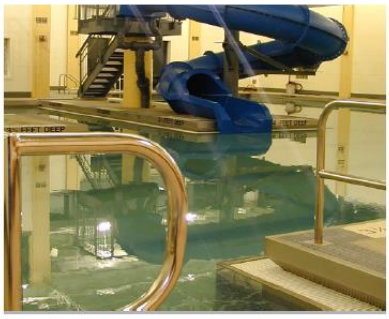

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Beecher School Pool Evaluation

40 Beecher Road
Woodbridge, CT 06525

October 2022

POOL EVALUATION REPORT

The Beecher School Pool, located in Beecher South School at 40 Beecher Road, Woodbridge, CT 06525, is a lap pool. Weston & Sampson, Inc. was retained to perform a professional engineering and compliance evaluation of the pool and the facility. Our scope of services included the following:

- Review of available pool facility information.
- A code analysis for conformance with Connecticut Department of Health Regulations and Guidelines, ANSI, as well as the new Federal Standards for ADA and Virginia Graeme Baker (VGB) Pool and Spa Safety Act.
- Non-Destructive evaluation of existing pool and filter room.
- Examination of visible existing piping, circulation, chemical treatment and filtration systems.
- Research appropriate repairs and improvements for the pool.
- Review pool deck and natatorium.
- Preparation of an Engineer's Report that provides recommendations to improve the pools existing conditions and bring the pool into compliance with code.
- Review structural concerns.

Code Review

The Beecher School Pool was evaluated based on the below code standards:

- 19-13-B33b. Public Pools Connecticut Minimum Standards for Swimming Pools
- 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 (ISPSC, 2015)
- 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)
- USA Swimming Rulebook (Latest Edition)
- FINA Swimming Rules (Latest Edition)

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1.0 – Background and General Information

The Beecher School Pool, located in Beecher South School at 40 Beecher Road, Woodbridge, CT 06525 (See Figure 1), is a lap pool that is utilized for swim team practice and recreational use. The pool is owned and operated by the Town of Woodbridge.

Figure 1 - Pool Site Location

The pool was built in 1972 and has seen few upgrades since then. Minor upgrades to the pool include installing new inlets in the late 1990s, installing new filters in 2001, replacing the main drains in 2009 and replacing one of the recirculation pumps in the early summer of 2022. The Men's and Women's locker rooms are connected to the pool natatorium. The locker rooms were not inspected as part of this evaluation.

2.0 – Evaluation of the Pool

The pool was visited on Tuesday, June 21, 2022, for an on-site evaluation and on Wednesday, September 7, 2022 for a structural inspection of the pool shell. The following summarizes the existing conditions of the pool and the pool mechanical equipment based on the on-site evaluation and available information from the Town.

2.10 – Description of Existing Pool and Deck

2.11 – Swimming Pool and Finishes

Patrons can enter the pool area through the locker rooms. There are short stadium style benches deck level at the shallow end of the pool and swimmer benches along one side of the pool.

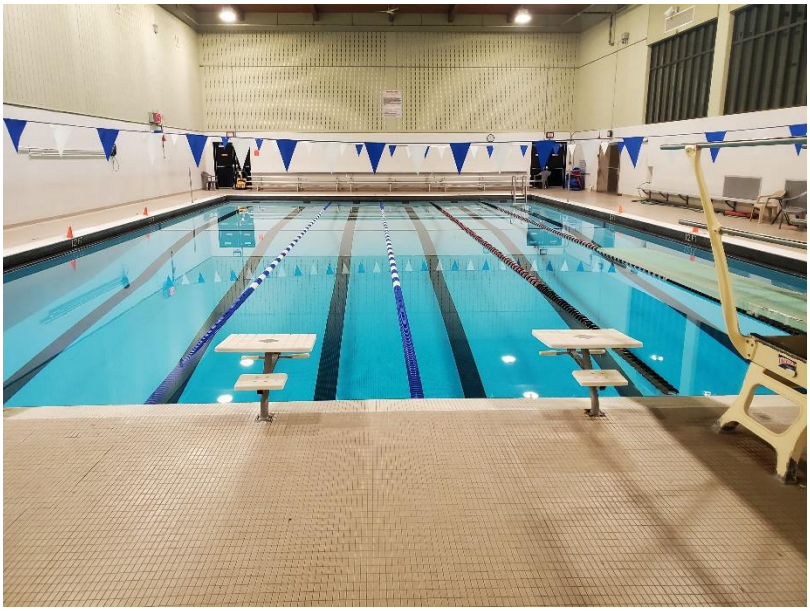


Figure 2 - Pool Area

The pool is rectangular in shape and is 75-ft 1-in long by 42-ft 0-in wide (See Figure 2). The pool surface area is approximately 3,153 square feet (sf), having a perimeter length of approximately 234 linear feet and a vessel volume of approximately 199,196 gallons (gal). The pool depth ranges from 3-ft 6-in to 12-ft 6-in.

Based on a bather load of 1 bather per 25 square foot of water surface area and 1 bather per 300 sq. ft. for diving areas, the maximum bather load is approximately 115 bathers.

The pool has a cast in place, reinforced concrete shell with a concrete tiled, recessed perimeter gutter system. The pool is fully tiled, with unglazed small format ceramic tile. During the inspection, some pool tiles were missing from the pool interior and pool perimeter gutter. The pool has never been regrouted but was acid washed once in the early 2000's to remove any grime and build up on

Figure 3 - Acrylic Window in Pool Wall

the pool surface. There is an acrylic viewing window installed in the pool wall (See Figure 3). This was previously used by coaches to better view swimmers' technique. The window does not serve any purpose at the moment.

There is a deck hatch located in the pool deck directly above the viewing window. Water that ends up on the deck around the hatch ends up traveling down the cutout and down the viewing windows sill. Over time this has cause the exterior of the pool shell to corrode, concrete to spall off the wall and expose the rebar below.

Tiled deck and wall depth markers are located around the pool perimeter. There are no "No Diving" signs or markings found at the facility.

There is a contrasting safety stripe that spans the floor and wall of the pool at the 5-ft depth, which is accompanied by a safety line when swimming lane lines are not in use. Entry points into the pool include four sets of recessed steps with grab poles, located in the shallow and deep end of the pool, on each side. There were no grab rails with the recessed steps but rather just a single grab pole for users to hold onto while entering the pool (See Figure 4). There were however anchor accommodations for the ladder inserts along the shallow end, short wall, that were uncapped at the time of the inspection. One ladder insert was installed in the shallow end of the pool. ADA access into the pool is provided with a portable lift.

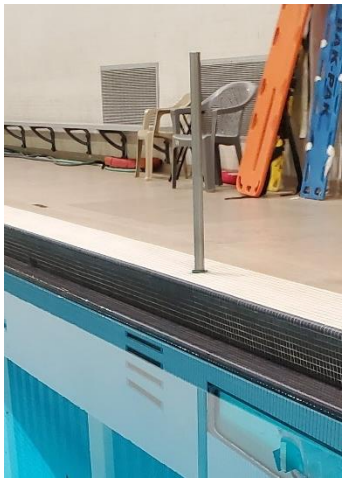


Figure 4 - Recessed Steps Grab pole

The pool includes swimming lanes that span the length of the pool. There are six 7-ft wide lanes. Each lane is fitted with a starting block in both the shallow and deep ends. The starting block anchors in the shallow end are not used and are capped with a cover. Some of the covers/anchors are depressed creating a potential trip hazard. The starting block anchors in the deep end are cracked, corroded, and create an abrasive hazard to users. Additionally, they are not securely installed to the deck. Staff noted that the starting blocks are not currently allowed to be used due to safety.

The deep end has a 1-meter diving board, situated between the 4th and 5th starting blocks. Staff noted they will be roping off the diving board after this summer season as the boards condition is worsening and it is becoming dangerous to use. The boards surface has lost its grip, the fulcrum

does not turn, and the stand has begun to corrode where the base meets the deck. Staff noted that there were intentions to re-paint the diving board stand after the season to help preserve it.

Over the pool are wall mounted backstroke flags located 15-ft from each end of the pool. There are no lifeguard stands at the pool, however the pool regulations called for "*no swimming without a lifeguard on duty*" and "*lifeguard chair is to be used only be lifeguards*.".

An emergency phone was located in the pool natatorium outside of the office, and a first aid kit located within the office of the natatorium. There were no instructions regarding emergency calls posted with the emergency phone. Spinal boards, a ring hook, and ring buoy were located in the pool natatorium.

The pool does not have underwater lights however, the area is lit with overhead artificial lighting, and the area appeared to be well lit. It should be noted that no official light testing was done at the time of the inspection.

There is no official timing system for the pool.

The pool does still have old wall vacuum fittings, one in the shallow end and one in the deep end. Both fittings have been capped from the backside of the pool wall, within the crawl space. Currently the facility uses an automatic pool vacuum which was found on the pool deck during the inspection. A service tag on the vacuum noted that the vacuum did not work, however the Town is in the process of getting it fixed.

2.12 – Structural Condition of Pool

The internal shell of the pool appears to be in good condition with a couple questionable locations under the pool tile, where rust spots are forming. The formation of rust in a tiled pool is typically caused by failed tile grout, exposing the concrete below and allowing it to corrode due to the chlorinated water. As this happens the rebar within the pool shell will begin to corrode as well.

There are also a few areas of concern with the exterior of the pool shell that should be addressed. Currently at the viewing window significant concrete spalling and corroded rebar is present. While the viewing window itself is not leaking the deck hatch from above, drains any deck water collected in its framing to the crawl space below. As the hatch drains, the water runs down the hatch opening along the exterior face of the pool wall and falls directly onto the windowsill. Over the years this has significantly compromised the windowsills' structure.

In addition to the window the deep end exterior pool wall "footing" at the main drains within the mechanical space has corroded, exposing the rebar within the pool wall. This appears to be a result from a combination of chipping that was performed when the new main drains were installed and

bonded to the then newly exposed rebar. In combination the existing main drains are leaking into the mechanical space directly on the wall footing and exposed rebar.

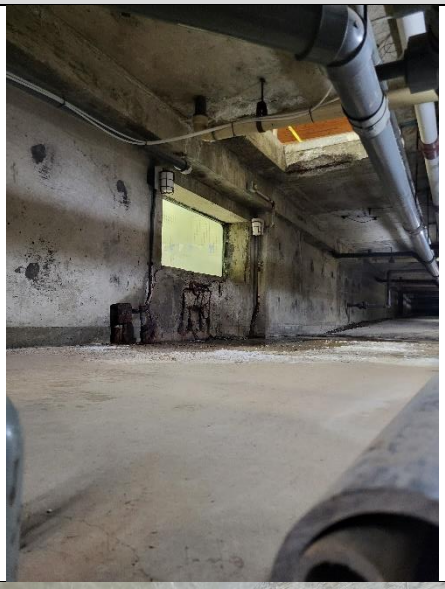
The pool main drains do have a bonding wire attached to the drain sumps that connects to an old brass main drain bonding lug. From there the bonding wire runs through the pool wall to the mechanical room where it is attached to the above-mentioned exposed rebar. This does not constitute as a bonding loop. In addition to the pool not being properly bonded, there are dissimilar metals found within the pool. As these metals corrode they begin to mix with dirt/debris and the other corroding metals found in the pool water and produce a large rust looking formation within the main drain sumps. The accumulation of debris and rust within the drain sumps has further caused the main drains to corrode and begin to leak. Refer to Figure 5. Due to the main drains leaking the outside face of the stainless-steel drain sumps have begun to also worsen and are beginning to experience significant rusting, corrosion, and efflorescence.

Figure 5 - Main Drain Rusting

The fourth area of concern is located above the pool filters where the exterior pool wall meets the under slab of the deck. There is a small area of spalled concrete where rebar has been exposed. There is clear indicating sign of how this damage was caused.

Table 1 below highlights some areas of the pool that are experiencing significant structural comprise via cracking and/or separation. Without remediation, structural compromise will continue to worsen. "Defect Rating", as noted on the table, is based on a scale of one through five as follows:

1. Area should be watched but no immediate work is necessary.
2. Minor patch work may be required. Continue to monitor area.
3. Patch work is necessary. Repair and continue to monitor area.
4. Immediate attention is required. Chip and patch as needed. Consult pool professional.
5. Extensive repairs are required. Consult pool professional.

Defect No.	Defect Description	Photo	Defect Rating
01	Viewing Window and deck hatch area, experiencing spalling concrete, exposed rebar and significance of efflorescence.		4
02	Deep end wall footing is spalling concrete leaving the pool wall rebar exposed and causing it to rust.		3
03a	Main drains experiencing moderate rusting and efflorescence		3

Defect No.	Defect Description	Photo	Defect Rating
03b	The underside of the main drain sumps		3
04	Missing concrete at the end of the pipe support bracket, where the exterior of the pool wall meets the under slab of the pool deck		02

2.13 – Pool Deck

The pool deck is original to the pool and is in fair condition. There are areas of the deck missing tile, have chipped tiles, or lifted tiles creating an abrasive surface. Additionally, there are areas around the pool where the tile has delaminated from the mortar bedding.

The pool deck drainage includes area drains around the perimeter of the pool. Staff noted that the majority of the deck drains are corroded at the fittings creating clogs and preventing proper deck drainage at the time of the inspection. A couple of the area drains have been damaged, no longer allowing them to sit flush with the decking. Four feet of unobstructed deck clearance is provided around the entire pool.

2.14 – Filtration and Recirculation System

The filtration system for the pool is located on the floor below in a shared mechanical room, through a locked door located in the pool office. Once within the mechanical room there is an overhead door that can be opened to grant access to the parking lot. The overhead door is mostly used for deliveries and maintenance entry.

Weston & Sampson was informed by staff that most of the mechanical equipment for the pool is roughly 20 years old or older. Table 1 below includes available information on the pool filtration equipment along with an assessment of the condition.

Equipment	Manufacturer	Model No.	Description	Condition
Filter Pump #1	Marathon Electric	BJ 213TTDR8302AAWR45	10 HP, 3 Ph, 208V	Fair
Filter Pump #2	Marathon Electric	WVK213TTDW16021AA M	10 HP, 3Ph, 208V	New
Dehumidification Booster Pump	Pentair	Superfo	Variable Speed Pump	Good
Pump Strainer	Pentair	C Series	-	New
Filter (2)	Astral	06681	F.A. = 16.57 ft^2 per filter	Poor
UV System	Delta	EM 600 EL	Ultraviolet Disinfectant Light	Good
Chemical Feeder	Stenner	85M5	Peristaltic Pump Feeder	Good
CO_2 Feeder	Assurance Valve Systems	The Eliminator	2 Tank Automatic Switchover	Good
Chemical Controller	Chemtrol	CH250	ORP/pH Digital Controller	Fair
Heat Exchanger	AERCO	SmartPlate	-	Good

Table 1 – Pool Mechanical Equipment

Pool water gravity feeds to the balance tank from the perimeter gutter system and two 18-in by 18-in wall main drains, which were replaced roughly 22 years ago (Early 2000s). The perimeter gutter system includes a series of brass gutter scuppers. At the time of the inspection the gutter was mostly dry due to the water level being below the gutter line. The grating on the scupper boxes were also clogged, which would restrict any skimming if the pool water level was above the gutter.

From the balance tank the pool water is suctioned through the pump strainer, filter pump and circulated through the filtration system. The flow rate for the filtration system is 500 gallons per minute (gpm) which results in a turnover rate of 6.64 hours. At the time of the inspection the flow rate was just under 400 gpm, which equates to a turnover rate of 8.3 hours. There are two sand filters each with a filter area of 16.57 sq. ft (33 sq. ft. total). This results in a filter application rate of approximately 15.1 gpm/sf at a flow rate of 500 gpm. Backwash for the sand filter discharges through a 6-in air gap to a standpipe.

From the filters the water is preliminary disinfected through a UV system then heated through a heat exchanger. Following being heated the water is then disinfected again with a liquid chlorine feeder. The existing chlorine feeder lines have been calcified. The waters pH is regulated by CO_2

which is automatically injected into the return line. The water quality in the pool is automatically monitored and controlled with a chemical controller. There is no water level controller and autofill, the pool is manually filled.

Water is recirculated back into the pool through a 6-inch, Schedule 80 PVC return line to a series of return inlets. The original return inlets were capped in 1997-98 and new inlets installed at that time. In the mechanical room there is a floor drain that is plugged. The State of Connecticut had enforced the drain to be plugged after determining it drained to a stormwater catch basin rather than sanitary. Any water that pools within the mechanical room must be pumped out by the maintenance staff.

2.15 – Pool Patron Usage and Programming

The pool is owned by the Town and operated by the Woodbridge Public Works Department. The pool is used primarily by the swim team for practice and general public swim. A small revenue is made off the pool programming.

2.16 – Existing Challenges

It was noted by staff that the biggest challenges with the pool are the following:

- One of current filters is not operable due to broken laterals
- Gutter scuppers are not properly functioning due to being clogged with rust and/or mineralization.
- Deck drains are not properly functioning due to being clogged with rust and/or mineralization.
- Current staffing is understaffed. Staff noted there is only one current CPO on staff.
- The deck hatch is corroding, spalling concrete, and creating areas of exposed rebar. Patching has not effectively worked in this area.
- There are rust spots within the pool.
- The UV strainer occasionally becomes clogged, which requires a service tech to come clean the strainer.
- The pool does not have an autofill which requires manual filling.

3.0 – Code Compliance Issues

3.10 – Pool Code Requirements

The Beecher School Pool is considered a “Class A” pool in accordance with the American National Standard for Public Swimming Pools (ANSI/APSP/ICC – 2015) and The Connecticut Public

Swimming Pool Regulations & Design Guide. A “Class A” pool is a pool intended for accredited competitive aquatic events. The following is a review of current requirements as they pertain to this pool.

The American National Standard for Public Swimming Pools (ANSI/APSP/ICC – 2014), the Connecticut Public Swimming Pool Design Guide, which includes the Public Health Code 19-13-B33b, Annex to the Model Aquatic Health Code (2018), and The International Swimming Pool and Spa Code (ISPSC 2021), apply to this section. These standards are requirements for competitive conditions.

Water Depth Markings

Code Requirements

In accordance with ISPSC 409.2 – Depth Marker, “Depth markers shall be installed at the maximum and minimum water depths and at all points of slope change. Depth markers shall be installed at water depth increments not to exceed 2 feet (607mm). Depth markers shall be spaced at intervals not to exceed 25 feet (7620mm).”

In accordance with the Public Health Code, Section 19-13-B33b.C.1 - Depth Markers. “Depth markers shall be provided on the pool rim at points of minimum and maximum depths, at all points where the pool floor changes slope, and at appropriate points in between. Depth markers at these points shall be visible from within the pool and while standing on the pool deck.”

Compliance Assessment

The existing depth marker locations exceed the required 25-ft spacing around the pool. Additionally, some of the vertical depth markers are not on the inside wall face for bathers to see while in the pool.

No Diving Symbol

Code Requirements

In accordance with ISPSC 409.3 – No Diving Symbol, “Where the pool depth is 5 feet (1524 mm) or less, the “No Diving” symbol shall be displayed. The symbol shall be placed on the deck at intervals of not greater than 25 feet (7620 mm) and directly adjacent to a depth marker.”

Compliance Assessment

There are no “No Diving” symbols currently for depths less than 5-ft.

Walkways and Decks - Gaps

Code Requirements

In accordance with ISPSC 306.6.1 – Maximum Gaps, “The open gap between pool decks and adjoining decks or walkways, including joint material, shall be not greater than 3/4 inch (19.1 mm). The difference in vertical elevation between the pool deck and the adjoining sidewalk shall be not greater than 1/4 inch (6.4 mm).”

In accordance with ANSI/APSP/ICC – 2015,7.1.6.1, “Decks shall be sloped so that standing water shall be no deeper than 1/8 in. (3mm), 20 minutes after the cessation of the addition of water to the deck.”

Compliance Assessment

Throughout the deck there are areas were missing tiles have allowed water to penetrate under the tile lifting off the deck. These areas are considered a tripping hazard and a code violation. Additionally due to the missing tiles and delaminated areas the deck pitch is no longer consistent. This in combination with the clogged deck drains allows water to pool up on the deck and become a slipping hazard.

Diving - Slip Resistance

Code Requirements

In accordance with ISPSC 402.4 – Slip Resistance, “Diving equipment shall have slip-resistant walking surfaces.”

Compliance Assessment

The gripping surface on the diving board is compromised. The boards textural grip is fading creating a safety concern for patrons.

Deck Equipment

Code Requirements

In accordance with the Public Health Code, Section 19-13-B33b.B.10 - Deck Equipment, “Handrails shall be provided at all steps, step holes, and ladders. When provided diving stands, lifeguard stands, handrails, and ladders shall be properly secured to the pool deck or pool, as appropriate. Deck accessories and equipment shall be properly maintained and stored.”

Compliance Assessment

The diving board anchors are showing signs of rusting and some cracking. The ladder anchors, starting blocks and stanchion pole anchors are loose and need to be regrouted.

Starting Blocks

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 16.6, Ladders, Recessed Treads and Stairs, "Starting blocks or platforms, where provided, shall be located adjacent to pool areas with a minimum water depth of four and one-half (4.5) feet. Starting blocks shall be removable and should be in place only during competitive swimming meets or training."

Compliance Assessment

At the time of the inspection the pool had starting platform anchors installed in the shallow end of the pool. The starting blocks were installed in the deep end. The anchors in the shallow end shall be grouted over or removed as to not allow starting blocks to be installed in this location.

Gutter

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 9.2, Overflow Gutters, "Where an overflow gutter is used, it shall extend completely around the swimming pool, except at steps or recessed ladders. The overflow gutter shall also serve as a handhold. This gutter shall be capable of continuously removing 100% or more of the recirculated water and returning it to the filter. All overflow gutters shall be connected to the recirculation system through a properly designed surge tank or other method approved by the commissioner of the Department of Public Health. The gutter, drains and return piping to the surge tank shall be designed to rapidly remove overflow water caused by recirculation displacement, wave action, or other causes produced from the maximum pool bathing load. The opening into the gutter beneath the coping shall be not less than four inches and the interior of the gutter shall be not less than three inches wide with a depth of at least three inches. Where large gutters are used, they shall be designed to prevent entrance or entrapment of bathers' arms or legs. The overflow edge or lip shall be rounded and not thicker than 2½ inches for the top two inches. The overflow outlets shall be provided with outlet pipes which shall in any case be at least two inches in diameter. The outlet fittings shall have a clear opening in the grating at least equal to 1½ times the cross-sectional area of the outlet pipe"

Compliance Assessment

At the time of the inspection the pool gutter scuppers were corroded and clogged limiting the amount of water that could flow though.

3.20 – Mechanical Code Requirements

Operations

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 15.4, Equipment Room – Lifesaving Equipment, "Operating instructions and a schematic drawing for all pool equipment are to be provided in the pool equipment enclosure or room."

Compliance Assessment

Currently there are no operating instructions found on site.

Autofill

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 9.5, Overflow Gutters, "Automatic water fill controls with manual override shall be provided to maintain the pool at the proper operating level."

In accordance with ANSI/APSP/ICC – 2014, 15.2, "All fill and makeup water to maintain the pool water level and water used as a vehicle for sanitizers or other pool chemicals, for pump priming, or for other such additions to the pool, shall be from a potable water source. No direct mechanical connection shall be made between the potable water supply and the swimming pool, chlorinating equipment, or the system of piping for the pool, unless it is protected against the backflow and back-siphonage in a manner approved by the state or local authority, or through and air gap meeting the latest published addition of ANSI A112.1.2."

Compliance Assessment

Currently there was no automatic water fill controller found on site. The pool is currently filled using the hose bibb on the deck and no official air gap is being provided. This can lead to back siphonage and contaminate public drinking water.

Recirculation Rate

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 11.1, Recirculation Systems, "A recirculation system consisting of pumps, piping, filters, water conditioning, and disinfection equipment and other accessory equipment shall be provided which will clarify and disinfect the

swimming pool volume of water in eight hours except that the recirculation rate shall be increased to provide a quicker turnover for swimming pools subjected to heavy bather loads."

Compliance Assessment

At the time of the inspection the pool had a flow rate of 400gpm, providing an 8.3-hour turnover rate, exceeding the code allowed time.

Sand Filters

Code Requirements

In accordance with Connecticut Public Health Code 19 – 13 – B33b – 13.2, Sand Type Filters, "High-rate sand filters shall have filtration rates that comply with the standards of the National Sanitation Foundation. No high-rate sand filter shall have a designed filtration rate that exceeds 20 gpm per square foot of filter area."

Compliance Assessment

At the time of the inspection the pool filters had broken laterals. Broken laterals will not allow for proper filtration. Due to the age of the filters this make and model, is no longer manufactured and replacement laterals are not available. Replacement of the filters will be required.

Mechanical Room Floor Drains

Code Requirements

In accordance with The International Swimming Pool and Spa Code (ISPSC 2021),324.2 Requirements, "The equipment area or room floor shall be of concrete or other suitable material having a smooth slip-resistant finish and have positive drainage, including a sump drain pump, if necessary. Floors shall have a slope toward the floor drain or sump drain pump adequate to prevent standing water at all times. The opening to the equipment room or area shall be designed to provide access for all anticipated equipment. At least one hose bibb with backflow preventer shall be located in the equipment room or be accessible within an adequate distance of the equipment room so that a hose can service the entire room."

Compliance Assessment

At the time of the inspection the floor drain in the mechanical room was closed up due to a state enforcement. A hose bibb was not identified.

Grounding/Bonding

Code Requirements

In accordance with Annex to the Model Aquatic Health Code (2018), 4.6.3.2, Permanent Electrical Devices, "All permanently connected electrical devices should be grounded per the NEC or other applicable CODE, using a separate grounding conductor which does not depend on the conductive integrity of any metal conduit exposed to CHEMICAL STORAGE SPACE air."

Compliance Assessment

At the time of the inspection the bonding wire connecting the main drains to the pool rebar was in poor condition. Additionally, the pool shell rebar was not bonded to the pool recirculation pumps. Currently the pool and pool fittings are not bonded.

Pipe supports

Code Requirements

In accordance with 2018 Annex to the Model Aquatic Health Code, 4.7.1.7.3, "All piping should be supported continuously or at sufficiently close intervals to prevent sagging and settlement."

Compliance Assessment

The pipe supports in all filtration systems need replacement due to corrosion. Not having properly supported pipes or unsound pipe supports can lead to damaged systems and potential failures if supports were to loosen or break.

4.0 – Recommendations

The following is recommended to bring the existing Beecher School pool into compliance with code requirements, help improve the existing conditions and address existing challenges.

Code Required Improvements

- Additional depth markers need to be installed on the pool deck and on the inside face of the pool gutter, ensuring code requirements of a max spacing at 25-ft and do not exceed 2-ft increments.
- "No Diving" symbols shall be added to depth markers for water depths less than 5-ft. Additionally, the starting block anchors in the shallow end should be removed as the shallow end does not have enough depth.
- Missing deck tiles and areas where the tile has delaminated from the pool deck shall be corrected to remove abrasive areas and allow for proper drainage.

- Deck drains shall be un-clogged, and/or replaced, to provide proper deck drainage.
- Areas on the pool deck that create a horizontal or vertical gap shall be corrected as to not cause a tripping or safety hazard.
- Chipped or missing tiles within the pool shall be replaced as to not create a hazard to swimming patrons.
- Gutter scuppers should be replaced, and pipes cleaned to allow for proper skimming.
- Diving board and stand shall be replaced as the grips have gone and the stand does not function properly.
- All loose grab rail and ladder anchors, starting block anchors, and diving board anchors shall be replaced as they have become loose.
- Pool Operations and maintenance manuals for all equipment shall be located within the pool mechanical room.
- An autofill shall be added to the recirculation system with a required air gap.
- The pool flow rate should be increased to 450-500gpm to allow for proper turnover times to be met.
- The existing sand filters with broken laterals. The new filters will need to be installed as replacement parts are not available.
- The mechanical room floor drain should be unblocked, and the drainage connection shall be connected to a state approved location.
- All rusted and compromised pipe supports shall be replaced to avoid damaging the recirculation system.
- The pool, deck anchors, and filtration equipment shall all be properly bonded to prevent potential electric shocks and further rusting.

Existing Conditions Upgrades

- If the pool is intended to be utilized for competitive swimming, proper lane lines on the pool floor and walls shall be installed. Targets need to be properly displayed.
- The pool deck hatch should be removed and infilled with concrete and tile to match the existing deck. The continuously wet hatch opening is most likely resulting in heavy efflorescence on the hatch opening and the outside face of pool shell at the viewing window.
- The main drain Certificate of Compliance should be checked to see when the main drain covers need to be replaced. The covers most likely need to be replaced.

- It is recommended that the Ultraviolet (UV) system bulb screen be replaced with an "EZ Strainer" valve to allow the operator to flip the screen when it becomes clogged with lint. This will remove the need to disassemble the piping connections when the screen becomes full and save the facility money by not needing to call a service company. Keeping the UV up and running year-round.
- In rust spot areas within the pool should have the tiles removed, and the pool shell further examined. Likely the shell has begun to deteriorate slightly exposing rebar and leading to rust spots. This can be parged over and then tiled over.
- Pool fittings should be replaced as some are cracked and have sharp edges.
- The pool should be acid washed and tile regrouted.
- Main drains should be replaced and rebounded.
- It is recommended any unused fittings within the pool be removed, grouted and tiled over.
- Dissimilar metals should be removed and replaced so all metallic items in the pool are stainless steel.
- To improve pump efficiency and power consumption VFD's should be added.
- It is recommended that additional staff be hired to help the current CPO operate the facility.

5.0 – Estimated Costs + Conclusion

Overall, the Town has done a remarkable job maintaining the Beecher School pool facility. Typically, concrete pools have a life expectancy of thirty to forty years. This pool is 50 years old, making it fall on the older side of this range. The current filtration system was replaced in 2001, roughly 21 years ago and it was still in operation until recently when the filter laterals were discovered broken. On average pool filtration systems stay operational for twenty to thirty years depending on maintenance routines and the environment they are subject to. It should be noted that the maintenance staff have done an excellent job maintaining this facility throughout its life of operation.

Over the years the Beecher School pool facility has seen updates, repairs, and patches, to keep it open and operational for the Town constituents and swim teams. At this time the Beecher School pool has come to a crossroads. Portions of the pool shell and recirculation system need to be replaced and/or repaired to continue to stay open and functional.

At this stage trying to "band-aid" or fix what is currently causing issues will not last for long, as it will not be addressing the issue at hand. Weston & Sampson recommends a partial rehabilitation of the pool and the recirculation system.

Due to the construction method of the existing pool, patch work will only hold for a short while before

needing to be further repaired. To address the existing leaking issue the pool main drains and gutter scuppers will need to be cut out and new installed. For this repair to take place the pool would need to be shut down and drained for a period of time. To further ensure leaking is resolved, all unused fittings such as the old main drains and vacuum fittings should be removed and grouted over. At this time any leaking inlets should also be addressed.

While performing selective demolition to the inside of the pool, the pool and mechanical equipment should be correctly bonded. This paired with resurfacing the concrete under the rusted tiles should help address the rust spots within the pool.

Within the mechanical room an autofill should be added to the recirculation system to ensure proper pool water levels are maintained. Additionally, the pool filters should be replaced to correct the broken lateral issue.

While addressing the main drain and bonding issues it would also be a good time to address the other code related items listed above as there are overlapping trades that would be needed to address the existing compliance issues.

The above-mentioned replacements and upgrades to the facility could each be performed within in one phase or be split up into multiple phases. If items are to be broken into phases Weston & Sampson recommends first correcting items that are code violations. Followed by items that are appearance or functional based, as these items do not have an impact of user safety.

Based on the above-mentioned items, the following critical improvements are recommended, listed in order of precedence:

- Replacement of the filters
- Structural repairs to spalling concrete and removal of deck hatch
- Replacement of the main drains
- Replacement of the gutter scuppers
- Replacement of the pool deck drains and correcting the deck slopes (via tile work)
- Replace particular items in the mechanical room
- Acid wash and regrout the pool

It is estimated that these repairs/improvements would cost $865,269 (See Attachment A for a cost estimate breakdown). All repairs do not need to occur at a single time and can be phased. However, it is recommended that they be addressed in the order shown above.

The Beecher School Pool is approximately 50 years old and is reaching a critical point in its service life. The pool will require upgrades to keep it in operation, and if avoided the pool will likely start to develop more critical and detrimental issues. Without any upgrades to the pool, the pool has approximately 2-3 year left of service life before significant damage occurs.

We will continue to work with the Town and staff to understand the most appropriate and viable option to meet the desired end goal.

Attachment A

Cost Estimate

Beecher School Pool Estimate

Woodbridge, CT **Revised:**

Owner: **Town of Woodbridge**

SECTION NUMBER	DIVISIONS	QTY.	UNIT	TOTAL COST MATERIAL UNIT $	LABOR	TOTAL	ALLOWANCE	**TOTAL**	NOTES
	DIV 2 - DEMOLITION								
	SELECTIVELY R&D SPALLING CONC AT WINDOW & HATCH	SF	50	$ 5.00	$ 8,640.00	$ 8,890.00		$ 8,890.00	(2) LABORERS, $135/HR @ 8HRS FOR 4 DAYS
	R&D MAIN DRAIN ASSEMBLY AND PIPING CONCRETE	SF	50	$ 6.00	$ 4,320.00	$ 4,620.00		$ 4,620.00	(2) LABORERS, $135/HR @ 8HRS FOR 2 DAY
	R&D GUTTER SCUPPERS AND PIPING	SF	20	$ 5.00	$ 10,800.00	$ 10,900.00		$ 10,900.00	(2) LABORERS, $135/HR @ 8HRS FOR 5 DAY
	R&D DECK HATCH	LS	1	$ 600.00	$ 3,240.00	$ 3,840.00		$ 3,840.00	(2) LABORERS, $135/HR @ 8HRS FOR 1.5 DAY
	R&D SECTIONS OF POOL TILE	SF	125	$ 4.00	$ 6,480.00	$ 6,980.00		$ 6,980.00	(2) LABORERS, $135/HR @ 8HRS FOR 3 DAYS
	R&D SECTIONS OF DECK TILE	SF	210	$ 4.00	$ 6,480.00	$ 7,320.00		$ 7,320.00	(2) LABORERS, $135/HR @ 8HRS FOR 3 DAYS
	R&D MISC POOL EQUIPMENT	LS	1	$ 2,500.00	$ 6,480.00	$ 8,980.00		$ 8,980.00	(2) LABORERS, $135/HR @ 8HRS FOR 3 DAYS
	R&D MISC POOL FILTER EQUIPMENT	LF	1	$ 3,500.00	$ 12,720.00	$ 16,220.00		$ 16,220.00	(3) LABORS, $135/HR @ 8HRS FOR 3 DAYS PLUS VAC TRUCK FOR (2) DAYS, @ $1500 / DAY
	R&D MECHANICAL ROOM FLOOR TO INSTALL SUMP	LS	1	$ 2,000.00	$ 5,120.00	$ 7,120.00		$ 7,120.00	(2) LABORERS, $135/HR @ 8HRS FOR 2 DAY
	ELECTRICAL POOL MAKE SAFE	LS	1	$ 5,000.00	$ 1,280.00	$ 6,280.00		$ 6,280.00	(1) SKILLED LABORER, $160/HR @ 8HRS FOR 1 DAY
	POOL PLUMBING MAKE SAFE	LS	1	$ 3,000.00	$ 1,280.00	$ 4,280.00		$ 4,280.00	(1) SKILLED LABORER, $160/HR @ 8HRS FOR 1 DAY
	ALLOWANCE FOR UNKNOWN PATCH WORK	LS	1	$ 10,000.00		$ 10,000.00		$ 10,000.00	ALLOWANCE
	HAZARDS	-	-	-	-	$ -	$ 10,000.00	$ 10,000.00	ALLOWANCE
								$ 105,430.00	
	DIV 3 - CONCRETE								
	POOL DECK AT HATCH	SF	25	$ 25.00	$ 4,800.00	$ 5,425.00		$ 5,425.00	(2) CARPENTERS, $150/HR @ 8HRS FOR 2 DAYS
	POOL SHELL AT WINDOW	SF	25	$ 25.00	$ 4,800.00	$ 5,425.00		$ 5,425.00	(2) CARPENTERS, $150/HR @ 8HRS FOR 2 DAYS
	POOL SHELL WITHIN GUTTER	EA	20	$ 650.00	$ 7,200.00	$ 20,200.00		$ 20,200.00	(2) CARPENTERS, $150/HR @ 8HRS FOR 3 DAYS
	ALLOWANCE FOR UNKNOWN PATCH WORK	LS	1	$ 10,000.00		$ 10,000.00		$ 10,000.00	ALLOWANCE
	POOL MAIN DRAIN	EA	2	$ 1,500.00	$ 9,600.00	$ 12,600.00		$ 12,600.00	(2) CARPENTERS, $150/HR @ 8HRS FOR 4 DAYS
	MECHANICAL ROOM FLOOR DRAIN SUMP	YD	4	$ 250.00	$ 3,600.00	$ 4,600.00		$ 4,600.00	(2) CARPENTERS, $150/HR @ 8HRS FOR 1.5 DAY
								$ 58,250.00	
	DIV 7 - WATERPROOFING								
	MECHANICAL ROOM DRAIN SUMP	SF	10	$ 17.00	$ 640.00	$ 810.00		$ 810.00	(1) SKILLED LABORERS, $160/HR @ 4HRS
	POOL SHELL WATERPROOFING	SF	150	$ 17.00	$ 2,560.00	$ 5,110.00		$ 5,110.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 1 DAY
								$ 5,920.00	
	DIV 9 - FINISHES								
	POOL TILE	SF	125	$ 33.00	$ 5,120.00	$ 9,245.00		$ 9,245.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 2 DAY
	POOL TILE GROUT	SF	125	$ 4.00	$ 2,560.00	$ 3,060.00		$ 3,060.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 1 DAY
	DECK TILE	SF	210	$ 33.00	$ 5,120.00	$ 12,050.00		$ 12,050.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 2 DAY
	DECK TILE GROUT	SF	175	$ 4.00	$ 2,560.00	$ 3,260.00		$ 3,260.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 1 DAY
								$ 27,615.00	
	DIV 10 - SIGNAGE								
	POOL HEALTH & SAFETY SIGNAGE	LS	1	$ 5,000.00	$ 540.00	$ 5,540.00		$ 5,540.00	(1) LABORER, $135/HR @ 4HRS, ALLOWANCE
								$ 5,540.00	
	DIV 13 - SPECIAL CONSTRUCTION POOL								
	PVC GUTTER SCUPPERS	EA	15	$ 20.00	$ 4,320.00	$ 4,620.00		$ 4,620.00	(2) LABORERS, $135/HR @ 8HRS FOR 2 DAYS
	POOL MAIN DRAIN GRATING AND SUMPS	EA	2	$ 4,000.00	$ 2,560.00	$ 10,560.00		$ 10,560.00	(2) Carpenters, $160/HR @ 8HRS FOR 1 DAY
	POOL AUTOFILL SYSTEM	LS	1	$ 3,000.00	$ 1,280.00	$ 4,280.00		$ 4,280.00	(1) PIPE FITTER, $160/HR @ 8HRS FOR 1 DAY
	POOL FILTER PUMP	EA	1	$ 12,500.00	$ 2,560.00	$ 15,060.00		$ 15,060.00	(2) PIPE FITTERS, $160/HR @ 8HRS FOR 1 DAY
	POOL FILTER PUMP VFD	EA	1	$ 7,750.00	$ 1,280.00	$ 9,030.00		$ 9,030.00	(1) ELECTRICIAN, $160/HR @ 8HRS FOR 1 DAY, ALTERNATING VFD USED FOR BOTH PUMPS
	POOL FILTERS AND MANIFOLD PIPING	LS	1	$ 70,000.00	$ -	$ 70,000.00		$ 70,000.00	ALLOWANCE BASED ON QUOTE
	POOL SITE PIPING	LF	200	$ 65.00	$ 4,000.00	$ 17,000.00		$ 17,000.00	50LF OF PIPE, AVERAGE OF $65/LF, $20/LF INSTALL, ALLOWANCE FOR GUTTER AND INLET PIPING
	POOL FILTER ROOM PIPING	LF	200	$ 65.00	$ 2,560.00	$ 15,560.00		$ 15,560.00	(2) PIPE FITTERS, $160/HR @ 8HRS FOR 1 DAY
	POOL FLOW METERS	LS	1	$ 1,500.00	$ 640.00	$ 2,140.00		$ 2,140.00	(1) PIPE FITTER, $160/HR @ 4HRS
	POOL VALVES	EA	4	$ 850.00	$ 2,560.00	$ 5,960.00		$ 5,960.00	(2) PIPE FITTERS, $160/HR @ 8HRS FOR 1 DAY
	POOL FITTINGS	EA	10	$ 1,500.00	$ 2,560.00	$ 17,560.00		$ 17,560.00	(2) PIPE FITTERS, $160/HR @ 8HRS FOR 1 DAY
	HANGERS & LABELING	LS	1	$ 4,000.00	$ 2,160.00	$ 6,160.00		$ 6,160.00	(2) LABORERS, $135/HR @ 8HRS FOR 1 DAY
	CHEMICAL CONTROLLER	LS	1	$ 3,000.00	$ 640.00	$ 3,640.00		$ 3,640.00	(1) PIPE FITTER, $160/HR @ 4HRS
	BALANCING POOL	LS	1	$ 1,000.00	$ 1,080.00	$ 2,080.00		$ 2,080.00	(1) LABORER, $135/HR @ 8HRS FOR 1 DAY
	CONTROL WIRING	LS	1	$ 4,500.00	$ 4,320.00	$ 8,820.00		$ 8,820.00	(1) ELECTRICIAN, $180/HR @ 8HRS FOR 3 DAY
	START UP & TRAINING	LS	1	$ -	$ 3,840.00	$ 3,840.00		$ 3,840.00	(1) PIPE FITTER, $160/HR @ 8HRS FOR 3 DAYS
	POOL LANE LINES & SAFETY EQUIP. FFE	LS	1	$ 2,500.00	$ -	$ 2,500.00		$ 2,500.00	ALLOWANCE FOR NEW LANE LINES
	STARTING BLOCKS	EA	6	$ 5,000.00	$ 7,680.00	$ 37,680.00		$ 37,680.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 3 DAYS
	1 METER DIVING BOARD	EA	1	$ 15,000.00	$ 5,120.00	$ 20,120.00		$ 20,120.00	(2) SKILLED LABORERS, $160/HR @ 8HRS FOR 2 DAY
								$ 256,610.00	
	DIV 22 - PLUMBING (POOL RELATED ONLY)								
	PLUMBING WORK	LS	1			$ 10,000.00	$ 10,000.00	$ 10,000.00	NEW BACKFLOW PREVENTOR & ALLOWANCE
								$ 10,000.00	
	DIV 23 - MECHANICAL (POOL RELATED ONLY)								
	MECHANICAL WORK	LS	1			$ 5,000.00	$ 5,000.00	$ 5,000.00	ALLOWANCE
								$ 5,000.00	
	DIV 26 - ELECTRICAL (POOL RELATED ONLY)								
	BONDING	LS	1			$ 10,000.00		$ 10,000.00	ELECTRICAL BONDING
	ELECTRICAL WORK	LS	1			$ 35,000.00	$ 35,000.00	$ 35,000.00	ELECTRICAL LINE VOLTAGE
								$ 45,000.00	
	DIV 32 - EARTH WORK								
	EXCAVATION - AT MECHANICAL ROOM SUMP	CYD	1	$30	$2,160	$ 2,190.00		$ 2,190.00	ALLOWANCE, (2) LABORER, $135/HR @ 8HRS FOR 1 DAY
								$ 2,190.00	
	DIV 33 - UTILITIES (MECHANICAL ROOM DRAIN RELATED ONLY)								
	SUMP PUMP	EA	1	$ 2,000.00	$ 1,280.00	$ 3,280.00		$ 3,280.00	(1) SKILLED LABORER, $160/HR @ 8HRS FOR 1 DAY
	DRAIN PIPING	LF	30	$ 65.00	$ 2,560.00	$ 4,510.00		$ 4,510.00	(2) PIPE FITTERS, $160/HR @ 8HRS FOR 1 DAY
								$ 7,790.00	
				SOFT COST SUBTOTAL =				$ 529,345.00	
				BOND			2.0%	$ 10,586.90	
				GENERAL CONDITIONS			15.00%	$ 80,989.79	
				COVID/UNPREDICTABLE ESCALATION			2.00%	$ 12,418.43	
				CONSTRUCTION CONTINGENCY			10.00%	$ 63,334.01	
				OVERHEAD & PROFIT			15.00%	$ 104,501.12	
				DESIGN SERVICES			8.00%	$ 64,094.02	
				CONSTRUCTION TOTAL =				$ 865,269.27	

Estimate includes a hazardous material abatement allowance as it was unknown at time of estimate