



*Pocantico Hills
Central School District*

Swimming Pool Facility Evaluation

September 2007



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**POCANTICO HILLS CENTRAL SCHOOL DISTRICT
SWIMMING POOL FACILITY EVALUATION**

**DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK**

SEPTEMBER 2007

1.0 INTRODUCTION/BACKGROUND

General

The Pocantico Hills Central School District maintains an outdoor swimming pool facility consisting of a Main Pool and a Wading Pool. The pool facility was constructed as part of an expansion of the school building in 1971. The Wading Pool was replaced in 1988 for reasons unknown. The boys and girls locker rooms appear to have been constructed at the same time as the swimming pool facility in 1971.

The pools have had significant problems with leakage over the past few years; therefore, the District has retained Dvirka and Bartilucci Consulting Engineers (D&B) to prepare this evaluation and to make recommendations for repairs or replacement of the facility.

Main Pool

The Main Pool is constructed into a hillside, primarily above grade, and is contained by a stone wall on the exposed sides. School personnel have indicated that the pool is constructed in this manner due to high groundwater and the presence of rock near grade throughout the site. The Main Pool includes a 25 yard, 6 lane lap area and a diving area. The lap area varies in depth from 3 feet at each end to 5 foot-3 inches in the center. The diving tank is 12 feet deep and includes two 1-meter and one 3-meter dive stands. The surface area of the pool is about 8,700 sf and the volume is about 338,000 gallons.

The pool includes a perimeter overflow gutter and a single main drain box located in the dive tank. At the time of inspection, the water was not overflowing the gutter due to water loss.

The pool is constructed of cast in place concrete and the interior surfaces are painted. In the winter, the pool is covered and the water is not drained.

The decks around the pool are concrete with some floor drains provided.

Wading Pool

The Wading Pool is constructed at grade adjacent to the Main Pool in a separate fenced enclosure. The pool is 36 feet long by 26 feet wide with depths ranging from 6 inches to 16 inches. The surface area is 936 sf and the volume is about 6,440 gallons.

The pool includes four skimmers and two main drain boxes.

The pool is constructed of cast in place concrete with a marcite interior finish. In recent years, the marcite has been over coated with paint. In the winter, the pool is uncovered and the water is drained.

The decks around the pool are concrete with some floor drains provided.

Filter Room

The filtration and chemical injection equipment for both pools is housed in a room below the Main Pool deck. The filtration system for the Main Pool is a vacuum diatomaceous earth (DE) system. The Wading Pool filtration system is a fiberglass horizontal high rate sand filter. Both recirculation pumps are the self-priming centrifugal type.

A 500-gallon polyethylene sodium hypochlorite storage tank is installed in the filter room for disinfection. The tank is installed inside a polyethylene secondary containment tank of unknown size. Two separate single walled 30 gallon polyethylene tanks are provided for daily sodium hypochlorite use for each of the two pools. One single walled 30 gallon polyethylene tank is shared for acid storage for both pools for pH adjustment. The chemical feed pumps for each pool are manually operated.

Bathrooms and Showers

The bathrooms and showers adjacent to the Gymnasium are also used to service the swimming pool facility. The following facilities are provided:

| Description | Boys | Girls |
|--------------------|-------------|--------------|
| Toilets | 2 | 3 |
| Lavatories | 2 | 3 |
| Urinals | 2 | NA |
| Gang Showers | 8 | NA |
| Private Showers | NA | 11 |

The bathroom and shower facilities are laid out so that people using the pool pass through the shower areas before going outside to the pool area. The bathroom and shower facilities are located within 300 feet of the pool area as required by code.

2.0 PHYSICAL CONDITION

General

The following is a summary of the observed conditions at the time of our site visit. Also included is information provided by the School personnel at the time of our visit.

The Main Pool and filter room are approximately 36 years old and are approaching the end of their useful life. Even though the facility appears to have been well maintained over the years, there is evidence of settling and general disrepair due to aging.

Main Pool

School personnel have reported that the Main Pool is leaking at a rate of about 1 or 2 inches per day. This equates to about 5,400 to 10,900 gallons per day. This is a significant amount of leakage. School personnel reported that caulking repairs were made to the gutter last year. In addition, repairs were made to the filtered water repair piping. Prior to these repairs, the leakage rate was reported to have been greater than the current rate. School personnel reported that there is a visible crack in the wall of the dive tank, near the 3-meter dive stand. This was not visible at the time of inspection because of the water in the pool. School personnel further reported that the leakage rate is greatly increased at times when the recirculation pump is not operating.

The concrete decks have cracks and areas that show signs of spalling. Some of the cracks and spalled areas have been repaired in the past and the repairs are now failing. There are low spots throughout the deck area which result in puddles. It appears that the cracks and low spots are due to settling of the subgrade below the decks. Since the pool decks appear to have been set mostly on backfilled material, it is reasonable to expect that some settling will have occurred over time.

Other visible signs of deterioration around the Main Pool include lifeguard chairs and tile depth markers.

Wading Pool

Similar to the Main Pool, the concrete decks around the Wading Pool have cracks and areas that show signs of spalling. Some of the cracks and spalled areas have been repaired in the past and the repairs are now failing. There are low spots throughout the deck area which result in puddles. It appears that the cracks and low spots may be due to settling of the subgrade below the decks.

School personnel reported that there have been frequent crack repairs made to the pool shell in the past. In addition, it was reported that there have been historical leakage problems with the piping. At the time of inspection, a temporary filtered water return pipe was installed and operating. The pipe was installed above grade on the concrete deck and inside the shallow end of the pool. A header with perforations discharges treated water to the pool. Despite these repairs, it was reported that the pool is still losing water.

The pool was originally constructed with a marble dust finish which has been painted over due to difficulties with frequent repairs.

Filter Room

The DE filter appears to be in fair condition as the elements have recently been replaced. No visible leaks were observed on the exposed piping inside the Filter Room.

The ventilation duct was observed to be leaking back into the filter room near the entrance door.

School personnel reported that there are frequent pump failures due to power outages. The power outages appear to be community wide and not related to the facility electric service or equipment.

Bathrooms and Showers

In general, the bathrooms and showers appear to be in good condition. Four of the private showers in the Girls room are out of order and are currently used for storage.

3.0 CODE COMPLIANCE

General

The following is a summary of the items observed to be out of compliance with Subpart 6-1 – Swimming Pools of the New York State Sanitary Code and the New York State Department of Environmental Conservation Chemical Bulk Storage Regulations (6 NYCRR Part 599) at the time of our inspection. Drawings provided by the School District were also used for this evaluation. Since the drawings are not labeled as “record drawings”, it is not certain that all of this information is correct.

Although the drawings provided did not include electrical details, it is unlikely that the metallic items in and around the pools have been properly bonded and grounded as is required under the current code. This requirement did not exist at the time the facility was constructed.

Main Pool

The back wall of the dive tank does not comply with the required dimensions for the diving stands and boards that are installed. The back wall is vertical to a depth of 9 feet and then slopes at 1-foot vertical to 2-feet horizontal from a depth of 9 feet to 12 feet. The code requires a minimum slope of 5 feet vertical to 1 foot horizontal for the back wall of any dive tank. The existing condition is suitable only for a ¾ meter dive stand or less.

There appears to be inadequate drainage provided on the deck. The code requires one drain for every 400 square feet of deck area. In addition, the puddles on the deck are not permitted by code.

Code requires that the perimeter fence must be a minimum of 4 feet high with horizontal openings of 4 inches or less and a maximum vertical clearance of 2 inches. Although the existing fence does meet this requirement, it is discontinuous around the pool deck. There are areas where there is no fence and only a stone wall.

As discussed earlier, some of the depth markers on the deck surface are damaged and illegible. In addition, there are no depth markers located on the interior pool wall. Code requires that 4 inch high depth markers be provided above the water surface. Due to the size of the existing gutter, it is not possible to add these depth markers to the existing installation.

There is only one main drain box located at the bottom of the dive tank. Code requires that two main drain boxes be provided. Each box must be designed to handle the full recirculation flow rate.

No surge tank is provided for the Main Pool. Code requires that one gallon of surge capacity be provided for each square foot of pool surface area. Therefore, a surge tank of about 8,700 gallons is required. The surge tank is necessary to maintain continuous skimming into the overflow gutter and to balance the relative flow between the overflow gutter and main drain.

The single 8-inch diameter gutter drain line is not adequately sized. Code requires a maximum velocity of 3 feet per second for this line. Typically, for a pool this size, two gutter drain lines should be provided.

Although the recirculation rate indicated on the pump name plate appears to be adequate, it is not clear whether the filter elements are appropriately sized. There is no nameplate on the filter or information on the drawings. However, it does not appear that the filter is undersized.

Wading Pool

Similar to the Main Pool, the perimeter fence is discontinuous around the pool deck. There are areas where there is no fence and only a stone wall.

The fill spout located on the deck is a tripping hazard.

Based on the dimensional data provided on the drawings, the required recirculation rate for the Wading Pool is 171 gpm. Although there is no nameplate on the installed recirculation pump, the drawings indicate that a flow rate of 160 gpm is provided. While this exceeds the required turnover rate of every two hours, it falls short of the total flow required from each of the skimmers and the main drain system.

The existing sand filter is adequately sized for the required recirculation flow rate. However, the filtered water return line is slightly undersized. A 4 inch line is required to be below the maximum velocity of 10 fps at the 171 gpm flow rate. The existing filtered water return piping has been replaced with a temporary above grade piping system which presents a tripping hazard.

Filter Room

Although the existing 500 gallon sodium hypochlorite tank has an existing permit, it does not meet the requirements of the New York State Department of Environmental Conservation Chemical Bulk Storage Regulations (6 NYCRR Part 599) for the following reasons:

- Remote fill port required.
- Tank level gauge must be provided at remote fill port.
- Overfill alarm is not installed.
- Transfer containment is required for delivery truck.
- Tank is not properly labeled.
- Piping is not color coded for chemical.
- Valves and pumps are not provided with splash pans or secondary containment.

Each of the smaller sodium hypochlorite tanks and the acid tank require secondary containment.

There is a waste pumping system located in the Filter Room, but it is not clear whether this discharges to a sanitary sewer system as required. A further investigation of the historical construction documents or a dye test is required to confirm the configuration of this system.

Likewise, it is not clear if the water service to the pool is protected by a backflow prevention device. It is likely that the water service originates from the school building water service which should include a backflow prevention device.

Bathrooms and Showers

The layout of the bathrooms and showers is in conformance with the code requirements. The number of fixtures provided in each bathroom area is adequate for the size of the facility.

4.0 REHABILITATION ALTERNATIVE

If the existing swimming pool facility is to be rehabilitated, the following major work will be required:

- Remove and replace concrete decks around both pools
- Remove and replace entire Wading Pool
- Remove and replace Main Pool perimeter gutter
- Vinyl liner in Main Pool
- New main drain boxes and piping
- New gutter overflow piping
- New filtered water return piping
- New concrete surge tank
- New High rate sand filters and recirculation pumps
- New chemical storage tanks and associated leak and level monitoring equipment
- Chemical transfer containment
- Replace waste water pumps and controls
- Perimeter fencing and gates
- Landscaping
- Filter room rehabilitation
- Security lighting
- Repairs to perimeter masonry wall
- New deck equipment (lifeguard stands, diving stands, ladders, etc)
- Upgrade electrical service as required

The estimated construction cost for the above scope of work is \$2,500,000 in 2007 dollars. The estimated cost includes a 20 percent estimating contingency and 15 percent for engineering.

It should be noted that the above repairs will not allow the installation of a 3 meter diving stand as the pool geometry is non-compliant.

No work will be performed on the bathrooms or locker rooms.

5.0 REPLACEMENT ALTERNATIVE

If the swimming pool facility was to be completely demolished and replaced in kind, the estimated construction cost is \$3,900,000 in 2007 dollars. The estimated cost includes a 20 percent estimating contingency and 15 percent for engineering. It should be noted that this cost is for constructing a new facility that is essentially the same as the existing facility, only fully compliant with the current codes and regulations.

The above estimate includes the costs for dewatering, soil stabilization and special foundations for the new pools and decks. It is not known for certain that this work will be required, but it is prudent to include provisions in the cost estimate based on the observation of extensive settlement and cracking throughout the site. At the time of design, after subsurface investigations have been completed, it may be possible to eliminate this work. The total cost associated with these special provisions is approximately \$800,000.

No work will be performed on the bathrooms or locker rooms.

6.0 RECOMMENDATIONS

The cost to rehabilitate the existing facilities is significantly lower than the cost to replace the facilities completely. However, the rehabilitated facility will have some shortcomings when compared to a new facility. Specifically, settlement problems could continue in the future causing damage to the newly renovated pools, decks and piping. Further, a 3-meter dive stand will not be allowed to be installed.

If soil investigations are performed, the cost estimate for the pool replacement can be further refined. If it is found that high groundwater and poor soils are not an issue, the need for dewatering, soil stabilization and special foundations can be eliminated. If this is the case, the cost for a new facility could be only nominally higher than the cost for rehabilitating the existing facility. It is recommended that a soil investigation be performed in the area of the swimming pools prior to selecting an alternative and commencing with design work.

If the District is to choose to construct a new facility, it is likely that some upgrades will be desired. This report and the cost estimates do not reflect possible upgrades to the sizes, configurations and features of the swimming pools. It is reasonable to assume that any upgrades that are included in the final project will increase the ultimate cost. This will be determined during the schematic design phase for the selected alternative.