

## Report to Community and Protective Services Committee

**To:** Chair and Members  
Community and Protective Services Committee

**From:** Cheryl Smith, Deputy City Manager, Neighbourhood and  
Community-Wide Services

Anna Lisa Barbon, Deputy City Manager, Finance Supports

**Subject:** Infrastructure Update – Thames Outdoor Pool

**Date:** March 21, 2023

## Recommendation

That, on the recommendation of the Deputy City Manager, Neighbourhood and Community-Wide Services and the Deputy City Manager, Finance Supports, the following actions be taken for Thames Outdoor Pool:

- a) Decommission Thames Outdoor Pool and explore future recreation and sport opportunities suitable to Thames Park and the surrounding neighbourhood (Option Five) **BE APPROVED**.
- b) Civic Administration **BE DIRECTED** to undertake the following:
  - i. Engage the neighbourhood on implementation of a future spray pad in the neighbourhood;
  - ii. Continue to explore other recreation and sport infrastructure opportunities suitable for Thames Park and in alignment with the Parks and Recreation Master Plan; and,
  - iii. Continue to analyse aquatic demand and assess the feasibility of including a 50-meter indoor pool at a future community centre build.
- c) Civic Administration **BE DIRECTED** to report back to Council on the costs and timelines associated with decommissioning Thames Outdoor Pool and building a spray pad at a future Community and Protective Services Committee (CPSC) meeting, noting that any costs will be built into the 2024 – 2027 Multi-Year Budget.

## Executive Summary

In the spring of 2022, major infrastructure issues were identified at Thames Outdoor Pool which resulted in the closure of the amenity for the 2022 outdoor season. This report provides information on aquatic service delivery, the history and usage of Thames Pool, the causes of the infrastructure issues identified, and provides a recommendation for Council consideration on the future of Thames Outdoor Pool.

## Linkage to the Corporate Strategic Plan

The Infrastructure Update – Thames Outdoor Pool report is aligned with the following strategic area of focus in the City of London Strategic Plan (2019 – 2023):

- Building a Sustainable City, under the outcome London's infrastructure is built, maintained, and operated to meet the long-term needs of the community.

# Analysis

## 1.0 Background Information

### 1.1 Previous Reports Related to this Matter

- [Parks and Recreation Master Plan Annual Report](#) (CPSC, January 31, 2023)
- [Recreation and Sport Summer Program Updates](#) (CPSC, May 31, 2022)
- [Parks and Recreation Master Plan Annual Report](#) (CPSC, March 29, 2022)
- [Thames Pool Revitalization](#) (CPSC, February 11, 2008)
- [Thames Capital Replacement Project \(RC2621\)](#) (CPSC, December 10, 2007)
- [Thames Outdoor Pool Capital Replacement Project \(RC2621\) – Public Consultation Process](#) (CPSC, October 29, 2007)
- [Allocation of Provincial Capital Grant](#) (CPSC, May 28, 2007)

## 2.0 Discussion and Considerations

### 2.1 Background and Purpose

The City of London offers high quality Recreation and Sport programs and facilities that engage residents and visitors of all ages and abilities. Recreation and Sport programs and facilities play a significant role in community building through the facilitation of active and passive activities, opportunities for structured and spontaneous play, and strengthening of neighbourhood connections. These services provide places for people of all ages and abilities to be active and learn new skills, connect with one another, share their interests, exchange ideas, and experience diversity.

The City of London currently operates eleven (11) outdoor pools in the community, throughout the months of June, July, and August, totalling 8-10 weeks of operation each year depending on weather.

The eleven (11) outdoor pools are as follows: Byron, Gibbons, Glen Cairn, Northeast, Northridge, Oakridge, Southcrest, Silverwood, Stronach, Thames, and Westminster.

This is in addition to the six (6) year-round indoor pools: Canada Games Aquatic Centre, South London Community Pool, Carling Heights Optimist Community Centre, East Lions Community Centre, Startech.com Community Centre, YMCA, and Library, and Stoney Creek Community Centre, YMCA, and Library.

The Parks and Recreation Master Plan (PRMP) does not recommend any additional future outdoor pools due to variable demand, high operating costs, the short season, susceptibility to changing weather, and because capacity exists in the current system of aquatic offerings. Instead, the PRMP recommends an increase in the number of year-round indoor pools to serve future growth.

During annual pre-season inspections by City of London staff in spring 2022, major infrastructure concerns were identified, including, but not limited to, shifting of the pool floor, and failure of the piping system at Thames Outdoor Pool, located within Thames Park at 15 Ridout Street South, requiring the closure of the amenity for the 2022 outdoor season.

The purpose of this report is to provide background on aquatic services, including PRMP direction for the future of outdoor pools, provide insight into the causes of the infrastructure concerns identified at Thames Pool, and to provide a recommended course of action for Council consideration.

## 2.2 Thames Outdoor Pool

Below is some information about Thames Pool's history and usage:

- Originally built in 1927 and redeveloped in 2010 to a 50-metre, 8-lane pool, including a beach entry.
- Amenities of the pool include universal changerooms, water slide, and 2 x 1-metre diving boards.
- There are approximately 25,000 visits annually, making up approximately 30% of all outdoor pool visits (approximately 80,000 visitors/year). The next highest usage outdoor pool is Stronach at approximately 9,000 visitors.
- Recreational swim program capacity is 500, which adds to the high visitor total noted above.
- Highest usage activities include (in descending order), recreational swims, lane swims, leadership certifications, swim lessons, and competitive swim rentals.

To maintain service levels for the above programs and services during the closure in 2022, Civic Administration implemented several strategies:

- Worked with competitive aquatic sport organizations to reassign time at other indoor and outdoor aquatic facilities where capacity exists, and amenity mix is suitable.
- Provided free summer swim passes to users of Thames Pool that could be used at any location.
- Provided transportation two days per week from the neighbourhood for set times to other indoor pool locations.

## 2.3 Thames Pool Site and Related Issues

Thames Pool is an outdoor pool complex located at 15 Ridout Street South, within Thames Park. Approximately 70 metres (230 ft.) north of the pool is the south branch of the Thames River. The pool is constructed in the river's floodplain making it vulnerable to hydrogeologic forces, specifically flooding and groundwater. (Appendix A, Photo 1)

The original pool was constructed in 1927 and a major rebuild project, creating the current complex, was undertaken in 2010. During the 2010 construction, a significant flood event occurred causing site damage and a need to redo work already completed.

Other recent incidents and significant repairs include:

- 2016 - Pool deck repairs (\$5,000)
- 2017 - Leaks in circulation lines repaired (\$11,000)
- 2018 - Major flood, height of the Thames River was 1.2m (4 ft.) above pool deck (\$145,000) (Appendix A, Photo 2)
- 2019 - Leaks in return lines repaired (\$15,000)
- 2020 - Flooding reached filtration room, equipment damaged/replaced (\$7,500)
- 2021 - Return lines repaired (\$20,000)
- 2022 - Pool caulking redone and repainted tank floor for waterproofing (\$35,000)

Following the discovery of the infrastructure concerns and failures in the spring of 2022, Civic Administration immediately began seeking out qualified partners to assist with the investigation into the causes of such failure.

In fall 2022, a consulting team, including aquatic designers, building science engineers and geotechnical engineers completed a review of the Thames Outdoor Pool. This work included a review of the construction plans for the 2010 rebuild, construction progress photos and discussions with City of London operational staff regarding the construction and later incidents and repairs. Additionally, a visual assessment, concrete core sample testing, and a soil analysis were completed.

The purpose of the review was to identify the likely cause(s) of the Thames Pool failure and propose potential solutions to remedy the concerns.

## 2.4 Causes of Infrastructure Damage

The consulting team concluded, and there is evidence to support this conclusion, that the Thames Pool has experienced:

- Differential movement in the slab, or pool floor;
- Failures in the piping systems; and,
- A loss of base support.

The repairs required since 2016 would be consistent with these findings.

The most probable cause of the infrastructure damage is hydrostatic uplift pressure or frost penetration below the slab (pool floor). Both are related to the groundwater conditions of the site. A 2007 geotechnical report prepared by Trow Associates prior to the 2010 rebuild found groundwater levels about 2 m (6.5 ft.) below the existing ground surface. The report also cautions higher groundwater levels would occur in wet seasons and when the Thames River level was high.

When frost penetrates soil supporting a structure, groundwater held in the soil can freeze, expanding in volume by approximately 10 percent. This expansion exerts force that can result in movement of the structure. If the movement is uniform, the structure will be displaced equally. If there is differential movement, cracking or other stress on the structure may result.

Hydrostatic uplift pressure occurs when the groundwater levels rise above the base of the structure, putting upwards pressure on the structure. If the uplift pressure exceeds the downwards pressure of the structure, then upwards movement occurs. (Appendix A, Figure 1)

The downwards pressure in a slab-on-grade pool is created in two ways. At the sides, the pool tank walls and surrounding soil exert downwards pressure on the slab. In the middle, it is the weight of the concrete slab and any water in the tank that exert downward pressure. The downwards pressure at the sides is greater than in the middle of the pool so the hydrostatic uplift pressure of high groundwater would result in differential slab movement.

Any movement of the pool slab will result in probable damage to the pool piping system. The protruding floor drain is evidence of significant hydrostatic uplift pressure. (Appendix A, Photo 3). Cracking in the pool slab (Appendix A, Photo 4) and damage at the pool walls (Appendix A, Photos 5 & 6) are the result of differential movement of the pool tank. The extent of the cracking is shown in (Appendix A, Figure 2)

In simple terms, the groundwater pressure resulted in cracking and shifting of the pool tank and damage to the piping.

A geotechnical investigation, including boreholes, completed by Terrapex Environmental in September 2022, found that voids appeared to be present in the granular base material below the pool floor. Leaking from broken piping could create localized voids, but the widespread existence of the voids suggests hydrostatic uplifting has disturbed the granular material. This may have created high and low points in the base material that the slab rests on and additional stress on the slab.

Sand in the floor returns and extruded through cracks in the concrete is evidence of the degradation of the base layer. (Appendix A, Photo 7)

In simple terms, water from leaking pipes and groundwater action has disturbed the sand and gravel base material under the pool.

It is clear from the history of repairs and investigations completed, that Thames Pool has experienced significant and repeated infrastructure damage due to its location in the floodplain. Significant weather events impacting the groundwater level and overland flooding from the Thames River are continuing threats for further damage.

The frequency and severity of weather-related events are increasing, and this also impacts the safe use of an outdoor amenity.

## **2.5 Key Principles**

In preparation for review of the potential options and determination of next steps to address the significant infrastructure damage, Civic Administration identified three key principles to evaluate the options to be considered:

### Service Level Expectations

To provide aquatics programming to meet the needs of Londoners in summer 2023 and beyond. Capacity at all facilities and alternative programming strategies are included in this principle.

### Stewardship of Funds

To consider fiscal responsibility, including operating and capital costs of each option and the inherent risk of groundwater or flooding damage at the Thames Park site.

### Capital Asset Management and Sustainability

To build and maintain infrastructure assets in a sustainable manner, including climate change adaptation strategies. This principle recognizes the changing climate patterns and increased risk of flooding on a year-round basis.

The consulting team completed a detailed review to identify the likely causes(s) of the Thames Pool failure. Based on their findings, the consulting team proposed several potential solutions to remedy the concerns and causes of failure. The section below outlines the alternatives proposed, taking into consideration the key principles that have been identified.

## **2.6 Options Considered for Next Steps**

The five (5) options presented below were reviewed and considered by Civic Administration in the context of the guiding principles when formulating this report's recommended option. These are high level proposals intended to help determine the preferred course of action. Further investigation, design and engineering would be required to support all the options listed below. The options are summarized as follows:

1. Minimum Repairs
2. Extensive Repairs
3. Rehabilitation
4. Rebuild at Current Site
5. Decommission Thames Outdoor Pool and explore future recreation and sport opportunities suitable to Thames Park and surrounding neighbourhood

In all options, strategies to address the underlying cause of the concerns and damage are presented. It is also important to note that each option increases the complexity of the project and the costs associated with it. Additional measures support mitigation and prevention efforts, however, the risk from groundwater and flooding remains at the Thames Pool site.

The primary objective of options one (1), two (2), and three (3) is to monitor and attempt to manage the groundwater to address the underlying cause of the concerns, however, these are not permanent solutions to minimize or manage the risk from groundwater. Flooding remains a continued risk at the Thames Outdoor Pool site. Option four (4) does not eliminate risk from groundwater and flooding at this site, however, a new design specific to the site conditions could mitigate the risks.

The final option is the only option that fully addresses the continued risk of failure and potential ongoing repair costs due to the site conditions. In applying the key principles identified above, option five (5) - Decommission Thames Outdoor Pool and explore future recreation and sport opportunities suitable to Thames Park and surrounding neighbourhood, is the only option that fully supports these principles.

All other options cannot fully mitigate the risk of infrastructure failure at its current site in the floodplain and potential costs to ensure long term sustainability of the capital asset to meet service level expectations.

**Option One – Minimum Repairs**

Scope

- Establish a site well to monitor and manage groundwater conditions.
- Provide additional relief ports in the pool slab to help relieve hydrostatic pressure.
- Remove pool slab, replace below slab piping, reconnect to existing main lines.
- Replace pool slab to existing depth.

Estimated Construction Cost and Duration: \$375,000 - 6 months

<b>Advantages</b>	<b>Disadvantages</b>
Shortest time to return pool to use (approximately six months)	Very short-term solution
Least expensive	Site well is independent of pool piping, rely on gravity and groundwater flow to site well
	High groundwater or floods could cause damage
	Contractors unlikely to offer warranty

**Option Two – Extensive Repairs**

Scope

- Provide site well and additional relief ports.
- Remove pool slab, pool deck and piping – Install new piping.
- Install new wall returns at higher elevations, connect to existing main lines.
- Replace pool slab with thicker concrete to provide more mass.

Estimated Construction Cost and Duration: \$600,000 - 8 months

<b>Advantages</b>	<b>Disadvantages</b>
Relatively short time to return pool to use (approximately eight months)	Short-term solution
Second least expensive	Site well is independent of pool piping, rely on gravity and groundwater flow to site well
Additional slab thickness provides greater mass and offsets the buoyancy of the pool tank to resist uplift	High groundwater or floods could cause damage
Less water volume in tank, improves filtration	Reduced pool depth may affect diving
	Contractors unlikely to offer warranty

**Option Three – Rehabilitation**

Scope

- Provide site well and additional relief ports.
- Install modular gutter with return system, abandon wall returns.
- Install membrane on existing slab, abandon floor returns.
- Install new, thicker slab on top of existing slab.

Estimated Construction Cost and Duration: \$4,000,000 - 12 months

<b>Advantages</b>	<b>Disadvantages</b>
Begins to address longer-term solutions	Groundwater and uplift pressure may cause membrane on existing slab to “bubble”
Eliminates piping outside of pool shell	Reduced pool depth may affect diving
Additional slab thickness provides greater mass and offsets the buoyancy of the pool tank to resist uplift	High groundwater or floods could cause damage
Less water volume in tank, improves filtration	Contractors unlikely to offer warranty

#### **Option Four – Rebuild at Current Site**

##### Scope

- Remove entire pool and deck.
- Construct new pool / aquatic amenities.
- Incorporate design and engineering provisions to mitigate groundwater pressures.

Estimated Construction Cost and Duration: +/- \$12,000,000 depending on design  
16 months

<b>Advantages</b>	<b>Disadvantages</b>
Proper design, engineering, and installation for a floodplain	Most expensive
Longer-term solution but floodplain location still presents ongoing risks	High groundwater or floods could cause damage

The timelines and costs presented in options one to four are estimates for construction only and are based on similar projects completed in the 2020 to 2022 timeframe. Permits, consulting fees, related landscaping costs etc. are not included in these cost estimates.

#### **Option Five – Decommission Thames Outdoor Pool and explore future recreation and sport opportunities suitable to Thames Park and surrounding neighbourhood**

##### Scope

- Thames Outdoor Pool be decommissioned as this site is no longer viable due to increased flooding and groundwater concerns.
- Civic Administration engage the neighbourhood on implementation of a future spray pad in the neighbourhood.
- Civic Administration continue to explore other recreation and sport infrastructure opportunities suitable for Thames Park.
- Continue to analyse aquatic demand and assess the feasibility of including a 50-meter indoor pool at a future community centre build.

<b>Advantages</b>	<b>Disadvantages</b>
Investments in an alternate site not prone to flooding and groundwater concerns is fiscally responsible	Thames Pool is a long-serving community amenity and the only 50 m outdoor pool in the portfolio
A new aquatics facility could address other service needs for other users	Time required to develop an alternative site and design
Redistribute current demand to other facilities that have available capacity	Cost dependent on final design but a more expensive option than repair options
Maximize the use of other pools	
Reduced operating costs on a per visit basis	
Consistent with Climate Emergency Action Plan to build assets with greater climate resilience	

The key principles of Service Level Expectations, Capital Asset Management and Sustainability, and Stewardship of Funds support investment into an aquatics asset that can be adequately maintained for the long term is most fiscally responsible and could meet the needs of multiple user groups.

### **3.0 Financial Impact/Considerations**

If option five (5) is approved, costs and timelines associated with decommissioning Thames Outdoor Pool and building a spray pad in the neighbourhood will need to be further explored with a report back to Council at a future date, noting any costs will be built into the 2024 – 2027 Multi-Year Budget.

Should Council provide Civic Administration direction to pursue an option other than option five (5) as presented, a Source of Financing will need to be identified.

### **4.0 Next Steps**

Upon approval of the recommended option presented, or if any other direction is provided by Council on this item, Civic Administration will immediately begin work on a comprehensive communications plan to inform user groups and the public of the outcome and next steps for Thames Outdoor Pool.

Next steps will build on the strategies used in 2022 to support the neighbourhood to access alternative opportunities. These include but are not limited to:

- Working directly with aquatic sport organizations on planning and securing time at alternate locations for the 2023 outdoor season and beyond;
- Reaching out to users of Thames Outdoor Pool to offer swim passes to other locations for the 2023 outdoor season;
- Exploring transportation options to other locations for the neighbourhood for the 2023 outdoor season;
- Beginning the feasibility process for a spray pad in the neighbourhood; and,
- Aligning future recreation and sport infrastructure with the recommendations in the Parks and Recreation Master Plan and the multi-year budget process.

This does not mean that Londoners experiences were not impacted by the closure in 2022 or will not be impacted by the closure in 2023 (noting all options will keep the amenity closed in 2023), as Thames Outdoor Pool is a destination location and a staple for many in the community.

## **Conclusion**

Thames Outdoor Pool was originally built in 1927 and redeveloped in 2010. It has served the community for almost 100 years and currently accounts for approximately 30% of all outdoor pool visits at London's eleven (11) outdoor pools annually.

This report and the associated recommendations are difficult for Civic Administration, City Council, and the public. Recreation and Sport facilities provisioned by the municipality have a deep connection with those they serve, often crossing generations and creating lifetime memories.

Despite the above, Civic Administration feels the most appropriate course of action for Council to consider is to decommission Thames Outdoor Pool, noting the risk of future infrastructure failure cannot be eliminated at its current site in the floodplain with any of the other options considered.

**Submitted by:** Jon-Paul McGonigle, Director, Recreation and Sport  
Lynda Stewart, Director, Fleet and Facilities

**Recommended by:** Cheryl Smith, Deputy City Manager, Neighbourhood and Community-Wide Services  
Anna Lisa Barbon, Deputy City Manager, Finance Supports



APPENDIX A

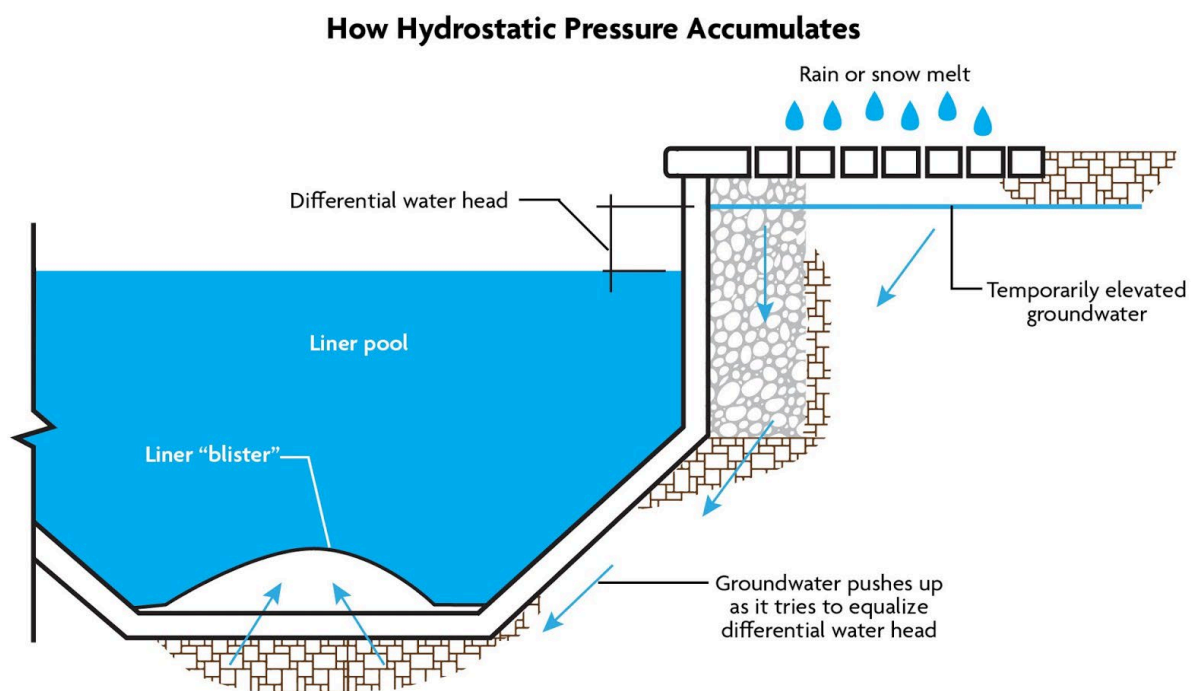
Photo 1 – Stock Aerial Photo of Thames Pool



Photo 2 – Thames Pool Flooding 2018



Figure 1 – Hydrostatic Pressure Diagram



**Photo 3 – Protruding Floor Drain**



**Photo 4 – Spalling of concrete along the crack line evident in the pool slab**

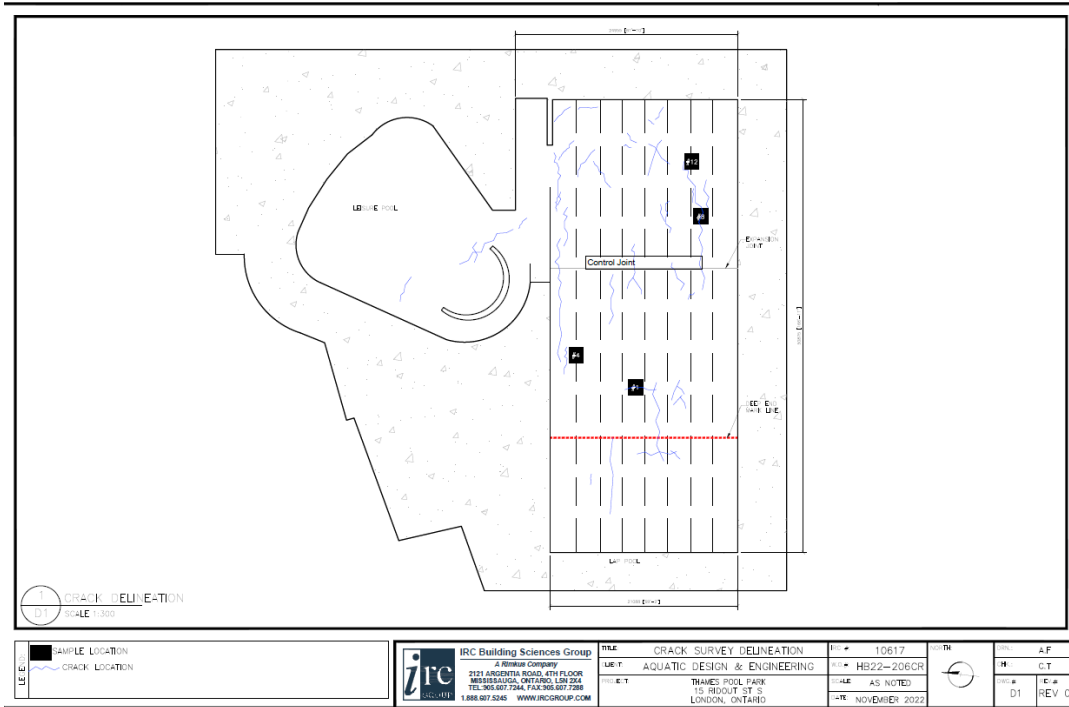


**Photo 5/6 - Indication of Pool Movement**



**Damage to coping and gutter – indication of pool movement, recently repaired**

**Figure 2 – Delineation of cracking in Thames Pool**



**Photo 7 – Subgrade Deterioration**



Hydrostatic pressure evidence: subgrade material forced out along crack line