

Regional District of Central Kootenay

Creston and District Community Complex

James Ross Memorial Pool

Pool Condition Assessment &

Upgrade Feasibility Study

May 2006

REGIONAL DISTRICT OF CENTRAL KOOTENAY	
FILE #	6915-12
JUL 07 2006	
DOC #	06003132
REF. TO:	MCS
CC:	CVSC

Executive Summary

The report was prepared based upon the review of a series of photographs, existing design drawings, consultation with pool operators about the history and operation of the pools and a site visit on April 24, 2006. The report only considers the swimming pools, decks and associated buildings, and does not address any other aspect of site development.

Criteria for determining the required upgrades and repairs of the pools include the Provincial Health Act, Swimming Pool, Spray Pool and Wading Pool Regulations, BC Reg. 289/72, the National Spa & Pool Institute standards and current industry health and safety standards for construction and operation of public swimming pools.

Both swimming pools are unsafe and no longer meet minimum acceptable levels of operational, Health and Safety standards. The operation of these pools as they currently exist would leave the Regional District of Central Kootenay (RDCK) open to possible liabilities and patrons at risks of personal injury. The Provincial Health Act, BC Reg. 289/72 has been in effect since 1972 and has been amended in 1986, 1988, 1992 and 2003. These pools have not been completely upgraded to meet current standard.

The estimated costs in this report do not include the costs to upgrade and repair associated buildings, as it is assumed that a cost assessment of these items will be completed by others more qualified.

The estimated cost of construction for the immediate repairs recommended in this report is \$ 55,000.00. The estimated cost for future repairs recommended in this report is \$ 175,000.00. Estimated cost for new pools of equal size, based current construction cost would be \$ 450,000.00.

Introduction

The Creston and District Community Complex swimming pools and associated facilities were originally designed in 1972, revised in 1974 and built shortly thereafter in combination with the ice rink to service residence of the Creston area. It is assumed the pools were designed in accordance with the most current regulations at that time.

Over the years, the leisure service staff has made an excellent effort keeping these pools operational, including making modifications and repairs as required to pool decks, piping, equipment and the pool tanks. Unfortunately, the age and continual deterioration of the pools due to the harsh freeze/thaw environment has created a need for extensive maintenance and repairs in order to keep the pools operational at an acceptable health and safety level.

In April 2006, Rockingham Pool Consulting Inc. was retained to prepare a report on the feasibility and costs for upgrading these pool facilities to the current standards of health and safety, which would be acceptable to the BC Ministry of Health and good engineering practices within the pool industry.

Objectives

The objectives of this report are as follows:

- .1 To review the existing pools for health and safety concerns.
- .2 To indicate repairs required to safely operate the pools.
- .3 To indicate upgrades required to meet current Health Act.
- .4 To provide an estimated cost to upgrade and repair pools.

Scope of Work

The scope of this report is confined to the actual swimming pools and facilities in the area of the pools and do not include other planning activities relative to the development of the overall site. Activities not included in this report would be:

- .1 Access to, and circulation outside the pool enclosure for foot traffic.
- .2 Assessment of Ice rink facility.
- .3 Planning of and connections to sanitary services.
- .4 Planning of any facilities necessary for the management plan of the area, including parking, signage, etc.
- .5 Planning for any restoration landscaping that may be required of desired at the sites.
- .6 Planning and construction of ancillary building repairs and upgrades.

General Overview

There are two pools within the enclosed area, one wading pool and one swimming pool with diving boards and slide. The pool deck is concrete. Public access to the pool area is through the change rooms. The change rooms are located inside the civic center and are shared with the ice rink. There are separate male and female change areas with toilet and shower facilities. A small lifeguard office area looks out onto the pool deck. The pool is enclosed by a 6'-0" high chain link fence with a locking gate access. All pool equipment is located in a pool mechanical building adjacent to the pool deck.

The pool apron is approx. 10'-0" wide along the longitudinal sides, 20' wide between the change rooms and the wading pool, 8' wide between the two pools and 16'-0" wide at the diving end. There are two diving boards at the deep end of the pool, besides that, the perimeter of the pools are clear of obstructions. The pool deck is uneven and cracked with weeds growing through cracks. The wading pool coping is lifting and the deck has sunk in areas around the main pool causing toe stubbing and tripping hazards. The deck does not drain well and there are areas with pooling water on the deck. Standing water becomes dirty and slippery; this combined with an uneven deck surface increased the risk of pool patrons falling while walking on the pool deck.

Female change room and washrooms are poorly laid out, causing patrons to exit the change room area and pass through the ice rink area to enter the toilet room. A door between toilet room and change room is provided, but kept locked so a baby change table can be located there. Flooring in toilet room has been destroyed by ice skates and impossible to keep clean and safe for patrons in bare feet to walk. Floor surface in change area is also very rough and does not drain. Female change room is poorly vented and maintains a "mildew like" odour leading patrons to believe the room is not cleaned despite the labour intensive daily scrubbing and disinfection of the entire area by pool staff.

Men's change room is larger and has better layout, traffic circulation and ventilation. Floors are also rough on bare feet but slope to drain much better than the Female area does.

Lifeguard room has direct access to pool deck, but room is crowded and has limited storage space. Floor has linoleum finish which can be extremely slippery when wet.

The pool equipment building has cracks in the floor slab due to settlement, but is generally in acceptable condition. Gas chlorine is located in a separate room accessible from the back of the pool equipment building, but is missing gas leak detector and monitors required by WCB.

Wading Pool

This 1408 sq.ft. outdoor wading pool was built around 1975 and has been operated every summer since. The estimated volume of this pool is 22,650 gals. The pool tank is concrete and finished with marcite plaster.

The pool dimensions are 32' x 44' with a continuous slope from approx. 2" to 2'-6" at the deepest point. Water level is 8" below the deck and there is a pre-cast concrete coping around the perimeter of the pool. There are access stairs in one corner of the pool with 3-12" treads and 4 equal risers. There is a 12" tile band around the top of the pool wall and the remainder of the pool tank has a plaster finish.

The concrete pool tank has deteriorated along the top of the walls and the tiles and plaster have pulled away exposing the pool shell. The exposed concrete pool shell is in poor condition (see appendix photos 1 & 2). It appears water has migrated between the shell and the plaster causing hollow areas and cracks that have required numerous repairs over the years. The cracked floor plaster and tiles cause a high rate of cuts to pool patron feet, estimated at 10+ injuries per day while the pool is in use.

There is only one main drain at the deepest point in the pool. The original drawings did not indicate any skimmers, but there are four surface skimmers installed, 6 wall inlets and 2 underwater lights. Water circulation and clarity is reported by pool operator to be good, but they operate with 60% flow through skimmers and only 40% flow through main drain to reduce risk of suction entrapment from main drain.

The wading pool's 36" sand filter, 2 hp recirculation pump and pool heater are in fairly good condition. Visible pool piping is schedule 40 pvc and appears to be in good condition although the main drain pipe is slightly undersized at 2 ½" instead of 3" as required by Health Act. All other pool piping is adequately sized.

Liquid chlorine is used to disinfect this pool. The chlorine and acid feed system is not automated therefore during heavy use times the pool water is difficult to keep balanced. The chlorine and acid tanks are kept inside the main pool equipment room along with the Soda Ash and DE tanks. The gas fired pool heaters are located in the same room along the opposite wall about 15 feet from the chemical tanks.

Swimming Pool

The 3615 sq.ft. outdoor swimming pool was built around 1975 and has been operated continuously every summer since. The estimated volume of this swimming pool is 146,600 gals. The pool tank is concrete and finished with marcite pool plaster and tile lane markers.

The pool dimensions are 82'-2" x 44'-0" with a floor slopes from 4'-6" to 5'-6" deep then the slope increases to form a dive tank area with a maximum 12'-6" depth. Water level is approximately 6" below the deck and spills into a pre-cast rim flow gutter system.

Current standards for 3 metre diving profile require a minimum 20' from end wall to have water depth between 11'-9" and 12' before beginning upslope to 5'. The dive profile indicated in existing pool drawings has sufficient width, but the upslope begins at 15' from end wall, thus creating a reduced area for divers and increasing the risk of divers hitting the upslope wall.

The rim flow gutter system is made of pre-cast blocks that have deteriorated to the point that there are sections breaking off and rebar is now exposed. Water has penetrated around the gutter blocks and caused tiles to lift and pull away from pool shell. Tiles and broken gutters have created many sharp edges causing a reported 5+ hand injuries to bathers per day while pool is in operation (see appendix photos 3 & 4).

The concrete pool tank has deteriorated and cracked over the years and has had numerous repairs. There are areas in deep end of pool where the shell has deteriorated to the point that ground water is visibly seeping through concrete and plaster finish (see appendix photos 5 & 6). The number of areas has increased from 3 in 2000 to 9 in 2006. Water caught between pool shell and plaster has caused tiles to lift and plaster to crack, creating a hazard for bathers' feet.

At the deepest point of the pool there are two 12" x 12" main drains with brass frame and grates. There are floor inlets evenly spaces along the pool floor and three wall inlets along wall at the deep end of the pool. Water circulation and clarity is reported by pool operator to be good. Suspected leaks in the gutter system and main outlet piping cause the pool to lose over 4" of water per day so fresh water is continuously added to pool. This substantial amount of water loss increases overall operating cost of pool due to chemical loss in water, increased chemical consumption and continuous heating of "new" water.

There is no sign of paint, plaster or any other form of waterproof coatings inside the surge tank structure. Over the years water has been penetrated the surge tank structure and deteriorating the concrete causing the tank to leak. Recent repairs to a large hole in a bottom corner of the tank helped reduce the water

loss in the pool from 8" to 4" per day, but the tank structure is weak and could develop more leaks anytime.

Large volume of water found in the storm sump in the equipment room was tested and found to have identical water chemistry as pool water, thus confirming that pool water has been leaking from the pool system, most likely from a break somewhere in the main outlet piping. Some pool pipes were tested for leaks about 8 years ago. Leaks in the gutter system were found and repaired, but the pool continues to have excessive water loss of approximately 4" per day.

The swimming pool equipment is operational, but the old style filter is difficult to maintain and replacement parts are becoming more and more difficult to obtain. Acutrol chemical controller monitors chlorine levels well, but soda ash is still manually adjusted. Liquid chemical feed system plugs easily and requires continual maintenance. Gas chlorine system operates well, but leak detector and monitor as required by WCB are missing.

Health and Safety Concerns

The pool facility does not meet current health and safety codes and standards. The most significant issues are as follows;

General

- 1) Pool deck is uneven, difficult to clean and has numerous toe stubbing and tripping hazard.
- 2) Access to toilet area from Female change room, floor finish and ventilation needs to be improved.
- 3) Lifeguard room linoleum floor extremely slippery and needs to be improved.

Wading Pool

- 4) The single main pool drain does not have enough open area to ensure the maximum suction velocity of water passing through the grate does not exceed 1.5 feet per second. A velocity greater than 1.5 fps will create a serious suction hazard that is made worse by having only one outlet. Worst case scenario, a single bather could theoretically sit on the outlet, block the grate and be unable to pull free due to the increased suction velocity.
- 5) Pool structure compromised especially around the perimeter of pool wall at the normal water level.

- 6) Broken tiles and plaster finish very rough with sharp edges and hazardous to bathers. Current reported injury rate is unacceptable.
- 7) During times of heavy use, the pool staff has a difficult time maintaining healthy water quality without the aid of an automated system similar to the Acutrol system used for the large swimming pool.

Swimming Pool

- 8) Dive tank profile does not meet today's standards required for 3 meter board leaving divers unfamiliar with this pool vulnerable and the pool owner / operators open to liability should an diving accident occur.
- 9) Pre-cast rim flow gutter condition causes sharp edges; uneven joints and exposed reinforcing create hazardous conditions and reported high injury rate to bathers' hands.
- 10) Pool structural integrity has been compromised at deep end. Large void areas under pool most likely exist due to leaking pipes releasing excess water, washing away soil and adding to the deterioration of the shell. Life expectancy and full extent of shell damage is unknown, but is obviously deteriorating at a significant rate based on the increased "weeping" areas over the past six years. Excessive water loss through main outlet piping will continue to wash away soil and erode pool shell.
- 11) Lack of adequate protective coating inside surge tank will allow for continued deterioration of tank structure and additional leaks.
- 12) Chlorine gas detectors and monitors must be installed to meet Health and WCB requirements.

Immediate Repairs and Upgrades

In order to make the pool facility serviceable for the upcoming season, there are a number of repairs and upgrades recommended in order to meet the minimal operational Health and Safety standards. The following is a list of minimum repairs and upgrades;

General Area

- 1) Pool deck to be replaced with new concrete decking that slopes away from pool and drains towards landscaping. New depth markers to be installed at the shallowest point, at 1'-0" water depth increments and the deepest point of both pools.

- 2) Female change room and toilet room flooring to be replaced with non-slip, non-abrasive surface, access to toilet room to be modified and ventilation to be repaired.
- 3) Men's change room flooring to be replaced with non-slip, non-abrasive surface.
- 4) Lifeguard room flooring to be replaced with non-slip surface.

Estimated cost to complete the above is not available.

Wading Pool

- 5) Pool shell to be repaired with concrete mortar and grout, cracks to be filled, all sharp edges to be sanded down and new tiles, plaster and/or epoxy pool paint to be applied.
- 6) Repair or replace wading pool coping with new poured in place coping.

Estimated cost to complete the above: \$ 45,000.00 (majority of cost in removal and replacement of existing pool plaster).

Swimming Pool

- 7) Remove and replace damaged floor and wall tiles.
- 8) Remove and replace pre-cast rim flow gutter system with new poured in place gutter. Remove existing gutter pipe. Provide 18 equally spaced drains in gutter connected to new 4" diameter continuous looped pipe.
- 9) Pressure test existing pipe and if all is well, tie new gutter pipe into existing pipe line that runs to pool equipment room.
- 10) Provide warning sign for 3 meter diving board users and establish maintain strict rules governing use of 3 meter board or remove 3 meter board.
- 11) Repair surge tank structure and apply new protective waterproof coating inside tank.

Estimated cost to complete the above: \$ 10,000.00

Future Repairs and Upgrades

In order to make the pool facility serviceable beyond this next season, there are a number of repairs and upgrades recommended in order to meet the current Health and Safety standards. The following is a list of minimum repairs and upgrades;

Wading Pool

- 1) Add 2nd main outlet to further reduce the suction velocity and to reduce risk of single outlet becoming blocked.

- 2) Replace the existing main drain suction piping with new 3" diameter schedule 40 PVC piping.
- 3) Repair pool shell and plaster as required to complete installation of new outlet & piping.
- 4) Install automated chemical controller.

Estimated cost to complete the above: \$ 15,000.00

Swimming Pool

- 5) Repair pool shell in deep end and modify profile to comply with current 3 meter diving standards. This would require major modifications to existing pool structure.
- 6) Replace existing DE filter with new Horizontal sand filter.
- 7) Replace surge tank with new structure complete with protective coating.

Estimated cost to complete the above: \$ 160,000.00

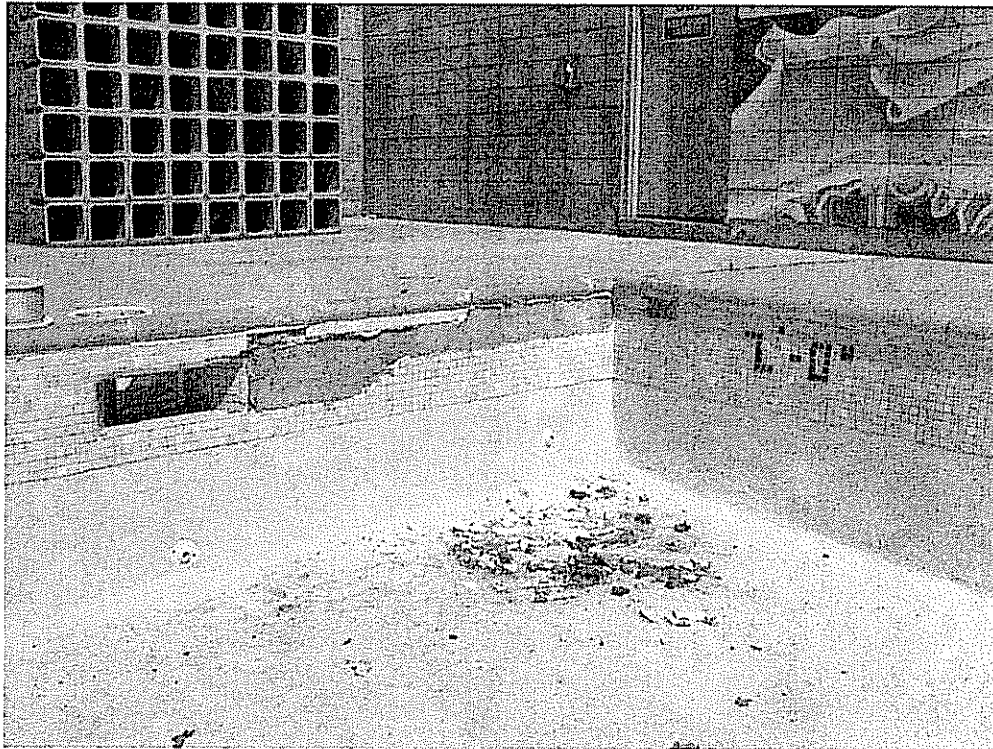
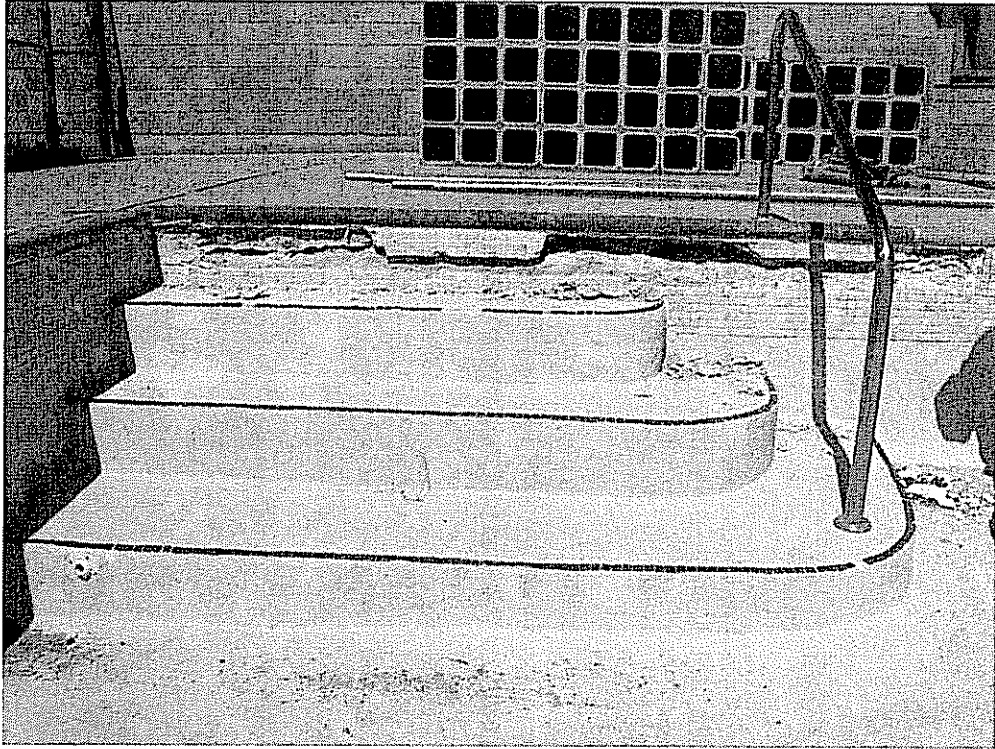
The cost estimate provided above only includes pool associated repairs and does not include the cost of upgrades to lifeguard room, change rooms or building ventilation. It is assumed the RDCK has staff more experienced at estimating the cost of these items.

A typical concrete pool shell has a life expectancy of approximately 50 years. In environments where an outdoor pool is more exposed to freeze/thaw conditions the life expectancy may be reduced significantly. Please be aware that even if the above noted repairs are completed, these pools will continue to deteriorate. At best the above repairs would be a band-aid solution that may only last a few years before this 30+ year-old pool shell is no longer repairable. Eventually, the old pools will have to be partially or wholly demolished and replaced with new ones.

My final recommendation would be to consider the option of building entirely new pools that could be enclosed at a later date, thus in effect phasing the construction on a year round indoor pool facility. New outdoor pool facility could incorporate updated technology and design features that help simplify operations and reduce operation costs.

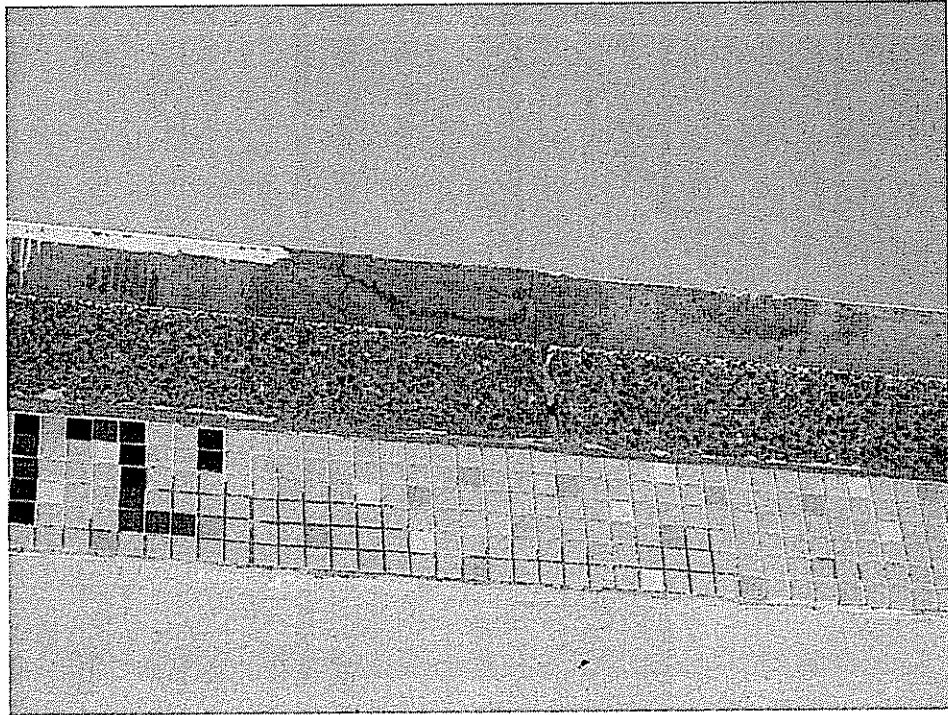
Estimated cost to construct new 25m swimming pool and wading pool of equal size \$ 450,000.00

Appendix



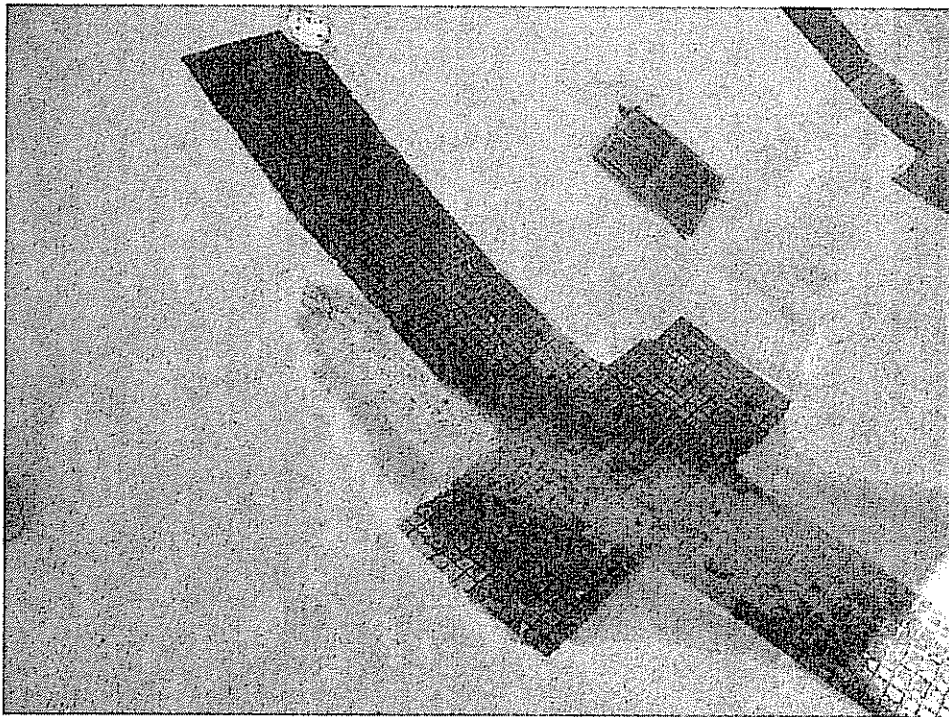
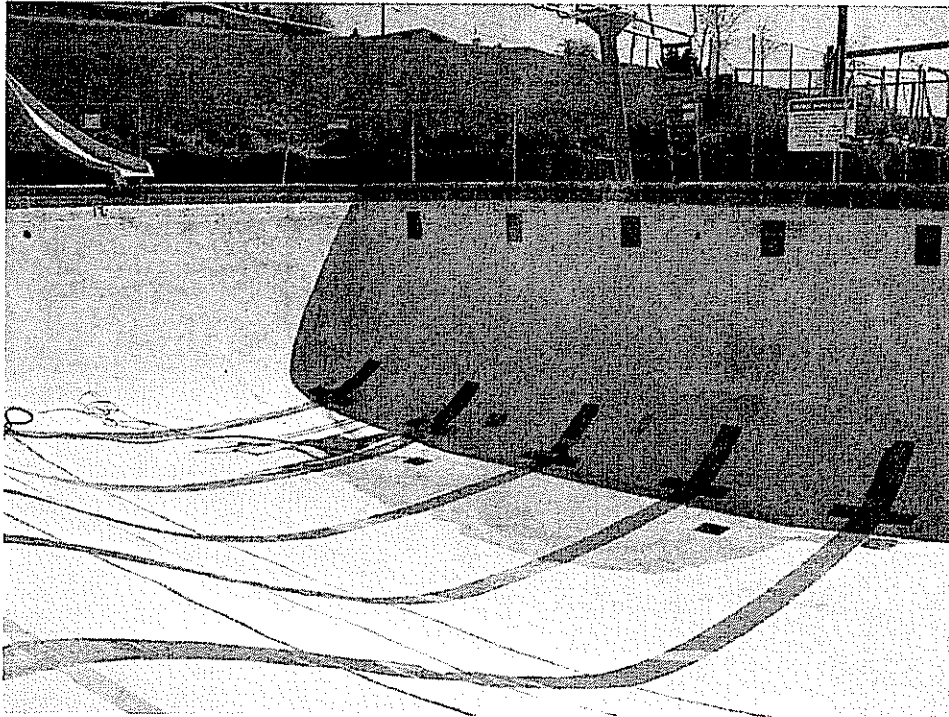
Photos 1 & 2: Wading Pool wall deterioration and tile damage

Appendix



Photos 3 & 4: Swimming Pool pre-cast gutter deterioration

Appendix



Photos 5 & 6: Swimming Pool diving tank ground water seepage

