

STRUCTURAL EVALUATION REPORT

**INSPECTION & EVALUATION
OF THE
LOWER MAKEFIELD TOWNSHIP COMMUNITY POOL
LOCATED IN
LOWER MAKEFIELD, PENNSYLVANIA**

PREPARED FOR

**THE TOWNSHIP OF LOWER MAKEFIELD
110 EDGEWOOD ROAD
YARDLEY, PA 19067**

NOVEMBER 2018

FILE No. PBLMT040



**Kenneth C. Ressler, P.E.
PA Lic. No. 033930**

11-7-2018

Date:



**REMINGTON
& VERNICK
ENGINEERS**

Prepared By:

Remington & Vernick Engineers
922 Fayette Street
Conshohocken, PA 19428

1. Executive Summary

1.1 General Description

Remington & Vernick Engineers was retained by the Township of Lower Makefield located in Bucks County, Pennsylvania to conduct an inspection and evaluation of the existing pool and bathrooms at the Lower Makefield Township Community Pool located at 1050 Edgewood Road, in Yardley, Pennsylvania. The main purpose of this assessment was to identify existing conditions and provide recommendations for renovation and repair.

A qualified professional from Remington & Vernick Engineers visited the property on October 5, 2018 and again on October 10, 2018 to perform the inspection. Remington & Vernick Engineers performed the inspection and evaluation and has prepared this report.

1.2 General Physical Condition

Bathroom facilities on site are in fair condition and in need of improvements. All bathroom facilities observed have outdated fixtures and finishes. Current ventilation in some bathrooms is undersized, and no air conditioning system is in place for any of the bathrooms. The Main L-shaped pool is losing water steadily, and in need of repairs. The leaks appear to be from vertical construction joints, cracks and spalls along the upper areas of the walls, and the concrete perimeter gutter.

1.3 Opinions and Probable Costs

The opinion of probable costs for the work that Remington & Vernick Engineers recommends be completed to remedy the identified deficiencies are detailed in Section 4 of this report. This includes estimates for the restroom renovations and the repairs to the Main Pool to address the leaking issues.

Please note that the construction cost estimates contained herein do not include "soft costs" such as Engineering fees, and should only be construed as preliminary, order of magnitude budgetary costs. Actual construction costs may vary from those contained herein depending on final design requirements, equipment manufacturers, phasing of work, unforeseen field conditions/interferences, etc.

2. Purpose and Scope

Remington & Vernick Engineers' scope of work was to perform a structural inspection and evaluation and prepare a comprehensive Condition Report that included our findings & recommendations to correct deficiencies. Our office performed the following work as part of our inspection and evaluation:

General/Structural Assessment:

- Provide visual inspection of accessible areas of the pool structure.
- Provide visual inspection of bathroom areas and systems made available at the time of inspection.
- Identify structural deficiencies.
- Provide recommendations for repair or improvement to correct deficiencies.

3. System Description and Observations

3.1 Overall General Description

The Lower Makefield Township Community Pool complex consists of several pools and buildings, identified in this report by their respective locations. The Main L-shaped pool and all bathroom facilities were inspected. A building location map is included in Appendix A of this report (*Figure 1*).

3.2 Condition of Bathroom Facilities

A. Main Office Bathrooms

These bathrooms are in fair condition. In both the male and female areas, showers and water closets are provided. Existing shower and water closet partition walls are non load-bearing walls with tile cladding. These may be removed and replaced with shower stalls. New shower stalls should incorporate an elevated changing area. Existing shower fixtures should also be replaced with new. Existing bathroom fixtures, including light fixtures, mirrors, sinks, faucets, soap dispensers are stainless steel, showing surface rust and should be replaced. All walls and floors are tile-clad. Existing wall and floor tile may be removed and replaced. The existing ceiling is in good condition and should be cleaned and re-painted. A single changing bench is provided in the locker room area of both the men's and women's bathrooms. This bench may be cleaned and painted to match new finishes. The lockers in both rooms should be cleaned and painted.

An air conditioning system was not present at the time of inspection in either the men's or women's bathroom. Exhaust fans are provided for ventilation in both areas. An air conditioning system may be added, with new units located adjacent to the existing exhaust fans in the attic space available in the open A-frame truss webs.

B. South Bathrooms

The south bathrooms are located near the pool entrance at the south of the site. These bathrooms, consisting of two stalls and a sink, are in fair condition. No closed ceiling is provided in the bathroom. A moisture-rated gypsum board ceiling should be fastened to the existing wood strip ceiling to provide a closed space. Existing fixtures, including light fixtures, mirrors, faucets, and soap dispensers are in need of replacement. Existing sinks, stalls, and water closets are also in need of replacement. Existing painted concrete masonry unit (CMU) walls should be cleaned and repainted. The existing steel door is operable with rusted hardware. Door hardware should be replaced, and the door cleaned and painted to prevent rusting.

Ventilation is provided by way of a louvered wall vent provided in the single-wythe CMU wall. The wall vent should be removed and replaced with an operable vent. Further ventilation may be provided by installing an air

conditioning system with appropriate air exchange for the bathroom, located in the space available in the open A-frame truss webs.

B. North Bathrooms

The north bathrooms are located in an outbuilding at the north end of the site. These bathrooms consisting of several stalls and a changing area are in fair condition. The existing ceiling should be cleaned and re-finished. Existing fixtures, including light fixtures, mirrors, faucets, and soap dispensers are showing surface rust and should be removed and replaced. Existing stalls should be removed and replaced. Tile is present on the floors, and to half-height on the walls. Existing wall and floor tile may be removed and replaced.

Duct terminations are visible within the bathroom, indicating that an existing ventilation and/or conditioned air system are in place. According to maintenance staff on site at the time of inspection, the existing system is not functioning. Further investigation is needed to determine whether the existing system can be repaired or replaced. In any case, a functional exhaust and air conditioning system should be provided for both bathrooms. Existing units may be located in the space available in the open A-frame truss webs above the ceiling.

3.3 Condition of Main L-shaped Pool

The main pool is losing water during the summer operation. This water leakage appears to be located in the top two to three feet of the pool wall, the vertical construction joints and the perimeter concrete gutter; which serves as the skimmer and return water drain. This is based on our visual observations and information from the maintenance personnel.

The existing vertical construction joint appears to have been repaired several times in the past. Therefore, the repair must include removing all loose materials and previous repairs down to the original pool wall structure. The joint can then be properly repaired and sealed to prevent water leakage.

There were cracks and concrete spalls observed near the top two to three feet of the concrete perimeter walls. These have also appeared to have been previously repaired several times. Prior to any repairs, all loose concrete and any previous repair materials shall be removed down to the original concrete pool walls.

The perimeter concrete gutter could not be fully inspected since the concrete grating is mortared in place. In order to ensure that this area is properly sealed and not leaking all the concrete grating should be removed. This will allow proper concrete repairs to any existing cracking and spalling in the water return gutter. Once repairs are completed, the entire concrete gutter can be sealed with concrete surface sealer to prevent leakage.

As an alternate to the repairs to the concrete gutter repairs; this can be replaced with a stainless steel type skimmer and return system. This would provide a long term more efficient return system which would also be a more maintenance free pool edge system.

3.4 Recommendations

The bathroom fixtures, finishes, and heating ventilation and air conditioning (HVAC) systems should be updated in all bathrooms inspected; and the existing Main L-shaped Pool will require repairs to mitigate water loss. These recommendations are noted as follows.

A. Main Office Bathrooms

1. Remove and replace existing fixtures, including light fixtures, mirrors, faucets, soap dispensers, and appurtenances.
2. Demolish existing tiled shower partition walls.
3. Remove and replace wall and floor tile.
4. Install new shower stalls with elevated changing area.
5. Remove and replace existing shower fixtures.
6. Install air conditioning system.
7. Clean and paint existing ceilings, benches, and lockers.

B. South Bathrooms

1. Remove and replace existing fixtures, including light fixtures, mirrors, faucets, soap dispensers, door hardware, and appurtenances.
2. Remove and replace existing sinks and water closets.
3. Remove and replace existing stalls.
4. Install moisture-resistant gypsum board ceiling.
5. Remove and replace existing wall vents.
6. Install air conditioning system.
7. Clean and paint existing walls, ceilings, and doors.

C. North Bathrooms

1. Remove and replace existing fixtures, including light fixtures, mirrors, faucets, soap dispensers, and appurtenances.
2. Remove and replace existing stalls.
3. Remove and replace existing wall and floor tile.
4. Repair existing ventilation / air conditioning system.
5. Clean and re-finish existing ceilings.

D. Main L-shaped Pool

The following recommendations are made to address the current water leakage from the pool and perimeter gutter system. These repairs will be made to the existing concrete using waterproofing concrete repair materials designed for this purpose. The concrete repairs will last from 3 to 5 years before additional maintenance or repair may be required to maintain the integrity of the waterproofing.

1. Repair the vertical construction joints in the existing pool walls by first removing all loose concrete and any previous concrete repair materials down to the original wall construction. Use concrete repair products to waterproof and seal the existing joints and prevent water leakage.

2. Repair and concrete cracks and spalls in the top 2 to 3 feet of the existing pool walls. Concrete crack shall be cleaned of all loose materials and sawcut to provide a good surface for repairs. Concrete spalls also be prepared by removing all loose materials and using a sawcut around the perimeter in order to provide a proper surface for repairs. Use concrete repair products to waterproof and seal the existing joints and prevent water leakage.
3. Re-coat the existing pool walls in all areas of the completed repairs to seal the wall and to match the existing pool finish.
4. Repair the concrete perimeter gutter by removing the existing concrete grating to expose the gutter. Repair all concrete cracks and spalls as noted previously. Provide a concrete sealing product on all surfaces of the gutter. Re-install the concrete grating and pool edge pieces.
5. An alternate design would be to replace the concrete perimeter gutter with a stainless steel gutter system which will function as the skimmer and water return system. This could be similar to the existing system on the adjacent pool. This installation would provide a long term more maintenance free solution to a concrete gutter which will require yearly maintenance and repairs. The stainless steel gutter system would have a warranty of 15 or 20 years compared to the repairs of the concrete gutter system which may have a 3 to 5 year life before additional maintenance is required.

4. Opinions of Probable Costs to Remedy Deficiencies

Restroom Renovations

Main Office Bathrooms:	\$91,200
South Bathrooms:	\$27,600
North Bathrooms:	\$65,400

Main L-Shaped Pool Leaking Repairs

Concrete Wall and Gutter Repairs	\$478,550
----------------------------------	-----------

The budget cost estimate for the Pool Leaking Repairs includes either repairs to the existing concrete gutter system or replacement of the gutter with a stainless steel system.

The attached cost estimate in Appendix B, details probable costs for each of the recommended repairs. Please note that the construction cost estimates for the restroom renovations contained herein do not include "soft costs" such as Engineering fees, and should only be construed as preliminary, order of magnitude budgetary costs. Actual construction costs may vary from those contained herein depending on final design requirements, equipment manufacturers, phasing of work, unforeseen field conditions/interferences, etc.

5. Qualifications

The field observer who conducted the walk-through survey on October 5, 2018 was Mr. Mitchell Butler. The field observer who conducted the walk-through survey on October 10, 2018 was Mr. Kenneth Ressler. Mr. Mitchell Butler is working under the supervision of the reviewer of Mr. Kenneth Ressler. Mr. Ressler is a Senior Associate and Head of the Structural Department, and is a Professional Registered Engineer in the State of Pennsylvania.

6. Exhibits

Appendix A:
Photographs of the buildings referenced in this report.

Appendix B:
Probable costs of repair items for the pool and each bathroom.

APPENDIX A

SITE IMAGES & PHOTOGRAPHS

Appendix A – Site Photographs & Images



Figure 1 - Site Overview

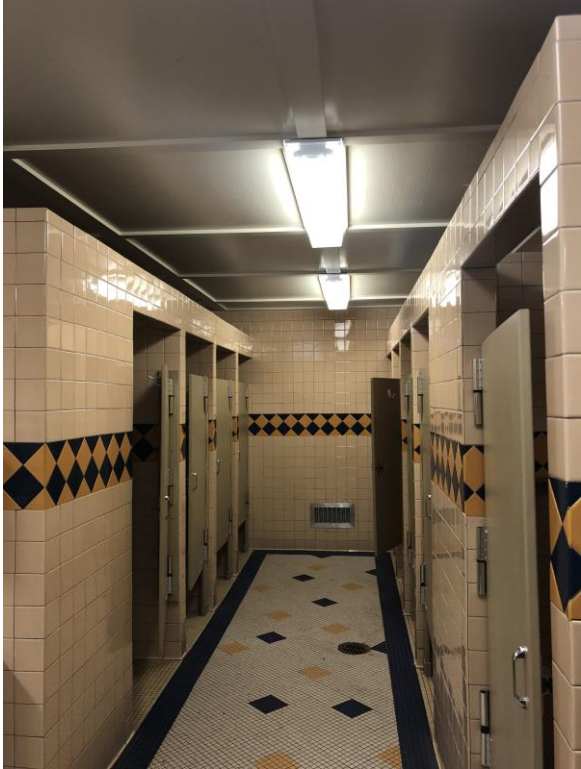


Figure 2 - Main Office Bathrooms - Partition Walls

Appendix A – Site Photographs & Images



Figure 3 - Main Office Bathrooms - ADA Shower Stall



Figure 4 - Main Office Bathrooms - Bench and Lockers

Appendix A – Site Photographs & Images



Figure 5 - Main Office Bathrooms - Rusted Fixtures



Figure 6 -Main Office Bathrooms - Interstitial Space with Attic Access

Appendix A – Site Photographs & Images



Figure 7 - South Bathrooms - Interior of Men's Bathroom



Figure 8 - South Bathrooms - Existing Water Closet and Fixtures

Appendix A – Site Photographs & Images



Figure 9 - South Bathrooms - Louvered Through-Wall Exhaust Vent

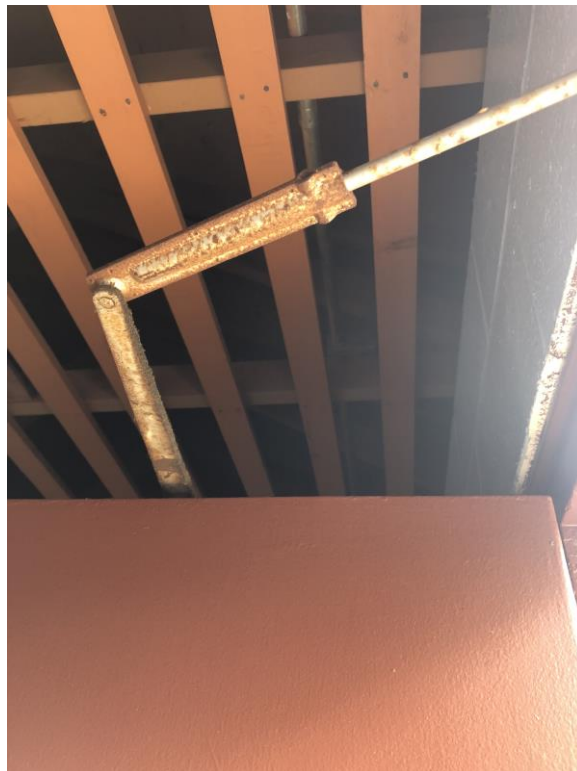


Figure 10 - South Bathrooms - Rusted Door Hardware

Appendix A – Site Photographs & Images



Figure 11 - North Bathrooms - Typical Interior Stalls with ADA Stall at End



Figure 12 - North Bathrooms - Sink Area

Appendix A – Site Photographs & Images



Figure 13 – Main L-Shaped Pool



Figure 14 – Concrete Perimeter Gutter System

Appendix A – Site Photographs & Images



Figure 15 – Top 2 to 3 feet of Side Walls and Concrete Perimeter Gutter



Figure 16 – Previous Crack Repairs and Surface Pitting

Appendix A – Site Photographs & Images



Figure 17 – Vertical Construction Joint and Horizontal Crack below Gutter



Figure 18 – Main L-Shaped Pool

APPENDIX B

COST ESTIMATE

R	REMINGTON & VERNICK ENGINEERS
V	

PROJECT NAME:
Lower Makefield Community Pool Inspection

PROJECT Number:
PBLMT040

CLIENT:
Lower Makefield Township

Main Office Bathrooms

#	DESCRIPTION	UNITS	PLAN QUANTITY	EST. UNIT PRICE	AMOUNT
1	REMOVE & REPLACE BATHROOM FIXTURES	LS	1	\$6,000.00	\$6,000.00
2	DEMOLISH EXISTING SHOWER WALL PARTITIONS	LS	1	\$2,000.00	\$2,000.00
3	REMOVE & REPLACE WALL AND FLOOR TILE	LS	1	\$28,000.00	\$28,000.00
4	INSTALL NEW SHOWER STALLS WITH ELEVATED CHANGING AREA	LS	1	\$12,000.00	\$12,000.00
5	REMOVE AND REPLACE SHOWER FIXTURES	LS	1	\$9,000.00	\$9,000.00
6	INSTALL AIR CONDITIONING SYSTEM	LS	1	\$10,000.00	\$10,000.00
7	CLEAN AND PAINT EXISTING CEILING, BENCHES, AND LOCKERS	LS	1	\$9,000.00	\$9,000.00
SUBTOTAL:					\$76,000.00
CONSTRUCTION CONTINGENCIES (20%):					\$15,200.00
TOTAL ESTIMATED CONSTRUCTION COST:					\$91,200.00

South Bathrooms

#	DESCRIPTION	UNITS	PLAN QUANTITY	EST. UNIT PRICE	AMOUNT
1	REMOVE & REPLACE BATHROOM FIXTURES & DOOR HARDWARE	LS	1	\$3,500.00	\$3,500.00
2	REMOVE & REPLACE SINKS AND WATER CLOSETS	LS	1	\$4,500.00	\$4,500.00
3	REMOVE & REPLACE STALLS	LS	1	\$3,500.00	\$3,500.00
4	INSTALL MOISTURE-RESISTANT GYPSUM BOARD CEILING	LS	1	\$1,200.00	\$1,200.00
5	REMOVE & REPLACE EXISTING WALL VENTS	LS	1	\$600.00	\$600.00
6	INSTALL AIR CONDITIONING SYSTEM	LS	1	\$5,000.00	\$5,000.00
7	CLEAN & PAINT EXISTING WALLS AND DOORS	LS	1	\$1,700.00	\$1,700.00
SUBTOTAL:					\$23,000.00
CONSTRUCTION CONTINGENCIES (20%):					\$4,600.00
TOTAL ESTIMATED CONSTRUCTION COST:					\$27,600.00

R V	REMINGTON & VERNICK ENGINEERS
	ENGINEER'S ESTIMATE

PROJECT NAME:
Lower Makefield Community Pool Inspection

PROJECT Number:
PBLMT040

CLIENT:
Lower Makefield Township

North Bathrooms

#	DESCRIPTION	UNITS	PLAN QUANTITY	EST. UNIT PRICE	AMOUNT
1	REMOVE & REPLACE BATHROOM FIXTURES	LS	1	\$10,000.00	\$10,000.00
2	REMOVE & REPLACE STALLS	LS	1	\$9,500.00	\$9,500.00
3	REMOVE & REPLACE WALL AND FLOOR TILE	LS	1	\$24,000.00	\$24,000.00
4	REPAIR EXISTING VENTILATION / AIR CONDITIONING SYSTEM	LS	1	\$4,000.00	\$4,000.00
5	CLEAN AND RE-FINISH EXISTING CEILINGS	LS	1	\$7,000.00	\$7,000.00
SUBTOTAL:					\$54,500.00
CONSTRUCTION CONTINGENCIES (20%):					\$10,900.00
TOTAL ESTIMATED CONSTRUCTION COST:					\$65,400.00

Main "L" Shaped Pool

#	DESCRIPTION	UNITS	PLAN QUANTITY	EST. UNIT PRICE	AMOUNT
1	REPAIR VERTICAL CONSTRUCTION JOINTS IN THE POOL WALL	LS	1	\$7,000.00	\$7,000.00
2	REPAIR CRACKS AND SPALLS IN POOL WALLS (LOCATED MOSTLY WITHIN TOP 3 FEET OF WALL)	LS	1	\$18,000.00	\$18,000.00
3	RE-COAT TOP 3 FEET OF REPAIRED WALL AREAS	LS	1	\$12,000.00	\$12,000.00
4	REPAIR CONCRETE GUTTER; OR REMOVE CONCRETE GUTTER AND REPLACE WITH A STAINLESS STEEL GUTTER SYSTEM	LS	1	\$340,000.00	\$340,000.00
SUBTOTAL:					\$377,000.00
CONSTRUCTION CONTINGENCIES (15%):					\$56,550.00
ENGINEERING DESIGN, BIDDING & CONSTRUCTION					\$45,000.00
TOTAL ESTIMATED PROJECT COST:					\$478,550.00