	14.5	10.6	**25.0**
Library	39 200	659 040	809 375	1 468 415	4.4%	16.8	20.6	**37.5**
Four Seasons	23 900	858 240	3 681 680	4 539 920	13.6%	35.9	154.0	**190.0**
Fire Hall #1	13 875	203 700	228 817	432 517	1.3%	14.7	16.5	**31.2**
Civic Center	70 000	1 054 800	1 415 027	2 469 827	7.4%	15.1	20.2	**35.3**
RCMP	33 000	912 300	207 057	1 119 357	3.3%	27.6	6.3	**33.9**
Art Gallery	19 312	486 240	586 469	1 072 709	3.2%	25.2	30.4	**55.5**
Aquatic Center	52 000	2 261 816	6 108 946	8 370 762	25.0%	43.5	117.5	**161.0**
Kin Center	86 319	2 006 018	1 301 058	3 307 075	9.9%	23.2	15.1	**38.3**
CN Center	140 265	2 218 011	3 035 801	5 253 812	15.7%	15.8	21.6	**37.5**
18th ave. Yard	45 544	604 174	1 772 402	2 376 576	7.1%	13.3	38.9	**52.2**
Total	639 308	12 914 819	20 579 254	33 494 073	100%	20.2	32.2	**52.4**

The EUI is a very common indicator used for benchmarking the performance of buildings. Table 2 shows some typical values compared to the facilities audited. Some values are yet to be obtained.

Table 2: Prince George Buildings EUI and Typical values

Facility	EUI - PG	Typical
City Hall	28.1	39.8
Coliseum	25.0	55.0
Library	37.5	30.5
Four Seasons	190.0	76.7
Fire Hall #1	31.2	26.4
Civic Center	35.3	-
RCMP	33.9	39.8
Art Gallery	55.5	-
Aquatic Center	161.0	76.7
Kin Center	38.3	55.0
CN Center	37.5	55.0
18th ave. Yard	52.2	-
Total	52.4	0.0

While a high EUI does not mean that savings are always easily available, it is a good indicator of the overall performance of a building. In looking at EUIs, one must keep in mind that some specific operating and practical constraints may be the reasons for the high energy usage.

However, based on this information, it is apparent that the Aquatic Center and Four Seasons Pool show very poor performances. It can also be observed that, as expected following observations made during the site visits, City Hall and Fire Hall #1 show good performances. The Art Gallery has a high electric EUI, which is in part due to its more stringent operational requirement but also due to some operational difficulties.

The three buildings with ice rinks are showing a generally good performance on the electric-side. The gas use may be somewhat high for unheated rinks and the typical EUI value may need to be adjusted to better account for the absence of fully heated bleacher sections. Heat recovery from the refrigeration system is minimal in all three facilities.

3.2 Description of the facilities and results

3.2.1 Two Rivers Art Gallery

This facility is one of the newest one audited dating back to 1999. The facility has a total estimated floor area of 19 000 ft2. The building is served by 2 air handling units. Heating is provided by two atmospheric natural gas hot water boilers and humidification is provided by a low pressure natural gas steam boiler. Cooling is provided by an air-cooled reciprocating chiller of 57 Tons capacity. Domestic hot water is provided by a separate natural gas hot water heater. This facility has a building automation system (BAS). The Art Gallery is characterized by its stringent humidification and temperature control. Humidity set point is maintained around 50% for the exhibitions areas with a temperature of 21 ^{o}C. This requires dehumidification with reheat as well as high humidification. The exhibitions areas are served by a constant volume system, which is energy inefficient but required for such tight control. The areas surrounding the exhibition areas are served by a conventional variable air volume (VAV) system. The humidification requirement for this system is also higher than usual as it serves to create a damper zone between outdoor conditions and the critical exhibition areas. Therefore, even this system will be less energy efficient than a standard VAV system. The estimated energy End-Use is shown in Table 3.

The Art Gallery shows the fourth highest EUI of the twelve buildings audited. This is in part due to the tight humidity and temperature control requirements for the Galleries. These areas require having the HVAC system running continuously. However, the system serving the Galleries appear to be plagued with a problem in maintaining the desired indoor temperature due to an insufficient cooling capacity. This has resulted in various actions to reduce this problem such as running both chilled water pumps continuously and using some amount of outdoor free cooling. The estimated energy End-Use is shown in Table 3.

Table 3: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas* ekWh	Total eKWh	% of Energy	Cost[2] $	% of Cost
Lights	159 284		159 284	15.0%	$9 557	19%
Cooling	79 964		79 964	7.5%	$4 798	9%
Heating & Hum.	1 465	565 812	567 277	53.5%	$21 972	43%
Fans	126 290		126 290	11.9%	$7 577	15%
Pumps	58 047		58 047	5.5%	$3 483	7%
DHW		20 657	20 657	1.9%	$799	2%
Plug and Other	48 436		48 436	4.6%	$2 906	6%
Total	473 486	586 469	1 059 955	15.0%	$51 092	100%

*: Data based solely on simulation model

[2] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

Observations made during the audit and possible measures identified for the Two Rivers Art Gallery are:

- AHU1 (General areas) is running 24/7. This system serves the non-critical zones and could be stopped at night conditional to not affecting the galleries.
- AHU1 (General areas) is equipped with a CO2 sensor but appears to have the capacity to modulate up to 30 % outdoor air setting. This setting should be reviewed as to insure it is required to only meet pressurization needs and does not create an additional humidification load. A pressure sensor should be used to provide this control. Occupancy OA should be left to the CO2 sensor. At the time of the visit the CO2 levels were at only 385 ppm but the OA level was at 27 % of supply flow. This indicates that the unit would have been under partial free cooling operation. This caused humidification cost to be greater than what the mechanical cooling cost would have been. This situation would be worse under colder conditions. The OA dampers should be left under the CO2 control in order to avoid high humidification loads and minimize the heating loads. NOTE: Refer to the point regarding cooling capacity prior to considering this measure.
- The humidification set point of 35% appears high as this is not the system serving the Galleries. It may be required if the Galleries are not in positive pressure due to leaks between the zones. If not, this set point could be adjusted to lower values.
- AHU2 (Galleries) is equipped with a CO2 sensor but has a 10 % minimum outdoor air setting. It is recommended by the industry that OA for museum exhibition areas be kept to the minimum required for pressurization and occupant purposes only. This minimum setting should be reviewed as to insure it is required to meet pressurization needs only. A pressure sensor should be used to provide this control for the critical zones (Gallery A, Gallery B). Occupancy OA should be left to the CO2 sensor and outdoor air economizer should not be used. NOTE: Refer to the point regarding cooling capacity prior to considering this measure.
- It can be noted that AHU2 has a relief damper, which is not recommended for a museum application (ref. ASHRAE Handbook HVAC Applications). This may hinder pressurization and make humidity control more problematic by forcing more outdoor air than needed. This will have a cascading effect in increasing the cooling load due to the additional requirement for steam injection (which adds to the cooling load).
- COOLING CAPACITY: It was mentioned during the visit that the cooling capacity for Gallery A and Gallery B was insufficient. The information provided allowed estimating that:
    - The sensible cooling capacity for each Gallery is approximately 40 000 BTU/h.
    - The original maximum lighting load for each Gallery was 31 000 BTU/h. This has been reduced to approximately 21 000 BTU/h by

using 90 lamps instead of 150 W and 100 W that were originally specified.

Dimmers are also used for the lights, which operate often at 50% of their luminous output. Given the cooling capacity and maximum design lighting load, the system can provide an additional 19 000 BTU/h for occupant load and humidification-induced load (i.e. steam sensible heat) under peak lighting conditions. This corresponds to an occupant load of approximately 40 peoples per gallery. The simulation model also indicates that the chiller and chilled water loop may be undersized. The model calculates that at peak time, a loop capacity of slightly more than 700 000 BTUH/h would be required while the chiller has a total capacity of 678 000 BTU/h. Therefore, measures aiming at reducing free cooling to save energy may result in insufficient mechanical cooling. However, since the maximum cooling load does not occur during free cooling periods, this remains an unlikely situation. The operator indicated at the time of the visit that the cooling load cannot be met in the exhibition halls even during non-peak conditions on the chiller (ex. mid-seasons). This cannot be explained based on the lighting load and the design cooling loads for these two spaces. This situation should only arise when the chiller is at peak load and unable to provide a supply water cold enough to insure dehumidification. Otherwise, such inability to meet the cooling load could be an indication that the design airflows for these spaces is not as per the specifications (2200 cfm). An balancing report Would provide this answer. If the airflow is correct, the only remaining possibility is with the chiller performance and control. At part-load, the chiller should easily meet the entire cooling load. This can be validated by analysing the chilled water supply and return temperatures. Given the complexity of the system, the tight control requirements and the high energy use of the facility, a recommissioning of the control algorithm along with performance testing of the HVAC systems could be considered. This would provide a structured approach to obtaining the answer to the current operating difficulties and would insure that all control component operate in the most optimal fashion (eg. No control hunting, no free cooling when humidification needs are larger than cooling expenses, etc.)

- The design lighting power density (LPD) for many spaces in this building is very high at over 3 to 4 W/ft2. Attempts are being undertaken to reduce the LPD. The 400 W and 250 W Metal Halide lamps on the second floor are especially responsible for these high LPD along with the Gallery incandescent lights. The Gallery lights are more difficult to change due to the dimming requirement, the accent lighting requirement and the UV requirement. These lights have already been down rated from 150 and 100 W to 90 W. The 2nd floor HID could be replaced with more efficient lights of lower capacity (e.g. Ceramic Metal Halide). The measure evaluated is based on replacement with T5s. The measure can than include the use of daylight sensors.

- The supply air control for AHU1 and AHU should be on zone reset to minimize reheat requirement. This type of control could not be positively verified during the visit but the control system in place can allow this type of control.
- The heating boilers are atmospheric. Much higher efficiencies could have been achieved in the original design by adapting the design for condensing boilers
- It can be mentioned that the thermal envelope for this building appears to be very good with R-values well above standard practice. The high energy use of the building is not linked to built-in design deficiencies, apart from the lower efficiency boilers, but with operational constraints.

Given the complexity of the system controls, a simulation model was used to represent the building and obtain an estimate of its gas usage. Possible savings from the measures were obtained through this model and are shown in Table 4:

Table 4: Possible Measures for the Art Gallery

Measure	kWh	m3[3]	$	% Energy	% Cost	Implementation cost	ROI
Stopping AHU1*	12 330	8 331	$ 4 072	9.3%	8.0%	$ 900	0.2
Improved 2nd floor lights	23 000	-1 327	$ 849	0.9%	1.7%	$ 12 750	15.0
Zone reset*	3 404	4 659	$ 2 068	4.9%	4.0%	$ 1 800	0.9
Minimum OA flow - AHU2*[4]	-9 248	3 413	$ 810	2.5%	1.6%	$ 3 000	3.7
Condensing boilers	0	5 187	$ 2 075	5.1%	4.1%	$ 40 000	19.3
Recommissioning	23 674	6 805	$ 4 142	8.9%	8.1%	$ 5 794	1.4
Daylight sensors	40 507	-2 208	$ 1 547	1.7%	3.0%	$ 3 200	2.1

*: included in part or in total in recommissionning

The cost for control measures is based on an estimate of the time required for modifying the control algorithm and properly commissioning the routines. The measures for lighting include the interactive effect on heating which are very significant for this building. No significant measures were identified for the exhibition halls.

The utility data was also analyzed to see if any significant changes have occurred over the last few months. This is done by making a running summation of the previous 12-months of utility data. However, in the case of all the facilities audited, the utility data never extended to more than 24 months in the best cases. The result for the Art Gallery show a stable profile over a 23 month period, as is shown in Figure 1.

[3] Gas Data yet to be obtained and required for model calibration and savings estimates.
[4] With a pressure sensor to control the Galleries positive pressure. This measures also entails shutting off and sealing the relief dampers

Finally, figures 2 to 4 show the results for the simulation model compared to the available data. The model is within 3% of electricity of the electricity use. The demand profile shows larger difference but it can also be noted that the utility data show a peak in June. This is an unusual profile for a building with gas heating and mechanical cooling.

Figure 1: Energy Use – 12-Month running summation

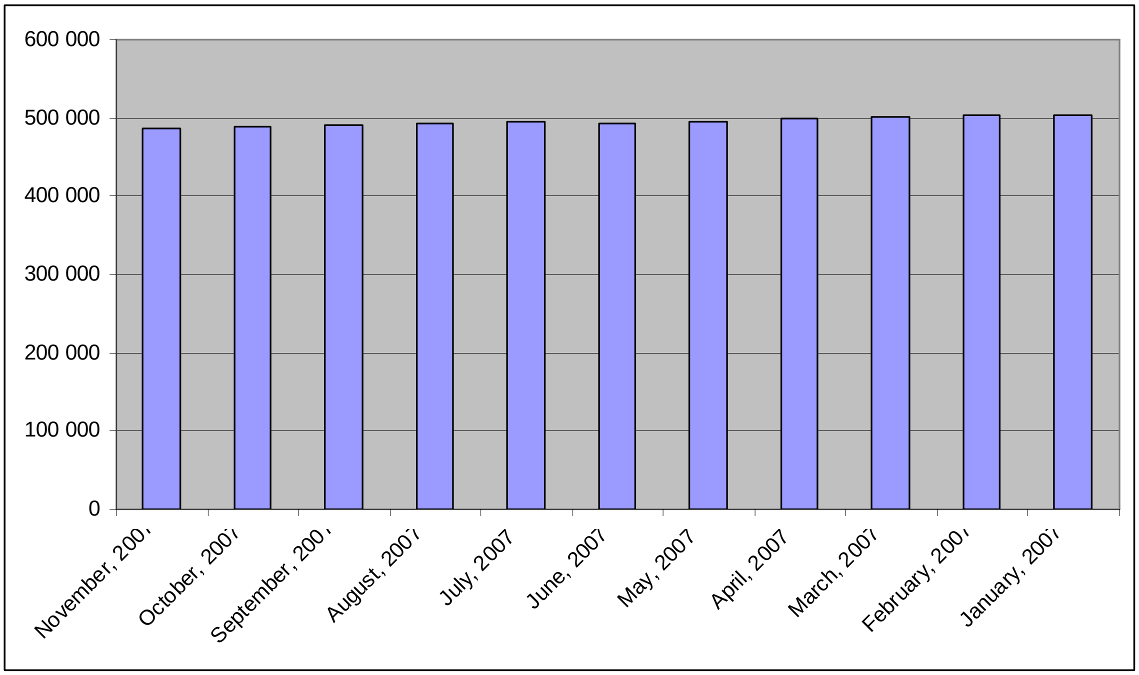


Figure 2: Model vs 2007 data - Electricity

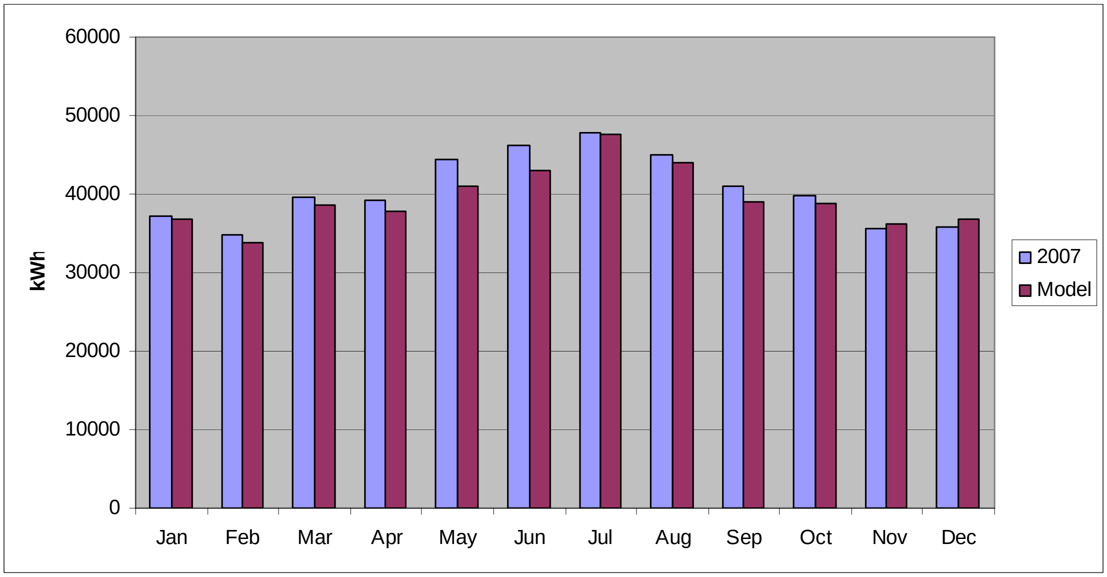


Figure 3: Model vs 2007 data - Demand

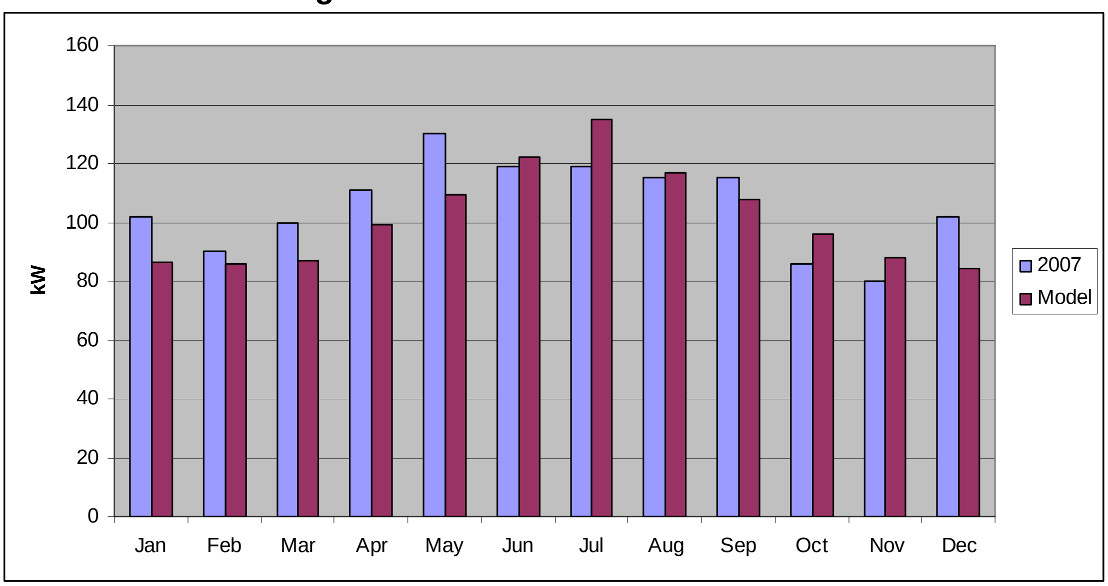
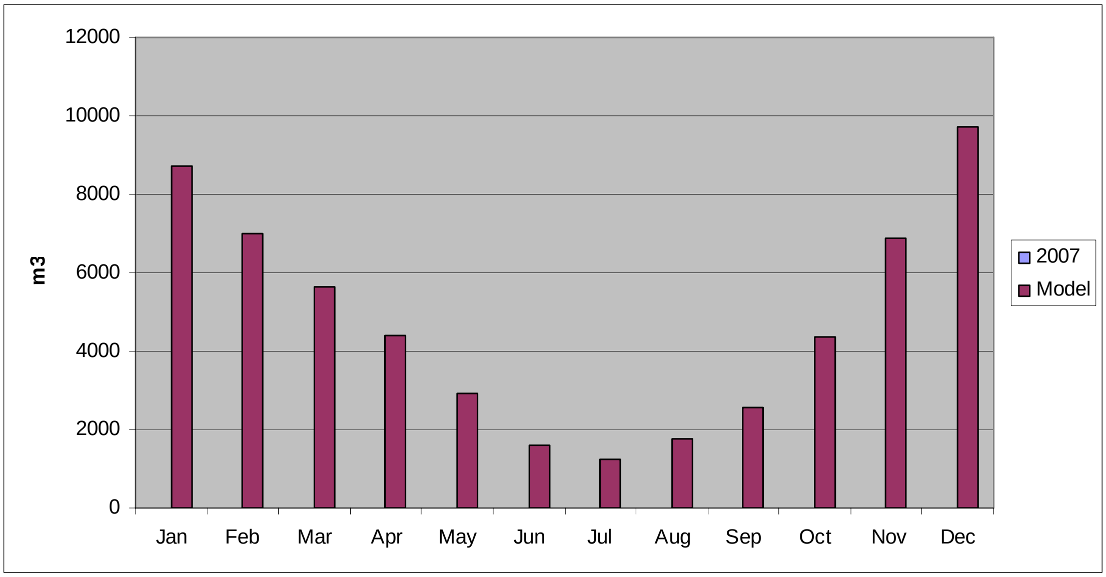


Figure 4: Model gas profile for 2007

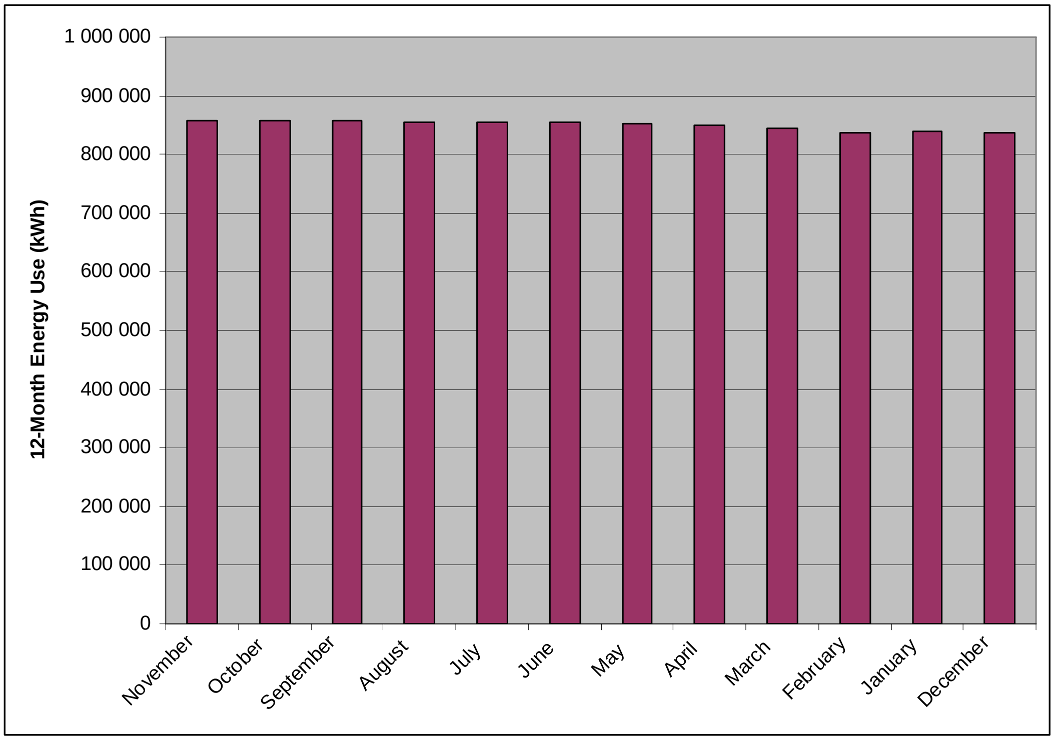


3.2.2 The Four Seasons Pool

The Four Seasons Pool has an estimated conditioned floor area of 24 000 ft2 based on the available plans and estimate from the PG Map web site. This is much smaller than the value provided by the city of 43 000 ft2. This latter value would require the building to have two storeys over most of its footprint, which is not the case. The value of 24 000 ft2 was used in the calculations of the buildings EUI. This facility is served by three main air handling system connected to a DOS-based BAS. An addition was made to this building to add a leisure pool and teaching pool. This section of the building is served by one of the three air handler and has its own set of hot water boilers. The older section of the building has a separate boiler and the other two air handlers, one for the pool section and one for the change rooms and offices. The building does not have mechanical cooling. As in all natatorium, the facility is characterized by a large number of pumps for various pool-related duties. This facility shares a common gas meter with City Hall and its gas usage has to be estimated.

The Four Seasons Pool demonstrates by far the worse performance of all the buildings audited. Pools are notoriously high energy users but the EUI of this facility exceeds the typical usage. The EUI would remain above average even if the larger floor area was used. The electric energy use of the facility is very stable, as shown in Figure 5. This figure shows the running summation of the previous 12-months. A flat profile is indicative that the operation has been very stable. This high EUI for this facility comes in large part from its gas use. Its electricity use is actually lower than that of the newer Aquatic Center.

Figure 5: Electric Energy Use – 12-Month running summation



The gas data also shows a flat profile. However, since the gas meter for the building is a common meter serving City Hall, Fire Hall #1 and the Coliseum, the actual profile can only be estimated as constant. Therefore, the data from this meter needs to be disaggregated between each facility. An hourly simulation model of each building based on the audit information was used to obtain the break down. The analysis showed that the Four Seasons pool was likely responsible for over 68% of the gas usage for this meter.

The utility data analysis also provided an estimate of the load attributable to heating the building and outdoor air and that due to the pool water heating and service hot water.

Table 5: Gas End-use Breakdown

End-Use	Gas - m3	%
Heating	184 603	52%
Pool water + DHW	170 002	48%
Total	354 605	100%

The two main reasons behind the very high EUI for this facility are:

- Use of outdoor air for dehumidification control.
- Low efficiency boilers, mainly for the leisure pool section.

The current efficiencies for the two sets of boilers for this facility were requested but these values are not available. Thus, savings are based on an estimate of their actual performance. Savings figures were obtained by assuming a combined thermal efficiency of 71%. This is not the annual efficiency but the nominal value used in the simulation model.

The estimated energy End-Use break down for this facility is shown in Table 6.

Table 6: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas* ekWh	Total eKWh	% of Energy	Cost[5] $	% of Cost
Lights	247 558		247 558	5.5%	$14 853	8%
Cooling	0		0	0.0%	$0	0%
Heating & Hum.	0	3 667 321	3 667 321	81.0%	$141 842	73%
Fans	186 246		186 246	4.1%	$11 175	6%
Pumps	413 971		413 971	9.1%	$24 838	13%
Plug and Other	10 468		10 468	0.2%	$628	0%
Total	858 243	3 667 321	4 525 564	100%	$193 336	100%

*: Estimated from common meter

Observations made during the audit and possible measures identified for the Four Seasons Pool are:

- As mentioned in the initial audit report, the boilers seem to have very low efficiencies, especially the series serving the leisure pool section. These boilers are in poor shape and need urgent upgrades (ref. Initial audit report).
- The pool is conditioned exclusively using 100% outdoor air without any heat recovery or dehumidification system. Furthermore, the fans are apparently stopped at night, even though this was not the case during the visit. Stopping the ventilation system will deprive the building of its only mean of controlling humidity levels. This will lead to serious humidity built up problems. These were underlined in the initial audit report. ASHRAE does not recommend stopping ventilation at night if it is the only means of controlling humidity levels in natatoriums. The building would greatly benefit both from an energy stand point and a humidity stand point from having a dedicated dehumidifier. This system would allow maintaining the pool area humidity set point while eliminating any night-time outdoor air requirement. Furthermore, the system would provide for heat recovery for pool water heating and reheating. The ASHRAE-required amount of outside air (i.e. 0.5 cfm/ft2) or any other applicable level should also be preheated using a heat recovery exchanger. This would lead to significant

[5] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

savings and insure that the deterioration of the building would be reduced or stopped.
- During the visit, the lights were programmed to remain on 24/7. This was due to a change in the schedules done by on-site personnel. On a yearly basis, this could lead to 3 500 $ in additional electrical cost.
- Most lights in the facility are either T8s or Metal Halide but a few incandescent are left in the lobby. These represents very small savings but should be replaced by compact fluorescents. The pool Metal Halide could be replaced by more efficient pulse start model.
- Additional savings from maintenance issues are available as was reported in the initial audit. However, savings from this measure could not be quantified.

Saving estimates for the measures for the Four Seasons Pool are shown in Table 7.

Table 7: Possible Measures for the Four Seasons Pool

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Forced draft mid-efficiency boilers	0	66 488	$ 26 595	15.2%	13.8%	$ 89 400	3.4
Dehumidifier w/heat recovery	-128 000	163 982	$ 57 913	34.6%	30.0%	$168 750	2.9
High efficiency HID	14 783	0	$ 887	0.3%	0.5%	$ 4 500	5.1

Figure 6: Inefficient atmospheric boilers – Four Seasons Pool

3.2.3 The Aquatic Center

The Aquatic Center is one of the newest facilities audited but also has the second worst EUI. This is obviously due to the presence of the pools, just as in the case of the Four Seasons Building, but also due to inherent design characteristics. This facility has a total floor area estimated at 52 000 ft^2. It is served by 8 main air handlers. Heating is provided by two 6 000 000 BTU/h Cleaver-Brooks boilers. The three air-handlers servings the pool do not have any mechanical cooling while the reaming systems, serving the ancillary areas have direct expansion cooling. The pool systems all use outdoor air for dehumidification, similar to the Four Seasons Pool design. These systems however do not operate at 100% outdoor air and have some amount of recirculation. The building also has a large number of pumps serving the pools. All the HVAC systems are connected to a modern BAS.

Despite being a new pool, the design does not include a dehumidifier for the pool area. Therefore, humidity control is again done using outdoor air. The performance of this building is better than that of the Four Seasons in great part due to its newer and therefore relatively more efficient boilers. The initial estimate for the Four Seasons Pool show that it would have just about the same EUI if mid-efficiency boilers were used. Thus, the two building are basically operating similarly on all other energy-related aspects. The Aquatic Center three single zone recirculation air-handling systems serving the pool area were providing approximately 34 000 CFM of outdoor air at the time of the visit.

A utility data analysis provided an estimate of the load attributable to heating the building and outdoor air and that due to the pool water heating and service hot water[6].

Table 8: Gas End-use Breakdown

End-Use	Gas - m3	%
Heating	389 105	66%
Pool water	201 588	34%
Total	590 693	100%

The estimated energy End-Use break down for this facility is shown in Table 9.

[6] By considering negligible heating demand in July.

Table 9: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas ekWh	Total eKWh	% of Energy	Cost[7] $	% of Cost
Lights	443 546		443 546	5.3%	$26 613	7%
Cooling	77 161		77 161	0.9%	$4 630	1%
Heating & Hum.	0	6 108 946	6 108 946	73.0%	$236 277	64%
Fans	751 226		751 226	9.0%	$45 074	12%
Pumps	893 055		893 055	10.7%	$53 583	14%
Plug and Other	96 104		96 104	1.1%	$5 766	2%
Total	2 261 093	6 108 946	8 370 039	100%	$371 943	100%

Observations made during the audit and possible measures identified for the Aquatic Center are:

- The design incorporated heat recovery exchangers for the pool HVAC systems (AHU 1,2,3). However, these are either no longer operational or no longer in place. This is due to perforations to the recovery coils. A review of the utility data prior to having the coils removed could indicate the impact of this system and the ROI for having good quality replacements installed. Initial estimates indicate that the savings from heat recovery would be in the order of 50 000 $/yr if the coils and systems are operating correctly. This assumes a 30% outdoor air ratio and a 50% recovery effectiveness.
- The much larger air flow in this facility appears to be allowing a better control of the humidity level, at the cost of higher energy use from outdoor air. The use of a dehumidifier would lead to significant savings but does not have the benefit of also saving the building from high humidity as for the Four Seasons pool. It would allow closing outdoor air dampers at night and heating the pool with the heat rejection from the dehumidifier.
- An overview of the control system showed some apparently inadequate settings. In one instance, a heating coil was combating a DX cooling coil (AHU-8). The same system had an apparent erroneous reading for its mixed air temperature (69.5 oC). Both boilers pumps were observed to be running at the time of the visit while only one was shown as “ON” on the system but with two distinct AMPS readout. The Lobby set point was set at 27 oC and many room temperature reading were well above their set points. This is indicative that a review of the control system is required. This would require sensor calibration as well as a review of the control logic to insure that it meets the design intent as well as energy efficiency targets.
- The initial audit indicated that the boiler operation could be optimized. Savings estimate from an improved operation were base on a rather conservative 5% improvement in overall efficiency.

[7] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

- AHU-6 (offices) was estimated to be running at close to 60% OA while in full heating mode. A CO_2 sensor or a review of the outdoor air requirement for this system would be required.

Figure 7: AHU-8 Control Screen

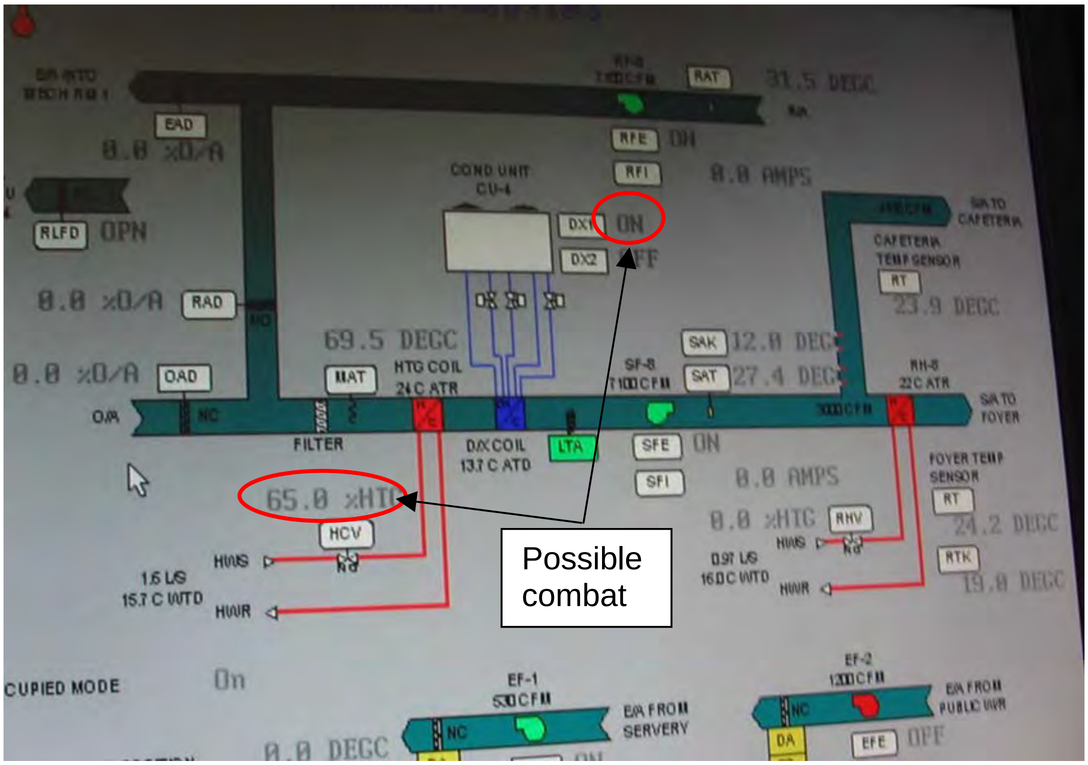
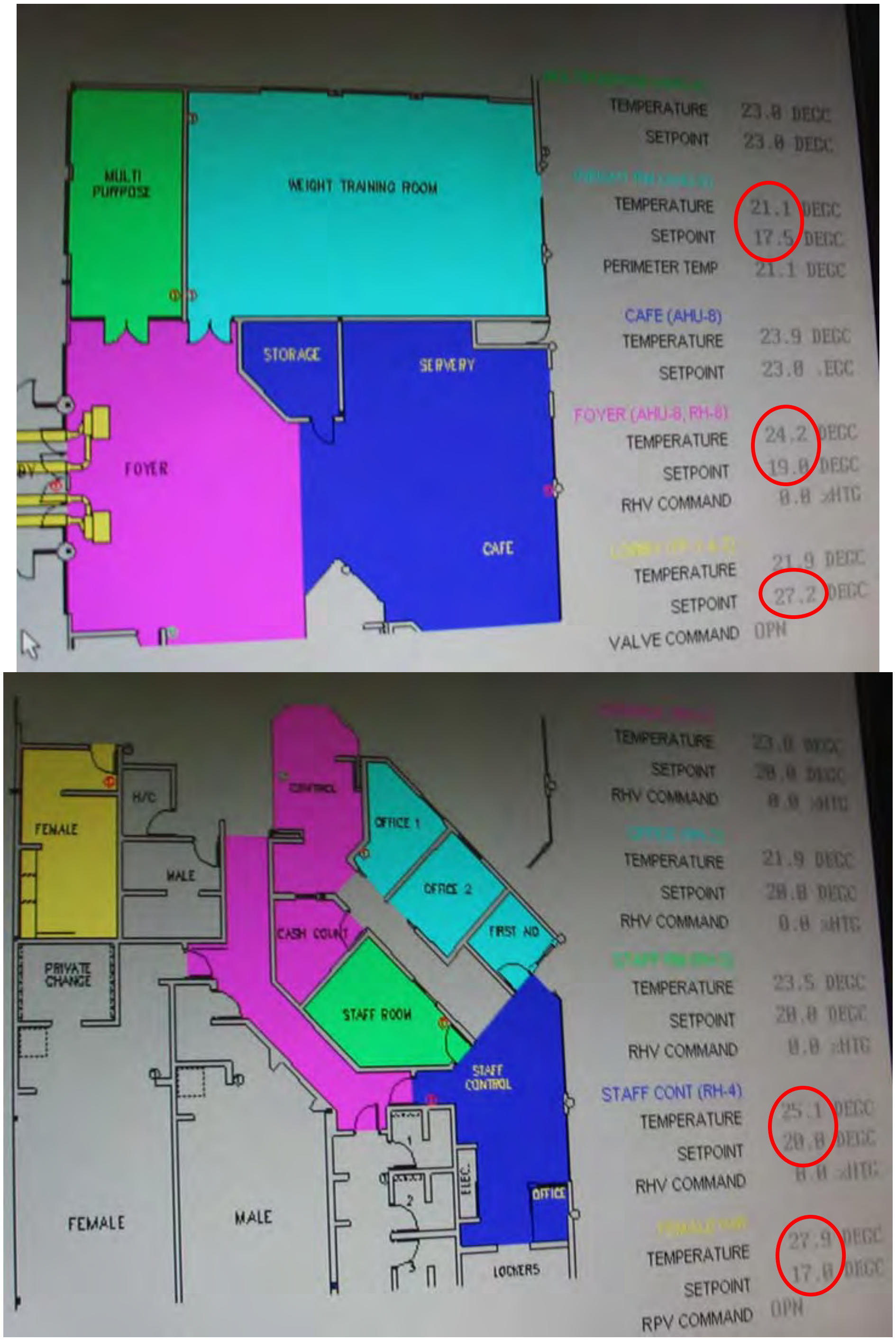


Figure 8: Room SP Control Screen



Saving estimates for the measures for the Aquatic Center are shown in Table 10.

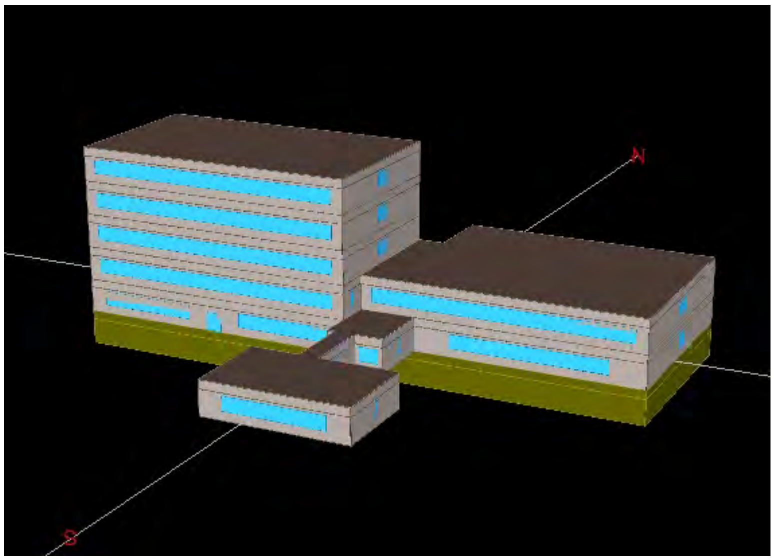
Table 10: Possible Measures for the Aquatic Center

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Heat recovery system	0	138 709	$ 55 484	17.1%	14.9%	$172 107	3.1
Dehumidifier	-192 000	141 112	$ 44 925	15.1%	12.1%	$180 750	4.0
CO2 sensr on AHU6	0	9 378	$ 3 751	1.2%	1.0%	$ 4 500	1.2
BAS recommissioning	20 301	30 545	$ 13 436	4.0%	3.6%	$ 10 400	0.8
Boiler optimization	0	36 918	$ 14 767	4.6%	4.0%	$ -	-

3.2.4 City Hall

City Hall is one of the best performing building audited as far as EUI is concerned, with only Fire Hall #1 being in the same range of values. This building is characterized by a good operation with its scheduling being adhered to rigorously. This building was also modeled in order to obtain some saving estimates, namely for a window retrofit measure considered by the city. The schematic of the model is shown in Figure 9.

Figure 9: eQuest Representation of City Hall.



The estimated energy End-Use obtained by the model is shown in Table 11.

Table 11: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas* ekWh	Total eKWh	% of Energy	Cost[8] $	% of Cost
Lights	277 700		277 700	16.7%	$16 662	20%
Cooling	25 050		25 050	1.5%	$1 503	2%
Heating & Hum.	0	826 934	826 934	49.8%	$31 984	39%
Fans	189 550		189 550	11.4%	$11 373	14%
Pumps	39 710		39 710	2.4%	$2 383	3%
DHW		9 464	9 464	0.6%	$366	0%
Plug and Other	292 390		292 390	17.6%	$17 543	21%
Total	824 400	836 398	1 660 798	100%	$81 814	100%

*: Estimated from common meter

[8] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

The model was used to provide an estimate for a window retrofit. Base windows considered are standard double galzed (clear) windows. A number of window configuration were tested, namely double low-e/argon (clear), double tinted low-e/argon and triple low-e/argon (clear). In all cases, vertical blinds were considered in the model.

The savings obtained are:

- Double low-e/argon: 117 000 ekWh and 4 600 $/yr.
- Double tinted low-e/argon: 117 000 ekWh and 4 600 $/yr.
- Triple low-e/argon: 149 000 ekWh and 5 900 $/yr.

The ROI is estimated at about 5 yrs for the double low-e cases and 6 yrs for the triple case. This is a rough estimate based on an extra cost of 3 $/ft2 for the doubles and 5 $/ft2 for the triple.

Observations made during the audit and possible measures identified for City Hall are:

- Information gathered during the site visit indicated that most control related measures are implemented either using the control system or manually. The lights were observed to be off in unoccupied spaces such as the Council Chamber and Conference room. The boiler is off in the summer time while the chiller is off in the winter. Heating pumps are off above 12 oC outdoor temperature. Ventilation is stopped at night. The supply air temperature is reset based on outdoor conditions as well as the heating water loop.
- The initial audit report indicates that the boiler efficiency is likely to be very low. A preliminary estimate based on a nominal efficiency of 66% (i.e. not annual efficiency) was done. The measure would consist in replacing the existing boiler with a mid-efficiency unit (84% nominal).
- The reciprocating chiller is over 30 years old. The efficiency of the unit is likely to be low compared to modern standards. However, the buildings cooling load is small and there is no ROI for an early replacement of this unit. However, when the unit will need replacement, savings from a high efficiency units were evaluated in the simulation model.
- Both the Council Chamber and the Conference room have push buttons to activate the HVAC system. However, these caused problems and are no longer used. Therefore, the ventilation system is running during all normal office hours. Savings would however be quite modest due to the absence of significant amount of outdoor air brought in by these two systems according to the BAS data taken during the visit.
- Lighting is based on 3-T8 fixtures with reflectors. Many fixtures had their center tube off. Opportunity for savings on lighting is minimal in City Hall.

- The small domestic water heater is fairly inefficient but has a very low load. As mentioned in the initial audit report, this unit could be replaced but only when it will fail since energy savings will not provide a ROI based on an early replacement cost.
- Based on the electric utility bill analysis and simulation model, it appears that the plug load is significant for this building. A closer examination of the office equipment and data center equipment should be perform to insure that whenever possible the equipment goes into sleep mode. An hourly monitoring of the building electrical demand would provide a more definite answer to the level of savings achievable through plug load management.
- Some systems could use demand control ventilation to minimize the outdoor air loads. The customer service system was running at 30% OA during the visit while AH-2 was shown at 37% (VAV system).

Saving estimates for the measures for City Hall are shown in Table 12.

Table 12: Possible Measures for City Hall

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Forced draft mid-efficiency boilers	0	19 990	$ 7 996	12.5%	16.2%	$ 74 700	9.3
Window replacement - triple	3 409	14 421	$ 5 973	18.5%	12.1%	$ 35 800	6.0
Window replacement - double	4 029	10 995	$ 4 640	14.3%	9.4%	$ 21 480	4.6
Demand control ventilation	0	4 527	$ 1 811	5.7%	3.7%	$ 1 600	0.9
AHU-4&5 control (Council&Conf.)	6 535	-253	$ 291	0.5%	0.6%	-	0.0
DHW Heater Replacement	-4 732	915	$ 82	0.6%	0.2%	3200.0	None
High efficiency chiller*	9 098		$ 546	1.1%	1.1%	$ 6 750	12.4

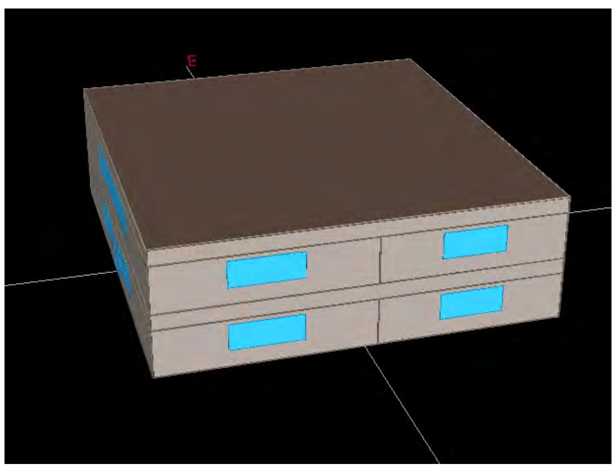
*: supplemental cost for high efficiency

3.2.5 Fire Hall #1

Fire Hall #1 is the smallest of the buildings audited with a floor area of approximately 14 000 ft^2 over two storeys. This building shares a common gas meter with City Hall, Four Seasons Pool and the Coliseum. This facility shows the third lowest EUI of all buildings audited. It vocation and limited HVAC systems are the main reasons for this low EUI. As for all the other building connected to the City Hall gas meter, its EUI is estimated since there is only one meter for four buildings. The heating for the Fire Hall is provided by four Lennox furnaces for the ground floor. Each furnace provide approximately 2000 cfm of supply air with an estimated outdoor air ratio of 25 %, according to the building's operator. The living quarters on the upper floor do not have any cooling. The upper floor call Center and ground floor front offices are served by rooftop units. These units are set at about 15% outdoor air. There is also a small split air-conditioner for the data center. The building does not have a BAS.

A simplified model of this building was built to obtain a heating energy use estimate and some savings estimate. The schematic of the model is shown in Figure 10.

Figure 10: Simplified eQuest Representation of Fire Hall #1.



The estimated energy End-Use obtained by the model is shown in Table 13.

Table 13: Estimated End-Use Breakdown

End-Use	Electricity KWh	Gas* ekWh	Total eKWh	% of Energy	Cost[9] $	% of Cost
Lights	86 610		86 610	20.1%	$5 197	25%
Cooling	6 161		6 161	1.4%	$370	2%
Heating & Hum.	0	215 182	215 182	49.9%	$8 323	40%
Fans	40 969		40 969	9.5%	$2 458	12%
Pumps	0		0	0.0%	$0	0%
DHW	0	12 743	12 743	3.0%	$493	2%
Plug and Other	69 960		69 960	16.2%	$4 198	20%
Total	203 700	227 925	431 625	100%	$21 037	100%

*: Estimated from common meter

Observations made during the audit and possible measures identified for City Hall are:

- Most light fixtures have been changed from T12 to T8. A few T12 are left and could be retrofitted. Savings are very limited with regard to lighting. The use of 28 T8 fixtures could be tested in the few areas mostly served by T8s and some incandescent in the living quarters could be replaced by CFLs.
- Lights are manually controlled in this building. At the time of the visit, lights were left on in many unoccupied areas. The vocation of the facility may prevent using automatic controls, such as occupancy sensors. An awareness program may help obtain some savings from better control. However, the savings would still be fairly small given the low power density of lighting in this facility.
- The 25% outdoor air value for the Lennox units may be high at time of low activity in the garage section. If code requirements allow modulating the outdoor air, this could provide savings. It must be mentioned that the 25% value used for the calculation is only an estimate from the operator and an air balance would be required to validate this value prior to looking further into this measure.
- The RTUs are controlled through programmable thermostat and are in “auto” mode. This is an optimal setting and the outdoor air amount is also quite low. Savings from CO2 sensors would be very small.

Saving estimates for the measures for Fire Hall #1 are shown in Table 14.

[9] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

Table 14: Possible Measures for Fire Hall #1

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Outdoor air reduction - Furnaces	0	6 557	$ 2 623	15.7%	12.5%	$ 2 000	0.8
CO2 sensors - RTUs	0	3 799	$ 1 520	9.1%	7.2%	$ 1 500	1.0
Occupancy sensors/awarness	6 496	-496	$ 191	0.3%	0.9%	$ 1 500	7.8
28 W T8s and CFLs	5920	-452	$ 174	0.3%	0.8%	$ 260	1.5

3.2.6 The Coliseum

This arena has an estimated floor area of 57 100 ft^2 as provided by the City. The area was estimated at around 50 000 ft2 from the blueprint. Given the relatively small difference between these values, the area provided y the City was used in calculating the EUI. It is a one-rink facility built in the early 1950's. The ice sheet is maintained approximately 10 months per year. The ice rink section of the building has only infra-red heaters over the bleachers area for heating. The heaters are controlled by timers which are set by the occupants. The change room, washrooms and staff room are served by recently installed horizontal furnaces with programmable thermostats. The front lobby and vestibule are served by a gas-fired make-up air unit. The snow melting system is served by a 3 000 000 BTU/h boiler. No heat recovery from the refrigeration system is used in this facility. The refrigeration system is an ammonia-based system with two 50 hp MyCom compressors and an evaporative condenser. Domestic hot water is provided by a separate natural gas hot water heater. This facility does not have a building automation system (BAS). A dehumidifier was added in 2004-2005 and has a 55% - 60% RH set point.

The Coliseum shows the lowest EUI of the twelve buildings audited. This very good performance is due to the low heating requirement of the facility but also to its efficient equipment and operation. The estimated energy End-Use is shown in Table 15.

Table 15: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas* ekWh	Total eKWh	% of Energy	Cost[10] $	% of Cost
Lights	174 053		174 053	12.3%	$10 443	15%
Cooling, dehum.	12 833		12 833	0.9%	$770	1%
Heating	18 250	361 470	379 720	26.9%	$15 076	21%
Fans, pumps	56 502		56 502	4.0%	$3 390	5%
Refrigeration	522 765		522 765	37.1%	$31 366	44%
DHW, snow melting	0	240 980	240 980	17.1%	$9 320	13%
Plug and Other	22 733		22 733	1.6%	$1 364	2%
Total	807 136	602 450	1 409 586	100%	$71 729	100%

*: From a common meter

Observations made during the audit and possible measures identified for the Coliseum are:

- This facility has a very low EUI and the walk-through confirmed that the building operation and equipment are efficient. This was also underlined in the initial audit report.

[10] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

- Some savings are available with regard to lighting. T12s are still used in the facility as well as incandescent lights in the lobby and vestibule. Furthermore, all the lights in the arena were on during the walk-through even though there was no activity. The metal halide in the rink section reduces the possibility of frequent switching of the fixtures due to the re-strike time but savings opportunities remain in reducing their usage. This measure may require changing to other type of metal halide, such as pulse start fixture. Similarly, lights in the south-west lobby were all on at the time of the visit (all incandescent ceiling fixtures).
- Heat recovery for snow melting could be analysed in order to reduce gas usage. This measure is partially implemented at the Kin Center.
- The ice temperature is monitored and controlled.
- The arena has a low emissivity ceiling.
- Exhaust ventilation in the rink section has minimal use.
- The vestibule and lobby unit is set to bring in 50% outside air according to the building's operator. This value appears high and could be optimized.

A simplified simulation model using the OEE's Arena EE Wizard was used to represent the building and obtain an estimate of its gas usage. Possible savings from the measures were obtained through this model and are shown in Table 16:

Table 16: Possible Measures for the Coliseum

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Rink lighting control	75066	0	$ 4 504	5.3%	6.2%	$ 13 250	2.9
T8s and CFLs	31 223	-755	$ 1 571	1.6%	2.2%	$ 6 638	4.2
Occupancy sensors*	26 217	-634	$ 1 320	1.4%	1.8%	$ 4 000	3.0
Heat recovery - snow melting	0	7 767	$ 3 107	5.6%	4.3%	n.a.	-
Lobby system outdoor air	0	4 148	$ 1 659	3.0%	2.3%	$ 260	0.2

*: Savings after implementation of T8s and CFLs.

The utility data was also analyzed to see if any significant changes have occurred over the last few months. The result for the Coliseum show a slight 5.5% increase over a 23 month period, as is shown in Figure 11. This is almost entirely due to a very large and unusual peak in consumption in August 2007.

Figure 11: Electric Energy Use – 12-Month running summation

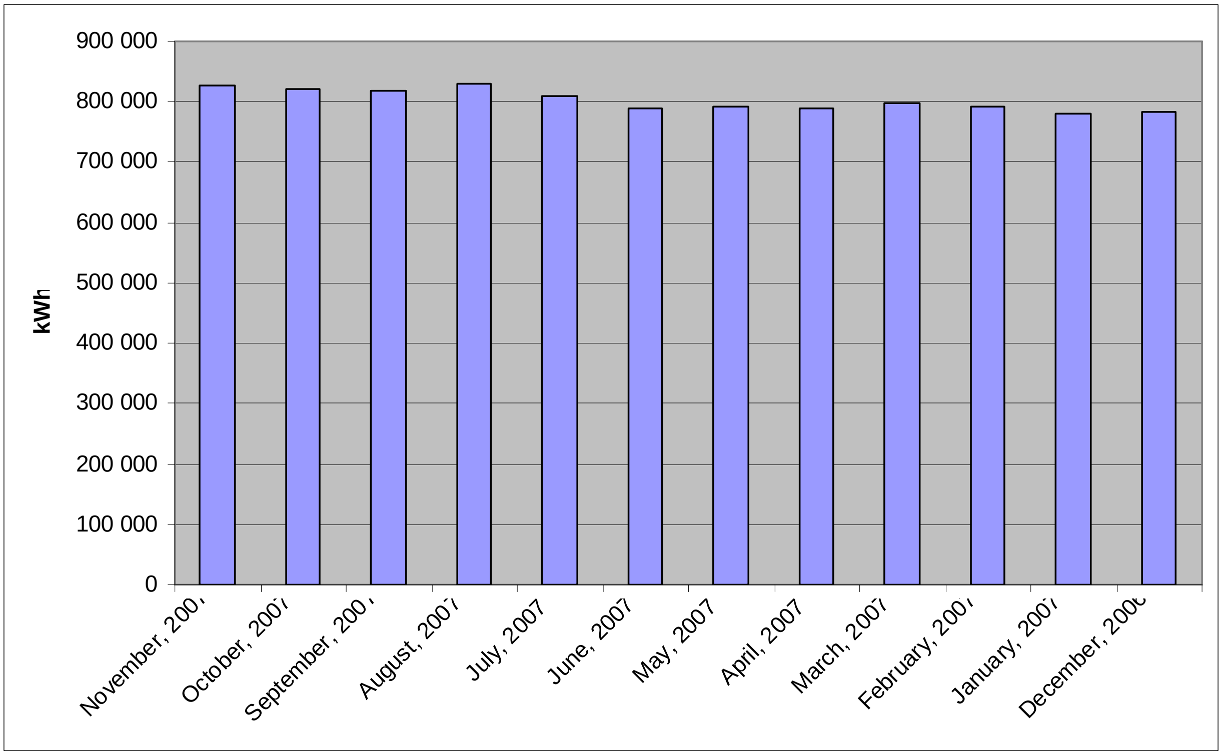
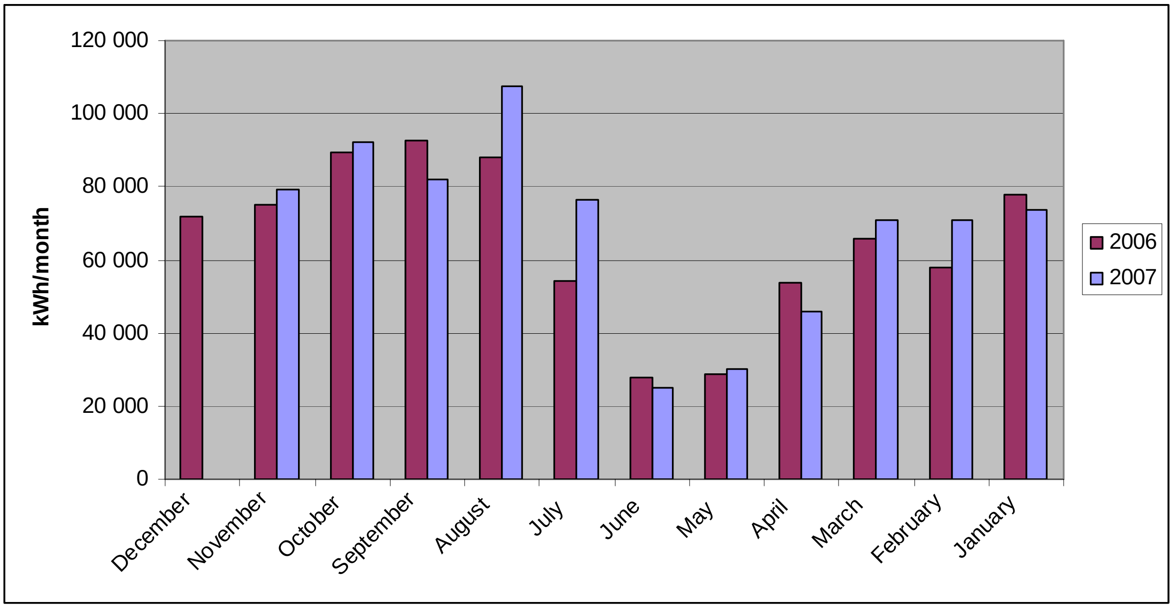


Figure 12: Rink lights on during unoccupied periods

Figure 13: Monthly Electric Energy Use – August 2007 abnormal usage



3.2.7 The Civic Center

The Civic Center is a 2-storey facility with an estimated total floor area of 70 000 ft2. The construction date provided during the visit was 1994, therefore it is a fairly recent construction with a good thermal envelope. The building is served by 8 air handling units. Three systems are single zone units, each serving one of the gymnasium located in the center of the building (AHU-1 through AHU-3, 12 000 cfm each). Heating Another unit, AHU-4 serves the kitchen. The kitchen operates its exhaust only in the day, from approximately 7:00 until 17:00, 6 days/week. The kitchen serves approximately 330 meals/day over the course of the year. Change rooms and washrooms are served by AHU-5, which is a make-up air unit of 4000 cfm with a heat pipe recovery system. Meeting rooms on the second floor and offices are served by a AHU-6, which is a 9500 cfm VAV system with 15% outdoor air and reheat coils. The main lobby is served by a single zone system (AHU-7). This system, has 0% minimum outdoor air and 21 000 cfm supply. Finally AHU-8 serves the Rotunda. It is a small 2 500 cfm single zone system with 0% minimum outdoor air. Heating is provided by 4 forced-draft hot water boilers. Cooling is provided by one York chiller with a dry condenser. Domestic hot water is provided by two atmospheric hot water heaters. The building has a BAS to control HVAC systems but lighting is under manual control. All fluorescent fixtures are T8s. Gymnasiums have 400 W metal halide as well as 120 W recessed incandescent for dimming applications. The estimated energy End-Use is shown in Table 17.

The Civic Center shows the fifth lowest EUI of the twelve buildings audited. This is a very good performance considering the presence of a full service kitchen that serves up a large number of meals per year. This performance is close to that expected from an average office building. This is due to the scheduled operation of the HVAC systems, the type of boilers used and also indicates that there appears to be a good discipline in turning off the lights during unoccupied periods.

Table 17: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas ekWh	Total eKWh	% of Energy	Cost[11] $	% of Cost
Lights	338 101		338 101	13.7%	$20 286	17%
Cooling	113 860		113 860	4.6%	$6 832	6%
Heating		1 068 727	1 068 727	43.3%	$41 335	35%
Fans	321 847		321 847	13.0%	$19 311	16%
Pumps	109 152		109 152	4.4%	$6 549	6%
DHW, Cooking	49 200	346 300	395 500	16.0%	$16 346	14%
Plug and Other	122 640		122 640	5.0%	$7 358	6%
Total	1 054 800	1 415 027	2 469 827	100%	$118 017	100%

[11] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

Observations made during the audit and possible measures identified for the Civic Center are:

- The kitchen exhaust is stopped at night. This is often not possible when pilot flames are present but is obviously not the case here. Further savings could be obtained by using variable flow exhaust hoods. The ROI of the measure is reduced due to having the system already stopped at night. Also, the actual exhaust flow was estimated since no data was available at the time of the visit.
- The gymnasium air handling units have heat pipe recovery system as well as the change room system. This is a good indicator that energy efficiency was considered in this design. These systems also allow for air-side economizers.
- The small tertiary pumps used at system-level were operating even when the systems were off at the time of the visit. However, these are very small and will not amount for significant savings.
- All systems have hot and chilled water coils with the exception of AHU-4 (Kitchen), which is a gas-fired unit, and AHU-5, which has no cooling.
- AHU-6 has a VSD on its supply fan, which is another efficiency measure for this building. However, at the time of the visit, this system was using mechanical cooling while its outdoor air damper was not fully open even if free cooling was available.
- The BAS indicated fresh air damper positions of only 7.6% for AHU-7 while the temperature readings provided an estimate of 39%. For AHU-8, the damper was indicated at 53% while temperature readings only indicated a 7% value. This is an indication that some sensors are not reporting correct value. The lack of economizer cooling on AHU-6 may be linked to similar problems. A review of the BAS should be done to insure that all control algorithm and sensors are operating properly. Since this does not appear to be a significant problem, an in-house review should be sufficient.
- Most systems have 0% setting for their minimum fresh air dampers. Fresh air is provided through free cooling. This is not a recommendable procedure even though it is very energy efficient. Demand control ventilation (DCV - CO_2 sensors) should be used to insure that air quality is maintained. In this case, DCV will not lead to energy savings since the building is already using such low outdoor air flows.
- The boilers were all operating (excepted the one under repair) at the time of the visit. As it was indicated in the initial audit, the boilers should be sequence to meet the load and only the minimum required number be kept on-line.
- The domestic hot-water heater are low efficiency models. These could be replaced by condensing units. Alternately, if heating from the main boilers is required year-round, a plate exchanger could be used to provide DHW

through the main boilers. However, the main boilers are off from June until September and condensing hot-water heaters would be the more efficient option.

- The T8 fixtures could be using 28 W or 25 W tubes instead of 32 W. The light level would required to be verified in more details to select the possible wattage.
- The 400 W HID in the Gymnasium could be replace with 320 W pulse-start lamps.
- The two secondary heating pumps (7.5 hp) were both operating at the time of the visit. It was indicated that the pump should only operate alternately and not simultaneously. This operation should be verified and one pump stopped if not required.
- All pumps are constant flow. A variable flow system could be considered for the chilled water loop. This would required changing the valves for 7 AHUs and there would also be a limit imposed by the chiller for the minimum flow setting.

Saving estimates for the measures for the Civic Center are shown in Table 18.

Table 18: Possible Measures for the Civic Center

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Condensing water heater	0	5 307	$ 2 123	2.2%	1.8%	$ 16 300	7.7
Free cooling AHU-6	9 090	0	$ 545	0.4%	0.5%	$ -	0.0
28 W T8s*	7 418	-143	$ 388	0.2%	0.3%	$ 1 355	3.5
25 W T8s*	17 308	-335	$ 905	0.6%	0.8%	$ 2 710	3.0
Pulse-start HIDs	26 622	-515	$ 1 391	0.9%	1.2%	$ 8 700	6.3
VSD chilled water loop	12 589	0	$ 755	0.5%	0.6%	$ 6 150	8.1
Boiler sequencing	0	7 750	$ 3 100	3.2%	2.6%	$ -	0.0
Tertiary pump control	3 397	-197	$ 125	0.1%	0.1%	$ -	0.0
Variable flow hoods	16 991	8 200	$ 4 299	4.1%	3.6%	$ 15 000	3.5

*: added cost compared to 32 W tubes

The utility data history, shown in Figure 14, indicate a very stable electric profile for this facility but a noticeable increase for gas. Gas use from 2006 to 2007 has increased by 23.5% while heating degree-days have only increase by 4.5 %. The reason for this increase could not be clearly identified but could be linked to a more important use of the facility, such as the kitchen (and associated exhaust). However, the electric load and gas summer usage has remained fairly constant and this would tend to indicate that building usage has remained fairly similar. A regression analysis of the gas usage against the heating degree-days was performed for 2006 and 2007. Results, shown in Figure 15, clearly indicate that for identical heating conditions, the building was using more gas in 2007 than in 2006. If this cannot be attributed to a higher building usage, than the very likely cause will be a decrease in boilers efficiencies, possibly combined with higher outdoor airflows in the building. Higher flows could be due to errors in the BAS sensors and/or programming. As mentioned, a review of the BAS is recommended. Savings according to the regression analysis could be in the order of 20 000 m3/yr or 8 600 $. This is assuming that the increase was not due to a change in building usage.

Figure 14: Electric & Gas Energy Use – 12-Month running summation

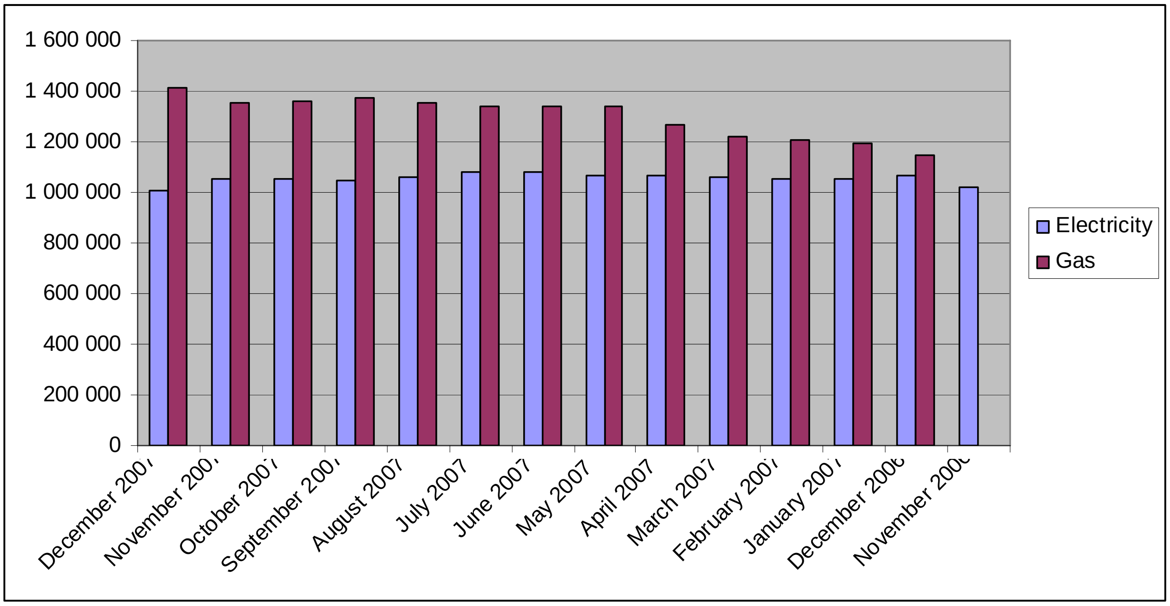
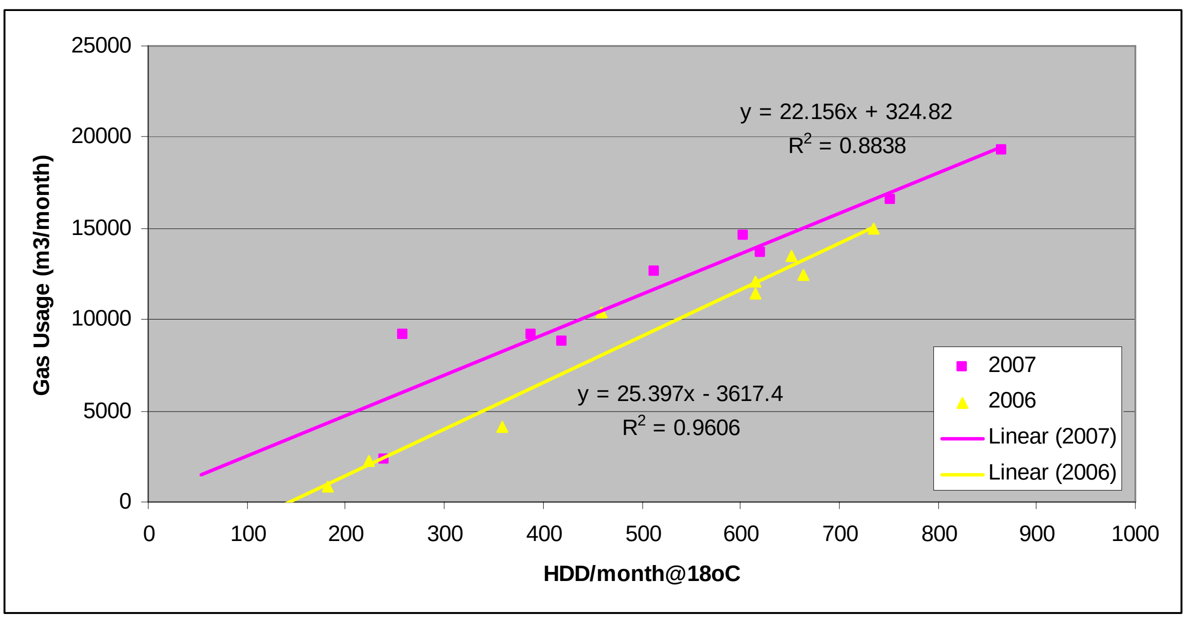


Figure 15: Monthly Gas Use – Regression Analysis



3.2.8 *The Library*

The Library is a 39 000 ft2 two-storey building. The design is characterized by being on stilts and thus having its ground floor exposed to outdoor conditions and also by its high fenestration area. The total floor area provided by the City for this facility was twice the value calculated from the plans. The value estimated from the plans was used in the analysis. The building HVAC is based on a distributed water-loop heat pump system. This type of system is typically a very efficient design that can use the building's internal gain for heating purposes. This system allows cooling and heating to be done simultaneously in different zones without energy penalties. However, in this particular case, the heat pump loop design is not well suited since the building does not have significant internal zones requiring year-round cooling. Both floor are mostly open areas that will be all either in cooling or in heating mode at the same time. Therefore, the potential for reusing internal gains for heating purposes is almost non-existent. Under such a configuration, the heat pump loop will require the use of boilers to maintain the loop temperature in the winter and a cooling tower in the summer. The heat pumps will provide little savings in the winter since they will only act as additional motors in a gas-heating system. The heat pump loop in this facility is served by two atmospheric hot water boilers and a cooling tower. Fresh air is provided by two make-up air units (100 % outdoor air). Domestic hot water is provided mostly by an atmospheric hot water heater. This building has a BAS that controls both HVAC and lights, including the parking lot lights.

The Library shows the seventh highest EUI of the twelve buildings audited but has an EUI 23% higher than that of a typical equivalent facility. The estimated energy End-Use is shown in Table 19.

Table 19: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas* ekWh	Total eKWh	% of Energy	Cost[12] $	% of Cost
Lights	291 354		291 354	20.2%	$17 481	25%
Cooling	39 690		39 690	2.8%	$2 381	3%
Heating	88 780	790 988	879 768	61.1%	$35 920	52%
Fans	76 450		76 450	5.3%	$4 587	7%
Pumps	47 880		47 880	3.3%	$2 873	4%
DHW	0	18 387	18 387	1.3%	$711	1%
Plug and Other	86 145		86 145	6.0%	$5 169	7%
Total	630 299	809 375	1 439 674	100%	$69 122	100%

Observations made during the audit and possible measures identified for the Library are:

[12] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

- The heat pump loop design is an efficient design but not adapted for this type of facility with minimal core zones.
- The lighting power density is fairly high, especially on the second floor. The design is based on T8 lamps and does not use the significant amount of available daylight in the building. The BAS could be used for daylight harvesting through the use of light sensors. Further light level measurements could lead to replacing the existing tubes with 25 W T8s, which will reduce the peak lighting intensity (Lux) by 15%.
- The make-up air units could be controlled according to the occupancy levels through the use of CO2 sensors and variable speed fans. However, the system may require a minimum flow during a heating call.
- The boilers are low efficiency units. Given that the heat pump loop is a low temperature system, condensing units could be used and provide significant savings.
- The water loop pumps are constant speed. A variable speed system could be considered but would require modifying the control valves for all 24 heat pumps in order to have two-way modulating valves in addition to having a variable speed drive for the pump.
- During the visit, it was indicated that the exposed floor had very little insulation. It is obviously difficult to add insulation to an existing design other the spray-applied insulation to the exposed section. The savings from this costly measure were evaluated at using the simulation model using an R-4 insulation value as the base case and a retrofit value of R-20.

A simulation model was used to represent the building and obtain an estimate of the energy end-use breakdown as well as savings from possible measures. Saving estimates for the measures for the Library are shown in Table 19.

Table 19: Possible Measures for the Library

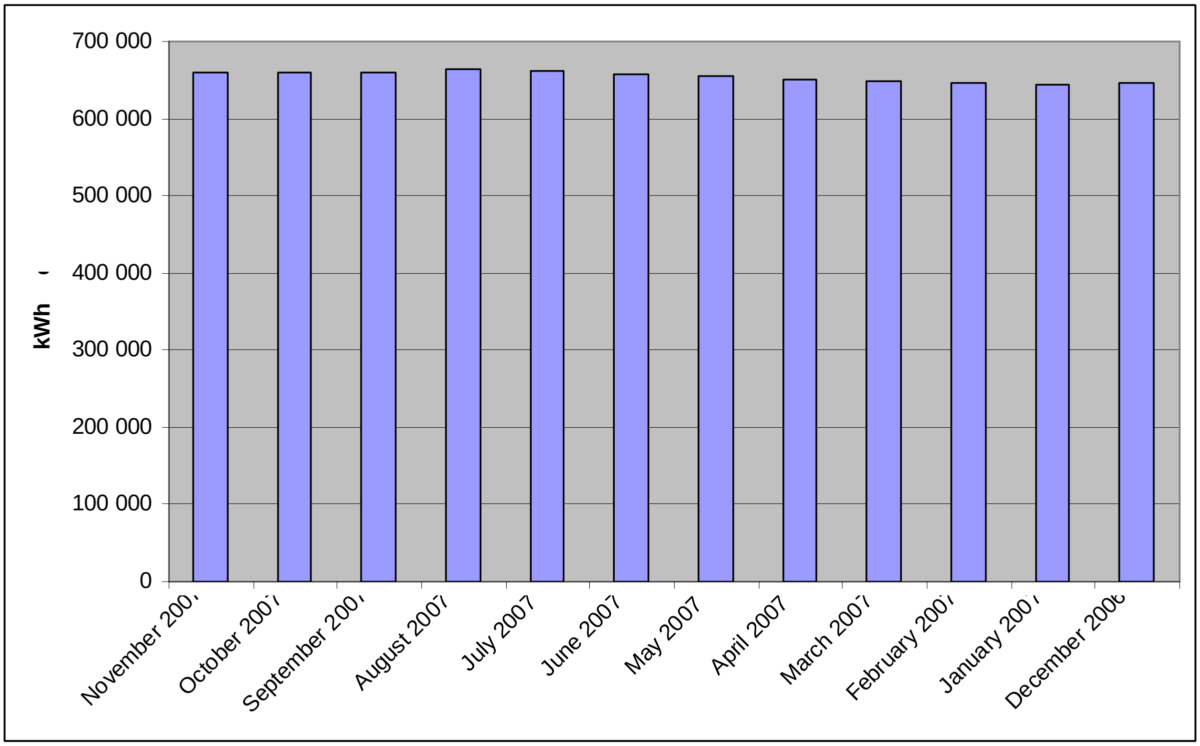
Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Condensing boilers	0	18 915	$ 7 566	13.6%	10.9%	$ 34 200	4.5
Condensing hot water heater	0	631	$ 252	0.5%	0.4%	$ 2 500	9.9
28 W T8s	32 651	-1 263	$ 1 454	1.4%	2.1%	$ 3 508	2.4
25 W T8s	76 185	-2 947	$ 3 392	3.2%	4.9%	$ 7 016	2.1
Daylight sensors*	124 080	-4 799	$ 5 525	5.2%	8.0%	$ 12 000	2.2
VSD heat pump loop	23 940	0	$ 1 436	1.7%	2.1%	$ 14 900	10.4
DCV	13 390	20 294	$ 8 921	15.5%	12.9%	$ 12 200	1.4
Floor insulation	24 530	19 789	$ 9 388	15.9%	13.6%	$ 78 400	8.4

*: using 32 W T8 as a reference

The cost for control measures, namely DCV and daylighting considers that the existing BAS can accommodate the additional points and that zoning for the lights is sufficient.

The utility data was also analyzed to see if any significant changes have occurred over the last few months. The result for the Library for electricity show a stable profile over a 23-month period, as is shown in Figure 16. The slight increase is proportional to the heating degree-days increase between 20067 and 2007.

Figure 16: Electric Energy Use – 12-Month running summation



3.2.9 The RCMP Building

The RCMP Building is an older facility. It is a 2-storey building with a total floor area estimated at 33000 ft2. It was indicated during the visit that this facility was soon to be abandoned by its current occupants but that it may remain in the City portfolio. Despite its age, the energy performance of this building is one of the better one of the building's audited. The building is served by 2 multizone constant volume air handling units. Heating is provided by the gas-fired multizone units as well as some electric perimeter baseboards. Cooling is provided by a chiller. The original compressors have been replaced by two Dunham-Bush PC60-2H reciprocating units. Domestic hot water is provided by an atmospheric natural gas hot water heater. This facility has an old building automation system (BAS).

The RCMP shows the fourth lowest EUI of the twelve buildings audited. The estimated energy End-Use is shown in Table 20.

Table 20: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas ekWh	Total eKWh	% of Energy	Cost[13] $	% of Cost
Lights	448 066		448 066	40.0%	$26 884	43%
Cooling	25 542		25 542	2.3%	$1 532	2%
Heating & Hum.	92 272	150 678	242 950	21.7%	$11 364	18%
Fans	109 157		109 157	9.8%	$6 549	10%
Pumps	6 000		6 000	0.5%	$360	1%
DHW	0	56 379	56 379	5.0%	$2 181	3%
Plug and Other	231 264		231 264	20.7%	$13 876	22%
Total	912 300	207 057	1 119 357	100%	$62 746	100%

Observations made during the audit and possible measures identified for the RCMP Building are:

- Both multizone systems use outdoor reset for their hot deck and cold deck. This is a fairly efficient setting for this type of system considering the limited capabilities of the BAS.
- Outdoor air is modulated to maintain a variable mixed air set point from 10 oC to 18 oC depending on outdoor conditions. This is a fairly efficient setting for this type of system considering the limited capabilities of the BAS.
- The constant volume configuration for the multizone systems is an inherently energy inefficient design. Conversion to a variable volume configuration would provide significant savings.

[13] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

- It was indicated at the time of the visit that many fluorescent fixtures were T12. These could be replaced by more efficient T8s, either 32 W, 28 W or 25 W depending on the required light levels.
- Electric baseboards have manual integrated thermostats. These are very inaccurate compared to newer electronic thermostats. Savings in the order of 10% of the heating energy use are possible.
- Domestic hot water could be provided by a condensing hot water heater instead of a low efficiency atmospheric unit.
- The furnaces used for heating the mutlizone system are likely low efficiency units given their age. Newer mid-efficiency heating sections would provide savings but the ROI would not be very good considering the building's energy use.
- Since heating is provided by the multizone systems, it is not possible to shut them off at night time. Also, the building as sections that are continuously occupied. However, some unoccupied sections could have automatic lighting control to insure that lights are off during unoccupied periods (through occupancy sensors).

Figure 17: RCMP Multizone System

Saving estimates for the measures for the RCMP Building are shown in Table 21.

Table 21: Possible Measures for the RCMP Building

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
high efficiency multizone furnaces	0	2 282	$ 913	2.1%	1.5%	$ 17 300	19.0
Condensing hot water heater	0	1 934	$ 774	1.8%	1.2%	$ 2 500	3.2
28 W T8s	89 936	-3 478	$ 4 005	4.8%	6.4%	$ 12 760	3.2
25 W T8s	115 632	-4 472	$ 5 149	6.2%	8.2%	$ 14 520	2.8
High efficiency chiller	10 217	0	$ 613	0.9%	1.0%	$ 16 000	26.1
VAV conversion	53 798	5 828	$ 5 559	10.2%	8.9%	$ 45 800	8.2
Lighting control optimisation	89 613	-3 466	$ 3 990	4.8%	6.4%	$ 8 000	2.0
Electronic thermostats	9 227	0	$ 554	0.8%	0.9%	$ 2 550	4.6

Figure 18 clearly shows that gas is a small fraction of the total energy use for this facility, thus that opportunities for heating savings are limited. Also, the electricity use has remained stable over the last two years while gas as increased by 14%. The gas increase is caused by an increase in the baseload usage as seen by the higher summer demand as well as much higher shoulder season demand. The baseload increase is normally caused by an increase in domestic hot water load (or decrease in hot water heater performance) while the shoulder season increase is likely control-related (e.g. higher set points in the hot deck, higher outdoor air flows).

Figure 18: Electric & Gas Energy Use – 12-Month running summation

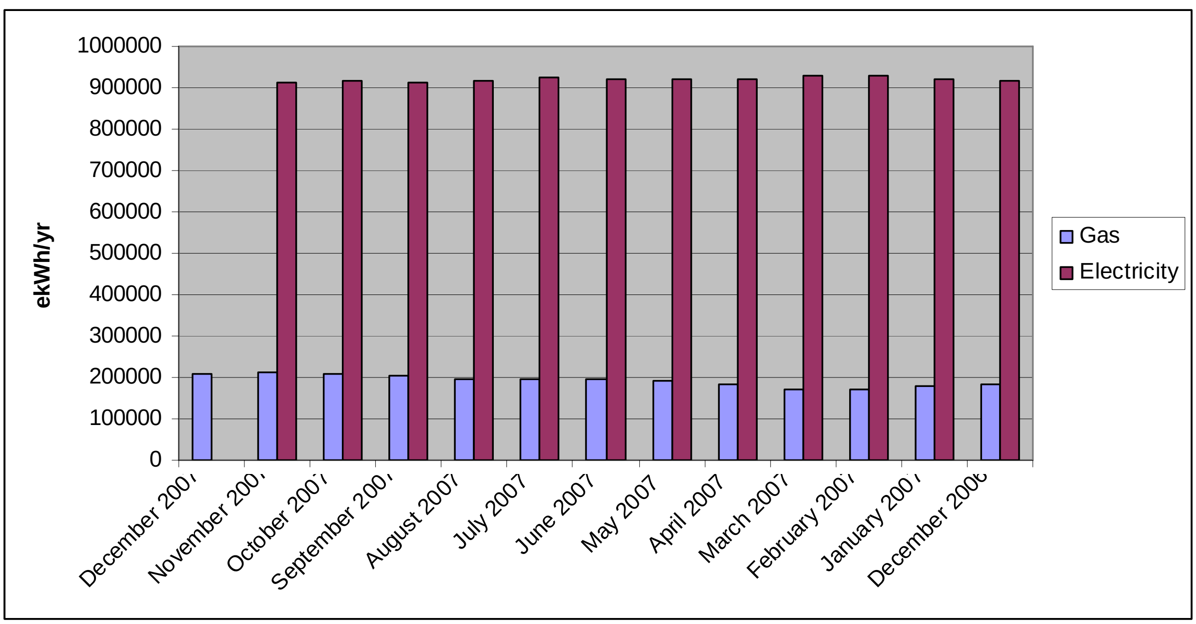
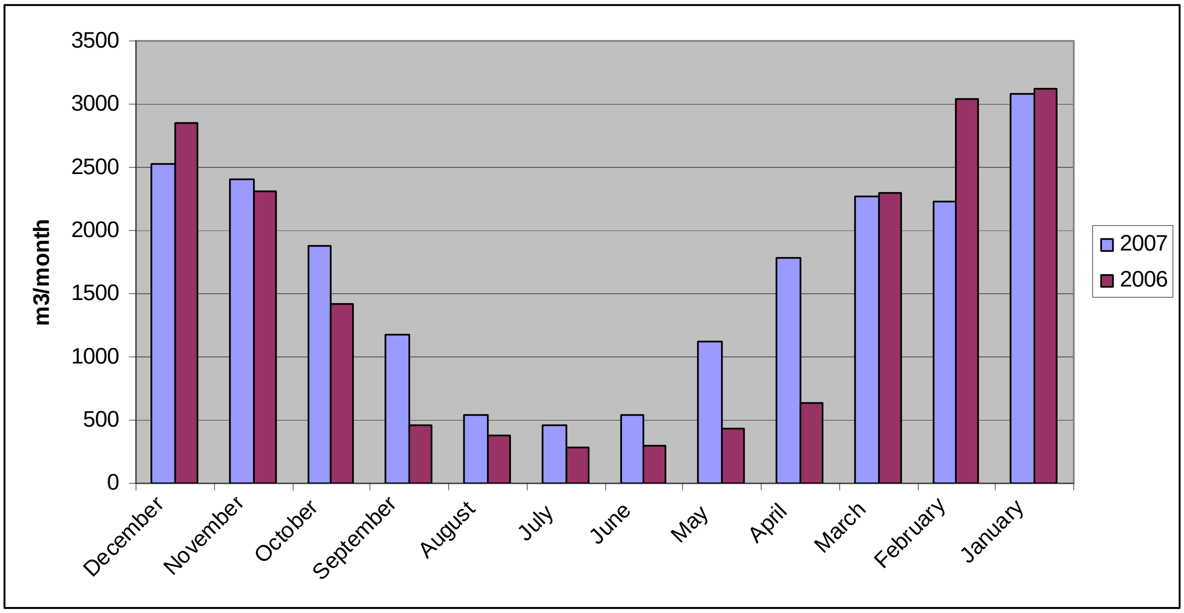


Figure 19: Monthly Gas Energy Use – 2006 & 2007



3.2.10 The CN Center

The CN Center is estimated to be the largest of all the facilities audited. Its estimated floor area is 140 000 ft2, including the two levels of under-bleachers areas. This facility houses one NHL size ice rink. The rink is not used during the summer. However, the facility is used year-round for skating, hockey and various shows. The building is served by 3 air handling units for the Rink section, 2 rooftop units for offices and fan-coil units for some specific areas. The rink does not have any system to control the humidity level. Heating is provided by two 8 000 000 BTU/h forced draft natural gas hot water boilers. Cooling is provided by one centrifugal chiller. The chiller is only used in the summer, when the refrigeration system is off. The chiller is served by two two-speed cooling towers. Resurfacing hot water is provided by a separate natural gas atmospheric hot water heater (468 000 BTU/h). This facility has a building automation system (BAS). The refrigeration plant is based on an efficient ammonia system using three 50 Tons compressors. Brine pumping is done through a two-pump system for low-high load conditions. This building does not have a low emissivity ceiling like the other two arenas audited.

The CN Center shows only the seventh highest EUI of the twelve buildings audited and the second of all three arenas. This is a good performance given the facility's much higher use for other activities and also considering that it is a heated facility unlike the other two arenas. This will increase both the heating energy use and its refrigeration requirements due to the added load on the ice. However, the EUI is based on an estimated energy distribution between the Kin Center and CN Center since they share common meters. Therefore, exact performance of each of these two facilities cannot be as accurately predicted. The estimated energy End-Use is shown in Table 22.

Table 22: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas ekWh	Total eKWh	% of Energy	Cost[14] $	% of Cost
Lights	453 502		453 502	8.9%	$27 210	11%
Cooling	61 771		61 771	1.2%	$3 706	2%
Heating	0	2 269 402	2 269 402	44.7%	$87 774	37%
Fans, Pumps	388 201		388 201	7.6%	$23 292	10%
Refrigeration	918 280		918 280	18.1%	$55 097	23%
DHW, Snow melting, Resurf.	0	766 399	766 399	15.1%	$29 642	12%
Plug and Other	224 423		224 423	4.4%	$13 465	6%
Total	2 046 178	3 035 801	5 081 979	100%	$240 187	100%

Observations made during the audit and possible measures identified for the CN Center are:

[14] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

- As was already mentioned in the original audit, this building is showing a good energy performance with good maintenance and operation.
- The ice temperature is monitored and maintained within 18oF to 22 oF.
- Lights are on schedules and are off during unoccupied periods.
- Motion sensors are used in public washrooms both for lights and exhaust fans.
- RTUs are in “Auto” mode allowing the fans to operate only when there is a heating call. The units have programmable thermostats.
- The main air handlers, AHU-1, AHU-2 and AHU-3 are on schedule. These systems were operating at the time of the visit when the building was basically empty. Each system has 40 000 cfm of supply air and AHU-2 and AHU-3 are providing outdoor air. The outdoor air setting on the BAS is shown as 25% of damper opening. The temperatures indicated on the BAS at the time of the visit showed that AHU-2 was bringing 39% outdoor air and AHU-3 22% outdoor air. Both systems were in heating call. The levels of outdoor air for a facility that has such large variations in occupancy should be controlled on a demand basis. Using demand control ventilation would provide some significant savings for the low occupancy periods. Also, the possibility of stopping one or two of these systems during very low occupancy periods should be examined. If not possible, using variable speed drives to run at reduced flow during these periods could be considered.
- It was indicated during the visit that no heat recovery of any type is done on the refrigeration system. Heat recovery for preheating outdoor air, snow melting or domestic water heating could be considered. However, the retrofit cost of these common measures is often high.
- Fluorescent light are T8s. The lighting power density for this facility is fairly low, estimate at around 1.2 W/ft2. Using lower wattage tubes may reduce the light levels to value below acceptable limits. Any measure aiming at using 28 W or 25 W T8s should be done along with lighting level measurements.
- Domestic hot water and resurfacing water are provided by low efficiency atmospheric units. Condensing water heaters would provide significant savings.
- Higher efficiency pulse-start metal halide lamps could be considered to replace the existing fixtures over the rink/bleacher area. The lamp wattage was not available and are assumed at 1000 W.

A more intrusive measure that can be considered for all the rinks is using a four-pass system for the underfloor circuit instead of a 2-pass system. This fairly complex measure requires modifying the brine header and requires and in depth analysis of the system. The savings reported are in the order of 8-9% of an arena total energy use.

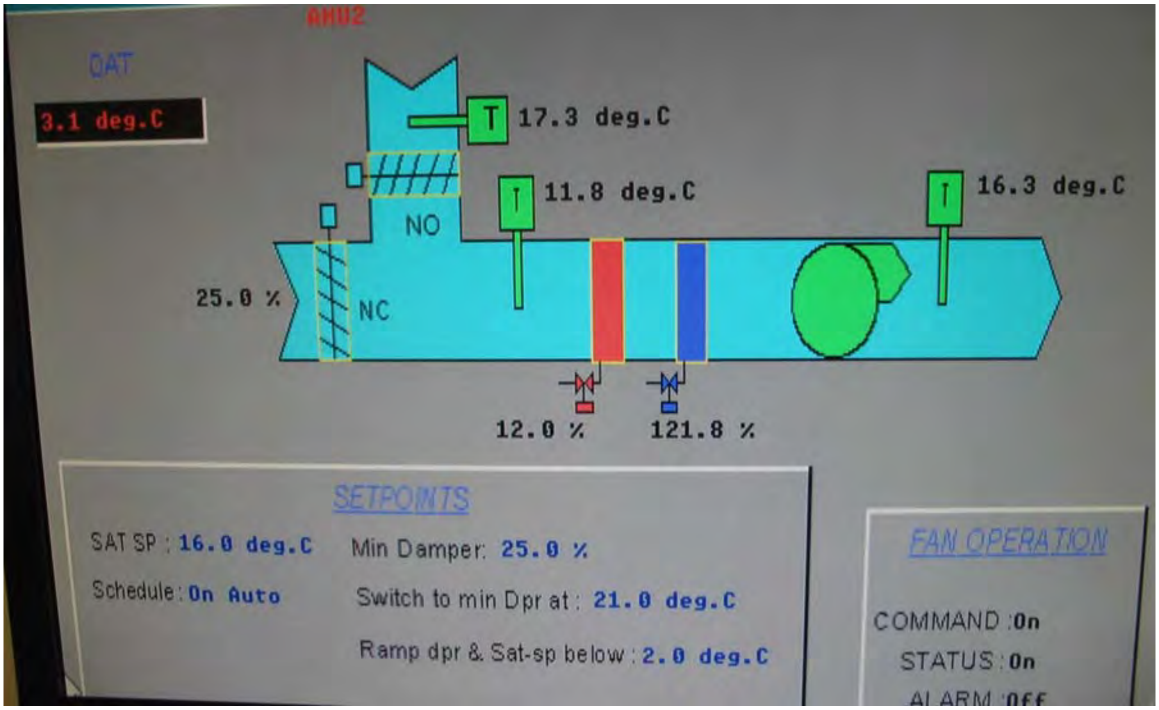
Possible savings from the measures for the CN Center are shown in Table 23:

Table 23: Possible Measures for the CN Center

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
DCV	0	58 167	$ 23 267	11.8%	9.7%	$ 6 000	0.3
Condensing hot water heater	0	22 311	$ 8 925	4.5%	3.7%	$ 22 575	2.5
Heat recovery - snow melting	0	10 711	$ 4 284	2.2%	1.8%	n.a.	n.a.
Heat recovery - domestic hot water	0	25 937	$ 10 375	5.3%	4.3%	n.a.	n.a.
28 W T8s	21 364	-826	$ 951	0.3%	0.4%	$ 3 052	3.2
25 W T8s	37 387	-1 446	$ 1 665	0.4%	0.7%	$ 6 104	3.7
VSD on mains AHUs/stopping AHUs	136 474	0	$ 8 188	2.7%	3.4%	$ 17 199	2.1
Pulse start HIDs	51 520	-1 993	$ 2 294	0.6%	1.0%	$ 11 520	5.0

Figure 20: Two out of three of the atmospheric hot water heaters

Figure 21: AHU-2 running at 39% outdoor air according to temperatures displayed on BAS – 25% damper position



3.2.11 ***The Kin Center***

The Kin Center is adjacent to the CN Center and is now connected to it by a recently built link. As mentioned earlier, the CN Center Kin Center and Link share common utility meters. In fact, some other facilities on the same site (exhibition grounds) may also share the electric meter, making the EUI estimates more uncertain. The facility has a total estimated floor area of 80 000 ft2, excluding the Link. This estimated area is much larger than that provided by the City of only 24 000 ft2. The link has an estimated floor area of 7 000 ft2. The facility houses three rinks. The building is served by one 10 000 CFM dehumidification system for the three rinks. The small bleachers are otherwise only heated using IR heaters, similar to the Coliseum. Ventilation for the rinks is provided by exhaust fans, controlled on timers to operate 20 minutes every three hours. The dressing rooms have gas-fired furnaces for heating with 20 oC set points. Refrigeration is provided by three ammonia units totaling 259 Tons of capacity. Each unit is served by a 2-speed brine pump system for low/high loads conditions. A cooling tower is used as a condenser. Heat recovery is used for snow melting for Rink 2 and 3 with gas back-up while gas is used for Rink 1. The ice is maintained until mid-April and operation starts up near the end of August. Domestic hot water is provided by a separate natural gas hot water heater. The link is served by a single rooftop unit. This 20 Ton unit provides heating (gas) and cooling to the link and is controlled by a programmable thermostat.

The EUI for the Kin Center is estimated to be somewhat higher than that of the CN Center. This is due to its high “density” of ice surface compared to its total area. The Kin Center has the highest ratio of rink area to building area of all three arenas audited. The estimated energy End-Use is shown in Table 24.

Table 24: Estimated End-Use Breakdown

End-Use	Electricity kWh	Gas ekWh	Total eKWh	% of Energy	Cost[15] $	% of Cost
Lights	379 802		379 802	11.5%	$22 788	13%
Cooling, dehum.	70 000		70 000	2.1%	$4 200	2%
Heating	0	769 362	769 362	23.3%	$29 757	17%
Fans, Pumps	46 625		46 625	1.4%	$2 798	2%
Refrigeration	1 371 482		1 371 482	41.5%	$82 289	48%
DHW, Snow melting, Resurf.	0	531 696	531 696	16.1%	$20 565	12%
Plug and Other	138 110		138 110	4.2%	$8 287	5%
Total	2 006 018	1 301 058	3 307 075	100%	$170 682	100%

[15] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

Observations made during the audit and possible measures identified for the Kin Center are:

- The rinks have a dehumidification system. It was indicated that only Rinks 2 and 3 were served by the system but the plans show the three rinks as served by that on system (see figure 22). The dehumidification set point is 60% RH.
- The initial audit indicated that lights were on during unoccupied periods. This would be similar to the observations made at the Coliseum. At the time of the visit, lights were on but all three rinks were utilized. Savings for reduced lighting periods were estimated on the basis of the initial audit.
- This facility is the only one making any use of the refrigeration system's rejected heat. In this case, ice melting for Rink 2 and 3.
- Additional heat recovery for domestic hot water could be considered. This would require further monitoring on the level of heat already captured by the current recovery system.
- Condensing hot water heaters for resurfacing needs and domestic hot water could be considered.
- Lighting for one of the three rinks has been converted from Metal Halide to fluorescent (4-tube T8 fixtures) as shown in Figure 23. It must be noted that most 400 W metal halide retrofit use a 6-tube T8 fixture. In this case, a 4-tube fixture is use. This will result in a light level reduction compared to 400 W metal halide. It is assumed that high output lamps are used. Fluorescent will provide a more uniform and constant light level than HIDs. The measure was evaluated based on a 400 W HID replaced by a 4-tube HO-T8. The fixtures could also be 250 W HIDs but this could not be confirmed during the visit.
- The IR heaters are supposed to be on timer, controlled by occupants. The initial audit indicated that some heaters were on when the building was unoccupied. This may be due to a failure in the control system or occupants that had just left. This should be verified but no saving estimate can be evaluated provided that the cause is not definite.
- Low emissivity ceilings were installed in this facility.
- The RTU for the link could use demand control ventilation. The actual amount of outdoor air could not be obtained and is assumed to be at a conventional 20% setting.

Few opportunities were identified for this facility. The possible savings from the few measures for the Kin Center are shown in Table 25:

Table 25: Possible Measures for the Kin Center

Measure	kWh	m3	$	% Energy	% Cost	Implementation cost	ROI
Condensing hot water heater	0	15 479	$ 6 191	4.8%	3.6%	$ 15 050	2.4
Heat recovery - domestic hot water	0	17 994	$ 7 198	5.6%	4.2%	n.a.	n.a.
Light scheduling*	113 940	0	$ 6 836	3.4%	4.0%	$ 2 000	0.3
HID to Fluorescent - 2 other rinks**	147 047	0	$ 8 823	4.4%	5.2%	$ 25 000	2.8
DCV - Link	1 750	1 400	$ 665	0.5%	0.4%	$ 2 000	3.0

*: assuming motion sensors in locker rooms and manual control for rinks
**: reduction of almost 50% in light levels, not considering optimized scheduling

Figure 22: Schematic of the dehumidification system showing distribution to all three rinks.

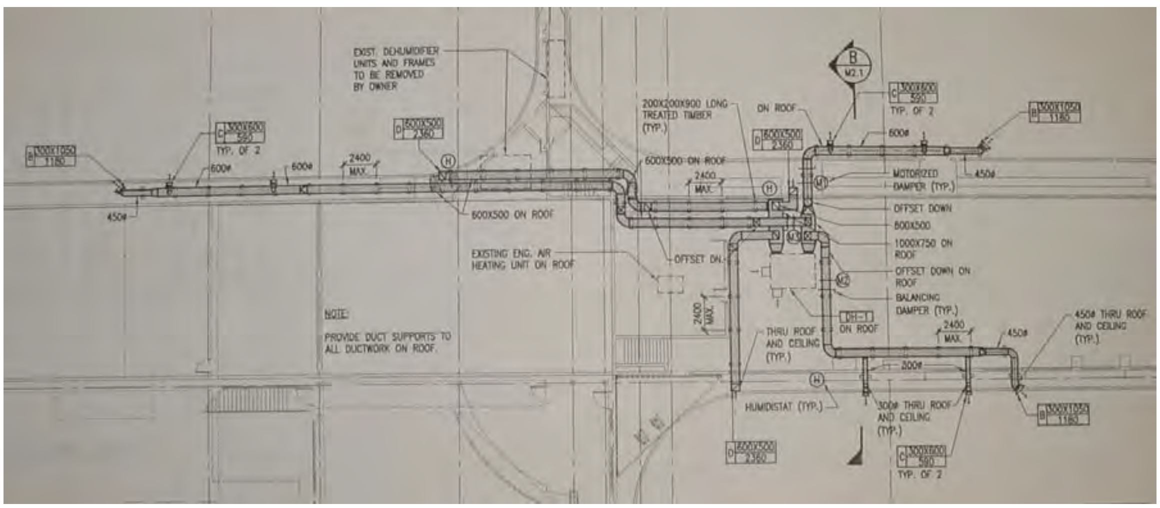


Figure 23: HID to Fluorescent Retrofit

3.2.12 18th Avenue Yard

The 18th avenue Yard is a 45 000 ft2 facility[16]. The building is divided in two main sections. The Garage portion is one storey while the front offices/parts section has two-storey. This Garage portion is in operation 24 hours a day. Except in the summer when it runs from 7:00 h to 23:00 h. The offices and parts section does not have any mechanical cooling and is served by two air handling units operating 24 hours a day. These units are gas-fired constant volume systems with electric terminal heating and electric perimeter baseboards. The Garage section is heated by a waste oil furnace in priority, by gas forced-flow heaters and by infra-red heaters in the welding shop. The exhaust in the welding shop is under manual control. The building has 22 large overhead doors.

The 18th Avenue Yard shows the eight highest EUI of the twelve buildings audited, with only the CN Center, the pools and the Art Gallery having higher EUIs. This is in part due to its continuous operation but also due to the constraints caused by the vocation of the facility (i.e. Garage with large numbers of overhead doors). Also, the EUI for the facility is higher than the number indicated in this report. The waste oil used for heating the Garage section is not accounted for in the EUI since no data was available for its consumption. It can however be noticed that this facility has the lowest electric EUI of all the buildings audited. Therefore, electric savings are very limited. The estimated energy End-Use is shown in Table 26.

Table 26: Estimated End-Use Breakdown

End-Use	Electricity KWh	Gas ekWh	Total eKWh	% of Energy	Cost[17] $	% of Cost
Lights	336 591		336 591	14.2%	$20 195	19%
Cooling	0		0	0.0%	$0	0%
Heating*	81 456	1 585 799	1 667 255	70.2%	$66 222	63%
Fans	43 800		43 800	1.8%	$2 628	3%
Pumps	0		0	0.0%	$0	0%
DHW	0	186 602	186 602	7.9%	$7 217	7%
Plug and Equipment	142 327		142 327	6.0%	$8 540	8%
Total	604 174	1 772 402	2 376 576	100%	$104 802	100%

*: Value for waste oil excluded. Actual heating requirement will be greater.

Observations made during the audit and possible measures identified for the 18th Avenue Yard are:

- Both office section air handlers are running 24/7. These systems could be stopped at night but would require newer controls. It would not be recommended to stop the units at night in the summer since some free

[16] Main building only, estimated from the blueprints. City of PG provided an area of 55 000 ft2.
[17] Cost based on an average of 0.06 $/kWh for electricty and 0.40 $/m3 for gas.

cooling is achieved presently by running the units during cooler night-time hours.

- The summer comfort conditions in the second floor offices will be limited given the absence of mechanical cooling in the air handling units. Furthermore, the use of constant volume systems is energy inefficient compared to variable volume. A simulation model indicated that cooling energy use would be approximately 5 000 kWh/year or 300 $/year in additional cost.
- All fluorescent lights in this facility are T12s. As in all other facilities, T8s should be used, either 32 W, 28 W or 25 W depending on the light levels. It is likely that most fixtures could use 25 W T8s.
- The waste oil furnace has a set point of 1oC higher than the gas units to insure that it has priority in meeting the heating load.
- The Garage area currently has high pressure sodium (HPS) lights. These are the most efficient type of lights generally available for high bay lighting applications. However, the color rendering index (CRI) of HPS lights is very low (yellowish light). In some applications, where CRI is important such as some type of manual work, using metal halide may provide savings even though these lamps are less efficient than HPS. In order to achieve any savings when replacing HPS by metal halide, the lamp wattage and light level is actually reduced. However, the improved light quality (i.e. CRI) is suppose to offset the loss in light level. What is often seen, is that there will be little or no energy savings from going from HPS to metal halide since lamp wattage often remains similar.
- The large overhead doors are the main source of the heating load. This is especially applicable when there are doors on both sides of the building, as is the case here, creating a strong cross-infiltration flow.
- Air Barrier installation for the overhead doors with the highest usage should be considered. Infiltration is likely the largest source of energy use for this facility. Reducing infiltration through open doors will increase comfort and reduce energy cost. It is proposed to pilot an air barrier installation in a phased approach. A first step should be to test the air barrier on a limited number of doors (no more than three) in order to validate both the savings and the acceptability of the measure with facility personnel. Following the results of this pilot project, more air curtains could be installed on high usage doors. The precise impact of the additional doors and the savings associated with their installation would be determined following the pilot project. However, it is important to insure that all the air seals for these doors are in good conditions prior to testing air curtains. Air curtains will not reduce infiltration due to bad air sealing around the doors.
- Given that air infiltration and door openings are the most significant source of energy use, an awareness program targeting their use would be very beneficial as was mentioned in the original audit. Minimizing door opening time, especially simultaneously on both sides of the building, will have a

significant impact on energy use. Maintaining the quality of all door gaskets is also important.

Possible savings from the measures applicable to the 18th Avenue Yard are shown in Table 27:

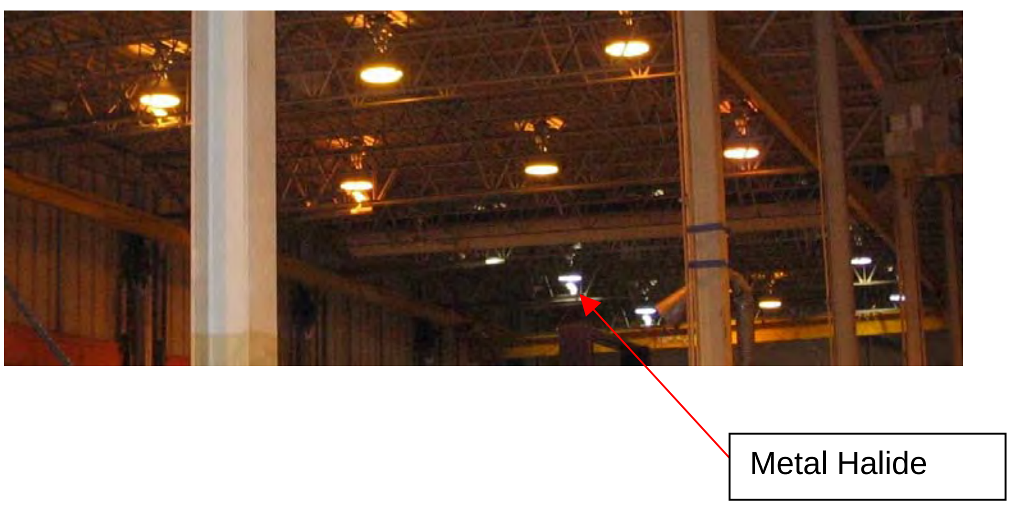
Table 27: Possible Measures for the 18th Avenue Yard

Measure	kWh	m3[18]	$	% Energy	% Cost	Implementation cost	ROI
Office VAV conversion	22241	567	$ 1 561	1.2%	1.5%	$ 24 000	15.4
28 W T8s	40 960	-1 584	$ 1 824	1.0%	1.7%	$ 8 302	4.6
25 W T8s	52 663	-2 037	$ 2 345	1.3%	2.2%	$ 9 447	4.0
Air curtains/door infiltration	0	21 000	$ 8 400	9.1%	8.0%	$ 33 000	3.9
Metal Halide*	46 253	-894	$ 2 417	1.6%	2.3%	$ 10 350	4.3

*: considering a 20% reduction in lamp wattage

Savings for the air curtains measure is much more difficult to ascertain since the portion of heating taken up by the waste oil system is not known.

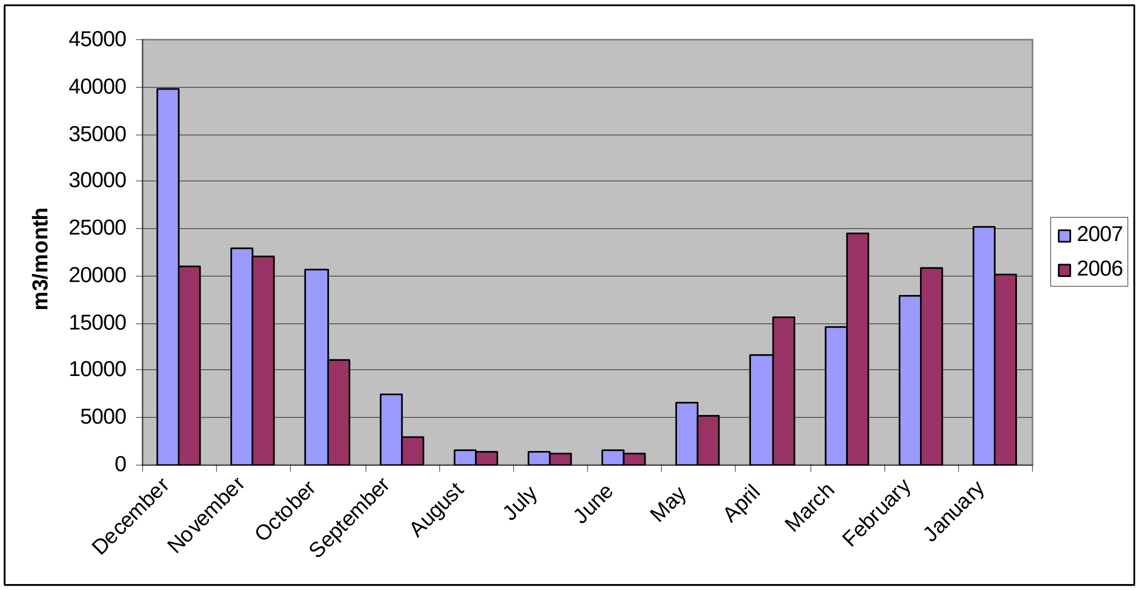
Figure 22: Section of the Garage ceiling with HPS and metal halide being tested



The gas use for this facility has also increased significantly between 2006 and 2007. The 18% increase is much more important the that for the heating degree-days. This is either due to a much more important operation (e.g. number of hours of door openings) or a much lower use of the waste oil furnace. This latter explanation appears more plausible.

[18] Gas Data yet to be obtained and required for model calibration and savings estimates.

Figure 23: Monthly Gas Energy Use – 2006 & 2007



4. Summary and conclusions

Follow up audits were done on 12 facilities for the City of Prince George. These audits allowed quantifying savings and ROIs for a series of measures applicable to each facility.

The most obvious saving opportunities are in the two buildings with indoor pools. In both instances, outdoor air dehumidification is used, leading to large energy use. Measures for other facilities are generally linked to optimized building operation with reduced hours of operation for HVAC and lights. Measure regarding more efficient equipment were mainly identified for better or more appropriate light fixture and lamps and with higher efficiency domestic hot water heaters. In some instances, capital intensive measures such as added heat recovery and boiler replacement can also be envisioned.

Many facilities have building automation systems (BAS). The BAS are of different make and vintages. This makes it more difficult to centralize all buildings control. There are, however, a number of facilities that can be monitored and controlled from City Hall. Most BAS were used efficiently to minimize energy use through scheduling and control routines. In some instances, local operators/occupants had overridden set points and schedules, resulting in increase energy use. An awareness program and training would help in minimizing such changes to the BAS settings.

It could also be observed that some recent facilities had inefficiencies in their original design, such as the new aquatic center without a dehumidifier. It is recommended that new designs be reviewed on an energy efficiency stand point to insure that measures with acceptable ROI are incorporated in the design and that target performances are met. Requireing that any new constructions meet standards such as MNECB + 25% or ASHRAE 90.1 is a start but is not sufficient since some energy end-uses are not considered by such standards (ex. Refrigeration, Pool heating and dehumidification).

The reader should also refer to the initial audit report for recommendations regarding procedures, maintenance and other energy efficiency aspects.

11.4 Mechanical and Electrical Costs

DISC	DESCRIPTION		Total
M	Replace D3040 DISTRIBUTION SYSTEMS AHU2 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$	67,733
M	Replace D3040 DISTRIBUTION SYSTEMS AHU7 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$	34,865
P	Replace D2020 DOMESTIC WATER DISTRIBUTION WH1 1998 FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Heaters, Residential,	$	3,539
		$	106,137
M	Replace D3030 COOLING GENERATING SYSTEMS CU3 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5	$	3,722
M	Replace D3030 COOLING GENERATING SYSTEMS CU5 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5	$	3,722
M	Replace D3040 DISTRIBUTION SYSTEMS AHU4 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$	35,943
M	Replace D3040 DISTRIBUTION SYSTEMS AHU5 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$	69,828
M	Replace D3050 TERMINAL & PACKAGE UNITS FCU2 1998 Mechrm MEZZ D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$	21,875
P	Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1 1998 FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe	$	1,096
		$	136,186
E	Repair D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$	1,294
M	Repair D2020 DOMESTIC WATER DISTRIBUTION FITTINGS1 1980 Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel 2"-4" Pipe	$	11,444
M	Repair D3030 COOLING GENERATING SYSTEMS CU4 2003 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 5	$	731
M	Repair D3040 DISTRIBUTION SYSTEMS HE3 1998 FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$	22,005
M	Repair D3040 DISTRIBUTION SYSTEMS HE4 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$	13,119
M	Repair D3040 DISTRIBUTION SYSTEMS HE5 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$	13,119
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC1 2008 FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	727
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC10 2000 Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	654
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2000 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	654
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	775
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC4 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	775
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC5 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	775
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC6 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	775
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC7 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	654
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC8 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	654
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC9 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	654
M	Replace D2010 PLUMBING FIXTURES WD1-FL1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$	3,552
P	Repair D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$	1,665
P	Repair D2010 PLUMBING FIXTURES WC1 FL1 1998 D201006 DRINKING FOUNTAINS AND COOLERS Water Cooler	$	527
		$	74,553
M	Repair D3020 HEAT GENERATING SYSTEMS CFW3 2011 Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$	435
M	Repair D3030 COOLING GENERATING SYSTEMS CU1 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21	$	1,811
M	Repair D3030 COOLING GENERATING SYSTEMS CU2 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26	$	2,209
M	Repair D3040 DISTRIBUTION SYSTEMS AHU1 1998 Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station	$	13,370
M	Repair D3040 DISTRIBUTION SYSTEMS HE6 2010 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$	29,508
M	Repair D3050 TERMINAL & PACKAGE UNITS FCU1 1998 FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$	4,546
M	Repair D3050 TERMINAL & PACKAGE UNITS HP1 2011 Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$	4,411
M	Repair D3050 TERMINAL & PACKAGE UNITS HP2 2011 Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$	4,411
		$	60,701
D	Repair D3020 HEAT GENERATING SYSTEMS B1 2010 Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$	18,256
D	Repair D3020 HEAT GENERATING SYSTEMS B2 2010 Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$	18,256
D	Repair D3020 HEAT GENERATING SYSTEMS B3 2010 Mechrm MEZZ D302001 BOILERS Gas, Hot Water - 1800-2500 MBH	$	18,256
D	Replace D3040 DISTRIBUTION SYSTEMS HWP3 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-	$	65
E	Repair D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$	6,774
E	Repair D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$	11,985
E	Repair D5020 LIGHTING & BRANCH WIRING LedL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$	8,539
E	Repair D5090 OTHER ELECTRICAL SERVICES EmgL1-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$	3,981
M	Repair D3020 HEAT GENERATING SYSTEMS CFW1 1998 FL1 Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$	456
M	Repair D3020 HEAT GENERATING SYSTEMS CFW2 1998 Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$	456
M	Repair D3050 TERMINAL & PACKAGE UNITS CF1 1998 Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$	10,833
M	Repair D3050 TERMINAL & PACKAGE UNITS CF2 1998 Mechrm MEZZ D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$	10,833

DISC	DESCRIPTION		Total
M	Repair D3050 TERMINAL & PACKAGE UNITS CF3 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 10,000 CFM	$	21,400
M	Repair D3050 TERMINAL & PACKAGE UNITS CF4 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 1500 CFM	$	3,526
M	Repair D3050 TERMINAL & PACKAGE UNITS CF5 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$	10,833
M	Repair D3050 TERMINAL & PACKAGE UNITS CF6 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line	$	10,833
M	Repair D3050 TERMINAL & PACKAGE UNITS CF7 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	$	11,936
M	Repair D3050 TERMINAL & PACKAGE UNITS CF8 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 7500 CFM	$	18,150
M	Repair D3050 TERMINAL & PACKAGE UNITS CF9 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Centrifugal In-Line - 3500 CFM	$	11,936
M	Repair D3050 TERMINAL & PACKAGE UNITS HUH1 1998 Mech Areas D305002 UNIT HEATERS Hydronic	$	11,561
M	Repair D3050 TERMINAL & PACKAGE UNITS HUH2 2007 Mechrm MEZZ D305002 UNIT HEATERS Hydronic	$	3,025
M	Repair D3050 TERMINAL & PACKAGE UNITS UF1 1998 Mechrm MEZZ-2 D305001 UNIT VENTILATORS Fan System, Utility Set	$	13,152
M	Repair D3060 CONTROLS & INSTRUMENTATION IAC1 1998 FL1 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$	2,487
P	Repair D2010 PLUMBING FIXTURES ES1 FL1 1998 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$	266
P	Repair D2010 PLUMBING FIXTURES EW1 FL1 1998 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$	279
P	Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$	2,841
P	Repair D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$	1,073
P	Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$	1,115
P	Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$	5,640
P	Repair D2020 DOMESTIC WATER DISTRIBUTION WTE1 1998 FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Water Treatment Equipment	$	1,862
P	Repair D4030 STANDPIPE SYSTEMS RISER1 1998 FL1 Mechrm D403001 STANDPIPE EQUIPMENT & PIPING Riser - 4" diam	$	2,746
		$	243,351
D	Repair D2020 DOMESTIC WATER DISTRIBUTION ST1 1998 FL1 Mechrm D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Galvanized steel, 500	$	3,260
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1 1998 FL1 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB10 1998 Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB3 1998 Elecrm MEZZ D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB4 1998 Elecrm MEZZ D501004 PANELBOARDS Other	$	14,492
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB5 1998 Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB6 1998 Mechrm MEZZ-2 D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB9 1998 Hall D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	783
E	Repair D5020 LIGHTING & BRANCH WIRING LedL2-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$	2,508
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2 1998 Elecrm MEZZ D501004 PANELBOARDS Main lugs, 400 amp	$	65
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB7 1998 Hall D501004 PANELBOARDS Main lugs, 400 amp	$	65
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB8 1998 Hall D501004 PANELBOARDS Main lugs, 400 amp	$	65
M	Repair D3020 HEAT GENERATING SYSTEMS ET1 1998 Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Expansion Tank - 305 gal	$	2,168
M	Repair D3020 HEAT GENERATING SYSTEMS ET5 1998 Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	$	472
M	Repair D3020 HEAT GENERATING SYSTEMS ET6 1998 Mechrm MEZZ-2 D302004 AUXILIARY EQUIPMENT Expansion Tank - 60 gal	$	472
M	Repair D3040 DISTRIBUTION SYSTEMS HE1 2011 FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40	$	4,744
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC1 2008 FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	507
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC10 2000 Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	439
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2000 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	439
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	544
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC4 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	544
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC5 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	544
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC6 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	544
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC7 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	439
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC8 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	439
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC9 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	439
M	Replace D3030 COOLING GENERATING SYSTEM CU4 2003 ROOF D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - direct Drive, 5	$	4,205
		$	42,092
M	Repair D3040 DISTRIBUTION SYSTEMS AHU3 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	$	26,998
M	Repair D3040 DISTRIBUTION SYSTEMS AHU6 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 30000 CFM, VAV	$	26,998
M	Repair D3040 DISTRIBUTION SYSTEMS HE2 2010 FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40	$	6,415
M	Replace D3040 DISTRIBUTION SYSTEMS HWP1 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction -	$	65

DISC	DESCRIPTION		Total
M	Replace D3040 DISTRIBUTION SYSTEMS HWP2 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction -	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP4 2011 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-	$	65
		$	60,606
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC1 1998 FL1 Mechrm D501006 MOTOR CONTROL CENTERS General	$	19,886
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC2 1998 Elecrm MEZZ D501006 MOTOR CONTROL CENTERS General	$	19,886
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC3 1998 Mechrm MEZZ-2 D501006 MOTOR CONTROL CENTERS General	$	19,886
E	Replace D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$	10,508
M	Replace D3040 DISTRIBUTION SYSTEMS HE3 1998 FL1 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$	178,715
M	Replace D3040 DISTRIBUTION SYSTEMS HE4 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$	106,542
M	Replace D3040 DISTRIBUTION SYSTEMS HE5 1998 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$	106,542
P	Repair D4020 FIRE SUPP WATER SUPPLY / EQUIP FPBFP1 1998 FL1 Mechrm D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT Backflow	$	1,501
P	Replace D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$	13,521
P	Replace D2010 PLUMBING FIXTURES WC1 FL1 1998 D201006 DRINKING FOUNTAINS AND COOLERS Water Cooler	$	4,278
		$	481,265
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR1 1998 FL1 Mechrm D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type, 480 V	$	1,967
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR2 1998 Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type,	$	2,270
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION IXFMR3 1998 Mechrm MEZZ-2 D501003 INTERIOR DISTRIBUTION TRANSFORMERS dry-type,	$	1,186
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION SG1 1998 Elecrm MEZZ D501004 PANELBOARDS Switchgear - 1200 Amp	$	11,371
E	Replace D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$	55,231
E	Replace D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$	97,717
E	Replace D5020 LIGHTING & BRANCH WIRING LedL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, LED	$	68,038
E	Replace D5090 OTHER ELECTRICAL SERVICES EmgL1-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$	32,459
M	Repair D3030 COOLING GENERATING SYSTEMS CU1 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 21	$	1,660
M	Repair D3030 COOLING GENERATING SYSTEMS CU2 1998 Roof D303002 DIRECT EXPANSION SYSTEMS Condenser, DX, Air Cooled - Direct Drive, 26	$	2,025
M	Repair D3040 DISTRIBUTION SYSTEMS AHU1 1998 Mechrm MEZZ D304008 AIR HANDLING UNITS Central Station	$	12,256
M	Repair D3050 TERMINAL & PACKAGE UNITS FCU1 1998 FL1 Mechrm D305003 FAN COIL UNITS Duct Mount, 2 Pipe	$	4,167
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC1 2008 FL1 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	518
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC10 2000 Office Commrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	469
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2000 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	469
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	542
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC4 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	542
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC5 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	542
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC6 2010 Mechrm MEZZ D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	542
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC7 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	469
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC8 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	469
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC9 2000 Mechrm MEZZ-2 D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in	$	469
M	Replace B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General Steel	$	22,784
M	Replace D3040 DISTRIBUTION SYSTEMS HWP5 2011 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP6 2011 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP7 2011 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 2-	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP8 1998 Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction -	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP9 1998 Mechrm MEZZ-2 D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction -	$	65
P	Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1 1998 FL1 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 4" pipe	$	1,496
P	Repair D2020 DOMESTIC WATER DISTRIBUTION ST2 1998 Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE,	$	4,684
P	Repair D2020 DOMESTIC WATER DISTRIBUTION ST3 1998 Mechrm MEZZ D202003 DOMESTIC WATER EQUIPMENT Storage Tank - Glass lined, PE,	$	4,684
P	Replace D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$	22,638
P	Replace D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$	8,552
P	Replace D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$	8,885
P	Replace D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$	44,943
		$	414,369
M	Repair D3020 HEAT GENERATING SYSTEMS CFW3 2011 Mechrm MEZZ D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$	461
M	Repair D3040 DISTRIBUTION SYSTEMS AHU2 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 15000 CFM	$	12,425

DISC	DESCRIPTION	Total
M	Repair D3040 DISTRIBUTION SYSTEMS AHU7 1998 Mechrm MEZZ-2 D304008 AIR HANDLING UNITS Central Station - 5000 CFM	$ 6,396
M	Repair D3040 DISTRIBUTION SYSTEMS HE6 2010 Mechrm MEZZ D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$ 34,822
M	Repair D3050 TERMINAL & PACKAGE UNITS HP1 2011 Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$ 4,673
M	Repair D3050 TERMINAL & PACKAGE UNITS HP2 2011 Mechrm MEZZ D305006 PACKAGE UNITS Heat Pump, Water Source, Central Station - 10 ton	$ 4,673
P	Repair D2010 PLUMBING FIXTURES ES1 FL1 1998 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$ 216
P	Repair D2010 PLUMBING FIXTURES EW1 FL1 1998 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$ 227
		$ 63,893
E	D5020 LIGHTING & BRANCH WIRING ExpL1-FL1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$ 6,657
E	Replace D5020 LIGHTING & BRANCH WIRING FluoL3-FL1 RD502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$ 14,978
E	Replace D5020 LIGHTING & BRANCH WIRING HiL1-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, High Intensity	$ 3,328
E	Replace D5090 OTHER ELECTRICAL SERVICES EmgL2-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lightin	$ 1,304
P	Replace C3030 CEILING FINISHES COther1-FLB1 C303090 OTHER CEILING & CEILING FINISHES General Replace D2010 PLUMBING FIXTURES	$ 6,699
P	Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS2 1970 Throughout bldg D202001 PIPES & FITTINGS CPVC <1" Pipe	$ 9,137
P	Replace D2020 DOMESTIC WATER DISTRIBUTION FITTINGS4 1970 Throughout bldg D202001 PIPES & FITTINGS Black / Galvanized Steel Replace	$ 7,105
		$ 49,208
M	Replace D3040 DISTRIBUTION SYSTEMS AHU3 1984 Mech Mezz D304008 AIR HANDLING UNITS Central Station	$ 64,338
		$ 64,338
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2010 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 779
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2000 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 658
M	Replace D3040 DISTRIBUTION SYSTEMS AHU1 1970 Mechrm D304008 AIR HANDLING UNITS Central Station	$ 66,329
		$ 67,766
D	Repair D3040 DISTRIBUTION SYSTEMS HE1 2011 Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM	$ 31,849
E	Repair D4010 FIRE ALARM AND DETECTION SYSTEMS DTECTR1 Throughout bldg D401001 FIRE ALARM DISTRIBUTION Fire detection systems, 50	$ 7,524
E	Repair D4010 FIRE ALARM AND DETECTION SYSTEMS FACP1 2011 Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel	$ 1,781
M	Repair D3040 DISTRIBUTION SYSTEMS HE2 2011 Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$ 31,537
M	Repair D3040 DISTRIBUTION SYSTEMS HE4 2008 Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$ 5,199
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC1 2011 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 649
P	Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$ 3,228
P	Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$ 1,900
P	Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$ 7,120
		$ 90,787
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MDP1 1970 Boilerrm D501002 SERVICE ENTRANCE EQUIPMENT Electrical Service - 3 Phase,	$ 5,242
E	Repair D5020 LIGHTING & BRANCH WIRING ExpL2-FLB1 D502002 LIGHTING EQUIPMENT Explosion Proof Lighting	$ 698
E	Repair D5020 LIGHTING & BRANCH WIRING Ext Lights1 D502002 LIGHTING EQUIPMENT Exterior Lighting	$ 865
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION SS2 1997 Mech Hall D501004 PANELBOARDS Safety Switch, 30-100 Amp	$ 1,128
M	Repair D3040 DISTRIBUTION SYSTEMS HE3 1970 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube	$ 17,629
M	Repair D3050 TERMINAL & PACKAGE UNITS UF1 1970 Mechrm D305001 UNIT VENTILATORS Fan System, Utility Set	$ 11,796
M	Repair D3060 CONTROLS & INSTRUMENTATION AIRDRYER1 1997 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$ 2,468
M	Repair D3060 CONTROLS & INSTRUMENTATION IAC1 1997 Mechrm D306004 INSTRUMENT AIR COMPRESSORS General	$ 2,486
M	Replace D3040 DISTRIBUTION SYSTEMS AHU2 1970 Mechrm D304008 AIR HANDLING UNITS Central Station	$ 70,495
P	Repair D2010 PLUMBING FIXTURES SvcSink1-FL1 D201004 SINKS Service Sink	$ 1,161
P	Repair D2010 PLUMBING FIXTURES WD1-FLB1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$ 297
P	Repair D2020 DOMESTIC WATER DISTRIBUTION BFP1 1997 Boilerrm D202002 VALVES & HYDRANTS Backflow Preventer - 2" pipe	$ 502
P	Repair D2020 DOMESTIC WATER DISTRIBUTION BFP2 1997 Mechrm D202002 VALVES & HYDRANTS Backflow Preventer - 3" pipe	$ 1,265
		$ 116,032
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB6 1987 Office D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$ 653
M	Repair D3050 TERMINAL & PACKAGE UNITS HUH1 1984 Boilerrm D305002 UNIT HEATERS Hydronic	$ 1,595
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC1 2011 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 429
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2010 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 544
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2000 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$ 439
		$ 3,660
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB2 1970 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$ 795

DISC	DESCRIPTION		Total
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB3 1970 Mechrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	795
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION PB5 1984 Boilerrm D501004 PANELBOARDS Main lugs, 120/208 V, 225 amp, NQOD	$	832
E	Repair D5020 LIGHTING & BRANCH WIRING FluoL4-FL1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$	16,500
E	Repair D5090 OTHER ELECTRICAL SERVICES EmgL3-FL1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$	1,144
P	Repair D2010 PLUMBING FIXTURES Lav2-FLB1 D201003 LAVATORIES General	$	1,907
P	Repair D2010 PLUMBING FIXTURES Shower1-FL1 D201005 SHOWERS/TUBS Shower	$	3,919
P	Repair D2010 PLUMBING FIXTURES Shower3-FLB1 D201005 SHOWERS/TUBS Shower	$	2,161
P	Repair D2010 PLUMBING FIXTURES Urinal2-FLB1 D201002 URINALS General	$	1,497
P	Repair D2010 PLUMBING FIXTURES WaterClos2-FLB1 D201001 WATERCLOSETS General	$	3,366
		$	32,916
E	Repair D5020 LIGHTING & BRANCH WIRING FluoL1-FLB1 D502002 LIGHTING EQUIPMENT Interior Lighting, Fluorecent	$	19,663
E	Repair D5090 OTHER ELECTRICAL SERVICES EmgL1-FLB1 D509002 EMERGENCY LIGHTING & POWER Emergency Lighting	$	1,227
M	Repair B2010 EXTERIOR WALLS Ext L n S1 B201005 EXTERIOR LOUVERS & SCREENS General	$	1,046
M	Repair D2010 PLUMBING FIXTURES WD1-FLB1 D201090 OTHER PLUMBING FIXTURES Washer / Dryer Hookup	$	277
M	Replace D3060 CONTROLS & INSTRUMENTATION DDC1 2011 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	3,966
P	Repair D2010 PLUMBING FIXTURES DF1 FL1 1990 D201006 DRINKING FOUNTAINS AND COOLERS Drinking Fountain	$	3,000
P	Repair D2010 PLUMBING FIXTURES ES1 FLB1 2000 D201090 OTHER PLUMBING FIXTURES Emergency Shower	$	276
P	Repair D2010 PLUMBING FIXTURES EW1 FLB1 2000 D201090 OTHER PLUMBING FIXTURES Emergency Eye Wash	$	289
		$	29,744
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC1 1970 Mechrm D501006 MOTOR CONTROL CENTERS General	$	20,429
E	Repair D5010 ELECTRICAL SERVICE & DISTRIBUTION MCC2 1970 Mech Hall D501006 MOTOR CONTROL CENTERS General	$	20,429
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION PB1 1970 Boilerrm D501004 PANELBOARDS Main lugs, 400 amp	$	65
E	Replace D5010 ELECTRICAL SERVICE & DISTRIBUTION SS1 1997 Mech Hall D501004 PANELBOARDS Safety Switch, 200 Amp	$	65
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC2 2010 Mechrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	542
M	Repair D3060 CONTROLS & INSTRUMENTATION DDC3 2000 Boilerrm D306002 ELECTRONIC CONTROLS D.D.C controller (avg. 50' run in conduit),	$	469
M	Replace D3020 HEAT GENERATING SYSTEMS CFW1 2013 Mechrm D302004 AUXILIARY EQUIPMENT Chemical Feedwater	$	2,549
M	Replace D3040 DISTRIBUTION SYSTEMS HWP1 2011 Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction	$	65
M	Replace D3040 DISTRIBUTION SYSTEMS HWP2 1997 Mechrm D304003 HOT WATER DISTRIBUTION SYSTEMS Circulating Pump, End Suction - 4" size,	$	65
		$	44,678
E	Repair D4010 FIRE ALARM AND DETECTION SYSTEMS FACP1 2011 Boilerrm D401001 FIRE ALARM DISTRIBUTION Fire Alarm Control Panel	$	1,880
M	Repair D3040 DISTRIBUTION SYSTEMS HE1 2011 Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type - 800 GPM	$	34,299
M	Repair D3040 DISTRIBUTION SYSTEMS HE2 2011 Boilerrm D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Plate Type	$	33,292
M	Repair D3040 DISTRIBUTION SYSTEMS HE4 2008 Mech Hall D304003 HOT WATER DISTRIBUTION SYSTEMS Heat Exchanger, Shell & Tube - 40 GPM	$	7,335
P	Repair D2010 PLUMBING FIXTURES Lav1-FL1 D201003 LAVATORIES General	$	3,484
P	Repair D2010 PLUMBING FIXTURES Urinal1-FL1 D201002 URINALS General	$	2,051
P	Repair D2010 PLUMBING FIXTURES WaterClos1-FL1 D201001 WATERCLOSETS General	$	7,686
		$	90,027
		$	2,272,309

11.5 Stakeholder Meeting Minutes

Meetings held at the Civic Centre on March 22 & 23, 2016

808 Canada Games Way

Prince George, BC

March 22, 2016

Meeting held from 18:00 – 19:30

Attendees Names

Marion LaRue - Principal Architect

Doug Wournell – Sport Architect

Kevin Post – Sport Architect

Connor O'Reiley – Counsilman-Hunsaker

Amanda Kleywegt – Stenographer

Lila Reynolds – Stenographer

Tracy Arrowsmith – PG Pisces President of Summer Swim Club

Jean Bowen/Neil – Directions Below/Scuba Diving

Christine Glazier – Special Olympics

Nicole Barager – PG Waterlillies/Synchro Coach/President

Rick Brine – Northwest Brigade Paddling Club/Kayaking

Jim Van Bakel – PG Iceman Society

Kerim Ozcan – Vice President PG Barracudas Swim Club/Level 4 Official

Sheila Nelson – Treasurer PG Barracudas Swim Club/Master Official

Purpose of Meeting by Doug Wournell – Sport Architect

Engaging a series of stakeholders like yourselves, who engage in current facilities?

Find out what groups are doing, how current facilities fulfill the roll you need them to fill, what they are missing that are preventing from being able to do activities better, how to engage more people, and how these can be remedied. What are the needs for Prince George in the terms of aquatics. We will produce a report that will be presented to Council.

Kevin Post Introduction – Sport Architect

We need to understand where PG is today. Did physical assessment of Aquatic Centre and Four Season Facilities today. (March 22, 2016). The City is looking for the future 3 – 8 year plan, possibly beyond. City is looking at big picture. We need to understand where you are today with facilities. How facilities are currently used, and operated. Want to know when you use it, how you use it. What you don't want to see go away. Need to see to change or improve, or what we need to add to facilities. Capital costs requirements for repairing, renovating, or replacing facilities. Look at cost benefit analysis. How the best use of dollars in the future will be put. We got all these groups together, as these groups make the most use of the facilities as well as know facilities the best. Also look to you as general users, friends, children, that input is important as well. Growth rates expected, capacity limitations.

Tracy Arrowsmith – PG Pisces

There is no space for vendors during provincial meets, no spectator space. No warm up room, and we need to send our athletes outside to warm up. Different clubs battle for lane space, and there is no time in between lessons. Swimmers need to get out of water immediately at end time, and swimmers need to get in water immediately at start time. There is no room or private space for coaches, place to store papers or records. They can put records in booth, but then needs to be unlocked and accessed by someone else. Dry land training in the summer twice a week. A gym area would be useful, as well as the lane ropes move constantly. Competition lanes need to be repeatedly tightened during use. The PA system does not work well; spectators cannot hear what anyone is saying. Another tank would be very beneficial for more space. There is a lower attendance of people at Four Seasons, and at least 8 lanes are needed.

Jean Bowen/Neil – Directions Below/Scuba Diving

We use the Four Seasons Facility for into to scuba driving. Aquatic Centre is mainly used for ages 10 plus. We start in removable floor area for skills. Kids participate in scuba lessons for PE program. Space is very limited for kids to scuba dive. There is more space what the gate is moveable, and also makes it easier for cleaning maintenance. At most, 10 scuba divers at one time at the Aquatic Centre. More shallow and deep space needed for scuba diving. Do not go to the Aquatic Centre as a general user as it is too loud. At Four Seasons, you can stay in shallow area and play with the kids while the older kids play in the deeper end, and you are still able to visually watch your kids.

Christine Glazier – Special Olympics

This club uses the Four Seasons, and has for over twenty years. Have upward to 30 athletes, and limited to 5 lanes. There is also a waiting list for athletes wanting to participate, but there is not enough space in the pool to accommodate. Would also need more volunteers, and do two nights a week. The Four Season facility closes for the month of December and our club heads over to the Aquatic Centre. With special needs athletes, it is a lot louder and bigger. These athletes prefer the Four Seasons, as it is much quieter, and are able to see athletes better visually. There is only one block start at Four Seasons, which means a lot of accommodating, and moving the low functioning swimmers over. Holds back a lot of training and potential with only one start block. Need more lanes and volunteers. There is a hand lift at the Four Seasons that does not work all the time. There is only 1 athlete this year in a wheelchair, but can change at any time. Lots of athletes in scooters and walkers. Lots of space is important. Limited family change rooms make things more difficult. Only 2 family change rooms, and people are always lining up for them. Parking is a huge issue at Four Seasons. No parking available if there is an event going on. I have had to cancel a week of swimming classes, when an event was going on because of no parking. Soccer people also park in the Aquatic Centre Parking lot, which is very frustrating.

Nicole Barager – PG Waterlillies/Synchro

Our group is not lane specific. The tank is very small. We have a 50-metre pool, which is too small in tank size. There is not enough room to train all 30 members at one time. Member count was 15 last year, and has doubled this year. Anticipate the group continuing to grow. We train at the Aquatic Centre from October to end of the year when Four Seasons is shut down. Water depth requirement would be minimum 6 feet. We don't need shallow water. Pool space and time makes it difficult for training. Train 3 times a week, next year hope to train 4 days a week. We rent the pool space. We would like a 25 X 25 tank size. The more clubs and more coaches, betters the community. There is a lot of dry land work, and lack of space for it. The sound system takes up a lot of space on the floor, and is dangerous. The sound system takes up space that we could be using to rehearse. A private office or space to have private conversations would be ideal.

Rick Brine – Northwest Brigade Paddling Club/Kayaking

Lines on the floor would be very helpful. More windows. There are very few people in the community who kayak. Four Seasons had everything they needed to practice kayaking. We were able to perform kayak tricks, and store our kayaks. A facility that supplies kayaks would be awesome. Only about a dozen kayakers for one hour was too costly at the Four Seasons so we had to move over to the Aquatic Centre. Aquatic Centre was much cheaper, and loved the removable floor, but no longer had deep water, or storage for our kayaks. Having direct access to the pool deck from a back door would be very ideal. 3 feet depth is perfect for training for Kayaks.

Jim Van Bakel – PG Iceman Society

We only use the Four Seasons Facility for half a day, once a year. The location is perfect for the event. A 50-metre pool would be nice. There are usually issues with the bulkhead. Access is perfect for event. More deck space for coming in and out of the backdoors. There is no room for spectators to stand or sit.

Kerim Ozcan – Vice President PG Barracudas

Wants to attract Provincial meets to Prince George. We as a club are limited to providing any type of provincial or western meets. There is no warm up tank for athletes. The 50-metre tank has bulkhead issues. A new quantum timing system just got approved. There are limited blocks that need to be secured to the deck, not the bulkhead. The 25-metre is for teaching purposes and would like warmer water. More deck space, bigger and better change room facilities, more private coaches space, kayaking space is needed. I believe it’s a mistake to put money into an aged facility, when there is potential to make a better facility. The scoreboard is past lifespan.

Sheila Nelson – Treasurer PG Barracudas

There is no 50-metre pool. The closest one is in Kamloops, Grand Prairie, etc. When the removable floor is up, it’s all one level and takes advantage of it. We have a waitlist of athletes trying to get into a swim program and swim school developmental program. The waitlist is ten plus as there is not enough pool space. We can have up to ten kids in each lane. We need to limit kids per class due to space.

There is lots of parking, but is problematic when soccer season is on. Love the one level, all accessible for wheelchair. The gym is awful. When competitions are run, there is no seating, and are a total madhouse. Between 70 officials to run each meet, family, friends, swimmers, swimmers belongings, there is no organization or space. We do not limit meet sizes or who gets invites. Try to keep athletes off benches to save seating. Parents are sitting on lawn chairs on swimming deck.

We move the bulkheads daily. One bulkhead is currently broken, and cracks in another. When new lights were put in facility, the lights stuck out too far and the bulkhead was getting stuck on the lights. The motors are not waterproof. There is no coach's office. Storage in back of pool. No food prep area. Opposite ends of the facility to prep food and serve for officials. Some lights that cannot be fixed in facility. Sound under the water does not work anymore.

I do not like the Four Seasons, as it is old, dirty, and hot. Adequate storage near pool area for coaches and athletes' belongings. We need more starting boxes. Computers in timing room. The fan needs to be running all the time; otherwise stuff rusts and stop working. We need a proper, dry storage area for appropriate devices and materials.

Things that would be nice would be a running track, and gymnastics. We are not able to accommodate a diving team. The pool is not big enough and does not have enough space to accommodate many clubs at one time. We would like a great sporting facility like TRU. (Thompson River University)

March 22, 2016

Meeting held from 19:30 – 21:00

Attendees Names

Marion LaRue - Principal Architect

Doug Wournell – Sport Architect

Kevin Post – Sport Architect

Connor O'Reiley – Counsilman-Hunsaker

Amanda Kleywegt – Stenographer

Lila Reynolds – Stenographer

Nancy Harris – Spinal Cord Injury

Furqana Khan – Spinal Cord Injury

Mia Robinson – Phoenix Physiotherapy

Purpose of Meeting by Doug Wournell – Sport Architect

Engaging a series of stakeholders like yourselves, who engage in current facilities?

Find out what groups are doing, how current facilities fulfill the roll you need them to fill, what they are missing that are preventing from being able to do activities better, how to engage more people, and how these can be remedied. What are the needs for Prince George in the terms of Aquatics? We will produce a report that will be presented to Council.

Nancy Harris – Spinal Cord Injury

Stresses the importance of making the facility into a universal design that works for everyone, including people in wheelchairs, scoots, or walkers. I am mostly here to speak for accessibility. There is no proper seating or a way to get around with people with disabilities or in wheelchairs during the Olympics. Aquatic Centre is tight for space and crowded. There is not enough free, clear designated pathway space. All space is occupied. Children with autism need special life jackets that are quite expensive, and we would love to have more of these on hand. Also full body life jackets for cerebral palsy patients. Currently use pool noodles under arms and legs. The location of the Four Seasons is ideal.

Furqana Khan – Spinal Cord Injury

I am currently doing my practicum as a social worker with Spinal Cord Injury group. Providing feedback as a pool user; I bring my brother to the pool for lessons and to swim with his friends. I would use the gym if it was bigger, and I could visually watch my brother the whole time while using the pool. Would still like the gym to be private, and less windows and mirrors. More seating to see all the different angels to view the pool.

Mia Robinson – Phoenix Physiotherapy

We do hydrotherapy in pools with people who have been injured at work, or car accidents. For people who need therapy after hospital. We mostly use the Aquatic Centre because of the river and have had accessibility issues at the Four Seasons. If someone just had knee surgery, they would not be able to use the ladder to go into the pool. Even the moveable stairs for getting in and out is hard. The slippery floors make patients cautious and nervous. The Aquatic Centre has non-slip tile and regular tile on the areas where it shouldn't get wet (But it does get wet). There is a two percent slop from the locker to grade. Only a 0.5 percent slope is needed. The steeper slope makes it more slippery and dangerous. Would nice to have the proper non-slip tile throughout the whole facility.

The handrails are very large and are slippery when they are wet. Patients need somewhere to hold and help balance when doing exercises. A bar along pool would be great. The woman's privacy change rooms need to be wider, and more stalls needed. There are only two handicapped stalls, and more change rooms.

The gym is very small, and therefore don't use it. We wouldn't make use of a meeting room. We use the river as cardio warm up, and as a resistance exercise. It gets extremely crowded when other groups, or the public, like teenagers and children use the river. The river is very popular for all ages. There is no community recreation centre, where it has everything. Air circulation is different from the Four Seasons to the Aquatic Centre. The bigger pool is slightly warmer, and it is much nicer with the warmer temperature. The Aquatic Centre contains sandy, gritty stuff that ends up all throughout the pool.

Accessibility and bus transportation is not easy for Aquatic Centre. Facility needs to be more accessible for scooters, wheelchairs, and walkers. Which would make it more enjoyable and easier for the users, and for the workers. Majority of schools use the Aquatic Centre. The schools want to book lessons, but the facility is not able to accommodate that because it is already fully booked. Better storage and being able to provide life jackets, and places to store equipment where it will be dry, sterile, and clean.

<u>March 23, 2016</u>

<u>Meeting held from 09:00 – 10:30</u>

Attendees Names:

Marion LaRue - Principal Architect

Doug Wournell – Sport Architect

Kevin Post – Sport Architect

Connor O'Reiley – Counsilman-Hunsaker

Amanda Kleywegt – Stenographer

Lila Reynolds – Stenographer

Julie O'Reilly – AiMHi

Lynn Bermann – CDC (lynnb@cdcpg.org)

Tim Bennett – Big Brothers Big Sisters

Christie Ray PG Chamber of Commerce

Stephanie Mikalishen – YMCA

Lynette Mikalishen – YMCA (lynette.mikalishen@nbcy.org)

Alana Oikonen – Rehab Services (Northern Health)

Marc Paulsen – Rehab Services (Northern Health)

Jessica Blewett – PG Accessibility Advisory Committee (blewettj@unbc.ca)

Purpose of Meeting by Doug Wournell – Sport Architect

Engaging a series of stakeholders like yourselves, who engage in current facilities?

Find out what groups are doing, how current facilities fulfill the roll you need them to fill, what they are missing that are preventing from being able to do activities better, how to engage more people, and how these can be remedied. What are the needs for Prince George in the terms of Aquatics? We will produce a report that will be presented to Council. This is an information gathering session, on aquatics needs.

Half Attendees moved to another room for discussion.

Jessica Blewett – PG Accessibility Advisory Committee

Not a huge general user with Four Seasons or Aquatic Centre. My biggest suggestion is to hire or recruit someone to educate on use of accessibility uses. I have heard lots of complaints for the location and accessibility of the Aquatic centre for drop off from bus stop. You need to take a path from the bus stop to get to the Aquatic Centre and the path is not lit, or regularly cleared in wintertime. When I do use the Aquatic Centre it is for the hot tub, and I go during adult time. The hot tubs are always way to full. A bigger hot tub is needed, as it is not big enough for the needs. I go to Four Seasons during the closed months, and the Four Seasons hot tub is way too small. A leisure access program is great, but would like to get a full access pass. People with low-income families would like to get an access pass to different facilities. An idea with be for disability people with a pass, that can alert staff privately of what their limitations are and what they would need help with. Staff would be able to assist people with disabilities without the users having to ask for it. Many people complain about the doors being too heavy. Push button to open doors is nice, but an automatic door would be much nicer, especially for people in walkers or wheelchairs. Want to make the facility more universally accessible. What is set up in the BC building access code does not work, and is out of date.

Lynn Bergmann – CDC

A lot of children are dependent on the backup lift in the change rooms. The Four Seasons Is not accessible for high need children. The change rooms at the Aquatic Centre on Tuesdays and Wednesdays are very busy and it is very difficult for children with high needs. There are too many people, and the change rooms get very hot as they are closed in. It would be nice to get a lift to get my clients into the wave pool. There is no entry except at zero entry. I run a therapy pool at the hospital, an early intervention program, at the Four Seasons. Hydrotherapy is an amazing tool for kids with special needs. Pool at the hospital is way too hot and there is a lot more structure needed with pool and health here. We can only have three kids at a time. Sensory issues are very big for children with special needs, more student volunteers would be nice. Would also be nice to get the help of a lifeguard to help teach children life skills and therapeutic programs. The Aquatic Centres change rooms are very isolated. The doors on the change rooms shut and lock. The Four Seasons has two different doors, with one opening at the top and one at the bottom. These doors are great for people with disabilities and the workers. More PFDA lifejackets are needed. The Four Seasons is not accessible for high needs. For older children, the Four Seasons works well because they don't need lifts or ramps. Many different groups of people use the Four Seasons, like Special Olympics and Para Olympics, starting from kids at the age of two. The special needs swim on Sunday is not very well used. People with special needs can compete with their own peers. Would like to do an early intervention at the pool one day, and encourage special needs program on Sunday. Public Transportation is not used, so location is not much of an issue. Breast cancer survivor group uses the Four Seasons on Sundays. I personally like the Four Seasons for the location as I can walk there. I am not a strong swimmer so I like the 25-metre. My partner finds the Aquatic Centre too busy, and has too much going on and has PTSD. Enjoy Four Seasons better, as it is simpler. Questions about a pool being built at the university?

Julie O'Reilly – AiMHi

We provide services to about 1000 people with disabilities in Prince George. 60% are children, and 40% are adults. People enjoy the Four Seasons because it is a quieter and smaller environment. Go to the Aquatic Centre for the river and to be able to gradually get into the water. Lifts don't always work. The floors in the change rooms are slippery. One gentleman fell off a bench in the change room and got a concussion. One tank in the Aquatic Centre is fixed and cannot be moved and makes it very limited to where you can get in. We need to find better ways to get into the pool. There is a need for more space.

Alana Oikonen – Rehab Services

We have had issues using the Four Seasons. Use the Aquatic Centre mainly for Aquafit classes on Wednesday. We use the Four Seasons when the Aquatic Centre closes and the participation numbers always go way down. The floors are dangerous and slippery. The accessibility in to the pool is not good, especially for clients with walker. Parking lot is located at the back of building and clients have to walk around to the front of the building, which is a long walk for them. We use the family change rooms instead of going into the separate men or woman because there is better privacy in the family change rooms. Both pools need better private change rooms. Both pools could benefit from focusing on a universal design; color coated type signage, easy to make how to get where going, follow a blue to get to pool, or where washrooms are, ECT. The location of Four Seasons is closer for majority of clients, and the City bus service access is much easier to get too than the Aquatic Centre. We provide clients transportation for the ones who need it, and provide counsel to other clients on how to use the bus. As a general user, I use the Aquatic Centre for my child and myself. I enjoy the aquafit classes, and my child likes the river. The Aquatic Centre has many options like sauna room, steam room. The sauna room is often out of service. I use the gym at the Aquatic Centre, and like the new equipment and more equipment. When the Aquatic Centre is busy, it's hot, especially when the sun comes out. There is not enough space in the Aquatic Centre. I wish we could go earlier to avoid how busy it gets, but younger children are not allowed in the morning. More flexibility on hours for younger kids would be nice. If a big rec centre were built, our clients would fear going, as it is in the general public, and would be large.

Marc Paulsen – Rehab Services

The change rooms at the Four Seasons are freezing when they need to switch over in the winter when the Aquatic Centre is closed. The lockers at the Four Seasons are broken and are constantly eating the money. As a general user, I use the Aquatic Centre at least one a week with the kids. It is hard to take toddler or infants into the Four Seasons. The only gyms that are attached to the pools are quite small. Our clients with disabilities are really dependent on subsidized services, so private industries are not good for our clients; that is a financial barrier.

Marion LaRue – Architect

I went to the Four Seasons yesterday, and was quite appalled at the accessibility issues. There is no elevator. The location of the Four Seasons seems to be popular. Facilities here are undersized, and we want to reach out to the universities through the City, as we have not been able to reach them. Interesting comment came up yesterday that Prince George does not have a rec centre, a one-stop shop. All facilities can complement one another in one building. There are various memberships need at different facilities; pool, fitness, ECT. We have found that private clubs strive just as well if there are recreation centres. With rec centres there is a mix of different things to do, and what different people want. Families can participate in what activities they want, while others are doing their activities. We try to include universal access in everything we do.

Attendees would like a copy of minutes

March 23, 2016

Meeting held from 10:30 – 12:00

Attendees Names:

Marion LaRue - Principal Architect

Doug Wournell – Sport Architect

Kevin Post – Sport Architect

Connor O'Reiley – Counsilman-Hunsaker

Amanda Kleywegt – Stenographer

Lila Reynolds – Stenographer

Jane Daigle – Prince George Brain Injured Group (jane.daigle@pgbig.ca)

Purpose of Meeting by Doug Wournell – Sport Architect

Engaging a series of stakeholders like yourselves, who engage in current facilities?

Find out what groups are doing, how current facilities fulfill the roll you need them to fill, what they are missing that are preventing from being able to do activities better, how to engage more people, and how these can be remedied. What are the needs for Prince George in the terms of Aquatics? We will produce a report that will be presented to Council. This is an information gathering session, on aquatics needs.

Jane Daigle – Prince George Brain Injured Group

I have been a case manager with BIG for 3 years. We are non-profit and receive funding from BC money. We scrape all over the place for funding. Our clients are brain injured, after birth, or stroke, trauma, heart attack, drowning, brain tumor surgery. We also have a group with 24-hour care. All needs are different, and we have a big range of clients. Most clients are low income, and get a leisure pass if they can. The leisure pass is limited to 40 visits. We go to Four Seasons, because the Aquatic Centre is too far with driving or the bus. Brain injury makes travel harder and clients exhausted; so Four Seasons is ideal location.

Clients refuse to go to the Aquatic Centre because it is intimidating and overwhelming. Clients couldn't even handle the idea of thinking of going to the Aquatic Centre; there are too many unknowns. Four Seasons flooring is so slippery. Maybe help clients visualize leaving house, and parking, and entering the Aquatic Centre, would help. Help clients to feel invited and welcomed into the facility. Parking is difficult; more parking and wider spaces (similar to Costco parking).

As a general user, I will not go to the Four Seasons because the change rooms are way too small. Aquatic Centre is better but still not enough space when it is busy. There is normally a line up for the change rooms. Clear signage for clients to know where they are going, and they don't get lost. Words are better than universal signs. Brain injury is very literal, clear signs and messages are best. No clutter, simple, clears pathways to get to pool.

Getting into pool is difficult. More lifts are needed, and there is only one at the Aquatic Centre. Specific wheelchairs for the water would be much better. Majority of clients at this time are not in wheelchairs, lots use scooters because of balance and easier to get around. Clients have a fear of falling. A ramp with handrails would make clients more comfortable. For clients to be able to take scooters straight from parking lot into the change room would make clients comfortable. A leisure pass that when scanned, can notify staff of disability and help staff to recognize what type of service they may need privately would be hugely beneficial to clients.

Some clients do not qualify for passes because they have pensions with long term disability, so there is a financial strain for many clients. Clients cannot afford to pay for a full pass themselves.

The noise at the Aquatic Centre is too much. If there were a private space to bring clients, simpler, warm, dry, and not noisy would be ideal. Screened off visually from general public, have quiet spaces, divider partition, separate building, or room. Clients get brain injuring flooding which is too much sensory. Separate entrances to a specific quiet tank or pool. The access to the change rooms is so small and narrow, feels more overwhelming to take clients through there. Always a crowded situation.

As a general user, more space for more lesson options. I prefer the Aquatic Centre because it's closer and I feel more comfortable. There is always a major time crunch for lessons. What would encourage me to come out more would be more fitness classes and more times, more space.

In summer I enjoy going out to the lake. Summers have gotten much warmer the last two summers, and would absolutely use pool if it had a splash park right on the deck outside the pools. Glass doors that opened wide up, and a roof that opened. Cushy solid rubber bottoms at Splash Park. I enjoy the river and the waves; it is always busy. A waterslide would be nice. My son gets bored at the Four Seasons as there is not enough activities.

We love the trees in the Aquatic Centre. A bigger hot tub would be good. I personally do not use the sauna, but always the steam room. The floor feels slippery in the steam room. There needs to be more access for people with balance issues, and to make them feel more comfortable and safe in and around pool. Railings throughout the pool and facility would be great. It would help reduce the fall risk, and put people at ease for safety who have had previous brain injury.

Stakeholder Consultation – Aquatic Needs Assessment

Prince George, BC

March 22, 2016 – 6:00 PM to 7:30 PM

Group: Sport Clubs

- **Barracuda Adult/Youth Swim Club** .... **Kerim Ozcan and Sheila Nelson**
- **Pisces Swim Club** .... **Tracy Arrowsmith**
- **Water Lillies Synchro BC** .... **Nicole Barager**
- **BC Special Olympics** .... **Christine Glazier**
- **Directions Below (Scuba Diving Club)** .... **Jean Bowen**
- **Northwest Brigade Paddling Club (Kayaking)** .... **Rick Brine**
- **PG Iceman** .... **Jim Van Bakel**

Doug presented overview of the purpose for the meeting, emphasizing the exploratory nature of the mandate of DIALOG in this project.

Kevin explained that they were tasked to develop a future plan with a 3-8 year timeline. Looking at physical access, mechanical structure, buildings, etc. What must be available (remain) and what are the needs of the future. Looking at Capital Costs, Operating Budgets, Cost/Benefit Analysis. What are usage numbers, capacity/time limitations, and what are individual/personal goals.

Water Lillies Synchro BC

- *Has 30 members currently and would like to be able to expand. 3 years ago club began with 15 members.*
- *We are not lane specific*
- *Train at the Aquatic Centre from October onward. September we must use the Four Seasons Pool*
- *Currently using 3 times a week for training. Next year we would like to expand to 4 times per week. Currently renting pool space/time.*
- *Timing is reflective of coaching availability. Not hurting right now, but in a couple of years, if we keep growing at this rate, it will become a problem.*

Concerns include:

- tank is too small.
- bulkhead can be moved to 25 metres, current size utilized is 25 x 25
- can't train all 30 members at the same time as size is not conducive
- minimum depth requirement is 6 feet – don't require shallow water level
- Dry-land Training is an issue. The giant sound system takes up much needed geography.
- a small private meeting area is available now, but it would be nice to have something larger to include a storage area.

PG Iceman

- *Use the Pool one day per year (Aquatic Centre). 400-500 people. Usually we have completed our usage by 1:30 PM and the Pool is reverted back to public use.*
- *50 Metre requirement for our needs*

Concerns include:

- A bit more deck space
- Better spectator areas. Its "ok" as is, but it would be nice to be able to improve that aspect.
- Parking is not an issue.
- No information about locker issues, as we don't use them. Most participants just drop their gear on the deck, do their program, and leave.
- For as much as we use the facility (Aquatic Centre) our needs are being met and we have no issues.

Special Olympics

- *Have used the Four Seasons Pool for over 20 years. 2 times per week. 30 adults.*
- *Can only use 5 lanes.*
- *There is currently a waiting list to join the group*
- *We would need to add more evenings in order to accommodate growth.*
- *Use the Aquatic Centre for one month a year due to maintenance shut down at Four Seasons.*

Concerns include:

- We find the Aquatic Centre a lot bigger, a lot louder
- The Four Seasons Pool is better suited to specific needs people.
- Only one starting block is available for us.
- We have members who qualify for National and International Level Competitions. It would be nice to be able to better accommodate the training needs of athletes with these types of ability
- When the starting block takes up one lane, then the other lanes are squeezed.
- 2 blocks wouldn't be a problem
- we could use more lanes but we would also need more volunteers and more evenings use.
- the hand lift at the Four Seasons doesn't always function.
- It would be nice to have a ramp or chair that could better facilitate getting people in and out of the water. we currently have one person with this requirement, but that could increase, and likely would increase if the means were available
- Individuals with severe mobility issues come with walkers and scooters. Getting in and out of the pool is difficult for them
- Lockers at the Four Seasons are old
- Family Change rooms are needed – there are only 2 available
- 3 feet to 6 feet or deeper would be great, but we do require a shallow end for teaching.
- Moveable floor – prefer something gradual sloping and change rather that what currently exists
- Parking at the Four Seasons is a big issue. If there is a large event (i.e. Canada Winter Games) or the Civic Centre is being used for a large function, the parking lot – which technically belongs to the Four Seasons, gets used by other venues patrons. We choose to cancel lessons due to a lack of parking in close proximity.
- Parking at the Aquatic Centre has the same issues because of its proximity to the Soccer Fields that require more parking than is available for their use.
- The Four Seasons Pool also has safety concerns at night because of the location.

Barracuda Adult/Youth Swim Club

- *Aquatic Centre is the only 50-metre pool available in the area. Next closest is in Grande Prairie or Kamloops.*
- *We swim the width, not the length when the floor is not graded*
- *We currently have about 40-50 members with a waiting list of 10+ kids*
- *Development D2's and D3's require 3 lanes so we are using about 10 kids per lane*

<u>Concerns include</u>:

- Wheel chair access is all on one level, so we think that is great
- The gym is available, but it is awful
- There is insufficient seating for spectators. We would like to be able to accommodate 300 kids plus parents.
- 7 Officials are currently required to run an event
- We feel this is the only experience for kids to be able to compete.
- Athletes also require seating area
- elevated seating would be preferred and believe it is possible in the current Aquatic Centre facility
- Currently, people bring lawn chairs because of a lack of proper seating. If we had more seating that was better suited to events, we are confident more people would come to observe.
- Bulkheads were not meant to be moved. When the new lights were installed, they caught on the bulkheads causing damage.
- Bulkhead motors are not properly waterproofed – very poor design. We understand that issue has been fixed now, but also recognize that proper bulkheads cost upwards of $150,000.
- We have nowhere for our coaches to gather. We have storage, but no meeting spot and no place for coaches to keep records, or meet with members, etc.
- We use part of the weight room.
- There is no food preparation area (we offer food to volunteers but then can't adequately provide for them). We end up using the office and staff fridge, etc.
- Lighting is too bright
- Sound can't be heard under water. Current Public Address System is inadequate. Doesn't meet our needs.
- Don't have starting blocks – there are some at the deep end, but that doesn't meet our needs
- We use the Four Seasons in September when the Aquatic Centre is closed for maintenance, but it is very unsuitable. It is hot and dirty.
- The Four Seasons Pool is no longer a viable alternative.
- In 10 years we would want to have a facility that would be on par with Thompson Rivers University facilities in Kamloops.
- We can't offer Provincial or Western Canadian competitions because of the lack of things like a proper warm up tank.
- We currently are using deck space to use for a warm-up area.
- Quantum Time System – Blocks vs Bulkhead – moving results in static.
- The ramp/warm up area is in the 25 metre pool

- For teaching and warm-up the 25-metre pool would be good, but not the 50-metre.
- We want to be able to offer National Competitions.
- The Four Seasons Pool 3 foot end isn't even legal anymore – it has been grandfathered, but technically is no longer acceptable.
- We need better Dry-Land areas.
- We need more deck space
- We need more changing facilities
- We need for more coaches for kayaking
  - Let's not invest dollars into antiquated pool or upgrade it. Let's look at new and "state of the art"
  - Both scoreboards are past their useful life and should be replaced
  - Adequate storage away from the Pool area is required to address issues such as rust and dampness/moisture issues. Things like computers, starting boxes etc require proper storage facilities.
  - We no longer have a diving club. We would require underwater windows. If we had a national caliber facility, we could attract divers again.
  - Going back to the T.R.U. facility as the "standard", we look at their ability to address seating, providing a fully functional gym, running, fitness facility. Need to be able to build on to a good aquatic centre to become a good "sports facility" that is all encompassing and in one location.
  - Due to timing issues and lack of space, the Barracuda Group has already been told they won't be issued any more group time. Expansion is needed.

Northwest Brigade Paddling Club (Kayak Group)

- *Small user group – high-end skill level required.*
- *Four Seasons Pool was a great location in terms of the ability to teach the skills in the shallow end, with gradual movement to the deep end for advanced skill level*
- *The dive tank provided a place to store boats.*
- *The Four Seasons helped develop the sport for the newcomer*
- *There are probably only a dozen people in town who Kayak now – We would like to be able to provide lessons and introduce the sport to more people, but we need proper facilities in order to do that.*

Concerns include:

- A moveable floor is definitely something we would want
- There is no deep end (Four Seasons)
- No storage now for our boats at the Aquatic Centre.
- Transporting boats in and out of the Aquatic Centre is very cumbersome and difficult.
- We need direct access to a parking door/ramp that leads directly onto the deck.
- The current facility limits growth and training for those already in the sport.

Directions Below (Scuba Group)

- *Currently utilize both pools.*
- *Small children use the shallow end at the Four Seasons while 10+ years old utilize the Dive Tank*

Concerns include:

- Bulkheads are breaking now. The gate is not moveable
- Older youth (grade 12) are using the moveable flooring (18 kids) then over to the Dive Tank
- When the gate was moveable, it was easier to get under and provided better training
- Long term storage (i.e. winter months) equipment freezes (freezing o-rings have been a problem)
- A gradual pool is lovely, and is visible
- Volume/Sound issues – as a parent, prefer the Four Seasons. The Aquatic Centre is too loud and visibility is an issue because of the size.
- Dive tank is too small – can only accommodate 10 kids maximum, but then we lose the gradual flooring
- The Four Seasons Pool is better suited to meet the diving needs.

Pisces Swim Club

- *primarily uses the 25 metre short course with emphasis on being a "summer use" club*
- *only utilize 2 hours of coached time per week from October to April*

Concerns include:

- no space for vendors, observers. Provincial Event can garner 300-500 swimmers, with 100-120 swimmers per meet.

- no space for warm-up
- not enough lane space – scheduling becomes a problem
- Barracuda club requires 30 minutes per night each week during the summer months. This results in only 2-3 lanes left for public use and is inadequate.
- Lack of storage is a problem
- Dry Land Training – gym is very poor at the Aquatic Centre and non-existent at the Four Seasons Pool. If it is raining, space really becomes an issue.
- Moveable seating, which can be converted to deck space would definitely be on the wish list.
- Lane ropes need to be improved.
- Bulkhead needs to be pushed back during a meet. Pins pull at times and can impact the size of the 25-metre pool.
- Public Address System is inadequate and of poor quality
- Pisces Club does Marshalling, but we can't be heard – noise levels and poor P.A. system cause most of that problem
- Utilize the facility 5 times per week from May 1st through to October. Because of the lack of lanes, we feel as though we are pushing people out, or causing late night scheduling which becomes problematic for parents.
- We would like a wider bulkhead
- We like "The River" at the Aquatic Centre – and note that it is also a popular component of the Centre for Seniors.
- We use the Four Seasons Pool in September when the Aquatic Centre is closed for maintenance.
- Would like to see the temperature increased at the Four Seasons Pool – it is too cold.
- The Aquatic Centre has a sandy/gritty feel which is not good

Stakeholder Consultation – Aquatic Needs Assessment

Prince George, BC

March 22, 2016 – 7:30 PM to 9:00 PM

<u>Group: Health Organizations</u>

Phoenix Physiotherapy .... **Mia Robinson**

Spinal Cord Injury BC .... **Nancy Harris (Regional Development Coordinator)**

Spinal Cord Injury BC .... **Furkana Khan (Practicum Student)**

Doug presented an introduction and explained why we were meeting.

<u>Spinal Cord Injury BC</u>

- *Interested in keep the lens on universal design and accessibility for both spectators and end-users alike.*

<u>Concerns include:</u>

- Spinal Cord Peer Program does scuba/kayaking activities.
- Canada Games experience was horrible – no proper seating, no proper areas for volunteers, wheel chair bound individuals can't participate seamlessly
- Slippery Tiles
- Heavy Doors
- Access is limited, people in wheel chairs can't get past the shower areas – narrow corridors
- Aquatic Centre needs an accessibility assessment.
- Not a lot of free movement – spectator area is very crowded.
- Great that there is a lift, but would be good if there was one in the shallow end
- Facility is challenging on a regular day for someone in a wheel chair – during special events, it becomes impossible.
- There is insufficient free/clear design space – there are obstacles everywhere
- Community Equipment Needs – Autism kids for example, require specialized life jackets. Please give consideration in the budget for this. Nancy Harris will send information – Doug provided his business card)

- Muscular Dystrophy patients and Paraplegics also struggle with floatation issues.
- Addressing fear of water – Aquatics is great because of the variety of activities
- as an individual user by able bodied young people, no issues have been encountered
- would enjoy doing other things while waiting for child who is in the Pool area, but would want to be able to maintain visibility.
- Having access to a low level of exercise during that time period would definitely be welcomed.
- Currently, visibility is poor and distance across the facility is quite vast.
- more seating areas are needed
- there is not enough table spaces (restaurant/café style seating)

Phoenix Physiotherapy

- *We don't use the front-end of the lengths pool at the Aquatic Centre.*
- *People who have had knee replacements, sore backs, etc can't access. Some use the ladder (most do not) but wouldn't use the lift.*

Concerns include:

- If a ramp were built, it would be better.
- Accessing the water is the problem
- The Aquatics Centre has issues from the Parking Lot to the Pool
- Slippery flooring – patients need to wear water shoes (i.e. crocks)
- All dry spaces have quarry tile. The Pool Deck has "slip proof" tiling, but everywhere else is an issue. (i.e. showers/change rooms, etc.)
- Slope of the showers/change rooms is excessive and becomes problematic – may be as much as 2%
- Hand railings are large and can be slippery. Smaller diameter would be better
- Hand rails also in the pool would definitely be a good idea
- Leisure Pool – holding on to the edge is the only option now. Railings to accommodate exercise programs and accessibility would be good
- Locker Rooms – narrow stalls in washrooms – no access for wheelchairs or crutches, etc.
- Limited family stalls (6). Two are for people with disabilities – not enough.
- Time/space issues around privacy for various user groups is a problem – different groups are using the same space at the same time and becomes crowded.
- Scooters require more room – can't get the turn radius required in the current facilities. Need 1 or 2 stalls at least to accommodate scooters and other mobility equipment
- Need to look at the door handles in the change room cubicles – are the handles levered and dead bolted in a manner that is easy for people with disabilities to utilize.

- Dry-Land space availability – Physio groups don't use the gym as it is quite small.
- Physiotherapists don't require a meeting space
- The River is a great cardio walk used primarily for warm-up and resistance exercises. Arm exercises at the jets have proven to be an effective rehabilitation tool. Back injured patients also benefit from the River.
- The only problem with The River is that there is a tendency for seniors groups to be using it at the same time that physiotherapy group is using. If we go at a different time (i.e. afternoons) then children are usually playing there.
- The River is a popular venue and excellent for resistance strengthening.

General Discussion:

Prince George doesn't have a "one-stop" Recreation Centre for the Community. There is the Sports Centre at UNBC, which is good, but there is no pool. each facility is separate and requires individual memberships, which become costly. A "One-Stop Shop" would be great. Alberta has many good models to reference.

- *Transportation Issues*

  The Four Seasons Pool addresses the transportation needs for low-income families because it is more central in most cases, to that particular user group. Moving the Four Seasons Pool to a different location would be a challenge for those families. It is preferred that it stay in the same location. Bus drop off is right at the Four Seasons Door. The Aquatic Centre does have bus service, but there is still a bit of a walk to the entrance – service does not go directly to the door.

  The majority of schools use the Aquatic Centre because of the location.

- *Sensitivity to Chemicals Used at the Aquatic Centre*

  The problem is recirculation of the air. The Four Seasons Pool has fresh-air circulation from outside and that affects the air quality.

- *Ways to Gain More Feedback*

  Surveys at Malls – perhaps offer free swimming passes

  Approach population at the University and CNC

  Facebook Group – "Hell Yeah Prince George" (Scott McWalter)

Stakeholder Consultation – Aquatic Needs Assessment

Prince George, BC

March 23, 2016 – 9:00 AM to 10:30 AM

Group: Non-Government Groups

YMCA of Northern BC .... Stephanie Mikalishen

YMCA of Northern BC .... Lynette Mikalishen

Big Brothers Big Sisters BC .... Tim Bennett

Chamber of Commerce .... Christie Ray

Big Brothers Big Sisters BC

- *Established in Prince George in 1979. Serving approximately 300 kids. There has been significant growth in the past 3 years. Partly due to need, awareness, more programming available*
- *Run an after-school program as well as a few other structured programs*
- *Currently operating 3 – 8 to 10 week sessions at the Four Seasons Pool and the Aquatic Centre.*
- *Lessons are funded through grants and some discounted rates by the City.*
- *Age group predominantly 5-14 years.*
- *Sometimes we use the Four Seasons because of the waterslide.*

Concerns include:

- Scheduling issues (i.e. 3:30 PM is not great timing for school kids).
- The Four Seasons usually creates the timing issues, but moving to the Aquatic Centre was a problem because it is oversubscribed.
- We use the Aquatic Centre because more of our Child-Care facilities are within walking distance of that facility.
- Loading kids into vans, need for vehicles/drivers/etc and a lack of parking makes the Four Seasons unattractive
- We want to better utilize recreational activities for fitness
- One large venue is preferred.

- Shortage of life guards is an issue
- Want more opportunities for lessons

<u>YMCA of Northern BC</u>

- *51 years in Prince George. Main facility is on Massey Drive*
- *9 child care locations*
- *5200 fitness members*
- *400 in child care program*
- *Recreation room includes a climbing wall, large fitness facility*
- *We subsidize 1 in 5 kids through funding*
- *Compliment the "Strong Start Program"*
- *In comparison to other communities of similar size, we are likely on par*
- *We hold camps in the summer months at a lake location, Mount Robson for hiking, Bowren River Chain for canoeing*
- *Programs are designed to accommodate Seniors, At Risk Youth, a Youth Exchange and Youth Employment Program*
- *The "Y" is open to a "Y Brand" Aquatics Program that would be City run. Possibility for partnerships is definitely something the YMCA would be interested in exploring.*
- *The YMCA has done a needs assessment. There was a real interest, but Stephanie couldn't speak to the specifics. She will ask that the information be forwarded to Doug.*
- *Prior to the University being built, the YMCA did have a plan, but it was abandoned because the focus seemed to be on the University construction and the plans around that. Stephanie can send that information as well.*
- *The current Massey Drive location does have land and space location to add a pool.*
- *The model of the Coquitlam and the Kamloops Recreational Facilities are something that would definitely be appealing. The YMCA enjoys being a good partner.*

<u>Concerns include</u>:

- We utilize the Aquatic Centre and the Four Seasons Pool on Pro-D days, but then timing becomes an issue.
- Child Care Groups would like to add swimming lessons
- A shortage of Life Guards has become an issue
- Children under 5 years of age need classes/instruction
- A "super structure" would be a better utilized facility
- Would love a facility that could enhance our camp program by offering instruction in things like canoeing, swimming lessons, rescue clinics, certifications, etc to complement

our out-door summer program

- Safety Training is better held where we play – best risk management practices.

Chamber of Commerce

- *Non-profit, business-based organization*
- *800 members – 5th largest in B.C.*
- *Focus is on business needs – recruiting/retaining quality people.*
- *Prince George struggles with image*
- *Downtown Revitalization is in progress, but still an issue*
- *Prince George currently serves approximately 350,000 people in the north.*
- *Downtown attractiveness is the Chamber's priority.*
- *Examples – UNBC and the Cancer Centre have been significant driving forces for both elements*
- *Philosophy and culture of the community seems to be a preference to focus on one big project at a time. Sports vs. Arts needs become a point of contention at times. There is sometimes a fear that we would build something that would end up not being used or even worse, move away.*

Concerns include:

- Consideration is two-fold – recruiting tool and an economic driver.
- We would prefer that something be built in the downtown core that would aid that effort
- The next 12 years is our immediate concern. Important to be moving forward. Any Capital Project requires those factors to be included.
- The "right" program would assist in retaining business, while attracting new businesses and new families who wanted to stay.
- We need to support projects that bring that "wow" factor
- We also want to be able to attract and support northern tourism. A strong sports complex would lend itself to that.
- Would like DIALOG to arrange for a meeting (conference/personal, etc) meeting with Chamber of Commerce membership to present the ideas and receive feedback from the business community.
- During this meeting address things like how the project would be funded. Emphasis on the large leisure component reducing costs. Consider the social amenities as an attractor for users. The more information the Chamber members have, the more support (possibly) can be garnered.

General Discussion:

Suggestions:

Creating an atrium space, a community meeting area, including things like internet sites, a good quality gym, good line of sight to the pool area, a social gathering place.

- Kelowna has a nice model – addresses the needs of young professionals, young Mom's,
- making child care part of the Recreation Centre while encompassing a dual exercise program for kids and parents
- better utilizing recreation time for both adults and children

Would a facility that included an outdoor component that could be closed during the winter months, but open in the summer be attractive? Something that had a waterslide, an outdoor pool, a portable roof with modifications for summer to winter use – adding a shade component, security and proper fencing?

- That would definitely be attractive and would be exciting for the community.
- Currently the YMCA is transporting kids to local lakes in the area for outdoor activities. Combining a nature component would be very interesting and assist with transportation costs as well as logistics.
- This would be an amazing opportunity for youth and families where transportation is an issue.
- A spray park with proper safe flooring would be welcome.
- Any outdoor water time in the city, would be a huge plus.

A gaming maize fountain that could be portable on special occasions or for special events.

- fascinating idea – generated interest
- would really help youth who don't have access to transportation to get to lakes
- would draw families to a facility that had both an indoor and outdoor component

- Would be interesting to explore a partnership with UNBC as well.
- Suggest that Erica Hummel at Tourism Prince George be approached for her comments on the project.

Suggested contacts for further support and comments:

- *Lynn Hall – Mayor*
- *Jillian Merrick – City Council Member*
- *Terri McConnachie – City Council Member*
- *Erica Hummel – Tourism BC*
- *Greg Pocock, Owner – Prince George Cougars (WHL Hockey Team)*

Future Meeting Considerations:

- *Perhaps be more involved in scripting the message to user groups who we want to meet with.*
- *Scheduling meetings during periods when more people would be available (i.e. not Spring Break, Summer Months, Christmas, etc)*

Recurring Themes/Issues:

- *Loud/Noise Factor at Aquatic Centre*
- *Parking*
- *Slippery Floors*
- *Small/Inadequate Change Rooms*
- *Accessibility*
- *Scheduling*
- *Retention of the Four Seasons Pool in some form*
- *Railings*
- *Bulkheads*
- *Seating*
- *Storage*
- *Transportation*
- *Acoustics/Sound System*

Interest In:

- *"one-stop-shopping" facility*
- *competition friendly venue*
- *indoor/outdoor component*
- *"community area" better designed to service adults who are waiting for children to complete programs*

11.6 Public Open House Notes

Note: In this section, "PGAC" refers to the Prince George Aquatics Centre, and "FSLP" refers to the Four Seasons Pool.

What We Like

Four Seasons Pros:

- Close to bus
- library is complimentary use
- free parking
- location

Aquatic Centre Pros:

- Free Parking
- Ability to break up the pool (moving bulkhead)
- Timing booth for racing
- Moveable floor/depths
- Family changing rooms
- Weight/fitness room
- Like that both facilities are publicly managed
- Both pools have good "incentive programs"
  - Swim to Vancouver
  - Around world jet

Asides:

- No parking for civic centre creates a lot of competition for parking space.
- New facility needs to have adequate parking; even if it is in the same location.
  - However, parking expectations may be unreasonable
  - Doug, in smaller cities people expect to have easy, close parking available.
- Family change rooms@A.C. are good, but there aren't enough of them.
- A.C. change rooms are humid, plus can be smelly
- A.C. "water dump toy" is often avoided by people, because it is uncomfortable (sprays from a high height) can be intimidating, especially for people with babies.

What Program Amenities Do We Need?

- School lessons – important for lower income kids
- All schools (including private) should be encouraged
- Better marketing of the pools and services (i.e. aqua therapy; appealing to retirees.)
- Making an effort to attract people of all ages and specific niches (people with disabilities, injuries, etc.)
- Sharing information in medical clinics
- Lack of maintenance at both pools is a big issue
    - "I would never truly describe either facility as clean."
    - Importance of building adequate maintenance plans into any future aquatic plans.
- Better ways to share space when multiple users

Aside:

- Participation – importance of getting kids in the water when they are 0-10, so they are comfortable in water as they age.
- Swimming is one of the few sports that is gaining revenue due to the health benefits
- Victoria Commonwealth Legacy Fund is fundraising for the future.

Are Using the Pool:

1. More concentration of users around the pool (i.e. gymnastics, on centre, etc.) to draw more users.
2. Idea of creating a multi-purpose space; could a new pool be tied to the performing arts centre? What about a coliseum?
3. "larger vision" – a new pool will be costly, so having more users behind the concept will help it be successful and support the concept.
4. Marketing – to attract people to Prince George especially northerners in rural areas.
    a. Also sporting events being an attractant for competitive athletes, but their families will stay an extra day to enjoy Prince George, if they have a reason to.
5. Food services: Need to have concession/catering or other options for facility users.
6. Better connecting our City services in "super pass"
    a. Pool; gallery; exploration place, etc.
    b. One fee is more convenient, efficient and accessible.
7. Consider providing frameworks for people to sponsor low-income kids or others to get access to recreation.
8. Waterslides are fun and can get kids interested in the water.

9. There is no facility in B.C. with two competitive-style pools in one facility. Victoria is the closest. This would allow you to apply for major events.
10. Aquatic centre needs more seating
11. Four Seasons Pool – kids changing space is not safe: no barriers, slippery, etc. Needs to be modernized.
12. Mushroom
13. Stairs @PGAC vs. FSLP
14. Punch card/tokens
15. Community gathering place
16. Doors @PGAC – blower
17. Younger Programs/Fit
18. Mark Lockers/Broken
19. Vents Hot tub higher
20. Jet on step @FSLP hot tub
21. Parking - not enough
22. Coliseum – Rec centre combo? Life of col.
23. Not enough handicapped parking
24. Coffee shop - More geared toward seniors
    a. Muffins /whole
25. Rec Centre – ex. Playgrounds, café
    a. Good
26. Nice viewing are comfy – convertible so space can be utilized
27. Chair/tables

Needs Assessment Survey:

28. Encourage more financial break for seniors
    a. LT benefit – ease health, active living, fitness
29. Similar to lap program to encourage seniors to participate
30. Social aspect, wellness

Like

FSLP Graduated floor for aquafit.

PGAC Having a place to watch. Socialize

Happy with Aquafit instructor

Lane swimming (morning)

FSLP Option of cold shower

Punch card with token included

Need

PGAC Better ladder to get in and out of pool

Look at aging population for getting then out of the pool

Knee and hip classes for recovery

PGAC Able to adjust temperature in shower

FSLP Auto shut-off for showers

FSLP Parking should be better, i.e. more parking

FSLP Better accessibility

Recreation facility i.e. a place to walk, work out, skating, one flat fee

Life in Coliseum, perhaps combine usage of two – facelift

Need

No place to park when Coliseum and Civic Centre has events, has to park a couple of blocks away.

Coffee shop, a place to socialize, others would come even without using pool; i.e. playground,

Café – cracker, cheese, fruit bar, healthy food

Pool bottom surface slipper at FSLP, good at PGAC

Converted pace, can be pulled in and out, i.e. bleachers

Nice viewing area for watching events, i.e. diving, synchro competition

FSLP Chairs, table in viewing

FSLP Easy access

Community gathering place

Warm air blower at entrance so in winter lobby is not so cold when door open

Comfortable lobby area

FSLP Need weight room at both facility

Lesson on how to use new equipment – offer a few times a week in personal trainers

Mark black marker on lockers that don't' work and need repairs

<u>Don't Want</u>

Stairs

FSLP jet on stairs in hot tub

<u>Need</u>

Daycare

Hot tub jets higher up in the shoulder area for massage.

Aquatic Centre Users:

- Aquafit – great instructors – shallow and deep classes

Lap swimmer
PGAC – good location
Gym users
Hot tub and steam room are great
Rive walking Aquafit
Nice and helpful staff and respond appropriately
Good size tanks

- Expand seniors program
    - Financial benefit
    - Subsidies for seniors

Super seniors!
Aquafit at after work time 5:00 p.m. or 5:30 p.m. at Aquatic Centre
Apply the leisure access program to seniors and use age instead of income

Give perks to seniors
Facility that encourages health and wellness and socializing
Promote swimming lessons to seniors
Ramp to go into lane pool
More lane swimming space
Lockers to be able to go in and out multiple times
Wristbands for every person
Separate tot pool with shallow water at aquatic centre
Issue with lots of people putting items in lockers, but not locking them

- Sandwich board reminders for closing lanes, i.e. communication
- Music volume and genre

What We Like

FSLP 2 pools compliment – family intimate

Smaller laps

Contained, small pool (tot pool) – preschool, lessons, warmth, stairs

Water temperature, lanes for lap swimming

Warm water

Location

Free parking, location of library, bus stop

PGAC Lots of parking, free

Bulkheads breaking up pool

Timing room visuals

Moveable floor

Needs work

FSLP Stroller parking

Acoustics

Parking spaces designated

Cleanliness of change rooms and pools

Maintenance upkeep –adequate

PGAC lockers

Not enough family changing areas

Smell, ventilation in change area is poor

Tumble buckets, too rough, large space

Programs

Starting them younger – more likely to use H2O

School programs (i.e. swim to survive)

Marketing for programs – attracting ppl to PG

Physiotherapy groups

"Superpass" that works everywhere or at different venues

One fee and one card

Sponsor swimming lessons with a membership

Lesson quality emails – communication about next level

Future

Link the recreation buildings – Coliseum and pool together

Food/concession/catering (a reason to stay)

Fun things (i.e. waterslides) with a flume

Two (50-m x 10 lane) tanks

Play pens for babies/moms

Towel cubbies in pool area

Email Responses

The City of Prince George is asking you as a representative of your organization for input into a needs assessment of the aquatic facilities in Prince George. Please answer the following questions and reply with the answers by April 22nd to Doug Wournell <dwournell@dialogdesign.ca>.

Question One: How does your organization utilize the City's current aquatic facilities and programs to further the goals of your organization?

Question Two: How could the current aquatic facilities and programs be changed or improved to further your organizations abilities to achieve its goals?

Thank you for your input on this important information gathering process.

Sincerely,

Good Afternoon Doug:

In response to your questions:

1. PacificSport Northern BC uses the aquatic facilities occasionally in the delivery of our physical literacy programming. Specifically we run introduction to sport camps where the facilities are used for several activities over the course of a week of summer day camp and 2-3 more times during the rest of the year for one-time sport “Try-it!” events.
2. PacificSport Northern BC values “barrier free” participation in sport and is focused on providing opportunities for people of all ages, abilities and socio-economic status. Developing swimming skills is important to the physical literacy of all people so ensuring that all facilities, including changing rooms, showers etc are accessible to all with appropriate lifts and modifications is important. In addition providing opportunities for children with lower socio economic status the opportunity to receive swimming instruction and recreational swimming at no cost is very valuable.

Thank you.

Leslie

LESLIE ANN WIRTH | EXECUTIVE DIRECTOR PACIFICSPORT NORTHERN BC lwirth@pacificsport.com **T** 250.960.5342
W PACIFICSPORTNORTHERNBC.COM PACIFICSPORT NORTHERN BC @ CHARLES JAGO NORTHERN SPORT CENTRE Office #14-300, 3333 UNIVERSITY WAY, PRINCE GEORGE, BC V2N 4Z9

Hi Debbie.

1. The PG Masters Swim Club meets each Sunday October through April (6 months matching insurance) to swim, improve technique and meet new swimmers each Sunday at 8:30. The club has been together for over 30 years established 1984 +/- . Some of the members also meet to train for iron men / triathlons and the iceman. The group is mainly self-coached.

2. The aquatic facilities provide most of our needs. The only improvement I would suggest is to have a few more pull-buoys and swim flippers (- the shorter training flippers preferred) - available at the aquatic centre (say 6 of each) the masters may be able to contribute some money if the City was interested.

We find the facilities and staff excellent, Chris

From: Chris Thornhill [mailto:christhornhill.60@gmail.com]

Sorry for the late late response >.

Question One: How does your organization utilize the City's current aquatic facilities and programs to further the goals of your organization?

We play waterpolo on Sunday nights at the Aquatic Centre from October thru March by drop in and the goal is to encourage fitness among the participants and encourage the love of the game

Question Two: How could the current aquatic facilities and programs be changed or improved to further your organizations abilities to achieve its goals?

Works perfectly

Dave Fuller davefullerpg@gmail.com PG Water Polo

Hi there,

Question One: How does your organization utilize the City's current aquatic facilities and programs to further the goals of your organization?

I have only been with the WBCA for about a year now, but as far as I know we do not utilize any of PG's aquatic facilities for any of our programs, except that I know people can register for things there. Our goals are to provide fun, affordable, and accessible recreation to the community but confine that to Elementary school gyms and fields.

Question Two: How could the current aquatic facilities and programs be changed or improved to further your organizations abilities to achieve its goals?

As we don't use the facilities for anything except registrations, if we can still have that option that would be great.

Thanks,

Tianna. Dulmage, WBCA programmer.

Hello Doug,

Please find the responses requested below:

Question One: How does your organization utilize the City's current aquatic facilities and programs to further the goals of your organization?

Our organization uses the aquatic facilities for low resistance exercise for our rehabilitation programs two to three times a week.

Question Two: How could the current aquatic facilities and programs be changed or improved to further your organizations abilities to achieve its goals?

To allow us to section a space in the pool for our clients, that is not interrupted by other patrons.

Chantell Grattan, DBA

Administrative Manager & Interim Clinic Manager

CBI Health Centre – Prince George

1310 5th Ave Prince George, BC V2L 3L4

T: 250.562.3537 F: 250.562.3547

www.cbi.ca

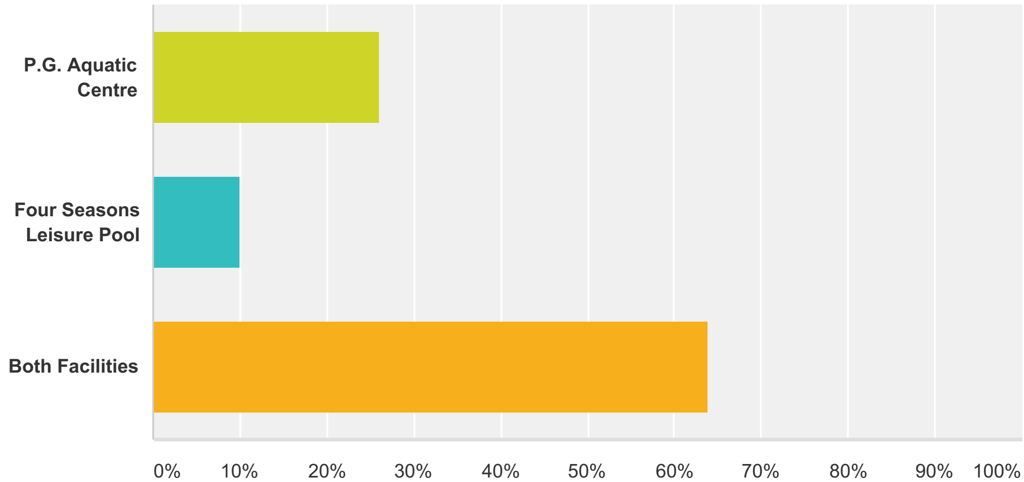
CBI HEALTH GROUP

LEADING CHANGE, IMPACTING COMMUNITIES.

11.7 Survey Results

Q1 What pool facility do you visit?

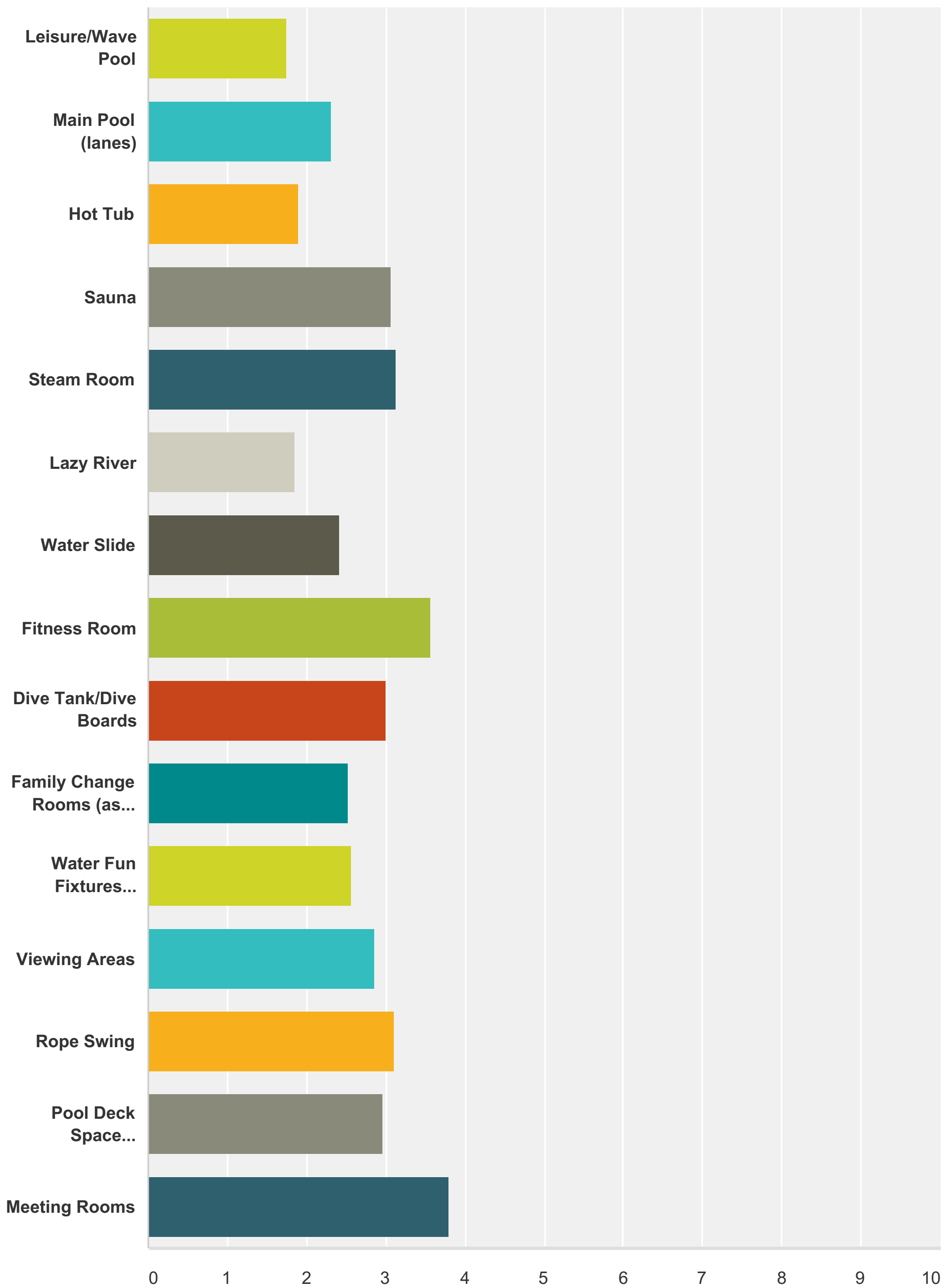
Answered: 615 Skipped: 5



Answer Choices	Responses	
P.G. Aquatic Centre	**26.18%**	161
Four Seasons Leisure Pool	**9.92%**	61
Both Facilities	**63.90%**	393
Total		**615**

Q2 How often do you use the following AMENITIES?

Answered: 592 Skipped: 28

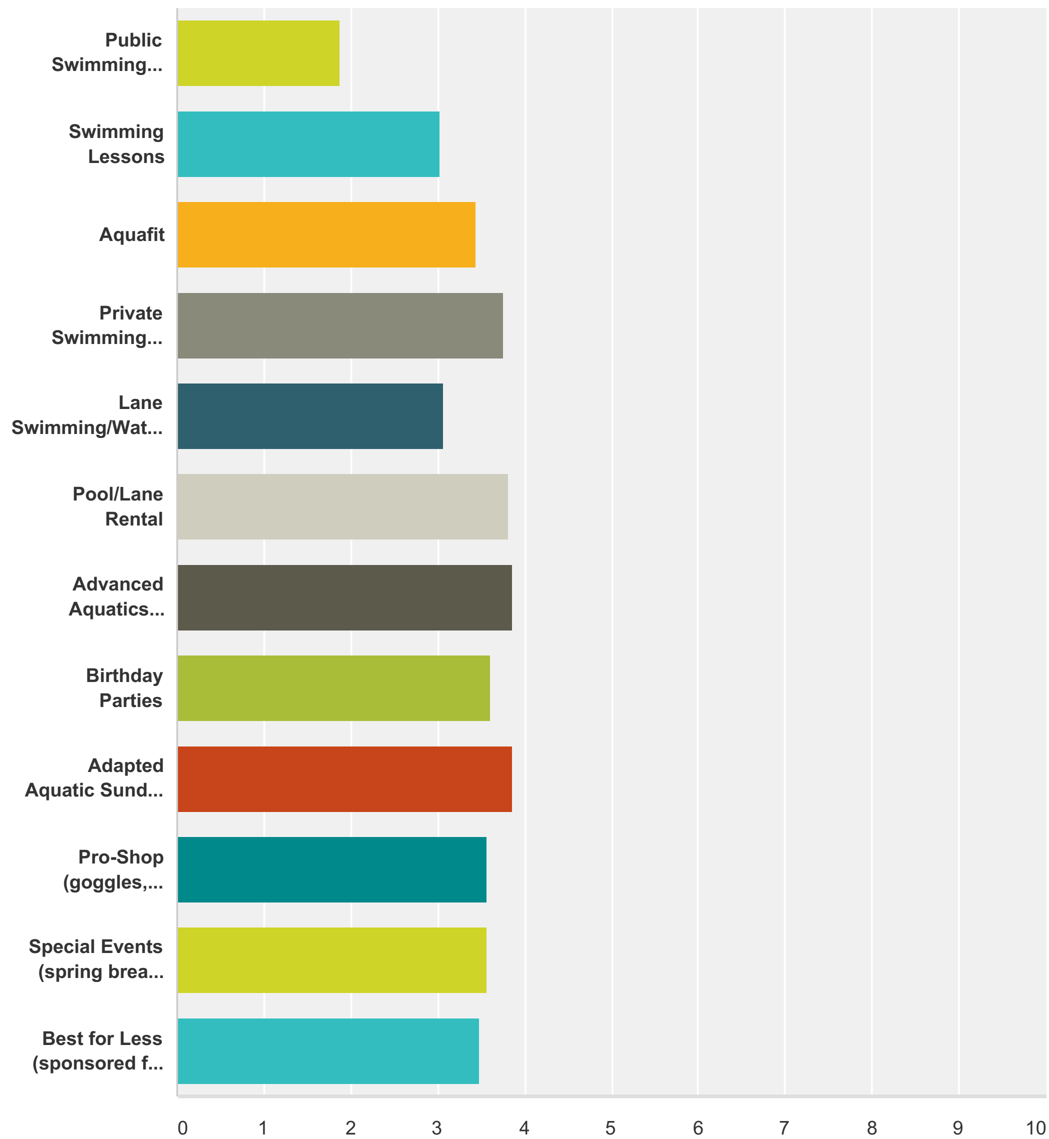


	Every Visit	Most Visits	Occasionally	Never	Total	Weighted Average
Leisure/Wave Pool	**56.37%** 314	**18.85%** 105	**18.67%** 104	**6.10%** 34	557	1.75

Main Pool (lanes)	**32.40%** 185	**20.32%** 116	**31.35%** 179	**15.94%** 91	571	2.31
Hot Tub	**48.17%** 277	**22.09%** 127	**20.70%** 119	**9.04%** 52	575	1.91
Sauna	**11.96%** 64	**13.46%** 72	**30.65%** 164	**43.93%** 235	535	3.07
Steam Room	**12.85%** 68	**11.15%** 59	**25.90%** 137	**50.09%** 265	529	3.13
Lazy River	**51.07%** 286	**21.07%** 118	**18.75%** 105	**9.11%** 51	560	1.86
Water Slide	**34.32%** 186	**16.97%** 92	**20.30%** 110	**28.41%** 154	542	2.43
Fitness Room	**2.46%** 13	**6.62%** 35	**23.63%** 125	**67.30%** 356	529	3.56
Dive Tank/Dive Boards	**13.05%** 71	**14.34%** 78	**32.35%** 176	**40.26%** 219	544	3.00
Family Change Rooms (as opposed to standard men's or women's change rooms)	**30.88%** 172	**17.06%** 95	**21.18%** 118	**30.88%** 172	557	2.52
Water Fun Fixtures (sprays, water bucket dump, etc)	**23.47%** 130	**24.55%** 136	**24.19%** 134	**27.80%** 154	554	2.56
Viewing Areas	**15.61%** 86	**15.61%** 86	**36.30%** 200	**32.49%** 179	551	2.86
Rope Swing	**14.10%** 77	**12.82%** 70	**21.06%** 115	**52.01%** 284	546	3.11
Pool Deck Space (spectators, dry land training or fitness activities)	**15.01%** 83	**14.10%** 78	**29.84%** 165	**41.05%** 227	553	2.97
Meeting Rooms	**0.93%** 5	**1.11%** 6	**16.14%** 87	**81.82%** 441	539	3.79

Q3 How often do you use the following SERVICES?

Answered: 581 Skipped: 39



	Every Visit	Most Visits	Occasionally	Never	Total	Weighted Average
Public Swimming (drop-in)	**43.13%** 245	**32.57%** 185	**18.84%** 107	**5.46%** 31	568	1.87
Swimming Lessons	**6.74%** 37	**24.23%** 133	**27.87%** 153	**41.17%** 226	549	3.03
Aquafit	**5.41%** 30	**7.57%** 42	**24.32%** 135	**62.70%** 348	555	3.44
Private Swimming Lessons	**0.92%** 5	**3.13%** 17	**16.39%** 89	**79.56%** 432	543	3.75
Lane Swimming/Water Jogging	**14.80%** 82	**13.36%** 74	**22.20%** 123	**49.64%** 275	554	3.07

Pool/Lane Rental	**3.49%** 19	**1.10%** 6	**4.77%** 26	**90.64%** 494	545	3.83
Advanced Aquatics (lifesaving & lifeguard courses)	**0.74%** 4	**2.03%** 11	**6.46%** 35	**90.77%** 492	542	3.87
Birthday Parties	**0.55%** 3	**1.09%** 6	**34.36%** 189	**64.00%** 352	550	3.62
Adapted Aquatic Sunday Swim	**1.28%** 7	**1.28%** 7	**7.88%** 43	**89.56%** 489	546	3.86
Pro-Shop (goggles, bathing suits etc.)	**0.55%** 3	**1.46%** 8	**36.98%** 203	**61.02%** 335	549	3.58
Special Events (spring break, swim meets, underwater Easter egg hunt etc.)	**2.55%** 14	**4.00%** 22	**27.64%** 152	**65.82%** 362	550	3.57
Best for Less (sponsored free swims)	**2.77%** 15	**6.27%** 34	**29.70%** 161	**61.25%** 332	542	3.49

Q4 What enhancements should be considered?

Answered: 453   Skipped: 167

Q4 What enhancements should be considered?

Answered: 453 Skipped: 167

#	Responses	Date
1	Updating tired or unclean looking walls or floors.	6/1/2016 8:32 AM
2	Please bring back the fitness room in Four Seasons Pool!	5/31/2016 10:59 PM
3	Cleaning by staff could definitely be done more, lots of sitting in their room not doing much when cleaning could be done	5/31/2016 11:42 AM
4	keep both pools! keep them maintained as you would your own house. this community needs these facilities. try and make some events that would encourage teens to go.	5/31/2016 10:34 AM
5	Senior only lane swim. Update shower area so there is a place tang bathing suits as there was previously. Respond to requests for basic maintenance - right hand tap in regular changing room is not working. Sell fabric bathing caps!	5/31/2016 8:25 AM
6	maintain the present service at minimum and consider replacing 4 seasons as it is nearing the end of it's life as reported in the news	5/31/2016 8:14 AM
7	Close the 4 seasons. Add another 50m tank to the aquatic centre with viewing area. Less overhead and lower maintenance. Gets it out of down town. 4 seasons is beyond repair and location is horrible for kids. Convert to parking for civic centre and expand for more re ensue generating conferences and rental.	5/30/2016 10:14 PM
8	4 Seasons is really run down. I think it is important that we have two pools in this town. I know of parents who like going there with their children for swim lessons because it is quieter and the change rooms aren't so overwhelming. Being a Northern town I wish that the hot tube at both facilities was larger as they are often packed.	5/30/2016 10:29 AM
9	Not sure	5/30/2016 7:00 AM
10	Please bring back the fitness room! It is a much needed part of your facility and I used it everyday.	5/29/2016 12:59 PM
11	Nothing we love the pool	5/28/2016 2:26 PM
12	If re-building, Multiplex facility like Grand Prairie where the whole family can go and do many different activities (pool, gym, field, playground, childcare, food/cafe)	5/27/2016 4:43 PM
13	The four season's doesn't have enough family change rooms, especially after tot classes. It's common to wait 30min+ With a shivering baby.	5/27/2016 9:43 AM
14	More young child friendly water space. The aquatic center gets too deep too fast for little kids.	5/26/2016 2:29 PM
15	I think both pools are fine the way they are. Possibly work on keeping change rooms cleaner.	5/26/2016 12:32 PM
16	More Janitorial Staff to keep floors clean Bigger changerooms (especially at 4 Seasons) & more Family rooms Better entrance for 4 Seasons	5/26/2016 11:51 AM
17	Another pool in the college heights area. More lanes at 4 seasons. More swim lessons for smaller class size. Total revamp of 4 seasons although love small pool for younger kid lessons. Aquatic center is great. Both pools need more family change rooms	5/25/2016 5:35 PM
18	The pools should have swimsuit spinners to help dry them out after swimming.	5/25/2016 11:42 AM
19	better water quality with new technology (ie. UV, salt, etc etc), lots of provisions for lane swims. Sauna.	5/25/2016 11:26 AM
20	something downtown	5/25/2016 10:42 AM
21	Family change rooms! Water slides! Bigger hot tub Warmer water	5/25/2016 8:56 AM
22	Better access for elderly and disabled	5/24/2016 11:13 PM
23	Check Grand Prairie swimming pool. It has a "river" that is 4 or 5 times the size of the Aquatic Center, water slides with tubes (single and double), a small children play area, two hot tubs with different temperatures, dive tank, swimming lanes, and a surf simulator. Probably missing something but the place puts our facilities to shame.	5/24/2016 7:45 PM
24	I don't use either but if one was built up the Hart I would use it.	5/24/2016 7:03 PM

25	Both pools are lacking in toys for children. Buckets, fish shaped toys and things like that are what would be fun and are at most pools but not here in PG. We have a young family and our kids are always looking for toys and coming up empty handed. The family change room has needs ventilation at the Aquatic Center.	5/24/2016 5:58 PM
26	Let the Y build a pool and that will fix the problem. We cant pay more taxes for a new pool that just loses money.	5/24/2016 3:50 PM
27	Update all change rooms and washrooms -very outdated at the Four seasons especially	5/24/2016 3:39 PM
28	I would use the pool or pools more often if you had at least 1 hour per day strictly for seniors 60 and over!! The whole pool area, not mixed groups!	5/24/2016 3:39 PM
29	Having 50 m pool longer (do not change to 25 m in the morning)	5/24/2016 2:26 PM
30	Replacement of 4 Seasons with Downtown Recreation Complex.	5/24/2016 1:43 PM
31	There are not enough family change rooms at the Four Season Pool.	5/24/2016 12:08 PM
32	Upgrade change rooms and fitness center	5/24/2016 11:32 AM
33	A new pool in the Hart	5/24/2016 10:56 AM
34	If a new pool were to be built, perhaps all on one level? Also, a small coffee shop and more available parking. A river is always nice.	5/24/2016 9:14 AM
35	Better change rooms, more swimming space, a better area for people to watch swimming from.	5/24/2016 7:45 AM
36	I'd put in a new tank at the Aquatic Centre, then close down 4-seasons.	5/24/2016 7:33 AM
37	Sell Pine Valley and use the money to build a new swimming pool.	5/24/2016 6:51 AM
38	Better viewing area Updated change rooms	5/24/2016 6:51 AM
39	Ensuring facility is handicap accessible.	5/24/2016 6:37 AM
40	Water slides	5/23/2016 10:14 PM
41	Lower the fees and more people can afford it, or at least would be willing to go and give it a try.	5/23/2016 8:17 PM
42	Get more family changing rooms. I won't take my kid (girl) into the guys changeroom with naked guys in there and it takes forever to get into the family room sometimes. Get people off their phones in the changrooms, that's justnot right!	5/23/2016 5:18 PM
43	Increased offerings of range of motion sessions	5/23/2016 4:24 PM
44	Switching to "sea water" from chlorinated water.	5/23/2016 2:24 PM
45	Please consider opening the pool a bit earlier. If it opened at 5 or 5:15, i and many others could swim before work (i start at 7, many others start at 6 or 7). Swimming after work is a problem as the lanes are full with swim classes. By opening just an hour earlier, you could decrease the peak load on the lanes after work by encouraging more people to come earlier and getting a better spread.	5/22/2016 11:19 AM
46	Better maintenance program. When bulk head or steam rooms go down, it is downs for weeks sometimes. Kind of joke in this day and age. Shower water temperatures are hot one day and cold the next, not sure why this would be.	5/21/2016 2:39 PM
47	More family change rooms are needed.	5/20/2016 9:33 PM
48	Another 8 lane 50m pool and stands to accommodate swim meets like AA's, Provincials, Nationals!	5/20/2016 6:37 PM
49	Spruce up the stained tiles and keep clean - love the facilities - thank you :)	5/20/2016 2:35 PM
50	cleanliness!	5/20/2016 1:07 PM
51	larger hot tub, new aquafit equipment - specifically the rubber tension bands.	5/20/2016 10:59 AM
52	H2o in Kelowna is a good reference point. Seating for swim meets.	5/19/2016 9:48 PM
53	Bigger faciliity at the aquatic centre more family fun activities.more spectator room on deck . Balcony for swim meets. Better timing clock	5/19/2016 7:16 PM
54	The pool deck at the four seasons is VERY slippery! Especially right at the exit to the pool deck from the change rooms. Lockers at the four seasons frequently do not work. Stairs leading up to four seasons on the parking lot side of pool (back entrance) are extremely hazardous for young children and anyone use that door really! I have seen so many near-misses there. Line ups for family change rooms (four seasons) are so long! I don't use them, but most people I know with kids do. Lifeguards and swim instructors are excellent! They do such a great job. Best instructors of all the cities I lived in.	5/19/2016 2:20 PM
55	more family change rooms at downtown facility.	5/19/2016 12:06 PM

56	Continue o focus on meeting the diverse needs of our city. Swim programs for schools and those with financial needs.	5/19/2016 9:28 AM
57	Improve access, stop the civic center using the 4 seasons car park	5/19/2016 3:43 AM
58	A complementary pool to the aquatic center, to ensure the same quality of service when one or the other is being maintained.	5/18/2016 9:13 PM
59	Cleaner pool	5/18/2016 9:12 PM
60	A bigger, better area for kids at the Four Seasons location (if a new facility is built). Swimsuit dryers (saw them in an american pool once and they are great!)	5/18/2016 7:27 PM
61	a better water slide	5/18/2016 6:37 PM
62	MORE WATERSLIDES	5/18/2016 6:35 PM
63	A salt water pool	5/18/2016 6:22 PM
64	Bigger pro shop and good concession stand	5/18/2016 5:14 PM
65	Better family changerooms at Four seasons	5/18/2016 4:37 PM
66	Larger hot tubs, with varied depths, like the aquatic center. Better viewing areas for public and guards.	5/18/2016 4:31 PM
67	New fitness equipment; Treadmill etc... is needed at the Four Seasons. It was very disruptive and inconvenient to many downtown workout people when the equipment was removed from downstairs. It was removed on short notice with no consultation (that I an aware of) and with a great deal of uncertainty from the staff as to whether it was to be replaced. The 15 minute drive across town to the new pool is very inconvenient when attached to a regular workday for workers in the core.	5/18/2016 4:23 PM
68	I'd like to see more family changerooms and someone to monitor them (teenagers keep using them to hook up)	5/18/2016 3:36 PM
69	When visiting the Aquatic Centre, there is no pool dedicated for young children. When the wave pool is active it is not convenient or even safe for young toddlers to be in the pool. A small, warm pool for young children would be a good addition.	5/18/2016 3:24 PM
70	More lifejackets available for kids to use. Approved lifeguard/babysitters that can swim with your little kids, for a fee.	5/18/2016 1:58 PM
71	The back entrance, the viewing area, the lockers in the change rooms	5/18/2016 1:02 PM
72	The only enhancements we need are the ones we can afford as tax payers. A good solid pool for swimming and teaching is all that's needed.	5/18/2016 12:24 PM
73	I would like a better process for private swimming lessons.	5/18/2016 12:05 PM
74	Get rid of the Four Seasons Leisure Pool.	5/18/2016 11:58 AM
75	More lanes and deep water Aquafina classes.	5/18/2016 11:25 AM
76	expansion at the Aquatic Centre would make more sense to me than a new stand alone pool	5/18/2016 10:36 AM
77	If you make a new pool like the newer Aquatic Centre - it'd be great!	5/18/2016 10:31 AM
78	Pools in College Heights and the Hart as promised in amalgamation. More thorough maintenance.	5/18/2016 10:21 AM
79	having a waterslide at the new location should be a must as the aquatic center doesn't have one.	5/18/2016 10:08 AM
80	Larger pool	5/18/2016 8:56 AM
81	the entrance to the fslp is horrible. especially in winter, steep icy stairs with babies and arm full of swimming gear makes me cringe and i try my best not to get her swimming lessons at fslp. Also, i find the facilities dirty all of the time.	5/18/2016 8:43 AM
82	Updating both pools, but mainly Four Seasons. Perhaps the city should look into building a new Four Seasons pool in the Downtown. It would "spice" up the area a bit	5/18/2016 8:41 AM
83	4 seasons (new) - female - larger change rooms; more private space; more lockers	5/18/2016 8:30 AM
84	Water slides, 'fun' environments, access to updated fitness facilities	5/18/2016 8:29 AM
85	If a new structure was built a climbing wall. Like Canmores elevation place.	5/18/2016 6:54 AM
86	Replacing four seasons with a new pool. It is a great pool and very welcoming, but it has seen its days. The city needs to stay modern and environmentally clean. With new technology a new swimming pool would most likely cheaper to run then the current pool.	5/18/2016 6:27 AM
87	Needs a refresh, looks shabby more private change rooms	5/17/2016 9:19 PM

88	Replacing or renovating the 4 seasons pool	5/17/2016 5:04 PM
89	My kids are bigger now, but for other families, suggest a little kids pool like at 4 seasons for a new facility. Lessons were really hard at the Aquatic centre when they were 3 and younger as they couldn't touch and it was SO busy. I like how 4 seasons has different spaces for different age groups. I like the Aquatic Centre's family change rooms and larger hot tub and the river is a great feature. PG could certainly use more water slides - great way to get kids to use stairs and be okay with head going under water! I think that a rec complex downtown is a GREAT idea. Anything to revitalize and bring people downtown and replace decrepit old buildings is a good thing. Really - in a pool, I'm looking for a clean place where I can easily keep track of my kids.	5/17/2016 12:05 PM
90	I have young kids. They love the water slide at the Four Seasons, but the facility is dated and the other swimming options are limited for younger kids. As a result we go to the Four Seasons for lessons, but use the aquatic center for recreation. I think this facility could use an update or replacement.	5/17/2016 11:54 AM
91	More family changes rooms , another area for pre schoolers as current one is used mostly for lessons and not open .... I've been to smaller pools that have these nice little boxes in change rooms common area that wring out clothing so that you don't have soaking wet clothing just mildly damp	5/17/2016 11:41 AM
92	Larger dive tank area. Surfing/wave area.	5/17/2016 8:35 AM
93	I would like to see a leisure pool without the wave setup. I need the warmer temps to do my physiotherapy, but the main tank is too cool. However, when the wave is turned on, it is overwhelming and forces the vast majority of users out of the water to avoid it. I realize it is very popular with kids, but people with mobility issues and toddler/babies cannot handle that violent wave action.	5/17/2016 8:31 AM
94	Aquatic Centre - Women's Change Room: 1. New shower heads! 2. Larger shelves for toiletries in showers, 3 Spin Dryer for wet suits Aquatic Centre - Sauna: 1. An additional step to be able to access the seating level. 2. A clock, 3. A temperature gauge. Four Season - Women's Change Room: 1. Hooks for hanging your stuff in the cubicles.	5/17/2016 4:39 AM
95	Four seasons obviously needs updating but my family enjoys the toddler pool as well as the larger swim area with the slide at 4 seasons. Family change rooms are a big deal. Overcrowding feels like an issue to me.	5/16/2016 11:05 PM
96	More family change rooms, even without showers would be great. We shower at home after and there are showers in the pool areas. We are always waiting for one at four seasons. We have waited over half an hour many times. I will not send my young son into the men's change room alone. We have no choice.	5/16/2016 9:27 PM
97	Keeping seniors fit is so important and the benefit is huge to the system . Many seniors live downtown I urge you to keep the four seasons , many of us do not drive !	5/16/2016 7:09 PM
98	New pool	5/16/2016 6:42 PM
99	more pool locations - at least 3 for PG	5/16/2016 5:41 PM
100	Increase number of pools in community. Step 1- new pool 25 meter pool in College Heights. Step 2 - demolish downtown pool; repurpose location for performing arts space which can add space for conference/convention uses Step 3 - build new community pool in Hart similar to CH pool (single design to save design costs) Step 4 - build exercise/therapeutic pool at Family Y.	5/16/2016 4:47 PM
101	More waterslides and attractions for the children - more amenities would mean more attention to the pool. The waterslide is a HUGE hit with children and it's the only one the Prince George has - take that away and you won't get that many visits.	5/16/2016 4:07 PM
102	The wave lost its novelty. To small to be good to big to knock over lil ones. Kids need open spaces to swim play throw ball etc. It would be wise to have slides eat that r modern and excite. Sportc enter should have swimming treadmills for lack of name.	5/16/2016 3:53 PM
103	Updates to women's change rooms especially with daily morning schedules.	5/16/2016 2:13 PM
104	My main point for responding to this survey has nothing to do with how I use the pools and when. It pertains to the parking issue at Four Seasons. It is poor and inadequte and if there are activities at the Civic Centre and arena then parking is terrible. I personally think a new pool, performing arts centre and/or arena are contemplated then the the City Hall/civic centre area is an absolutely dumb choice of location as there is so little parking. They need to go elsewhere where there is adequate public parking within a reasonable distance of the facilities!!	5/16/2016 1:50 PM
105	Toddler pool and play items, special times for babies and toddlers only, more lessons at convenient times, more family change rooms, cleaner/newer facilities.	5/16/2016 1:32 PM
106	more pool toys/ equipment for older children ie; rope swing, pulley glide etc.	5/16/2016 1:29 PM
107	better quality change rooms	5/16/2016 1:00 PM
108	The women's change room showers need adjustment. Temperature is often extreme (hot or cold) and they could use a cleaning to fix the irregular spray.	5/16/2016 12:37 PM

109	More lanes. When swim lessons or meets are in progress, the remaining lanes are crowded.	5/16/2016 11:40 AM
110	A spray Park / toddler area for small children More water slides Something similar to the wave pool at West Edmonton mall. Make it a tourist draw for all of Northern BC	5/16/2016 11:25 AM
111	Terrarium could be add on to take advantage of humidity and heat. I would prefer time dedicated to adults as screaming children can be annoying. The Four Seasons could use a proper fitness room in a Reno. Love the current fitness room at AC.	5/16/2016 11:14 AM
112	Fix up the Four Seasons pool and keep it as a vital inner city recreation centre	5/16/2016 10:56 AM
113	More swimming pools in the facilities avaliable!	5/16/2016 10:41 AM
114	upgrades at the four seasons to include more lanes, larger hot tub, updates slide. better lanes at the four seasons could alleviate some of the congestion in the lanes at the aquatic centre	5/16/2016 10:28 AM
115	Our aquatic exercise classes can be quite making it crowded. A bigger area for those classes may be required especially for older adults as they are many in number.	5/16/2016 10:03 AM
116	Another water feature like a waterfall. Another River. One for playing and one for actual walking.	5/16/2016 9:49 AM
117	We really need a few water slides installed, this is the only reason we prefer the four seasons pool over the aquatic centre. I have three young children and we would go swimming twice as much if this would happen. I would be willing to pay more.	5/16/2016 8:36 AM
118	Full 50 metre lanes during the day	5/16/2016 8:22 AM
119	More individual change room space.	5/16/2016 8:08 AM
120	Hire support staff instead of lifeguards for certain tasks	5/16/2016 6:22 AM
121	More spectator seating for swimming/diving competitions.	5/15/2016 8:44 AM
122	Updating the bathrooms, including the floors. Better water temperature for the showers and Hot tub, they are either much too hot or cold.	5/14/2016 10:48 AM
123	Clean up the rust - 4 Seasons Better control of water temperatures/levels, pools and showers -COLD! Would like gym at 4seasons	5/14/2016 10:39 AM
124	RE-OPEN THE GYM AT THE DOWNTOWN POOL. ALOT OF PEOPLE USED IT AND MAY NOT ANSWER THE SURVEY.	5/14/2016 10:02 AM
125	More small lockers in mens change room	5/13/2016 8:41 PM
126	Better entry way access to downtown pool as well as parking. If there is an event at the Civic Centre, its always full and frustrating when you have little ones in lessons. New ceiling- its gross. Better change room facilities.	5/13/2016 5:59 PM
127	The FSLP women's changing room is kept considerably cleaner than the Aquatic, and is the go to pool when not at lessons	5/13/2016 1:15 PM
128	Remove raised screens from river walk and wave pool areas. Enlarge mens change room(more benches and showers. s.	5/13/2016 1:11 PM
129	Eliminate the Four Seasons in its current location and build a new complex in College Heights	5/13/2016 12:46 PM
130	More adult swim times with more lanes open in early evening hours. Very difficult to swim when most lanes are taken by swimming clubs. Not all adults can come in morning or afternoon because of work.	5/13/2016 6:19 AM
131	nothing new, just maintain the pool in good condition as you are	5/13/2016 3:45 AM
132	Bigger gym more reliable sauna and steam room amenities and more hot tubs with more jet power - possible flow rider pool.	5/12/2016 8:19 PM
133	Increase the size of the aquatic center(ie. Another 50m pool and more bleachers)	5/12/2016 6:09 PM

134	I like the Four Seasons pool very much and the staff are very helpful and friendly. But the pool needs more continuous upkeep. Men's change room is far too cold especially in winter (present heating system in changer oom is dysfunctional), showers need improvement (water runs cold sometimes, no automatic shutoff, no strong flow). In addition, the roof of the pool leaks sometimes right into the change room. The lockers in the change room are rusting and many are broken. In addition to the above improvements, I am a regular lane swimmer and like to see at least three lanes kept open for lane swimming. All of this being said, I believe the present building should be maintained, rather than closed down. To close it down would be a shame in that a city the size of Prince George needs several affordable pools. Similarly, handing it over to a private interest would also be a shame (and would undoubtedly generate strong opposition from citizens). Continuous upkeep is the issue (funds need to be set aside). The pool also needs better marketing to reach out to a growing population of older adults, as well as families and children. Despite its present problems, the Four Seasons pool provides a valuable service to our community and needs to be maintained in its present location to provide access tto he people and children in the VLA, Miller Addition and downtown, as well as others like myself from other parts of town.	5/12/2016 5:47 PM
135	Increase benefits for seniors to encourage active life style as a long term life goal	5/12/2016 4:52 PM
136	More cleaning staff and replacement of damaged items(ceiling tiles). The mens bathroom at four seasons is always disgusting.	5/12/2016 1:09 PM
137	More seating for swim meets.The aluminum stands we have are fine, but we need a few more for proper seating. These could even be brought in just on the weekends we have swim meets for the Barracuda and Pisces meets. A second time clock for swim meets. We run a double ended swim meet in Prince George, with only one time clock that shows all 8 lanes. The second clock we currently have, only shows the top finisher. The equipment in the fitness room is okay but we could use more treadmills and elliptical machines, The bikes we have are old and if we are going to have cycles it would be nice to have some proper spin bikes. More swim fins and kick boards for the public to use.	5/12/2016 11:40 AM
138	Bring back the concession. I spent hundreds in there on snacks the pool isnt the same without it. Put one in each pool. One for the Four Seasons one for the Aquatic Center.	5/12/2016 11:18 AM
139	Four Seasons Pool needs to have their change rooms and family change rooms renovated badly. The aquadic pool just needs to be freshed up and cleaned better. Both are pretty dirty	5/12/2016 9:47 AM
140	healthy food options	5/12/2016 8:57 AM
141	4 seasons showers should be timed so the hot water doesn't run out	5/12/2016 7:47 AM
142	Very hard to breathe at Four Seasons Leisure Pool, my husband is asthmatic and can't even go there due to poor air circulation. Aquatic Centre he can go to but my kids and I end up going to the Four Seasons for the adapted swim as we enjoy being able to go when it is quiet and appreciate that this program runs. My kids really enjoy the water slide at Four Seasons. Needs to be a better understanding of disabilities with the instructors running the swim lessons. My fourteen-year-old son has a condition which makes it difficult for him with proper kicking technique due to motor control issues and would love it for him to be able to pass swim kids level 2 so he can feel accomplished.	5/12/2016 6:27 AM
143	More water slides. More baby friendly things. More floaties provided, Maybe you could like sign them out or something.	5/12/2016 12:42 AM
144	Have the soccer people NOT park their vehicles in the lot north of the aquatic centre	5/12/2016 12:10 AM
145	A dedicated space for swim lessons	5/11/2016 11:04 PM
146	Raise the standard for general maintenance on the present facilities.	5/11/2016 10:46 PM
147	The Auqutic centre is in poor shape and needs to be undated. The cleanliness is horrible	5/11/2016 9:59 PM
148	From a high level perspective, having visited pools all across the country - the city would benefit from reducing expenses and increasing availability by adding another pool to the PGAC and trying to connect them to the gymnastics club, horse area, and kin/CN centres. You will find that a corridor linking all the facilities together without having to go outside will generate more revenue and usage of the aquatic centre. This model is proven in other cities. (eg. Kamloops).	5/11/2016 9:52 PM
149	1) floor in ladies change room bleached or ? to remove stains from edges 2) water stained ceiling tiles replaced	5/11/2016 9:33 PM
150	More lanes during lunch hour at FSLP. More family change rooms at FSLP.	5/11/2016 9:20 PM
151	Can not think of	5/11/2016 8:15 PM

152	Number of Private change roomsand shower stalls should be increased at aquatic centre. I don't think my child should have to watch a naked woman or man shower in front of them. Likewise, when my children come from the Barracuda swim practice, why should adult men be "watching" them change because there aren't private change rooms Viewing area of swim meets is inadequate as most of the kids leave their bags on the benches. This leaves it a danger for adults to climb up to the higher seats without tripping over bag straps and there are no hand supports to come down the bleachers. The change rooms are quite often dirty, not sure if anyone actually looks at the back of the door or the walls of the private change rooms. At the aquatic centre, family change room smells of urine I hope that they close the aquatic centre (or fix it properly) as it really is a great asset for downtown. I LOVE the waterslide. If financially it's better to close it, I hope that a waterslide can be installed at the aquatic centre. It's probably the only piece of the puzzle that's missing at the aquatic centre. Almost forgot!!My pet peeve is that the hot water runs out too quickly at the aquatic centre (and maybe at the 4 seasons pool?) when there are alot of lessons going on. It would be wonderful if there was hot water on demand (but still on a timer) so that water is not wasted.	5/11/2016 7:58 PM
153	A new bigger family change area/rooms at the Four Seasons aquatic centre is a definant must. And cafeterias with hot food, added to both aquatic centres.	5/11/2016 7:42 PM
154	Four seasons pool.....upgrade of showers	5/11/2016 7:16 PM
155	Aquatic Centre - Cleaning family change rooms & more swimming lesson times Four Seasons - more family change rooms & better ventilation	5/11/2016 6:28 PM
156	Bigger and more waterslides better and cleaner changerooms and a real concession. Enough to do to spend the day there instead of an hour.	5/11/2016 4:59 PM
157	I think with how popular the pools are, just tear down the Aquatic Centre, and build a bigger, better Aquatic Centre, with a consession like they used to have, more lanes as I have gone to swim lanes in the past and couldn't because they were full. Common problem there. Have waterslides, a better wave pool, maybe a bigger hot tob? Come on PG. You always advertise that we're growing and expanding, so let's do that. The new pool would pay itself off quick.	5/11/2016 4:38 PM
158	The PG Aquatic center should have 3-4 water slides added to it so that it can be advertised as more of a destination. if you sold it this way then you can increase revenue from out of town people who wish to use the facility. I think that the four seasons should be closed and all the resources focused on the big pool. with the savings in operating cost you could even add on a smaller lap pool.	5/11/2016 4:03 PM
159	When it comes to the Aquatic centre, more seating would be great. When it comes to events like swim meets there is very little place to sit	5/11/2016 3:45 PM
160	More seating at aquatic centre to better accommodate larger swim meets	5/11/2016 3:42 PM
161	clean/paint the Four Seasons interior walls/ ceiling	5/11/2016 3:30 PM
162	Childcare room, clean and spacious family change areas, safe deck surfaces, concession	5/11/2016 3:08 PM
163	Free 15 min swimming before Barracuda lessons	5/11/2016 3:08 PM
164	As I routinely use the Four Season pool I would definately like to see this pool renovated and cleaned up .. I am happy with the type and hours of the Aquafit classes offered.	5/11/2016 3:00 PM
165	Better times for young childrens swim lesson. During the day in the week days or first think in the morning on weekends is not convenient	5/11/2016 2:37 PM
166	Expand the competition pool so larger meets can be considered.	5/11/2016 2:09 PM
167	Family passes	5/11/2016 1:56 PM
168	Permanent seating at AC	5/11/2016 1:55 PM
169	The pool need an update on the electronic equipment to host swim events in town and also will support the youth in this town and help promoting Health , Body, Mind, thru Sports	5/11/2016 1:54 PM
170	Fix up the Four Seasons. The Aquatic Centre is great but it is good to have a pool downtown for many reasons.	5/11/2016 1:54 PM
171	I love how friendly the life guards are and how helpful they are when you need to ask a question.	5/11/2016 12:54 PM
172	It would be nice to have more lessons available at the aquatic centre, especially in the evening.	5/11/2016 11:21 AM
173	thats tough to say. the kids and i really enjoy both pools. the four seasons needs alot of maintenance and cleaning to be done. for a public facility it has a lot of wear and tear such as uncleaned tiles through out the pool areas and deck, leaking or dripping pipes into the mens change room, rusty stairs and mounts for the slide. i question what sort of cleaning is completed when the pool is closed for two weeks every year.	5/11/2016 11:09 AM
174	The four seasons pool is in desperate need of renovation!!!!	5/11/2016 9:56 AM

175	Better cleaning at both pools. I think it is ridiculous that the highly specialized trained life guards do this work. They the cleaning between guard duties. I wonder what the results would be if a 'swab' test was done in the toilet and change facilities to see what was growing .....hmmmm? I would be very interested in the results. Linda Martindale	5/11/2016 9:50 AM
176	Better cleanliness, I often find the dressing rooms unbearably dirty	5/11/2016 9:25 AM
177	repair things that are broken	5/11/2016 8:56 AM
178	Tame the waves ..... toddlers do not enjoy being thrown around . As a teen and pre kids I loved the aquatics center but for kids the four Seasons is more kids accommodating. It be nice to see slightly bigger swim area at four seasons where water slide is as the "kiddy" pool is used so much for lessons it's never open public during key times .... Water slide is a must kids love it .... aquatic shop is great but too overpriced kind of miss the consessions. More family rooms lots of young families with little or special needs children and definitely not enough family rooms at four seasons, bring back waterside attendant. ... takes younger kids longer to get top which really slows down the water slide	5/11/2016 8:49 AM
179	A waterslide at the Aquatic Centre would be nice for the kids. The Nanaimo Aquatic Centre has a pirate ship play structure for the kids that would be a welcome addition here as well. The Four Seasons needs some cleaning up to look more modern and safe.	5/11/2016 8:47 AM
180	The four seasons needs help! It is very run down! Better family are would be great!	5/11/2016 7:02 AM
181	The aquatic centre is a wonderful facility and would greatly benefit from adding on to the building, adding another tank and enhancing the spectating area. Prince George is already a sporting destination. An upgrade to the aquatic centre would enable the local swim clubs and the city to host much larger sporting events, such as provincial and national swim meets as well as summer games.	5/11/2016 6:28 AM
182	More family change rooms in 4 seasons. An area to get away from waves for toddlers Prenatal aqua fit! !!!! (I can't stress this enough. There's no where near enough offered for pregnant women)	5/11/2016 4:06 AM
183	Respect in the workplace.	5/10/2016 11:28 PM
184	cleanliness!!!!	5/10/2016 11:08 PM
185	Put a waderslide at the new pool	5/10/2016 10:53 PM
186	A real kiddie pool and waterslides at the aquatic centre. More family change rooms at the 4 seasons.	5/10/2016 10:44 PM
187	General updates to the four seasons pool need to happen. Install working showers, and new lockers. Pool facilities are import, swimming is a life skill that every kid should have.	5/10/2016 10:31 PM
188	- More water sides. - Bigger family change rooms. - An actual warm kids pool. with no wave pool - If you do a wave pool make the waves worth it. not these tiny half ass waves, that only go up a foot. - Having been a victim of beating, I no only feel safe in any (Female) change rooms. so better security. - find a way to not use bleach as a main cleaning agent. - A bigger hot tub area, both are very small and get crowded fast. - More changing rooms with female, male, and family. - More general cleaning to all rooms. if its done 2x a day.. up it to 4+ a day. - the Sauna and steam rooms could be bigger, or place a few more around. - Make the warm pools more deeper. - Bigger food court/drink bar. - they used to do a teen night swim.. why cant adult's have a time for them to just swim/ relax with no kids around. - would love to see more things family related. like mother/child swim, father/child swim, family swim, sibling swim (with parents), swim for cancer. (Even if these are already there, they are poorly advertised, for I have not heard of them at all. On a positive note, I do like the anti-slip sand texture of the aquatic centre, and would love to see that more, and hopefully get rid of tiles. within all the wet area's	5/10/2016 10:05 PM
189	Change rooms for wheel chair at the four seasons	5/10/2016 9:58 PM
190	Swimming pool gets cramped need everything to be made bigger. More entertainment stuff like water slides.	5/10/2016 9:50 PM
191	The family change rooms at both facilities need improvement. It's very difficult to change yourself and your baby as there is not a safe place for the baby. The pool in Duncan has baby seats with straps that a person can put their baby safely and securely in when changing. The family change rooms at the aquatic centre are actually too small to fit a family of four in so we often end up just going into the separate men's and women's changerooms which makes it difficult for me to shower, again because there is no safe place for an infant. There is also a need for a designated safe place for baby bucket seats. I usually just put mine in the changerooms and hope no one steals it. I have to bring it, though, because otherwise where would I put the baby when I change? We visit Four Seasons most often as our 5 year old loves the water slide and the rope swing. A rope swing at the Aquatic Centre would be great! There is not enough seating at the Aquatic Centre during weekend swimming lessons. The wave pool is too rough for infants. There's not a lot of affordable activities for babies in their first year in the winter so please make the pools more baby friendly! Thank you!!	5/10/2016 9:15 PM
192	The family change rooms at Four seasons are always full! Last time I was there, there was no place to put the baby while I changed myself! And the floors in the family change rooms are always nasty! We have gotten multiple foot problems every time we visit. My kids love the pool, but I hate going because it is such a chore!	5/10/2016 9:02 PM

193	Slides, wading pools at both locations separate from main leisure pool, (especially separate for those who feel the hot tub is too crowded and dislike the wave pool), a shallow end in the main pool at the aquatic center with gradual depth increase.	5/10/2016 8:34 PM
194	Outdoor pool space? Besides that amenities are good	5/10/2016 7:44 PM
195	Four seasons needs an upgrade to change rooms with more family rooms. I can't go in men's with my young children and have to wait long times for the family room	5/10/2016 7:05 PM
196	More family change rooms at the four seasons	5/10/2016 6:37 PM
197	Separate kids pool at the aquatic centre because the waves are too rough for baby toddler etc.	5/10/2016 5:58 PM
198	More water slides. Bigger water slides. A water slide that goes around the whole building	5/10/2016 5:44 PM
199	A better hot water tank for the showers	5/10/2016 5:41 PM
200	More family changer rooms at the 4 seasons, water slide at the aquatic, spinning water extractor	5/10/2016 5:40 PM
201	Improve the fAmily change rooms at the 4 seasons pool. Improve the lighting at 4 seasons kids pool.	5/10/2016 5:22 PM
202	Family room change rooms need more hooks, better shower heads with slower water and better heat controls. Makes it Very hard to work with and wash a disabled child/ person. Better control over who uses handicapped shower rooms, more handicapped shower rooms. Better space for wheelchairs to park while not in use. More seating in the main lobby area, hard to find seating for everyone while at adapted swim for special needs. More handicapped parking spots outside. Thank you. I have a 6 and 11 year old wheelchair bound kids.	5/10/2016 4:39 PM
203	The ceiling tiles at 4 seasons were really gross last time we went	5/10/2016 4:25 PM
204	Prenatal workout classes, since there are near non existent in town. I've also noticed someone else's comment about needing more regular aquafit classes since they're so crowded, so maybe if there were more types in general? I.e. seniors classes, woman's classes, prenatal, family, etc	5/10/2016 4:04 PM
205	We really need more change rooms in the family room.	5/10/2016 3:58 PM
206	Overhaul to Four Seasons as it is in bad shape!	5/10/2016 3:30 PM
207	Perhaps a built in hose for employees to hook up and rinse floors hourly to avoid hair/mud/dirt and derby from flooring along with nightly discenfecting. I find it concerning with my young daughter how dirty the change rooms and swimming area are.	5/10/2016 3:09 PM
208	more senior / handicap / disabled classes ~ I think ROM or light Water aerobics is all that is offered for them... More advertising for what is available to utilize at the pools.. I would love to see an outdoor pool back in PG ~ thats for sure !!!	5/10/2016 3:06 PM
209	try to keep it clean	5/10/2016 2:57 PM
210	updating the change room @ 4 season improving the lighting @ 4 season Adding a swim suit spinner	5/10/2016 2:48 PM
211	I go daily to aquasizes at the Aquatic center, we used to have balls to work with that would be nice again. the number of noodles is starting to diminish again. The aquasize classes are GREAT I now have my husband taking the ones at the Four seasons. There used to be a free trial month, maybe a try a class free to encourage more folk.	5/10/2016 2:33 PM
212	Bring back some proper seating for parents at 4 seasons. The 4 seasons is still a great pool, but where do i sit and watch family. No where since the city removed all the seating. Something better than a plastic chair would be appreciated. Maybe not using all the upper deck area, but some kind of improvement would be useful.	5/10/2016 2:25 PM
213	The Four Seasons pool: ceiling tiles are rotten. With the humidity of a pool there shouldn't be ceiling tiles at all. The grout in between the tiles of the pool is so worn down that people stub their toes.	5/10/2016 12:51 PM
214	More water slides! Also, We have Sunday morning swimming lessons and were very disappointed to learn that we are not able to enjoy the pool with our kids when the lessons end.	5/10/2016 12:34 PM
215	More aquafit instructors at Four Seasons Pool. Most of the good ones are always at the PG Aquatic Centre.	5/10/2016 11:25 AM
216	The 4 seasons is old and tired - It really needs to be updated. Additional Seating, instead of the plastic chairs would be great. There is nearly no place to sit at the aquatic center if you have a child in the younger swim lessons (salamander, etc). As a parent, there is no place to sit and watch in the small (wave) pool. I would also be nice to have more family changing rooms in either location. The pools themselves seem well maintained, however. Our family really enjoys have the option of either location.	5/10/2016 10:44 AM
217	Have the wave machine turned on more often. Add a waterslide to Aquatic Centre	5/10/2016 10:39 AM
218	Updates to the Four Season pool... Tiling, Lockers, More toys for children (noodles, beach balls), and better advertising for lessons for adults and other programs.	5/10/2016 9:32 AM

219	More cleaning staff throughout the day. The bathrooms are almost always disgusting, not just dirty, but downright wretchingly disgusting,unless you are there first thing in the morning.	5/10/2016 9:01 AM
220	Moving staff between both facilities. Better communication and knowledge between supervisors management maintenance cashiers and both facilities. Consistence with rules and feedback with staff support from supervisors and management. Some positive feedback rather than pages of rules and what we are doing wrong. More focus on the pool deck rather than cleaning!	5/10/2016 8:27 AM
221	Waterslide at both pools.	5/10/2016 8:21 AM
222	Water slide(s) at the aquatic centre. It would make the facility more of an attraction and would entice more people including tourists. Everyone loves water slides!	5/10/2016 6:29 AM
223	I would like to see more cleaning done at the pools. It seems like ancouple years ago, the pool areas and especially the change rooms were much cleaner than they are now.	5/10/2016 4:56 AM
224	A 2nd hot tub or bigger hot tub. Proper leasure seating for each hot tub. More seating for steam sauna. Permanent open space in main pool for leasure swimming. Installation of multiple spin dryers for swimwear. More shower heads in change rooms. Bigger hot water tanks to handle heavy periods of hot water use in showers, no more cold showers. Some lockers should accept personal locks instead of tokens.	5/10/2016 3:13 AM
225	Roof repairs - they both appear to have leaks Having spare parts available for popular features- feel as of the sauna is always down at either pool. Ventilation at FSLP - very hard to be a spectator	5/9/2016 11:21 PM
226	four seasons changing rooms need to be cleaned up(renovated). four seasons needs to be some how monitored, with out being discriminating, and only be excepting those that are looking for recreation, exercise & family fun not for the homeless, travellers or tree planters to clean up because its cheaper then a hotel.	5/9/2016 11:12 PM
227	More separation between kids areas and spaces for adults that just want to swim laps.	5/9/2016 10:58 PM
228	Waterslide at the aquatic center. More private showers in men's locker room. More small lockers in men's locker room.	5/9/2016 10:54 PM
229	Bathroom and change room updates	5/9/2016 10:39 PM
230	Spruce up Four Seasons! This is a fine facility and is a terrific location!	5/9/2016 10:38 PM
231	The downtown pool needs fresh paint and some adjustments to the flat walking surfaces to make them less slippery.	5/9/2016 10:35 PM
232	another hot tub as it can get pretty crowded. a glow in the dark swim would be pretty cool too. maybe special body paint that won't come off in the water so it is easy to keep track of everyone...or glowing wristbands. not total darkness as safety is obviously a priority. Just a thought anyway	5/9/2016 10:16 PM
233	Four seasons needs upgrade	5/9/2016 9:36 PM
234	Keep both pools and keep maintaining them. Would love to see surfing	5/9/2016 9:35 PM
235	More comfortable seating for parents. Spending six days at the pools these days.	5/9/2016 9:25 PM
236	better options for swimming lessons. both us parents work all day m-f, swimming lessons for young ones are all scheduled during daytime....need after 5pm or weekends please.	5/9/2016 9:12 PM
237	More cleaners, for a cleaner facility. Right now both facilities are so disgusting I won't visit them	5/9/2016 8:41 PM
238	Expanded viewing area for swim meets.	5/9/2016 8:17 PM
239	Lockers available for public use with their own locks. Call the YMCA of Edmonton/Calgary/Vancouver. Their lockers can be locked using their membership cards or a lock. When working their and the change was made, members were thrilled with the new change. Better awareness of who is in the wave pool and not turning it on for 20 minutes at a time when the majority of patrons at the time are their with small children who then have to vacate to the river or hot tub.	5/9/2016 8:05 PM
240	The four seasons leisure pool would benefit from more family change rooms. It takes a very long time to be able to get one and sometimes results in families being late for parent participation swim lessons. The main change rooms are not set up well for toddlers/infants	5/9/2016 8:00 PM
241	Improving children's activities	5/9/2016 7:18 PM
242	More family change rooms at the four seasons as there is almost always a long wait for them.	5/9/2016 7:02 PM
243	More family change rooms and a hot tub upgrade at four seasons.	5/9/2016 6:31 PM
244	The four seasons pool needs help! Only 2 family change rooms, the tiling looks gross	5/9/2016 6:28 PM

245	The outside door by the sauna at the four seasons is always open; please keep it closed during cold weather. Some of the lifeguards are pretty rude to parents of young children, especially at the four seasons pool. Toddler swimming lessons sheiks be scheduled for first thing in the morning or late afternoon. They always seem to be right at nap time or bedtime.	5/9/2016 6:19 PM
246	Cleaning staff - you need more! Especially at the aquatic center. The change rooms there are sooo gross! Four seasons is old, but at least it's kind of clean	5/9/2016 6:05 PM
247	Use four seasons exclusively for deep water Aqua fit. Find water in Aquatic Centre too cold. Fitness instructors are excellent. Needs stained tiles replaced. Generally cleaner than Aquatic Center (less traffic). Some work needs to be done in Four Seasons in painting and other areas to bring it up to date	5/9/2016 6:01 PM
248	Enhancements to the website so that public drop in knows when the lane(s) will be used for Barracuda/Pisces club training, or adult swim club(s).	5/9/2016 5:09 PM
249	I think the services are very good. A few more senior fitness activities would be nice. I really like the river walk in the morning. It would be nice to offer it at a different time and day as an alternative. A bit better rate for seniors would be nice.	5/9/2016 4:42 PM
250	Expand the time available for 50 m lane swimming; More equipment available in workout room (e.g. BOSU ball, medicine balls)	5/9/2016 4:29 PM
251	time for seniors, which would be different than adult time	5/9/2016 3:54 PM
252	Change rooms need major updates. Pool deck can be very slippery for seniors!	5/9/2016 3:50 PM
253	Definitely needs to be cleaned better. I have seen mold growing in the corners of the showers and changing rooms. The machine they use to clean the floors doesn't do a great job especially for corners.	5/9/2016 3:30 PM
254	More variety of evening classes, most people work during the day	5/9/2016 3:08 PM
255	The roof at the FSLP should be done...those shingles must be past their life expectancy. And the roof at the PGAC needs to be addressed. You can see nasty tar running down the columns and dripping onto the deck.	5/9/2016 2:59 PM
256	lockers or cubbies in the fitness centre. It is silly for someone to have to go into the change room to store their purse or jacket if they are only coming to use the fitness centre.	5/9/2016 2:30 PM
257	Great facilities as is. Often not hot water in showers.	5/9/2016 2:14 PM
258	I would like to see a pool with more water slides maybe ones that allows children that are scared of the four seasons to use. a smaller one etc	5/9/2016 1:32 PM
259	Transit access to both pools is good but can't safely walk to aquatic center, thanks to no sidewalks on 18 ave. Need better wheelcahir access to the downtown pool and better monitoring of bathrooms/change areas so taht wheelchair users get priority on the larger spaces. Do NOT close either pool. Both are well used and with a few minor upgrades of the pool or surrounding infrastructure, can be used for many years to come.	5/9/2016 1:25 PM
260	The Four Seasons could use some TLC. Overall, I think the City provides good aquatic services.	5/9/2016 12:31 PM
261	Another aquatic facility west of twon	5/9/2016 12:15 PM
262	I don't feel the change rooms are clean. Family change rooms and Women's change rooms.	5/9/2016 11:52 AM
263	There should be a pass like the university students have that gets you access to the pools, the busses and the Sports Centre. One membership for all, for individuals and families. if you can do it for non taxpaying students, then you should have no problem doing it for taxpaying families.	5/9/2016 11:46 AM
264	either upgrade the four seasons or preferably add another 50m tank at the aquatic center - this would allow efficiencies in administration costs, increase the size the newer facility, allow for larger sporting events in PG and could increase the gym and training areas as well	5/9/2016 11:41 AM
265	Shoe storage/removal so dirty shoes do not go into changerooms	5/9/2016 11:41 AM
266	You should look at Grand Prairie east link centre our town would def benefit from a facility like that and the Prince George gymnastics club could have a new home in a more updated building	5/9/2016 11:10 AM
267	More water slide options. Perhaps lanes can be dual-use so that they can be used for slides or as lanes when needed.	5/9/2016 11:02 AM
268	Monthly/yearly pass holders should get free lockers	5/9/2016 10:44 AM
269	Four Seasons Pool is very run down looking, to the point that it feel dirty. There needs to be some improvement made.	5/9/2016 10:21 AM
270	Better spectator amenities and please fix the leak in the roof? It's ruining the bleachers and reduces where parents can watch.	5/9/2016 10:08 AM

271	The pool should offer some drop-in swim lessons to help people who are unable to afford regular swim lessons or lack the time available to sign up for regular lessons. This way they can still learn some tips on how to swim, but don't receive a recognized course. It may aid people otherwise unable to swim to become better swimmers.	5/9/2016 9:57 AM
272	Reduce costs. Advertise programs that are available.	5/9/2016 9:52 AM
273	More regular cleaning of the change rooms. Extended hours. Family only hours.	5/9/2016 9:49 AM
274	Change rooms terrible, staff generally unfriendly, terrible bike lock up. Generally the pool area not very clean. Signage terrible and does not make sense in certain areas, babies in hot tubs (???)	5/9/2016 9:46 AM
275	Maintain the facility as it is.	5/9/2016 9:45 AM
276	We loved going to the pool but we have been turned off and will not go again due to the unsanitary conditions of the family change rooms. Our last several visits the cleanliness of the facilities seems to be really detoriorating. Please keep the changing area bathrooms clean and renovated. Seems like both facilities need a renovation but at the very least more scheduled and regular cleaning.thanks for listening.	5/9/2016 9:42 AM
277	The Diving boards are never open at the Aquatic Center. Have them open or put in a waterslide instead.	5/9/2016 9:14 AM
278	Another aquatic location	5/9/2016 9:13 AM
279	Fix the bubble pit	5/9/2016 9:13 AM
280	4 seasons needs an upgrade to the chlorination system	5/9/2016 9:07 AM
281	At PG Aquatic Center, would love to see space set aside in dive tank for leisure swimmers when diving boards are not in use. Currently, even if there is only one diving board open, there is no leisure swimming permitted, leading to an overcrowded lane pool and underutilized dive tank. Plus, some of us love the deep water!	5/9/2016 9:06 AM
282	Yearly Family pass	5/9/2016 9:03 AM
283	Family change area at FSLP is small and overused. Toilets and main locker rooms need to be redone. Lockers most times don't work. Too small at family area when you have a family. No place for boots. Get's crowded.	5/9/2016 8:54 AM
284	Upgraded bathrooms at the 4 Seasons Pool.	5/9/2016 8:48 AM
285	More baby friendly toys and supports. It would be nice if the toys that are used during swimming lessons were available during public swim times so that skills learned in class can be practiced during visits on our own. Perhaps a sign out system would work to ensure return of items? Also, it would be great to have more of those infant floating devices at both pools.	5/9/2016 8:43 AM
286	Updates for four seasons pool and a pool in college heights	5/9/2016 8:40 AM
287	Don't know	5/9/2016 8:34 AM
288	1. Improvements to 4-seasons mens/ladies showers. Temperature control is poor in mens, and there are only 3 showers operational in mens, with 2 of these in so close proximity that it is uncomfortable for two people to shower in them at the same time. 2. Cleanliness. Although staff try, my wife found mould on the floor behind the entrance to the ladies changeroom at the Aquatic centre. 3. Make more swim lanes available, especially at the four seasons over the lunch hour. Especially when there is a school in the pool, sometimes there is only one lane available for 3 or 4 people.	5/9/2016 8:20 AM
289	Four seasons needs to be cleaned up / renovated , it's looking very dirty and dated . The water slide is a great attraction and keeps us comming ☺	5/9/2016 8:18 AM
290	More weekend swimming lessons at the Aquatic center, I have used the 4 seasons for lessons once and did not think the lessons was as good there (to many kids in a very small pool was chaotic and parents sitting so close to the pool) plus the change room and shower at the four seasons is horrible.	5/9/2016 8:14 AM
291	more family change rooms at 4 seasons	5/9/2016 8:01 AM
292	Updates need to be done on the existing pools. The Four Seasons is really showing its age. It could really use a renovation to improve its image. When choosing a pool, I almost always choose Aquatic Centre (even though it is twice as far away) because it appears much cleaner.	5/9/2016 7:58 AM
293	Love both pools! Wouldn't want to lose either. I think they function very well. Great rehab facility.	5/9/2016 7:53 AM
294	More times for lane swimming for the not so professional swimmers	5/9/2016 7:53 AM
295	Retain existing four seasons pool but with additional family rooms though using staff space. Staff space can be relocated to another area.	5/9/2016 7:47 AM
296	The change rooms at Four Seasons are terrible. The family change room is totally inadequate and when my nephew turns 6 we won't be able to go to Four Seasons anymore since we can't change close to each other.	5/9/2016 7:39 AM

297	The Four Seasons just needs an update.... * the washrooms doors don't latch like they should. *Rust is clearly visible on lockers. *Hot water is not always available for showering. *The swimming lanes are not too bad *in a dream world some sort of automated lap counters.	5/9/2016 7:36 AM
298	WATERSLIDES PLEASE NOTE THE PLURAL !	5/9/2016 7:33 AM
299	Nothing that I can think of at this moment.	5/9/2016 7:31 AM
300	Maintenance needs to be up kept in the older pool. Really, they are all needed upkeep on a daily basis. More important than the .studio arts building.	5/9/2016 7:29 AM
301	More slides and fun activities for the kids	5/9/2016 7:29 AM
302	renovate four seasons pool	5/9/2016 7:28 AM
303	Small free standing slide and rope swing at aquatic centre	5/9/2016 7:26 AM
304	Better maintenance for the Four Seasons. If a new pool is ever built, more consideration given to very small children as the Aquatic Center isn't really toddler friendly due to the depth of the water, waves, overcrowding and cooker temperature (relative to the Four Seasons).	5/9/2016 6:59 AM
305	better wheelchair access; the survey wording asks "what do you use" implying "what do you use NOW"; would one not want to ask something like this "what do you use or have you used"? I answered based on NOW, though my answers would probably have been different if my past experience had been asked for.	5/9/2016 6:55 AM
306	I believe in order to afford enhancements the city should charge a higher rate to non residents to use the pools. The pools are expensive to maintain and the non resident users should be contributing to that.	5/9/2016 6:53 AM
307	Nothing specific other than keeping what we have in tip top shape.	5/9/2016 6:33 AM
308	Four seasons needs a better tot pool for swimming lessons. As well swimming lessons being done during aqua format four seasons is extremely distracting - you can't Ben hear the instructor	5/9/2016 6:25 AM
309	I think a bigger water slide would be a nice upgrade at either pool.	5/9/2016 6:23 AM
310	Structural upkeep on the building, especially the ceiling, definitely needs replacing, not attractive for visitors. Change room area too small. PG should take a look at facility in Dawson Creek.	5/9/2016 6:04 AM
311	Upgrade pool deck at Four Seasons as it is VERY slippery with wet feet (unsafe - even when walking slowly and carefully). Repair ceiling at Four Seasons as it looks horrible - like nobody cares. I prefer not to go to this pool as it looks very run down and doesn't seem to be taken care of. Aquatic Center - more options for aqua fit classes in the late afternoon/evening during weekdays.	5/9/2016 6:03 AM
312	The 4 seasons women's change room really needs help. The lockers often eat coins, it is not uncommon to approach the front desk twice per visit for a replacement coin. The stalls in around the toilet are in disrepair and I've had to physically shift the door/wall just to lock the door. I've reported dust hanging from the ceiling of the change room from the wooden strips. The deck tiles are extremely slippery and I catch myself from falling at least twice per visit. I don't want to see this pool close, but nothing seems to have been updated since I was a child over 30 years ago. My biggest complaint/suggestion at the aquatic centre is the lack of cleanliness. Ants around the dive tank. Women's change room is grimy. (Definitely not as clean as it used to be when there were designated cleaning staff).	5/9/2016 5:35 AM
313	More Family change rooms at Four Seasons. Fewer lessons happening at same time in Four Seasons baby pool. Possibly more staggered start times for lessons. By 15 or 10 minutes. Showers, change rooms, and baby pool could be less congested. Business of showers and change room goes in waves. Helpers for early swim levels (1-3). Need an extra set of eyes to deal with behaviour issues while instructor tries to teach. With so many kids in small space it can be a gong show and the instructor can't really do a good job.	5/9/2016 5:24 AM
314	The four seasons needs a make over. earlier times (@ four seasons) for swimming and a wider range of times for aquafit	5/9/2016 4:46 AM
315	Updated four seasons pool More fitness equipment and I might actually go. More water toys	5/9/2016 12:58 AM
316	Four Season is looking rough. It needs to be upgraded/cleaned up.	5/8/2016 10:11 PM
317	Pricing should be lowered. We have a hot tub at home. Before we got it we went to the pool all the time. We don't swim now because we can't justify spending 10.00 when we can just go in the back yard. Also, upass was great while i was at unbc. Something similar (discount pass) should be developed for alumni and similar pricing for employees of businesses. Might make people healthier and be a good hook for businesses in PG too. May also open a door for more corporate sponsorship too. It should be a couple dollars to swim all the time. The increase in traffic will offset the decrease in price.	5/8/2016 10:09 PM
318	Water slide at the aquatic centre.	5/8/2016 10:02 PM

319	I am satisfied the way things are going now.	5/8/2016 9:59 PM
320	More family rooms	5/8/2016 9:00 PM
321	Upgrade, repair and renovate 4 Seasons. More Family change rooms at 4 Seasons. Possibly more lessons at the Aquatic Centre.	5/8/2016 8:43 PM
322	keeping tabs on the people swimming and what they are wearing. our last visit was cut very short as there were a number of people in the pool in very dirty street clothes. there was stuff floating off them and jean cut offs and dirty shirts are not for the pool. I know there are chemicals in the pool to help keep it clean but this was disgusting. it seems every time we go now there are people in regular clothes. women in t shirts that are wet and see thru bras on, jeans, other pants, I even saw one is sweats one time.	5/8/2016 8:22 PM
323	More family change rooms	5/8/2016 8:12 PM
324	Would be nice to have more of the family change rooms at both facilities. More control over who is using what change rooms: when we use the ladies change room we see a lot of young boys using the change room too (with their moms) but they are too old to be in there! I don't like myself or my grade 2 daughter changing in front of her classmates/peers/like-aged boys! This does not amount to good things being said at playgrounds the next day. We end up using the privacy stalls within the ladies change room to hide away - but we shouldn't be the ones hiding away in the ladies room. And nothing can be done in the showers - so we shower with bathing suit attire on and then shower again at home: not cool! Finally: cell phone use in change rooms. There is one sign I know of in the ladies room but it is not clear, not obvious, and certainly not being respected as a rule. Most people I am sure are just 'texting' while their phone is pointed at me....but how am I to know. These two things are super important for the safety of privacy, children and others too! Otherwise the pools are absolutely awesome, the staff is great and we are very lucky to have these fantastic facilities. Thank you.	5/8/2016 8:09 PM
325	The 4 seasons needs major renovations. The change rooms are falling apart. Tiles need to be replaced	5/8/2016 8:09 PM
326	I would use Aqua centre pool but too cold and every time I've gone to lane swim, lanes are full. Would be nice if these two problems could be fixed as I know I am not the only one who feels this way. I would be a regular customer at Aqua centre for Aqua fit and lane swim if it were different.	5/8/2016 8:05 PM
327	Accessibility for the disabled always worth the investment -such as handrails on both sides entering the wave pool just like at four seasons lane pool -handrails on the wheelchair ramp going into the wavepool -easy access to equipment like the smaller dumbells	5/8/2016 8:01 PM
328	You need to keep up maintenance at 4 seasons, all showers at both sites should have timed shower controls, showers at 4 seasons have not been at proper temp for 2 years now since the 2014 shutdown. the first day of the shut down before the pool is drained I would like to see a pet and owner day/part day for patrons to bring their dogs in for some fun could be done as a fund raiser for SPCA etc.	5/8/2016 7:57 PM
329	New tiling in change rooms of four seasons pool. They are old and stained.	5/8/2016 7:52 PM
330	Later hours specifically for adults only.	5/8/2016 5:43 PM
331	cleanliness	5/8/2016 4:54 PM
332	Continue to keep facility as clean and well maintained as possible. Potentially extend hours especially for small children in the morning 9:00am.	5/8/2016 2:46 PM
333	Swimming lesson times are so inconvenient. Always want to put my kids in but not a lot of options.	5/8/2016 2:09 PM
334	Bigger water slides, more lazy rivers	5/8/2016 2:04 PM
335	More variation in aquafit classes like water spin, better family change room (like Dawson Creek), separate baby pool with no waves and warmer water	5/8/2016 1:49 PM
336	Water slide at PGAC Toonie swim till 4 pm City employees swim free	5/8/2016 1:38 PM
337	Improvements to the four seasons pool and more convenient places, with less distractions, for swim lessons.	5/8/2016 1:07 PM
338	More vigorous Aquafina class a in the morning. It would be nice to get in a class before work, but range of motion is not vigorous enough.	5/8/2016 12:42 PM
339	4 seasons pool need more family change rooms. Aquatic centre needs more regulation of the family/handicap change rooms. Many times the rooms are full of single adults and families or people needing the handicap rooms are waiting long periods of time.	5/8/2016 11:05 AM
340	The four season pool need to be remodeled. The aquatic center should have had a water slide when origanilly designed. If a new one gets built and/or the exiating pool get remodeled there should be a rockclimb wall set over the pool	5/8/2016 10:56 AM

341	Four seasons needs a big face lift. And Aquatic center some mantainance	5/8/2016 10:02 AM
342	Please refurbish the floor around the pools at 4 seasons pool - it is very slippery & have almost fallen several times while holding my toddler	5/8/2016 10:01 AM
343	have maintenance on repairs performed quicker	5/8/2016 9:34 AM
344	Keeping cleaning staff to maintain health and safety issues. Nothing worse than seeing a dirty, grimy change room.	5/8/2016 9:07 AM
345	FSLP showers that work, nonslip tile flooring, bathroom doors that lock Aquatic Centre numbers on lockers that can be read, more small lockers	5/8/2016 8:41 AM
346	Reno 4 seasons	5/8/2016 8:41 AM
347	perfectly satisfied with things as they are; one of the best facilities in Canada	5/8/2016 8:40 AM
348	Cleaning the dirty ring line around the main pool and cleaning the drinking fountains more often. New floaters in the wave pool at the deep end.	5/8/2016 7:32 AM
349	better ventilation in change rooms at aquatic center. NEVER feel like I can get dry there and find it hard to breathe from being so hot and humid	5/8/2016 7:09 AM
350	Happy with the aqua center except I picked up a toe fungus there. Since fall the water temp in showers seems to fluctuate alot	5/8/2016 7:06 AM
351	More family and accessible change rooms. General updates of old facilities (four seasons), healthier snacking choices on site maybe even a cafe, updated gym	5/8/2016 6:31 AM
352	Children love water slides, another one would be a great addition to either pool. More family change rooms at four seasons.m, ceiling tiles are stained and need replaced also. Kelowna has an amazing pool perhaps follow their lead :)	5/7/2016 11:34 PM
353	Water slide and warmer pool and air temperatures at aquatic centre! And to be able to take a child down the slide	5/7/2016 11:01 PM
354	More Water Slides!! We desperatly need an indoor water park! Like the one Edmonton Mall has. We REALLY need one! My family makes frequent trips to go there to visit the indoor waterslide and wave pool there. We should have one here!!	5/7/2016 10:47 PM
355	if everything was clean and working that would be good. rent a climbing wall or floaty bouncy castle for a limited time something cool and special but not a major commitment	5/7/2016 10:09 PM
356	The downtown pool is in dire need of restoration. It is highly used swimming pool in this city and should be maintained regularly. The aquatic center is not under 2 year old friendly. We had to seek refuge whenever the waves started. There should be scheduled time when one section of the pool area has a depth of 2 feet so parents of toddlers can let their children play without having to worry about a height drop or powerful waves. The Aquatic Center needs regular cleaning in the family change rooms. Every time I have visited they have been quite disgusting.	5/7/2016 9:44 PM
357	larger family changeroom, there is usually a wait to use a room	5/7/2016 9:35 PM
358	Change rooms in older pool need updating	5/7/2016 9:10 PM
359	Fixing the ugly water spots on the ceiling at the four seasons pool would be my priority. More family change room options at the four season would also be great. Overall, both are fantastic facilities... but need a bit of updating/maintenance.(more paint, get rid of rust, etc.)	5/7/2016 8:42 PM
360	Offer better times for classes (earlier for younger children, not 6:30/7:00 as that is close to bedtime). More classes offered at the aquatic center.	5/7/2016 8:19 PM
361	Outdoor pool please	5/7/2016 7:51 PM
362	Don't shut down the four seasons. And more lessons, have to book to far in advance to be reasonable.	5/7/2016 7:49 PM
363	Concession stand for food Larger and more family change rooms Accessibility into Four Seasons Other recreational activities or other uses together in one building	5/7/2016 7:33 PM
364	Better changerooms that are cleaner and more space .... Floatables for kids and family's .... More 50m lane availability	5/7/2016 6:33 PM
365	Adding space for families to change. Even if these areas have no plumbing but are just several contained change areas. I am a mom who takes 2 special needs boys aged 9 and 4 swimming regularly and am often not able to access the family change rooms because they are busy. As a result we have changed in the handicap washroom at aquatic centre and in the area outside the family change room doors at four seasons.	5/7/2016 5:57 PM
366	It is imperative that attention be paid to cleanliness. I stop going to the pools because of how dirty it was the last few times we visited. Also staffs need to ensure safety of all. Too many times are children allowed to play in lanes, push each other and not be safe.	5/7/2016 5:47 PM

367	just maintain what we have, slide area roof at 4 seasons is awful. change rooms at both facilities need updating and better cleaning	5/7/2016 5:29 PM
368	Close 4 seasons. Too much $ to properly repair even to get to a modern standard. Question 1 is flawed...You aren't tracking respondents who never use either facility. You assume one, the other or both. Typical mediocre attempt at engagement.	5/7/2016 5:16 PM
369	Maintain what we have. I'd hate to lose a pool! Change rooms at the 4 Seasons could use an upgrade... they're pretty dingy and many lockers are broken. There are also lots of stained and damaged ceiling tiles.	5/7/2016 5:05 PM
370	Hoping for healthy options Cafe - something like h2o has in Kelowna was nice	5/7/2016 4:31 PM
371	Parking/access/ family changerooms at FSLP.	5/7/2016 4:27 PM
372	Cleaning or replacing the tiles at the Four Seasons pool. Yearly or monthly memberships in conjunction with one or more gyms	5/7/2016 4:18 PM
373	4 seasons requires a face lift. The facility appears dingy and dirty even after it's been cleaned. It needs more family change rooms.	5/7/2016 3:33 PM
374	Update both pools but don't add pools to other areas or down town will be deserted as it is now and no one goes downtown ..update down town make it a uban city	5/7/2016 3:03 PM
375	outdoor pool	5/7/2016 12:23 PM
376	Cleanliness of the changerooms and pool.	5/7/2016 11:19 AM
377	Baby swim lessons at different times to help with working parents.	5/7/2016 10:42 AM
378	Scheduled times when there will be no waves turned on. My 4yo is afraid of them and I had a bad experience last week while trying to retrieve a ball by the rope where the waves are. If my friend hadn't grabbed my hand I would have gone under water with my son on me. Thankfully I was ok but there needs to be a longer warning before the waves start and there needs to be greater attention paid to those in the pool prior to turning on the waves. Some people are not strong swimmers and cannot swim away fast enough with the little warning that is given.	5/7/2016 9:44 AM
379	Add more family change rooms at aquatic center, facelift the four Seasons. Lessons definetly better at four seasons	5/7/2016 9:13 AM
380	Update four seasons pool as the change facilities are disgusting. Pool closures should be timed better.	5/7/2016 9:08 AM
381	Public swim on the weekends should open before 10:30 as toddlers are up early & nap, 9 am would be much nicer	5/7/2016 8:40 AM
382	Family change rooms at 4 seasons are small, cramped, unclean and need more of them!	5/7/2016 7:47 AM
383	More enhancements for handicapped visitors particularly in winter, presently have to bang on door to get let in. I prefer Four Seasons because I can breathe there whereas I have no idea what you do at the Aquatic Centre but I find it extremely hard to breathe in that facility. I used to do Aquafit at the Four Seasons after work and when I retired I tried the Aquatic Centre but it was too difficult trying to breathe in that facility. I now have COPD & Osteo so I enjoy being able to do Range of Motion exercises at the Four Seasons. Please don't close it.	5/7/2016 7:40 AM
384	having a bigger work out area/more equipment, making the affordable passes more accessible or lowering the price all together, having the adult hours earlier in the day and hiring cashiers that are more friendly	5/7/2016 7:35 AM
385	Updates to four seasons. Expansion to include more water slides/attractions.	5/7/2016 6:45 AM
386	cleanliness of facility needs improvement	5/7/2016 5:04 AM
387	More hot tubs	5/6/2016 11:44 PM
388	At the 4 seasons I smashed my knee into both bottom of the pool coming off the slide. All the lifeguards turned and walked away as I struggled to swim to the edge. I couldn't walk on it properly for 6 weeks after that. So how bout competent staff that do their jobs. I haven't been back since.	5/6/2016 11:39 PM
389	More cleaners needed as washroom, change room & pool deck are dirty!! Staff are always accommodating & professional!	5/6/2016 11:25 PM
390	More water slides. Upgraded and bigger pools. Main pool at Aquatic centre is small and crowded when busy. Four seasons is old and needs a serious update. Combining a skating rink and pool would be ideal.	5/6/2016 11:17 PM
391	I think the city should consider adding on a significant exercise room to the aquatic center. Presently much of the weight training etc by the clubs is done on deck or outside in the summer	5/6/2016 11:12 PM

392	Four seasons needs a good cleaning in the ladies change room - the floors have brown marks and there is dust on the tops of the washroom and change cubicle doors and up between the wood slats on the ceiling. The showers in ladies change room need more signage, for people to shut the water off when done showering - there are one or two broken handles in there now, that don't even turn on also. Mens change rooms need individual cubicles. Last cubicle in ladies change room, the door needs to be adjusted - so it will close properly. The entrance off the back big parking lot gets so frozen over with ice in the winter. There are gaps between the door and floor - you can see outside from the pool. It needs weather-stripping of some kind. The 'toys' are kept in a supply closet - why aren't more of them left near the pool so they can be used? The clocks have different times on them - the big one over top the chair/table viewing area and the small yellow one over the water slide pool area. The Adapted Aquatics program needs to have somebody checking on the "special needs" swimmers once a month or so. Two younger fellows were doing this for the last 3 months or so, and it was wonderful. We also love the sign that shows it's Adapted Aquatics only from 10-11:30, instead of just leaving the till empty and light off - and leaving other customers to guess there's a special event going on.	5/6/2016 11:06 PM
393	A minimum of 3 lanes available at all times for the public.	5/6/2016 10:52 PM
394	More lanes open to the public during club practice. 2 lanes is not enough. Or just take them all and close the lanes for a couple hours.	5/6/2016 10:07 PM
395	The infant/lesson pool is too restricted in hours due to lessons and is often over crowded. Also no family change room at four seasons??	5/6/2016 10:02 PM
396	More lanes at four seasons	5/6/2016 9:50 PM
397	More change rooms needed at the Four Seasons pool and private showers.	5/6/2016 9:49 PM
398	Meet the growing competition with the new pools being built throughout BC - we want to be a premier destination for competition and tourism because of our Aquatic facilities. I would enhance our pool decks to ensure we are keeping up with new standards of design. I would make the pools more accessible and modern with waterpark aspects.	5/6/2016 9:48 PM
399	Updates to 4 Seasons Leisure Pool - including changeroom facilities (more family changerooms)	5/6/2016 9:47 PM
400	Improved cleaning - floors and bathrooms are usually quite dirty, especially in winter. Broken lockers, lack of cleanliness reduce patron pride in facility (patrons less likely to keep things clean)	5/6/2016 9:45 PM
401	The YMCA should take over 4 seasons. That way people could use their membership to benefit from swim lessons and offer daycare so people can take a class when they have kids to watch!	5/6/2016 9:40 PM
402	I dont like that I have to pay inaddition to my daughters swim lessons for her to swim while her brothers class is in session. One follows the other in time, socshe swims for 30 minutes. Why? They are kids and it is 30 minutes! Such a slimy money grab. If it doesnt change I likely wont register them again.	5/6/2016 9:38 PM
403	Would love more affordable private lessons for special needs	5/6/2016 9:22 PM
404	Let the YMCA have a pool, encourage participation	5/6/2016 9:21 PM
405	More toys	5/6/2016 9:13 PM
406	cleanliness	5/6/2016 9:10 PM
407	Replace sound system Aquatic Centre used for fitness classes	5/6/2016 8:52 PM

408	Cleaning!! Four Seasons is old and looks really bad even after just a few hours of being open. It's enough to make us avoid that pool. Expand hours for aquafit classes to make them more accessible, so that classes are offered at both locations at reasonable times. Also, if you're going to spend the money and space to have exercise equipment, make the space friendly. I've never seen the one at Four Seasons, but I think it's in the basement? The one at the Aquatic Centre is an open room that everyone can see, and is like the size of my bedroom. Pretty small, as though it's an afterthought. Either do it right, or don't waste the money. Consider things like annual family memberships. Or fun things like a mother-daughter aquafit, or a couples aquafit. Maybe consider trying new styles of aquatic exercise classes. Also, the city may want to consider building seasonal outdoor pools. I grew up in a winter city where summertime outside pools were standard, and an excellent way for kids to get exercise (because who wants to be indoors in the summer?). Also, the city might consider something bigger. Four Seasons could be re-built to be a more efficient use of space so that the lanes don't conflict with the leisure part of the pool. Expand the lanes and expand the ways in which people are able to play. Also, the viewing areas at Four Seasons make it difficult for a parent to get to a child quickly if necessary, but there are no decent sitting areas for parents near the pool itself. These should be re-designed to make it more like the Aquatic Centre. Another possibility is to consider ditching one of the pools altogether and expanding the other. Or, consider other, smaller, neighbourhood pools. One in the Hart would be nice. Consider things like working in conjunction with the Sports Centre to get a pool up there. While the location is good for Four Seasons, the pool itself really should be torn down, or rebuilt, or something. It seems to me that there wasn't a lot of foresight putting two pools so close to one another, but since the city seems to need two, and one should be downtown, but the Aquatic Centre is newer and better … it really puts us all in a bind for upgrading or changing locations. If money weren't an issue, I would totally redesign the downtown space to be more like a full sports centre with a pool rather than just a pool. I think the city could get more use out of that facility, especially with a new hotel going there and with the Sports Centre already being at capacity. Have it be a pool with a dance studio, yoga rooms, other exercises, classes, etc. Whatever you do, though, Four Seasons as it is should be dealt with in a substantive way (fixing the roof several years ago was touted as a huge improvement, but it did nothing to increase the value in and enjoyment of the facility). Do something better with that space.	5/6/2016 8:47 PM
409	Please consider keeping the 50 meter pool in this length until 10:00 am week days.	5/6/2016 8:44 PM
410	I strongly feel the pool should be added on to accommodate the demands of the swim teams including viewing area expansion	5/6/2016 8:43 PM
411	I would like to see a water slide at the aquatic centre	5/6/2016 7:56 PM
412	I would love more than anything else to see a water slide at the aquatic centre. I think that would make an already amazing facility the absolute best.	5/6/2016 7:44 PM
413	4 seasons - more family changing rooms, and more cleaning staff. Both - more toys for young kids	5/6/2016 7:41 PM
414	50m lanes available/open more frequently (not just 6am) One more hot tub Lower ratio in swim lessons (instructor to children) Cleaner change rooms	5/6/2016 7:38 PM
415	More family change rooms. Better showers that stay on warm water. Cleaner bathrooms and ones that lock.	5/6/2016 7:36 PM
416	I believe you should have gym eq. In better shape	5/6/2016 6:51 PM
417	I would use the pool daily is there were enough swim lanes - I find it too crowded and have been hit in the face because of lane overcrowding and find there is never enough space - I feel PG needs a pool for lane swimmers only that is not taken up by clubs and because of this I do not go as frequent as I used to	5/6/2016 6:51 PM
418	Would like to see aquafit after work between 5 and 6 Changerooms cleaned more often, they are usually very dirty when I go	5/6/2016 6:41 PM
419	cleanliness...both pools are always filthy...fslp especially. I know there is a lot of people in there, but it is dirty, and the floors are covered in hair...all the time. ive stopped taking my kids there for swimming lessons, they go to a private pool now, which is really unfortunate.	5/6/2016 6:39 PM
420	None for my use	5/6/2016 6:30 PM
421	More options for swimming lessons. All the lessons fill up so fast	5/6/2016 6:26 PM
422	Four Season needs a serious maintenance job. I can see the insulation falling apart outside the building from since last year and I brought it up with front desk about it and it is still falling apart. Family change room is not maintained (open holes that people could easily urinate into behind the toilet), smoke dectector hanging from ceiling, dehumidifier doors left open every single time I stop by to swim there, etc. The grouting have been etched away in the leisure pool to the point where the tiles now have sharp edges. I have actually hurt myself on them catching onto my big toe nail bending it backward. More family change room would be nice but space is a serious issue that I can understand. Lockers can be replaced.	5/6/2016 6:25 PM
423	Leisure access pass income level needs to be raised a bit (senior). I am slightly over but not enough that I can afford monthly passes every month. I would like to be able to take a variety of fitness classes and can't swim so need lessons.	5/6/2016 6:16 PM

424	Ozone or ultra violet treated water and eliminate the chlorine. Same goes for our drinking water.	5/6/2016 6:14 PM
425	Better spectating area for the Aquaric Centre.	5/6/2016 6:08 PM
426	Implementing higher city taxes to make swimming at both facilities free to all residents of Prince George to use as part of a healthier community initiative. Twoonie and Free swims are popular as the cost is lower all around providing more value for the price.	5/6/2016 5:53 PM
427	Upgrades to 4 seasons	5/6/2016 5:52 PM
428	cleaner change rooms.	5/6/2016 5:07 PM
429	Cleaning the public change rooms and bathrooms. They can become quite gross.	5/6/2016 4:29 PM
430	Times the young swimmers classes offered. Not conducive to the age of the kids (1 year old taking lessons at 6:30pm? Bedtime is 7pm!) considering working parents.	5/6/2016 4:06 PM
431	Change rooms that have place to put baby safely while parent dresses. Better more comfortable viewing area. Fans in summer. More slides. Baby/ kiddy pool. Bigger private change rooms	5/6/2016 4:04 PM
432	Bigger water slide and it to be open more often as well as the Tarzan swing to be open more often	5/6/2016 3:35 PM
433	- 4 Seasons: change room improvements! - Aquatic Centre - mini-restaurant or some sort, more vending machines	5/6/2016 3:13 PM
434	Having the baby pool is really important, it seems much easier on the lifeguards when they're teaching. Some more water park features would also be fun. The surfing machine at H2O in Kelowna is neat!	5/6/2016 3:00 PM
435	Open public swimming earlier on weekends, silly my kids can't swim after their lessons because there is no public swimming till later	5/6/2016 2:57 PM
436	Private change stalls in the men's change rooms	5/6/2016 2:53 PM
437	Better communication around events. For instance we arrived for the underwater easter egg hunt midway through the advertised time due to nap schedule, but the egg hunt portion of the event was done. However overall I am pleased with the facilities/services	5/6/2016 2:30 PM
438	More age appropriate swim options for children under 5 and parents	5/6/2016 1:59 PM
439	Four seasons: tile between the pools is VERY slippery...priority one! Change rooms need redone, esp family rooms, not enough. More fun things to do in the kids pool. Aquatic centre: could have more toys etc in the wave pool.	5/6/2016 1:51 PM
440	Wheelchair access to the Four Seasons pool is very poor (having to enter via the pool deck make a wheelchair user feel like a spectacle and the change rooms are barely adequate and are often in use by families. It's great to have space for families to change but there needs to be more awareness that wheelchair users don't have a choice and should get first priority for these spaces. Families could still use the regular change rooms, even if the family rooms are better for them.) Sidewalk access to the Aquatic Centre is appalling because for some reason the city doesn't have sidewalks on 18th Ave. In the summer this is ok for people walking (not for wheelchair users) but in the winter it's dangerous for everyone because of the snowbanks. Please upgrade this.	5/6/2016 1:37 PM
441	Toddler water activities	5/6/2016 1:32 PM
442	Price reductions	5/6/2016 1:28 PM
443	Please please add additional preschool and children's swim lessons. There aren't enough options and the classes fill up too far in advance. Classes are full before we even know if our child is staying in a present class or progressing to the next.	5/6/2016 1:25 PM
444	More warm water	5/6/2016 1:25 PM
445	Better hours and more frequency of lessons. Especially after 5 pm during the week. Also Four Seasons pool deck should be changed so that it's not so slippery, like the Aquatic Centre.	5/6/2016 1:02 PM
446	More family change rooms at the Four Seasons. More Saturday morning swimming lessons for pre-schoolers. More two-week every day swimming lessons for pre-schoolers.	5/6/2016 12:22 PM
447	Shut down four seasons pool. Build a pool beside or near the YMCA. With multiple pools for :lane swimming, lazy river, wave pool area, hot tub, diving pool. Similar to the aquatic centre but with the four seasons pool combined. Bigger and better. Families, teenagers, and adults would go visit this pool (new pool) 100 times more than the existing pools.	5/6/2016 12:19 PM
448	Modernize Four Seasons with new changerooms	5/6/2016 12:16 PM
449	More swim lessons at the aquatic centre. Would be a bonus if there was a pool in College Heights.	5/6/2016 12:13 PM

450	fixing the bubble pits in the shallow wave pool entrance (by change rooms), and the bubble pit in the lazy river. New lane ropes, the red ones are saggy, loose and wobbly	5/6/2016 12:10 PM
451	updating the family change room at the four seasons as well as a new wheelchair lift.	5/6/2016 11:51 AM
452	Clases for 4-5 yrs old to be later in the evening, sometimes as a working mom can't make it to the lesson that starts at 5:30 when I'm done work at 5, move the parent participation ones to be at 5:30 instead most of the parents that go is because they are on parental leave	5/6/2016 11:46 AM
453	Greater accessability at Four Seasons.	5/4/2016 2:12 PM

11.8 Manifold Methodologies

Manifold Methodologies

manifold
data mining inc.

Zhen Mei, Ph.D. in Mathematics

220 Duncan Mill Road, Suite 519,
Toronto, ON M3B 3J5
CANADA
Tel: 416-760-8828
Fax: 416-760-8826
www.manifolddatamining.com

1) Manifold's Methodology for Updating Population Estimates and Projections

Demographic data are population statistics collected by Statistics Canada via Census every five years. The most recent Census was conducted in May 2011. The upcoming Census will be conducted in May 2016. There is normally one to two years time lag between collecting and publishing Census data. For example, the first batch of 2011 Census, population and dwelling, were released by Statistics Canada in February 2012. The last batch, income and housing from the National Housing Survey, was published in August 2013 only at Census Sub-Division (CSD) Level for about 2/3 of the CSDs.

Census normally has a 3~5% under-coverage of population as people might not be at home or not submit the census forms on the census day. For details please refer to Statistics Canada at

https://www12.statcan.gc.ca/census-recensement/2011/ref/estima-eng.cfm

Statistics Canada conducts the Reverse Record Check (RRC) after Census to measure census population under-coverage and adjusts population estimates, e.g.,

http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3902&Item_Id=47932

For example, Statistics Canada published total population (33,476,685) of Census 2011 on May 16, 2011 at

http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/tbt-tt/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=102014&PRID=0&PTYPE=101955&S=0&SHOWALL=0&SUB=0&Temporal=2011&THEME=88&VID=0&VNAMEE=&VNAMEF=

On the other hand, Statistics Canada has also a population estimate (34,483,975) for July 2011 at

http://www.statcan.gc.ca/pub/91-002-x/2013001/t002-eng.htm

The difference is 34,368,053-33,476,685 = 1,007,290, which is about 3% of the total population. The current year population estimate is available at:
http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm

Manifold Data Mining Inc. has been providing current year population estimates since 2001. Below is a brief description of our data sources and methodologies for updating population estimates and projections.

Sample Data Sources:

Statistics Canada
Health Canada
Regional Health Ministries
Citizenship and Immigration Canada
Regional School Boards
BRISC International Inc.
Flyer Distribution Association
Real Estate Boards/Companies
Canada Mortgage and Housing Corporation (CMHC)
Canadian Bankers Association
Building permit statistics from Municipalities
Industry Canada
Consumer and business directories books
Publication of hospitals, government agencies and partners
Bureau of Broadcast and Measurement
Proprietary survey and research

Longitude Data
We have been mining historical data to identify patterns in population growth and settlement. This includes the historical Census data 1991, 1996, 2001, 2006 and 2011, the yearly immigration statistics from year 1981 to 2014, Royal LePage's quarterly Survey of Canadian Housing Price from 1974 to 2014, publications from Canadian Mortgage and Housing Corporation and Canada Post Corporation.

Key Assumption
At Provincial and Census Division levels we have taken consistent assumptions for each component of population growth (birth, death and migration/immigration) with Statistics Canada. At Sub-Census Division level, we determine the assumption by real estate development and directory books as well as historical trends in the Census and immigration statistics.

Fertility
We estimate age-specific fertility rates by cohorts of women in the reproductive age group 15 to 49 and estimate the number of births each year. The data is based on historical birth rate and statistics from national and regional health offices as well as

publications of researchers at health networks around major universities, hospitals and Statistics Canada. The trend is that women are having fewer children and are postponing births.

Mortality
We estimate age-specific mortality rates by population cohorts[1]. The data is based on historical mortality rate and statistics from national and regional health offices as well as publications of researchers at health networks around major universities and hospitals. Life expectancy will increase gradually at a slower pace. Over the last decade, average gains in life expectancy have been in the order of 0.12 year per annum for females and 0.25 year for males. The male life expectancy is expected to progress at a faster pace than female life expectancy.

Interprovincial Migration
Based on mover's statistics from past census we estimate migration at Census Sub-Division (CSD) level. Thereafter we use postal code development data from Canada Post Corporation, mover's data from data partners, e.g., directory books and real estate boards, and spatial regression models to project migration at sub-CSD level. We also correlate macro-economic activities with migration of labour force across Canada to establish trend of population growth by economic regions.

Ethnicity and International Migration
Our projection of the Chinese, South Asian, East European, Filipino, and Caribbean communities is based on historical Census from 1991 to 2011, immigration statistics 1991 to 2014 from Citizenship and Immigration Canada as well as birth and mortality rates of these communities in Canada.

Immigration is a key contributor (>=75%) to the population growth. Asian has been the main source of immigrant population in the last two decades. At provincial and Census Metropolitan Area (CMA) Levels we use statistics from Citizenship and Immigration Canada, at sub-CMA level we use surveys, community settlement statistics and directory books to estimate the immigration population. Furthermore, immigrant settlement patterns and their longitude shifts are identified from the historical Census and immigration data for projections in future years. We have been studying the large pool of foreign students and temporary workers as the increasing source of immigrant population and factoring them into the population projections.

The household spending patterns of these communities are derived from the annual Survey of Household Spending from Statistics Canada. We used predictive models to link the spending data with Census data and extrapolate them to the 6-digit postal code covering whole Canada. We used spending patterns in areas with high concentration the cultural communities to represent cultural spending patterns. Coupled with their settlement patterns and socio-economic data at the 6-digit postal code level we extrapolate their spending patterns across Canada.

---

[1] Ronald D. Lee and Lawrence R. Carter, 1992, "Modeling and Forecasting U.S. Mortality," *Journal of the American Statistical Association* 87(419): 659-671.

Occupation & Labour Force & Household Income
Statistics Canada conducts a Labour Force Survey (“LFS”) every month. This survey provides estimates of employment and unemployment which are among the most timely and important measures of performance of the Canadian economy. The LFS also provides employment estimates by industry, occupation, public and private sector, hours worked and much more. Statistics Canada published Labour Force Information every month including cross-tables with a variety of demographic characteristics. We use the most recent LFS, the regional unemployment rates based on the Employment Insurance Program, and the Census 2011 as the foundation for our annual updates of labour force activities. Furthermore, we established associations between labour force statistics in Census and business establishments, immigration statistics and settlement patterns to track trends in the labour force and employment development. This enables us to combine the most recent employment statistics, wages, income and inflation data with the demographic information and business establishment data by region, industry and occupation, and estimate the current labour force and occupational activities and income levels.

Methodology
As census is conducted every five years and there is a 1-2 years lag in collecting and publishing census data, we estimate demographic data between the census years and project for 1, 5, 10, and 15 years in the future. Our update techniques are based on the following techniques:

- Enhanced cohort survival methods;
- Nearest neighborhood and regression techniques;
- Structural coherence techniques.

Example: Population Forecasting
Population estimation calculates the expected population for the present; population projection calculates the expected population for one or more periods in the future.

The cohort-survival method is the essence of population forecasting:

- Population[t+1] = Population[t] + Natural Increase + Net Migration

This formula states that the population at the next time interval ("t + 1") is equal to the population at the beginning time interval ("t") plus the net natural increase (or decrease) plus the net migration. This is calculated for men and women for each age group.

1. Data source for population at the beginning interval is the Census data from Statistics Canada, e.g. 2011, 2006, 2001, 1996, 1991 census;
2. Data sources for natural increase are Health Canada, Statistics Canada and regional health centers and scientific publications;
3. Data sources for migration are Citizenship and Immigration Canada, Canada Post Corporation, and telephone directories.

Natural increase is the difference between the number of children born and the number of people who die during one time interval. The follow two factors are essential in calculating natural increase:

- Birth Rate[cohort *x*] = Births / Female population at childbearing age;
- Survival Rate[cohort *x*] = 1 - (Deaths[cohort *x*] / Population[cohort *x*]).

Net Migration is the difference between the number of people moving in and the number of people moving out. There are many ways to calculate net migration. Theoretically one can construct complex linear models to predict migration for each cohort. One of the simplest models is based on the assumption that the rate of migration for the next time interval will be the same as the rate of migration for the last time interval for each cohort:

- Migration Rate[t+1] = {(Pop[t] - Pop[t-1])-Natural Increase} / Population[t].

We build models with immigration data from Citizenship and Immigration Canada, new postal information from Canada Post Corporation, labour force survey and macro-economic business activities from Statistics Canada, and directory books.

After population projection we estimate the households and other census data with the following methods:

- Nearest neighborhood techniques;
- Structural coherence techniques.

Income data are projected with current and historical labor force surveys from Statistics Canada. Refinements are performed with the consumer survey data. Labour force data are updated with business establishment data and adjusted with the survey data.

We apply bottom up and top down techniques to population estimates and projections. Information at sub-DA level was used for projections and data at sup-DA level were employed for fine adjustment. Directory books, dwelling structure, real estate development and postal code data are key factors for estimating household counts and migrations. Census 1991, 1996, 2001, 2006 and 2011 were the base and trend for population projection. In the following we summarize the key techniques in creating and updating SuperDemographics.

a) Nearest neighborhood and regression techniques
To estimate population in a new residential area, we use nearest neighbors and regression techniques, looking for most similar records in the historical database and in the neighbourhoods in terms of construction type, year, number of dwelling, phone lines, … and assigning an initial value to the new area. We improved the basic nearest neighbor techniques with a multi-level similarity measure and an adaptive voting procedure from the K-nearest neighbours for assigning prediction to the new record. The confidence of the improved K-nearest neighbours technique are measured as follows.

- The distance to the nearest neighbor provides a level of confidence in accuracy.
- The degree of homogeneity among the prediction within the K-nearest neighbors is an indicator of confidence in coherence.

b) Structural coherence techniques
Multi-colinearity is common in large databases. We use structural coherence to measure robustness of the databases. In the modeling process, we explore structure in data and variables structure and preserve structural coherence of the database.

To preserve the coherence structure of the census data, we have applied the theory of nonlinear dynamic systems developed by Manifold's principal to the spatial and demographic dynamics[2].

c) Transferring data from DA (Dissemination Area) to postal code level via numeric methods
Data at different geographic levels are linked by a large system of linear equations. For example, a 6-digit postal code can run across several dissemination areas. Population within the postal code will be split into different portions corresponding to the dissemination areas. Correspondingly, a dissemination area may cover multiple postal codes. The total population of the dissemination area is equal to the sum of proportional populations of the linked postal codes. Setting up such a linear equation for every dissemination area and postal code in Canada generates to a large system of linear systems for population weight of all postal codes. This system is over-determined and has more than 750,000 unknowns. By solving such a system for anchor demographic variables, e.g., population, dwelling, income, … we obtain the core census data at the 6-digit postal code level, which incorporates population density, dwelling types, real estate development and building permits where available, patterns and trends in population settlements, business establishments and economic developments.

d) Predictive models for postal code level data
Based on the anchor variables at the 6-digit postal code level, we used spatial linear and nonlinear regression techniques to derive all other demographic variables. Particularly we considered the variation of population density and dwelling values among different postal codes within same dissemination area. Thousands of models were built to predict census attributes to all residential 6-digit postal codes.

e) Consumer product usage, purchase behaviour, shopping pattern, media usage, financial and psychographic data products
Since 2007 we have been providing the Canadian marketplace with the a dozen of consumer product usage, purchase behaviour, shopping pattern, media usage, financial and psychographic data products at the 6-digit postal code level. We developed these data products based on the Return-To-Sample Survey from the Bureau of Broadcast and Measurement (BBM RTS). This survey is conducted twice a year and the sample size is over 63,000 in each wave. We have licensed over six years of the survey data. Totally we have

[2] Zhen Mei: *Numerical Bifurcation Analysis for Reaction-Diffusion Equations.* Springer Series in Computational Mathematics, Vol. 28, Springer-Verlag, Heidelberg, Berlin, New York 2000.

over half million responders in our database and they are stratified well by geography and demographics. They represent Canadian consumers across the country. For over 13 years BBM RTS survey data has been widely by Canadian media operators, agencies and advertisers.

Applying data fusion techniques to the BBM RTS responders' level data and our 6-digit postal code level demographic and spending data we developed thousands of predictive models to estimate propensity of consumer purchase behaviour, consumption and psychographics for all 6-digit residential postal codes across Canada. The propensity score measures how likely consumers in a 6-digit postal code purchase and use certain items, how often they may shop at certain stores and what do they think about certain things.

f) Validation and refinement via independent data sources
Our databases have been verified with most recent data from Statistics Canada and survey data from our partners, postal information from Canada Postal Corporation, real estate boards, data vendors and online maps.

g) Errors
All regression results were derived within 5% error bounds with 95% confidence level.

2) Manifold Methodologies for Data Mining

At Manifold we develop and apply innovative and efficient data mining techniques to help clients achieve their marketing objectives. We employ both the well-established statistical methods and the newest data-driven technologies to custom solutions for our clients. We have active joint research projects with university professors (Sherbrook, York) on innovative data mining algorithms and big data initiatives supported and endorsed by Natural Science and Engineering Research Council of Canada (NSERC). Here are a few examples:

a) Dimension reduction techniques

Dimension reduction is a process to condense information in big database into low dimensional manifolds with the following features:

- They share all essential attributes with the original database;
- They are suitable for efficient campaign management, analytics and data mining, as well as Ad Hoc query and reporting.

We used the following proven methods and proprietary technologies:

- Correlation analysis
- Variable clustering
- Principal component analysis
- Factor analysis
- Discriminate analysis
- Regression analysis
- Feature selection with clustering techniques[3].

b) Resample techniques

Survey data are mostly collected at the household level. These data may describe accurately certain aspects of consumption behavior of the responders. However, the sample size is often too small and the sample is biased because responders may not represent the total population properly. We developed stratified sample techniques to improve the efficiency of survey data.

c) Cluster analysis

A process clustering objects in a database into different groups so that:

- Objects in the same group are as similar as possible (Homogeneity);
- Objects in different groups are as different as possible (Heterogeneity).

[3] Sun H., S. Wang, and Z. Mei: A fuzzy clustering based algorithm for feature selection. Machine Learning and Cybernetics, 2002. Page(s): 1993 - 1998 vol.4 4-5 Nov. 2002

Here the measure for similarity is crucial. Particularly for categorical variables, there are many ways to define a similarity matrix. For the interval scale variable, we use Euclid or Mahalanobis distance.

We have enhanced the K-means clustering techniques with the identification of a local optimal number[4] of cluster and optimization of seeds selections.

d) Data fusion

Data fusion with stratified sampling techniques. Stratum is the key to link survey data at the household level with census data at the level of dissemination areas. We used a multi-staged and adaptive nonlinear method to reduce the dimension of the database. We defined effective statistical distance functions and measured structural coherence in selecting the geographic level and integration of demographic, expenditure and behavior databases.

e) Product-driven data mining

The purchase behaviour of consumers is influenced by many factors. The consumer's needs and desires are described by factors like the individual's demographics, spending patterns, hobbies and activities, culture, social status, lifestyle and attitudes. Manifold has been cooperating with university researchers on understanding how these complicated and interrelated factors drive consumer purchase behaviors. Our results are published in:

R. Aggarwala, C.S. Bohun, R. Kuske, G. Labute, W. Lu, N. Nigam and F.M. Youbissi: Product-Driven Data Mining. Proceeding of the Seventh PIMS-IMA Industrial Problem Solving Workshop, 2003

and CANADIAN APPLIED MATHEMATICS QUARTERLY Volume 12, Number 1, Spring 2004
http://www.math.ualberta.ca/ami/CAMQ/pdf_files/vol_12/12_1/CAMQinfo.pdf

f) Validation and refinement via independent data sources

We validate the selected and developed techniques with most recent data from Statistics Canada and survey data and publications from A.C. Nielsen, Ipsos Reid, Adhome, BBM and other data vendors.

We work with our clients and market research partners to validate theory with their valuable business experience and iteratively improve our techniques.

[4] Sun H., S. Wang, and Q. Jiang: A New Validation Index for Determining the Number of Clusters in a Data Set. Proceeding of INNS-IEEE Conference on Neural Networks'01 (Washington DC) pp.1852-1857, 2001.
Sun H., S. Wang, and Q. Jiang: FCM-based Model Selection Algorithms for Determining the Number of Clusters. *Pattern Recognition*, 2003.

Contact

Dr. Zhen Mei or Thomas Ding
Manifold Data Mining Inc.
220 Duncan Mill Road, Suite 519
Toronto, ON M3B 3J5
Canada
T: 416-760-8828
F: 416-760-8826
E: zhen@manifolddatamining.com

DIALOG

Counsilman · Hunsaker
AQUATICS FOR LIFE

VANCOUVER
406-611 Alexander Street
Vancouver, BC V6A 1E1
TEL 604 255 1169
FAX 604 255 1790

CALGARY
300, 134-11 Avenue SE
Calgary, AB T2G 0X5
tel 403 245 5501
fax 403 229 0504

EDMONTON
100, 10237-104 Street
Edmonton, AB T5J 1B1
tel 780 429 1580
fax 780 429 2848

TORONTO
1100, 2 Bloor Street E,
Toronto, ON M4W 1A8
tel 416 966 0220
fax 416 966 0223

DIALOGDESIGN.CA