ENGINEER'S REPORT

The Town of Goffstown (the Town) is located in Hillsborough County, New Hampshire. It is a community of roughly 17,651 people (2010 Census), with a square mileage of 37.5. This engineering report provides an evaluation of the Town's bathing facility and swimming pool at Barnard Park, and provides recommendations for improvements based on Weston & Sampson's site evaluation.

The swimming pool was evaluated based on discussions with the Town, available information provided by the Town, such as operation and maintenance (O&M) records, and from a site visit that was conducted on September 16, 2019. During the site visit the swimming pool was closed for the season

Weston & Sampson was retained to a perform professional engineering and compliance evaluation, and for planning services in connection with the Town's Pool Facility at Barnard Park. Our scope of services included the following:

- Review of available pool information and systems.
- A code analysis for conformance with New Hampshire Public Health Regulations and Guidelines Minimum Standards, ANSI, as well as the new Federal Standards for ADA and Virginia Graeme Baker (VGB).
- Evaluation of existing pool facility and filter room/building.
- Examination of visible existing piping, circulation, chemical treatment and filtration systems.
- Research appropriate repairs and improvements for the pools.
- Preparation of an Engineer's Report that provides recommendations to improve the pools existing conditions and bring the pool into compliance with code.

Code Review

Each pool facility was evaluated based on the below code standards:

- New Hampshire Code of Administrative Rules, Chapter Env-Wq 1100, Public Bathing Places (2011)
- American National Standard for Public Swimming Pools (ANSI / NSPI – 2014)
- American National Standard for Aquatic Recreation Facilities (ANSI / IAF – 9 2005)
- International Swimming Pool and Spa Code (ISPC, 2012)
- International Building Code (IBC, 2018)

- International Plumbing Code (IPC, 2018)
- United States Access Board – Accessible Swimming Pools & Spas (ADA Code, June 2014)
- National Electrical Code – Article 680 – 2011 Edition (NEC 680)
- Virginia Graham Baker Pool and Spa Safety Act – January 2012 (VGB code)

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1.0 – Background and General Information

The Town of Goffstown, NH (the Town) operates and maintains the Barnard Park Pool (the pool) located off of Barnard Lane, see **Figure 1**. The pool is an outdoor seasonal pool that is typically open from mid-June to mid-August.

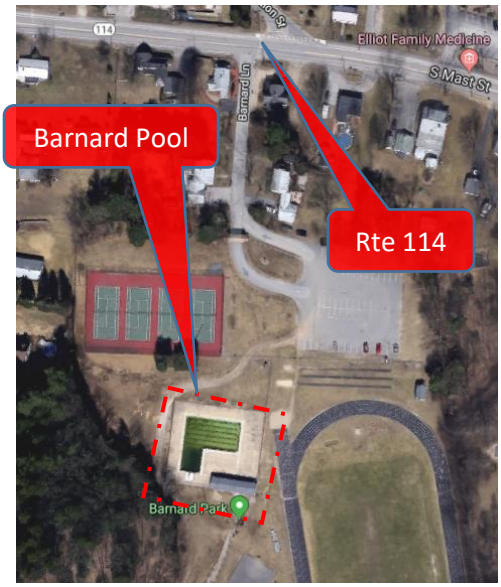

Figure 1 – Barnard Pool

The Barnard Park Pool Facility was established in 1974 and in recent years from 2011 to present has seen minor upgrades. Recently, the pool received a vinyl liner, new skimmer suction piping and minor skimmer box repairs. The facility includes a bathhouse located to the south of the pool that houses the Men's and Women's bathrooms, showers, lifeguard/first aid room, miscellaneous storage and the pool filtration equipment.

To the North of the pool facility, are tennis courts, to the East is a track and sports practice field, to the South there is a playground, and to the west is a neighborhood. Parking for pool patrons is located directly northeast of the facility in a shared lot with the athletic fields, tennis courts, and playground.

On average, the Facility sees roughly 150-200 patrons per day (Refer to **Table 3** for year to date patron usage). The pool is free and open to all residents and therefore collects no revenue from patron usage. However, costs associated with yearly expenses to date was provided (Refer to **Table 1**).

Over the past three years it is evident that operational costs have increased. Years 2017 and 2018 had relatively the same operational costs with a slight increase from 2017 to 2018. Pumps were purchased, in both 2017 and 2018 for the pool at Roy Park and Barnard Park respectively (seen in operational costs). The cost associated with 2019 only accounts for the first nine (9) months of the year and no significant purchases, indicating that overall expenses have increased. In addition, as the pool continues to age, unexpected costs associated with maintenance and repairs will most likely appear.

Expense	2017	2018	2019
Water	753	1,110	498
Electrical	2,343	2,088	2,087
Operation, Maintenance & Repairs	17,294	19,170	13,529
Total	**20,389**	**22,368**	**16,114**

Table 1 – Yearly Expenses

2.0 – Evaluation of the Barnard Park Swimming Pool

2.10 – Description of Existing Pool and Deck

2.11 – Swimming Pool and Finishes

The swimming pool is an outdoor recreational pool, enclosed by a 6-foot high chain link fence. Patrons access the pool through a central corridor in the bathhouse.

The pool is an “L” shaped stainless steel pool, with a water surface area of approximately 4,885 square feet, a perimeter length of approximately 331-ft and a volume of approximately 174,190 gallons. It spans approximately 83-ft in length with widths of 45-ft and 30-ft, and depths ranging from 3-ft to 12-ft. Based on the current square footage the pool’s bather load is 180 bathers.

Deck level, the swimming pool shows no immediate signs of structural deterioration. However, staff have noted that while repairs were being done to the pool they noticed portions of the framing system had rusted. This was not confirmed around the perimeter of the pool but indicates there could be more areas rusted through. During the field visit it was determined that where the skimmer boxes meet the pool shell, the shell wall has rusted, causing water to leak.

There are four sets of drop in ladders around the pool, two in the deep end and two in the shallow end. The facility does also have ADA stair inserts and an ADA lift for entry into the pool. The pool has a contrasting strip to delineate the 5-ft depth of the pool. When open, the Town installs buoys at this location to define at the pool surface the change in depth between the shallow and deep end. In the deep end there is a diving board centered on the wall for patrons to use under lifeguard supervision.

The pool has six, 7-ft 6-in wide swimming lanes. There are no starting blocks and lanes are distinguished by a black contrasting lane center line and end wall target that stretch the length of the pool. Vinyl depth markers are installed around the inside wall of the pool.

The Town has three portable lifeguard chairs positioned around the pool one of which is positioned in the deep end by the diving board.

2.12 – Pool Deck

The pool deck is a series of cast-in-place concrete slabs. The deck is original to the pool and is in poor condition with large cracks due to the undermining described above. There are some areas where the caulking over the expansion joint has decayed and the different sections of concrete have separated creating a hazard to patrons. A lifeguard chair was also removed and

the steel deck mount was cut flush with the deck and left in place. Over the years this has rusted and become an abrasive, rusty surface for a patron to injure themselves on. The mount will need to be removed and the hole grouted over.

While most of the deck drains away from the pool to the surrounding grassy area the area between the pool and the bathhouse drains towards the bathhouse with no provisions set in place to drain the water from the deck. This results in frequent ponding in front of the bathhouse. Also, some areas of the deck that have settled experience frequent ponding as well.

2.13 – Bathhouse

The bathhouse is a slab-on-grade wooden structure. Portions of the wood structure currently do not conform to code and could cause future structural problems. Along with structural integrity concerns, the building has not been renovated to meet current ADA codes. The only semi-accessible portion of the bathhouse is the entry way from the front of the building to the pool deck through the entry corridor.

There are five (5) main areas to the building; the Women's bathroom, the Men's bathroom, the shower area, the lifeguard/first aid and the chemical storage area and filter equipment area. All areas are accessible from the deck except for the filter equipment area and chemical area, which must be accessed by passing through the lifeguard/first aid area.

2.14 – Filtration and Recirculation System

The filtration system is located belowground, under the lifeguard/first aid area. The chemical storage is aboveground in a room off of the lifeguard room. Portions of the filtration system have been replaced as needed over the pools lifetime.

Table 2 below includes available information on the existing pool filtration equipment.

Equipment	Manufacturer	Model
Self-Priming Pump	Hayward	HCP30503
Filter(s)	Pentair	TA-100D
50 Gallon Chlorine Storage Tank	*	*
Chlorine Feed System	Rola-chem	RC103SC
Flow Meter	H2flow	Flowvis

Table 2 – Swimming Pool Mechanical Equipment

* - Model Number and Manufacturer Tags not available

Water from the pool is suctioned from two (2) main drains and eight (8) skimmers to the pumps. The main drain sizes were not able to be confirmed as the pool was full, but the drains are original to the pool. The water level skimmers are also original to the pool.

With a flow rate of roughly 410 gallons per minute (gpm) the pool has a turnover rate of approximately 7 hours (hrs). The filter is backwashed twice a week at the beginning of the season and then backwashing tapers off as the season winds down to once a week. Backwash from the filter is conveyed to the sewer system. Makeup water for the pool comes from the hose bibb on the outside of the bathing facility building.

Power for the pump is supplied through a breaker found next to the pump in the basement. Additionally, there is an emergency stop found on the wall as you enter the lifeguard area, for quick access. There is no ventilation for the equipment area or for the area where the chlorine system is stored.

Currently there is no pH feeder and the pool operators have to hand measure and calculate chemical usage to adjust the pH levels.

Below is an assessment on the current filtration equipment.

Flow Meter

There are four (4) flow meters, one on each of the return pipes. Three (3) of the four flow meters are maxed out at 110gpm while the fourth reads 80 gpm. The flow meters do not meet the manufacturer's recommended lengths of straight pipe and will need to be adjusted to properly display the correct flows.

High Rate Sand Filter

The six (6) current filter(s) and filter sand are relatively new and still in workable condition. The pool staff has provided the proper care and maintenance to prolong the filters lifespan and keep them running. The staff replaced the filters sand in 2016.

Figure 2 – High Rate Sand Filters

Filter Pumps

The pumps were purchased in 2017 and are still in good condition and running properly.

Chemical Feeder and Storage

The Rola chemical feeder is considerably old but the staff has not had a problem with it functioning correctly. There is no pH feeder so the Town hand calculates, measures and manually adjusts the pH. Manually maintaining the pools water chemistry is a time intensive process and can lead to inconsistencies in water chemistry.

2.13 – Pool Patron Usage and Programming

The Barnard Park pool offers a variety of programs to accommodate the diverse patron usage. Currently the pool offers swimming lessons, free swim, summer camps, and adult swimming. On a nice summer day the pool sees upwards of 120 to 200 patrons over the course of the day. During the summer months, roughly 70 patrons a day are kids attending summer camps, while the rest of the patrons are a mix of adults and kids. See **table 3** below for average number of patrons in the pool per hour.

Month	2017	2018	2019
June	30	25	12
July	37	27	26
August	30	21	11

Table 3 – Average number of Patrons in pool per Hour

2.15 – Existing Challenges

The Barnard Park Pool Facility has outlived its current life expectancy. With the facility in constant operation for free swim and summer camps, the system and shell are barely holding together.

In the mechanical area, one of the largest challenges that the pool operators face is balancing the pool. With no working chemical controller and no autofill, staff have to constantly sample the water and manually adjust the chlorine and pH levels.

Another challenge in the mechanical area is backwashing. Occasionally when backwashing the filters some sand ends up at the bottom of the pool. This could be due to a cracked lateral in the bottom of the filter.

Within the bathhouse the main challenge is providing ADA access to the bathrooms and showers. With no ADA access ramp or ADA stall patrons with disabilities currently require assistance in the bathhouse.

Within the pool are additional challenges that the operators and maintenance team have to deal with every season. At the time of the visit the skimmer boxes were pointed out by staff as not being properly sealed due to age of the pool shell. The shell has begun to rust and degrade causing the boxes to become loose and break away from the shell. Staff has caulked the areas to prevent water loss but the shell is too old and is barely holding together. Currently, the pool loses roughly 1,300 gallons a day, even after recent renovations. The leaks cause the water to occasionally drop low in the skimmer box, resulting in ineffective skimming. With no autofill the operator has to pay close attention to the pools water level and manually add supplemental water as needed using the deck hose. Installing an autofill would help stabilize water levels even with leaks in the pool. This loss and addition of water causes the pool to become chemically unbalanced, requiring additional chemicals to be added to maintain proper residuals. Not only does this add more maintenance items for the staff to stay in control of, the added water makes the pool colder and uncomfortable to the patrons swimming.

A hammer test was not performed, however, with the skimmers leaking and significant cracking observed in the deck, it can be assumed that there are voids around the perimeter of the pool. Staff also indicated that during a recent repair where decking had to be removed there was a 6- to 12-in void between the bottom of the concrete and the retaining earth.

While there were no immediate signs of structural deterioration, during the repair mentioned above staff noted that the pools structural “A Frames” were completely rusted through. This indicates that the only support the pool walls have is the surrounding earth that is also eroding away.

Another notable challenge is providing enough deck space/shade for patrons. Currently there are two shade structures on the east side of the pool but as the deck gets crowded staff cannot supply enough shade for all patrons.

3.0 – Code Compliance Issues

3.10 – Pool Code Requirements

The Barnard Park swimming pool is considered a “Class B” pool in accordance with American National Standard for Public Swimming Pools (ANSI/APSP/ICC – 2014). A “Class B” pool is any pool, not otherwise classified, intended for public recreational use. The following is a review of current requirements as they pertain to this pool.

New Hampshire Code of Administrative Rules, Chapter Env-Wq 1100 Public Bathing Places,

applies to this section.

No Diving Symbols

Code Requirements

In accordance with *International Swimming Pool & Spa Code* (*ISPSC) 409.3 - No Diving Symbol*, "Where the pool depth is 5-feet or less, the "No Diving" symbol shall be displayed. The symbol shall be placed on the deck at intervals of not more than 25 feet."

Compliance Assessment

Currently the pool does not meet this code requirement. There are no "NO DIVING" symbols on the deck where the pool depth is 5-ft or less.

Marking of Depth

Code Requirements

In accordance with *Env-Wq 1102.18 - Depth Markers and Float Lines*, "

a. The owner of a [Public Bathing Facility] shall plainly and conspicuously mark the depth of water in feet at or above the waterline on the vertical wall of the pool or spa at the [Public Bathing Facility] and on the top of the coping or edge of the deck or walkway next to the pool or spa at the [Public Bathing Facility]:
b. Depth markers on surfaces used for walking shall be slip-resistant.
c. Depth markers shall be installed at;
    1. The maximum and minimum water depths
    2. All points of slope change; and
    3. Intermediate increments of water depth not to exceed 2 feet, nor spaced at distances greater than 25-foot intervals
d. Depth markers on irregularly shaped pools and spas also shall designate depths at all major deviations in shape."

Compliance Assessment

Currently there are depth markers on the pool deck but are not at intermediate increments of water depth that exceed two feet. Additionally, the depth markers do not designate depths at all major deviations in shape. Depth markers will need to be added to meet these code requirements.

Pool Ladders

Code Requirements

In accordance with *Env-Wq 1105.20 – Ladders, Recessed Steps and Stairs for* [Public Bathing Facilities], "

a. Subject to (b), below, the owner of a [Public Bathing Facility] shall provide ladders, steps, and stairs as follows:
    1. Where the vertical distance from the bottom of a pool or spa at a [Public Bathing Facility] to the deck is more than 2 feet, one set of recessed steps or stairs, or a ladder, shall be provided for each 75-foot length of perimeter or portion thereof;
    2. Recessed steps or ladders shall be provided at the deep portion of all swimming pools.
    3. If the swimming pool is more than 30 feet wide, recessed steps or ladders shall be located on each side near the deep end; and
    4. Subject to (c), below, the leading edge of each stair tread, swim-out, and spa seat or bench shall be outlined with a 2-inch slip-resistant contrasting tile or other permanent marking.

Compliance Assessment

Currently in some areas the pool does not provide a ladder every 75-feet of perimeter.

Main Drains

Code Requirements

In accordance with *ISPSC 6.1 – Periodic Evaluation, Testing, and Maintenance,* "Covers/grates and suction entrapment avoidance systems and related components shall be evaluated, maintained, and replaced by a person licensed or qualified in accordance with applicable manufacturer's instructions and local law".

Compliance Assessment

Currently the main drain grates have not been inspected since they were installed prior to the mandatory VGB Act. The main drain grates need to be replaced accordingly. The Town should refer to the certificate of compliance letters from the manufacturer which will have the date the grates were installed and the date they will need to be replaced.

Openings in Deck

Code Requirements

In accordance with *ADA Code 302.3 Openings,* "Openings in floor or ground surfaces shall not allow passage of a sphere more than 1/2 inch (13 mm) diameter except as allowed in 407.4.3, 409.4.3, 410.4, 810.5.3 and 810.10. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel".

Compliance Assessment

The pool deck has separated creating large openings greater than ½-in.

Changes in Level

Code Requirements

In accordance with *ADA Code 303.2 Vertical Changes in Level,* "Changes in level of ¼-in high maximum shall be the permitted to be vertical.

Figure 3 – Entrance to the Women's Bathroom

Compliance Assessment

The pool deck is roughly 3-inches lower than the bathing facility. This change in level does not allow patron requiring ADA accessibility access to the restrooms or showers.

Door Clear Width

Code Requirements

In accordance with *ADA Code 404.2.3 Clear Width*, "Door openings shall provide a clear width of 32-inches minimum"

Compliance Assessment

Currently the door ways to the men and women's bathrooms has a clear space of 30-in. This configuration would not allow ADA access, and needs to be addressed.

Chemical Feeding

Code Requirements

In accordance with *Code 8.5 Water Clarity and Chemistry*, from the American National Standard for Public Swimming Pools, "The circulation system shall be designed to maintain water clarity and to distribute chemicals as required for pool sanitation. The pool water shall circulate during all hours the pool is open for use, plus any additional time necessary to ensure continuous water clarity and chemical distribution."

Compliance Assessment

As described by staff chemical levels are adjusted manually. There have been cases were the pool became too chlorinated and staff had to quickly adjust the levels. When power loss occurs and is then corrected the chemical feed pump automatically turns back on, while the other equipment requires manual startup. This causes an over feeding of chemicals into the return pipe

and eventually, upon startup of the system, into the pool. Over chemicalization to a system can be extremely dangerous to patrons. The chemical feeder(s) should be interlocked with a chemical controller or the pool pumps to prevent chemical surges.

Barrier Requirements

Code Requirements

In accordance with *ISPSC 305.2.7 Chain Link Dimensions*, “The maximum opening formed by a chain link fence shall be not more than 1.75 inches. Where the fence is provided with slats fastened at the top and bottom which reduces the openings, such openings shall be not more than 1.75 inches.”

Compliance Assessment

The openings of the current perimeter fencing are 2.5-in by 2.5-in, making the fencing not compliant with the *ISPSC 305.2.7*. Openings this large creates foot holds for individuals to climb the fence.

Pool Rules

Code Requirements

In accordance with *Env-Wq 1104.04 PB Safety*, “(a) The owner of a [Public Bathing Facility] that has a pool shall: (1) Develop and adopt safety rules for patrons of the pool; and (2) Post conspicuously displayed signs informing patrons of the safety rules. (b) The rules and signs required by (a), above, shall include the following:

(1) Patrons with any communicable disease shall not enter the pool;
(2) Patrons shall not discharge any bodily fluids into the pool;
(3) Patrons shall not bring or throw into the pool any object that may in any way carry contamination or otherwise endanger the safety of bathers;
(4) Patrons shall not spit in or in any other way contaminate the water, floors, walkways, aisles, or dressing rooms associated with the pool;
(5) Bathers shall take a cleansing shower before entering the pool;
(6) Patrons shall not run or engage in boisterous rough play in the pool or on the deck or walkways around the pool or in the bathhouse associated with the pool;
(7) Patrons shall not bring food or drink into the pool or within 4 feet of its edge;
(8) Patrons shall not have glass containers in the pool or on the deck or in the bathhouse associated with the pool; and

(9) Any additional rules developed by the [Public Bathing Facility's] management.

Compliance Assessment

The Barnard Park pool does have a Rules sign posted in the pool area but the sign does not include the above required rules. The sign should be updated to include all required rules.

3.20 – Bathhouse Code Requirements

Bathing Requirements

Code Requirements

In accordance with *Code 19.6.2,* from the American National Standard for Public Swimming Pools, "One water closet, one lavatory, and one urinal shall be provided for the first 100 male users. One additional water closet, lavatory, and urinal shall be provided for each additional 200 male users or fraction thereof."

In accordance with *Code 19.6.3,* from the American National Standard for Public Swimming Pools, "Two water closets and two lavatories shall be provided for the first 100 female users. One additional water closet and lavatory shall be provided for each additional 100 female users or major fraction thereof."

In accordance with *Env-Wq 1105.04 Toilets for [Public Bathing Facilities]* , "The owner of a [Public Bathing Facility] shall provide toilet facilities as follows: (a) The toilet facilities shall be located within 200 feet of the pool or spa at the [Public Bathing Facility] for use immediately before entering the water; (b) Separate toilet facilities shall be provided for each gender; (c) For a pool or spa installed prior to the 2014 effective date of this chapter, one toilet and one urinal for every 60 males and one toilet for every 40 females shall be provided."

In accordance with *Env-Wq 1105.01 Showers*, "The owner of a [Public Bathing Facility] shall provide shower facilities to the patrons of the [Public Bathing Facility], as specified below: (1) One shower for every 40 swimming pool bathers shall be provided; (2) A minimum of one shower for each spa shall be provided; and (3) Showers shall be of such design that a mixture of hot and cold water that will not scald patrons can be obtained through a mixing valve."

In accordance with *International Plumbing Code 2015, 403.1 Minimum number of fixtures,*

Fixture	Women's Locker Room*	Men's Locker Room*
Water Closets	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500
Lavatories	1 per 150	1 per 200
Showers	1 Per 200	
Drinking Fountain	1 Per 1,000	

New Hampshire code takes precedence with regards to required showers and toilets. Since the New Hampshire code did not specify a required number of lavatories, The International Plumbing code was used here.

Compliance Assessment

The pool has 4,885 sq. ft. of water surface (27 Sq. Ft./Bather). This equates to a maximum bather load of 180 bathers. This being the case, assuming a bather load of 90 Women bathers and 90 Men bathers, **Table 4** evaluates the bathing facilities compliance with code requirements.

Fixture	Women's Locker Room*	Men's Locker Room*
Water Closets	**2 (3)**	2 (2)
Urinals	N/A	**0 (2)**
Lavatories	1 (1)	1 (1)
Showers	**3 Shared (5)**	

Table 4 – Locker Room Code Compliance, Provided (Required)

***Does Not Meet Code Requirements**

The bathing facility does not provide a sufficient number of water closets for the Women's locker room or urinals for the Men's locker room. Per code, the bathing facility should have a total of 5 showers and therefore two additional showers are required as well. There are no ADA accessible water closets or ADA accessible showers.

Ventilation

Code Requirements

In accordance with *Code 19 .2 Maintenance*, from the American National Standard for Public Swimming Pools, “Dressing rooms and sanitary facilities shall be well lighted, drained, ventilated and constructed with impervious materials. They shall be developed and planned so that good sanitation can be maintained throughout the building at all times.

Compliance Assessment

The Barnard Park pool bathhouse does not have any ventilation system in place. All rooms including the bathrooms, lifeguard room, chemical storage and equipment room are all gravity vented through doors and some small windows.

Showers

Code Requirements

In accordance with *ADA Standards for Accessible Design 608.3.1*, “In transfer type compartments, grab bars shall be provided across the control wall and back wall to a point 18 inches from the control wall.”

In accordance with *ADA Standards for Accessible Design 608.4*, “A folding or non-folding seat shall be provided in transfer type shower compartments. A folding seat shall be provided.”

Figure 4 – Shared Showers

In accordance with *ADA Standards for Accessible Design 607.7*, “…the controls, faucets, and shower spray unit shall be installed on the side opposite the seat 38-inches minimum and 48-inches maximum above the shower floor and shall be located on the control wall 15-inches maximum from the centerline of the seat toward the shower opening.”

Compliance

There are no ADA showers provided at the bathing facility. Showers to comply with ADA codes shall be installed.

3.30 – Mechanical Code Requirements

Operating Instructions

Code Requirements

In accordance with *Env-Wq 1106.07, Filter Systems,* "(b) Each filter system shall include the following:

1. A strainer such as a pressure-type sand filter, a diatomaceous earth pressure or suction filter, or a cartridge-type filter;
2. A flow meter that also meets the requirements of (c), below;
3. A pressure gauge and an air relief valve for each filter;
4. A sight glass in each waste line from filter to backwash; and;
5. A set of instructions for operating and maintaining the system."

Compliance Assessment

Currently there are no operating instructions found on site.

Pressure Gauges

Code Requirements

In accordance with *Env-Wq 1106.04, Hydraulic Design: Pumps, Drains and Suction Outlets,* "

(h) Each pump shall be equipped with a vacuum and pressure gauge that is separate from the pressure gauge associated with the filter."

Figure 5 – Missing Pressure Gauges on Pumps

Compliance Assessment

Currently there are no vacuum of effluent pressure gauges found on either of the pumps.

Flow Measurement

Code Requirements

In accordance with *Env-Wq 1106.07, Filter Systems,* "

(c) Each flow meter installed on a [Public Bathing Facility] filter system shall be:

1. Capable of measuring flows that are at least 1.5 times the design flow rate;
2. Accurate within 10% of true flow;
3. Located where the operator or an inspector can read the meter in the normal course of operations or during a routine inspection, respectively; and
4. Installed in accordance with the manufacturers specifications."

Compliance Assessment

Currently there are four (4) flow meters on the filtration system. The flow meters are not installed per the manufacturer's recommendations, and are not capable of measuring flows that are at least 1.5 times the design flow rate. An incorrectly installed flow meter will result in inaccurate

readings.

Pipe Velocities

Code Requirements

In accordance with *Env-Wq 1106.06, Piping* “Piping shall be designed to carry the required quantity of water at a maximum velocity not to exceed 6 fps for suction piping, and not to exceed 10 fps for discharge piping except for copper pipe where the velocity shall not exceed 8 fps.”

Compliance Assessment

Assuming the skimmers were properly designed and are collectively taking 100% of the flow, and the main drain line was sized to handle 100% of the flow. The current system has the following:

(1) 4-in Main drain line, 410gpm, 11.68FPS (assuming full flow)

(3) 2-in Skimmer suction lines – (2) 2-in line is handling 3 skimmers, 153.75gpm, 17.16FPS

- (1) 2-in line is handling 2 skimmers, 102.5gpm, 11.44FPS

These flows far exceed the code allowed velocities. The pool piping needs to be increased in size to properly handle the required flows.

4.0 – Recommendations

The following is recommended to bring the existing Barnard Park Pool Facility into compliance with code requirements, help improve the existing conditions and address existing challenges.

Code Required Improvements

- “No Diving” symbols should be installed along the perimeter of the pool decks where the depth is 5-feet or less. The symbols shall be placed no more than 25-ft apart.
- Accurate depth markers need to be installed where the depth and distance currently exceeds code and markings need to be installed no more than 25-ft apart on the deck and vertical face of the pool wall.
- There shall be an entry/exit point at a minimum of 75-ft of pool perimeter.
- All main drain grates need to be inspected and new grates installed if applicable.
- Pool deck joints needs to be re-caulked and/or replaced to cover up any large openings.

- Portions of the deck need to be releveled to keep the changes in vertical height less than ¼-in.
- Create ramps at all bathhouse entry points to grant proper ADA access to the facility.
- The perimeter fence should be replaced with one that does not have openings exceeding 1.75-inches.
- The pool rules sign should be updated to include all required language.
- Update the bathing facility to include the required number of water closets, urinals, lavatories, and showers and to include ADA accessible showers.
- Update the bathing facility to meet code requirements for ventilation.
- Operating instructions need to be kept near the filtration equipment.
- All pumps need to have a vacuum and pressure gage installed.
- Flow meter needs to be reinstalled to manufacturers recommended dimensions to allow for proper calibration and flow measurements.

Existing Conditions Upgrades

- At a minimum the filter laterals should be inspected.
- It is highly recommended that a pH regulating device be installed.
- It is highly recommended that a chemical controller be installed, to operate the chlorination and pH metering pumps.
- An auto fill line through an air gap should be installed.
- It is highly recommended that the main drain grates be replaced to comply with VGB.
- Pool walls need to be structurally assessed for structural integrity.
- To improve the efficiency of the filter pumps it is recommended that Variable Frequency Drives (VFDs) are installed.
- Repair skimmer boxes and sections of the pool wall to prevent further leaks.

- Promote patrons to bathe prior to entering the pool. This will help reduce the amount of oils in the pool, in turn reducing the amount of filter media changes required.
- It is recommended that additional shade structures be installed for patrons.

5.0 – Conclusions

In the above report are the findings from Weston & Sampson's evaluation of the existing Barnard Park Pool Facility.

We would like to note that the pool facility staff have done an excellent job maintaining this facility throughout its life of operation.

The evaluation did not test for any contaminations such as lead, polychlorinated biphenyls (PCB's), asbestos, and other contaminates at the existing pool location. The facility was constructed during a time where these contaminants could have been used in the construction industry and therefore it can only be assumed that the facility may contain these contaminants. Additionally, our structural evaluation was limited to a visual inspection of the pool and facilities. Concrete testing was not performed for this evaluation.

Weston and Sampson finds that with the above mentioned facility upgrades the pool would have approximaely another 3 years of operable life. Operating this pool much beyond 3 years could create unnecessary costs associated with operating an inefficient system. Currently much of the facility is in need of code compliant upgrades, along with recommended upgrades to improve its overall efficiency. We will continue to work with the Town to understand the most appropriate and viable option to meet the needs of the Town and its patrons. This concludes our analysis of the Barnard Park Pool Facility.