EVALUATION OF THE MOUNTAIN VIEW ELEMENTARY SCHOOL INDOOR SWIMMING POOL

Prepared For:

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DATE: March 20, 2001

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EXECUTIVE SUMMARY

POOL FUNCTION AND USABILITY

An analysis of the existing pool tank configuration indicates the following:

Instruction: The existing pool is quite adequate for basic instruction, training, and aerobics.

Competition: The existing pool meets none of the requirements for competitive swimming. The length is too short, the width does not allow the six to eight lanes required for competitive meets and the shallow-end depth is inadequate for tuck and turns by adult swimmers.

Diving: The 9'-6" maximum depth and the low ceiling of the Natatorium make the existing pool inadequate for diving from one or three meter boards and is marginal as to whether it meets the minimum depth requirements for diving from the deck.

IMPROVEMENTS TO MEET CURRENT CODE AND OPERATION STANDARDS

Physical features of the Natatorium and the pool meets most of the rules and regulations of the Washington State Board of Health WAC 246-260. We are recommending that a pool liner system & handicap lifter be installed, and that new deck graphics and signing be provided as well as several maintenance items. We recommend some minor changes to the Mechanical HVAC System Controls and a new domestic water heat exchanger; perhaps the biggest deficiencies are in the pool lighting and electrical systems. We recommend new Natatorium lighting, new emergency lighting, and a new fire alarm system. The cost to accomplish these code and operational improvements is estimated at $167,714.00.

MAINTENANCE ITEMS EXPECTED OVER THE NEXT 30 YEARS

In order to extend the life of the pool for another 30 years we anticipate that 10-15 years a new pool deck and pool liner surface will be required. In 15 to 20 years a new roofing system must be installed and periodic painting of the interior and exterior every 10 years. In addition we would anticipate the HVAC System will periodically require replacement of bearings, control dampers motor, and an upgraded control system. The same type of maintenance will be required of the pool water circulation system. We anticipate pump replacement, pool/water heat exchanger replacement, filter media replacement, valves, and chemical controller replacement as they become in operative. The lighting system as replaced above should last for another 30 years. The cost to replace finishes and equipment over the 30 year extended life of the pool is estimated at $355,113.00 in today's dollars.

NEW 25-YARD LAP POOL OPTION

The new interior layout incorporating a 75'-1" x 28'-0" lap pool and a 24'-0" x 56'-0" zero depth family pool will cost $ 1,392,108.00 to construct. In comparison a new 75'-1" x 44'-0" competition pool with one and three meter diving and a 24'-0" x 56'-0" zero depth family pool would cost $3,862,022.00 to construct.

BACKGROUND AND ANALYSIS OF POOL TANK CONFIGURATION

BACKGROUND

The Mountain View Elementary School Indoor Pool Facility was constructed in 1962 and is now thirty-nine (39) years old. Modifications were made to the Natatorium HVAC System in 1994 and the pool mechanical system at the same time; otherwise, the facility remains essentially the same as originally constructed. The purpose of this pool evaluation is to:

- Make a detailed field investigation of the Natatorium space, swimming pool tank, mechanical, and electrical systems. The existing dressing rooms, showers, and office areas are excluded from the study.
- Evaluate and analyze existing conditions for operating, safety, and health code deficiencies.
- Identify costs to repair or replace existing systems to extend the useful life expectancy of the facility another 30 years.

ANALYSIS OF POOL TANK CONFIGURATION

Main Pool Tank:

The existing main pool tank is an “L” shaped pool, 60 feet in length and 28 feet in width in the East/West lanes and 56 feet in length and 28 feet in width in the North/South lanes. Depth varies from 3'-0" to 4'-0" in the East/West lanes and from 4’-0” to 9’-6” in the North/South lanes. The two (2) main drains are located at the deepest part of the pool, which is 9’-6” at the main drains. There are no diving boards in the facility.

Since the Mountain View pool tank dimensions are fixed, we can only compare it to accepted standards for new pools. Refer to the "Main Pool Tank Design Dimension Configuration Analysis" and "Analysis of Physical Condition" following.

Main Pool Tank Design Dimension Configuration Analysis:

Although the facility is not presently used for competitive swimming and diving, the City should give consideration to the adaptability of the existing dimensions to the future uses contemplated. The governing bodies of competitive swimming (USA Diving, USA Swimming, NCAA and National Federation of State High School Associations) differ on a number of essential points in regards to competitive pool design. Few swimming pools will ever conduct national or international swimming and diving championships; compromises can be accepted in pool dimensions without affecting the local competitive swimming meets. In areas of safety, there should be no compromise in the dimensions of the pool. There are certain minimum standards, which no pool should fall below if the community intends to conduct a competitive swimming program.

BACKGROUND AND ANALYSIS OF POOL TANK CONFIGURATION

In 1969, the Council for National Cooperation in Aquatics (CNCA) published an initial series of recommendations to guide Architects and Engineers in the planning of public swimming pools. In 1975 those recommendations were amended to include safety issues and have since been amended again in 1987. In 1984, CNCA published a report entitled "*Diving Injuries, A Critical Insight and Recommendations."* In 1990, this report was amended and republished by Nova University Press. From a liability standpoint, those recommendations formed the standard for minimum safety in pool accident litigation nationally. The ORB Organization, Inc. (ORB) has used these standards, along with the State of Washington Rules and Regulations for Water Recreation Facilities, in this review.

Recreational Swimming:

ORB has found that 75-80% of all recreational swimming is done in water less than five (5) feet in depth, primarily because during recreational swimming, people prefer to relax and play, rather than actually swim.

Some 1680 square feet of the Mountain View Elementary School Indoor Swimming Pool's surface area is less than 5'-0" deep. This is approximately the same as the shallow area of the most widely accepted and constructed pool, the American Short Course Pool, which generally has approximately 1,600 square feet of water less than 5'-0" deep.

The area of perimeter decks around the pool total 2960 square feet, which is 1392 square feet more than the State of Washington Health Department requirements based on maximum bather load.

Thus, ORB judges that the actual shallow area to be more than sufficient to meet recreational requirements.

Instructional Swimming:

Instructional swimming must be evaluated as:

- Beginning Lessons - usually 8 to 10 years old;
  - Handicapped - special education;
    - Advanced Swimming;
      - Diving;
- Competitive Swimming and Diving; and
  - Extra Curricular Activities:
    - Synchronized Swimming
      - Scuba Diving

Most of these types of swimming instruction require a high percentage of shallow water and a large amount of deck space. Only the diving instruction and extra curricular activities require deep water.

It appears the existing pool's width and length is quite adequate to handle good basic instructional swimming programs.

BACKGROUND AND ANALYSIS OF POOL TANK CONFIGURATION

Competitive Swimming:

The primary considerations affecting competitive swimming are pool length, width, and endwall depth.

Length:

At the present time, some differences in the preferred pool length for amateur, interscholastic, and intercollegiate competition exist between the various governing organizations.

The current rules concerning swimming pool dimensions for competitive swimming by the various governing bodies are outlined below.

- **UNITED STATES SWIMMING, INC. (USA Swimming, formerly Amateur Athletic Union - AAU) 1999 Rules and Regulations United States Swimming, Article 103.2.**

  a. Length:
     1) Long Course: 50.00 meters (164 feet and ½ inch).
     2) Short Course: 25.00 yards or 25.00 meters (82 feet and ¼ inch).

  b. Width:
     Eight (8) lanes, minimum width of 2.5 meters (8 feet 2½ inches), from centerline to centerline of the lane dividers, with approximately 0.45 meters (1 foot 6 inches) of additional open water outside lanes 1 and 8. The site selection committee with the approval of Program Operations may waive this requirement for National Championships. Minimum lane width for competitive swimming shall be 7 feet (2.13 meters).

  c. Depth:
     1) 2 meters (6 feet 7 inches) deep throughout the course. The Site Selection Committee with the approval of Program Operations may waive this requirement for National Championships.
     2) Minimum water depth for racing starts during competition and practice shall be measured for a distance 3'-3½" (1.0 meters) to 16'-5" (5.0 meters) from the end wall. Starting requirements and height of starting blocks shall be as follows:
        a) In pools with water depth less than 3'-6" (1.07 meter) at the starting end, the swimmer must start from the deck or from within the water; and
        b) In pools with water depth 3'-6" (1.07 meter) to less than 4'-0" (1.22 meter) at the starting end, starting platforms shall be no more than 18" (0.46 meter) above the water surface.
        c) In pools with water depth of 4'-0" (1.22 meter) or more at the starting end, starting platform shall be no more than 2'-5 1/2" above the water surface.

BACKGROUND AND ANALYSIS OF POOL TANK CONFIGURATION

- **NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS**
  Swimming, Diving, and Water Polo Rule Book 2000-2001, Rule #2, Section 2, Section 5, and Section 7.

Short Course Swimming Pool:

Length:

The swimming pool shall be either 75 feet (22.860 meters) long or 82.021 feet (25 meters) long, measured from the inside walls or from the tile or timing devices attached to the walls, and at least 45 feet wide (13.716 m). A pool 60 feet wide (18.288 m) is recommended.

Width:

The width of the lanes shall be a minimum of 7 feet (2.134 meters). The 2 lanes next to the side walls may be wider in such pools, outside lane markers are recommended.

Depth:

Water depth at starting end shall be a minimum of 3'-6" (1.0668m) in newly constructed pools, it is recommended that there be a minimum water depth of 4'-0" in the starting end and inlets on the end walls be at least 2'-6" below the surface of the water. Pools with radius transition from vertical wall to horizontal bottom meet the rule specification provided the 3'-6" depth requirement is met within the 12" distance measured out from end wall.

Water Depth At Starting End	Maximum Height of Platforms/Decks Above Water Surface
4' or more	30"
3 ½' to less than 4'	18" **or** start from deck/in water
Less than 3 ½'	Start in water

Diving Rule NO. 9

The diving pool may be separate from or part of the swimming pool and the following standards for clearance and water depth are recommended for one meter diving:

a. End of board to anchoring pool wall, 6 feet (1.829 m)
b. Side of board to side of another board, 8 feet (2.438 m)
c. Side of board to pool side wall, 10 feet (3.048 m)
d. End board to forward pool wall, 29 feet (3.839 m)
e. Top of board at the take-off end to ceiling overhead, 16 feet (4.877 m)
f. Water depth at any point 2-5 feet in front of the end of the board, 10 feet (3.048 m) with 12 feet or more (3.658 m) preferred;

Note: Pools constructed after January, 1987 must have a water depth of 12 feet or more.

g. Maximum depth reduction rate diving pools which do not exceed minimum depth requirements, 6 ¼ percent for a distance of 16.5 feet forward (6.096 m) from the end of the board and 6 feet (1.829 m) back and to the sides. Deeper pools may have proportionately steeper depth reduction rates. The diving board shall be horizontal and 1 meter (±5 cm) above the water surface, measured from the top of the board. The board shall be 16 feet long (4.877 m) and 20 inches wide (.508 m), and the entire top surface shall be covered with nonskid material. A fulcrum, which can be moved and set at varying positions between 5 feet 6 inches and 7 feet 6 inches (1.676 m and 2.286 m) from the rear of the diving board is required.

Analysis of Length:

The Mountain View Elementary School pool tank has a length of only 60'-0" in the East/West lanes and 56'-0" in the North/South lanes. The existing pool is not suitable for regional competitive swimming meets as a "Short Course Competition" swimming pool. It is ORB's opinion that a competitive short course pool 75'-1" long cannot be reasonably provided in the existing Natatorium.

Analysis of Width:

The Mountain View Elementary School pool tank has a width of 28 feet, which is not suitable for regional competitive swimming meets. The minimum lane width for competitive swimming is seven (7) feet for short course pools. The minimum number of lanes recommended is six (6); eight (8) or ten (10) for championship meets. The total overall width for the most common six-lane pool, including outside lane clearance, is a minimum of 43'-0".

As far as width is concerned, the existing pool could accommodate only four (4) short course lanes with no open water outside of lanes 1 and 4.

Analysis of Endwall Depths:

The minimum recommended depth for shallow end starts is 4'-0". The minimum recommended depth is 3'-6" to allow a "tuck and turn". Four (4) feet is desired.

The 4'-0" deep end wall at the West end of the pool is suitable for competitive swimming starts and the 3'-0" at the East end of the pool is very tight for adult tuck and turns.

Analysis of Diving Programs:

The primary considerations are diving board heights and water depth clearances beneath and in front of the boards. Diving from the deck is restricted by WAC 246-260, to water over 8-0" deep. This will change to 9'-0" deep in the new code, currently being considered for adoption.

BACKGROUND AND ANALYSIS OF POOL TANK CONFIGURATION

USA Diving Rules and Regulations 1999

According to United States Diving, Inc. (abbreviated USA Diving - formerly and commonly refereed to as Amateur Athletic Union - AAU), diving facility standards should comply with FINA Requirements. FINA Requirements are generally water depth at the end of a one and three-meter board should be a minimum of 11'-2" and 12'-2" respectively. The depth 16'-5" in front of the one-meter board should be 11'2" and the depth 19'-8" in front of the three-meter board should be 12'2" deep. USA Diving FINA Standards are used in this report because they are also the standards used in WAC 246-260. The National Federation of State High School Association and National Collegiate Athletic Association (NCAA) requirements are somewhat similar.

A 1984 report (amended in 1990) by the Council for National Cooperation in Aquatics (CNCA) entitled "Diving Injuries, A Critical Insight and Recommendations" relates that during the past several years, there has been a sizable increase in the number of damage claims arising out of neck injuries from diving into a shallow diving tank.

The Mountain View Elementary Pool is not suitable for diving. The existing pool depth (9'-6" maximum) and bottom profile do not meet minimum recommendations for either one or three meter diving. In fact, it is doubtful that the existing pool meets minimum depth requirements for diving from the deck.

Conclusion:

From an instructional standpoint, the pool provides a workable facility. The large percentage of shallow water makes it especially desirable for recreational swimming and instruction. **From a competitive swimming standpoint, the 4'-0" depth at the starting blocks in the east/west lanes is adequate, but the 3'-0" depth at the east end of the East/West lanes is inadequate for tuck and turns.** The 4'-0" depth at the South end of the North/South lanes is also adequate for starting block starts. The 4'-0" depth at the North end of the same North/South lanes are adequate for tuck and turns. The pool does not provide an adequate depth and length to swim a competitive 25-yard course. ORB does not feel that a good 75'-1" American Short Course Pool can be accommodated in the existing Natatorium. From a competitive and recreational diving standpoint, the existing depth and bottom profile of the pool are inadequate and dangerous.

ANALYSIS OF PHYSICAL CONDITION OF FACILITY & FIELD INVESTIGATION & REVIEW COMMENTS

ANALYSIS OF PHYSICAL CONDITION OF FACILITY

Description of Existing Facility:

The Mountain View Elementary School Indoor Swimming Pool contains the following components:

1. Bathhouse and Mechanical Spaces:
   a. Bathhouse:
      - **Bathhouse not included in this study**

   b. Mechanical Spaces:
      - Boiler Room combined with School Heating Plant
      - Filter Room: Area- 128 SF
      - Construction: Slab on grade, Concrete Block interior walls and cast-in place exterior walls, glue-lam roof beams with T & G Roof Deck and built up roof. Wood doors and frames.
      - Access: on grade access throughout to Bathhouse and Filter Room. Boiler room is accessed at walk-in basement door from exterior of building.
      - Sanitary Facilities:

      Bathhouse not included in this study.

2. Natatorium (Pool Room)

Area:	6300 sq. ft.
Deck:	Slab on grade with structural slab over mechanical tunnel. (5'-0" wide mechanical tunnel around perimeter of pool)
Deck Finish:	Appears to be a type of thin coat finish.
Exterior Walls:	Poured in place concrete.
Interior Walls:	Concrete Block
Structure:	Glue-lam beams with T & G Roof Deck.
Finish:	Painted Ceilings & Walls.

3. Main Pool:

   a. Size: "L" Shaped- 60'X28' East/West Lanes and 56' X 28' North/South lanes:
      - 2464 square feet.
      - Volume: 92,900 gallons
      - Depths: Shallow Point - 3'-0"
      - Deep Point - 9'-6"
      - Bather Load: 98 people
      - Diving Tank: "None"
      - Ladders: 4
      - Lifeguard Chair: 1 - one at west, side of North/South Lanes.
      - Lifeline: located at 5'0" depth@Break point between North/South and East/West lanes.
      - Lanes: Four (4)

b. Construction:
- Gunite concrete without plaster finish.
- Minimal Perimeter scum gutter with 3/4" Lip.
- Filtered water is distributed through inlets in the sides of the pool.
- Pool drains at deepest point.
- Finish: Painted.

Note: The original rough gunite surface has been painted. Finish plaster was apparently never installed.

3. Main Pool Deck:

a. Area: 2960 SF
- Natatorium Deck: Concrete slab-on-grade draining to area drains in deck.

FIELD INVESTIGATION AND REVIEW COMMENTS

Field Investigation:

During the field investigation and subsequent office analysis, ORB has noted several deficiencies in the existing Mountain View Elementary Indoor Pool Facility, which do not meet current codes and standards.

In this portion of the report, ORB has reviewed the Mountain View Elementary Pool Facility comparing it with the State Board of Health, Water Recreation Facilities Regulations Chapter 246-260 WAC.

Architectural Comments:

1. **Bathhouse and Mechanical Room**
   - **Bathhouse not included in this study.**

   - Roof:
     The roofing appears to be in fair condition having been completely replaced in 1998. The timber roof structure is in good condition. The Pool Manager indicated that stains on the underside of the roof deck were caused by roof leaks, which occurred prior to the installation of the new roof system.

   - Exterior Walls:
     The cast-in-place concrete exterior walls are generally in good condition.

   - Toilet Partitions:
     Bathhouse not included in the study.

   - Toilet Fixtures:
     Bathhouse not included in this study.

- Public Restrooms:
  Bathhouse not included in this study.

- Toilet Accessories:
  Bathhouse not included in this study.

- Doors and Windows:
  Exterior doors are hollow metal type with aluminum store front single glazing, and in good condition.

- First Aid Area:
  A designated first aid area exists at the pool deck control room.

- Interior Finishes:
  Interior concrete block walls throughout the building have been well maintained.

- Exterior Finishes:
  Exterior cast-in-place concrete walls are painted and in fair condition. Other painted surfaces are in fair condition.

2. Main Pool Tank:

- Diving Board Clearances:
  As previously mentioned under "Main Pool Tank Design Dimension Configuration Analysis", the water depth and bottom profile is inadequate to meet even the minimum requirements for all types of diving. The height of the Natatorium is inadequate for the installation of a diving board.

- Pool Ladder and Steps:
  Steps and ladders are required to be spaced a minimum of every 75'-0" of pool perimeter deeper than 4'-0" and recessed into the wall of the pool. There are four (4) ladders in the existing pool, which meet State Requirements.

3. Main Pool Deck:

- Concrete Deck:
  Pool Deck is slab on grade over perimeter tunnel, existing deck slopes to drain, little puddleling noted.

- According to WAC 246-260
  a) Decks are to have at least six (6) feet wide at the shallow end of the pool. **Existing decks are only 5'-0" at North end of North/South lane.**
  b) Maintain a minimum of six (6) feet between spectator area and pool. **The existing pool only has 5'-0" between spectators and pool.**

- Pool Surfaces should be non-abrasive construction. **The existing surface is quite rough. It is apparently a Gunite tank on which no plaster surface was installed when the pool was constructed.**

- **No handicap access to the pool is now provided. A pool lifter should be installed to allow use by the physically impaired.**

- **Signs should be provided to meet requirements of WAC- 246-290 paragraph (33).**

- **WAC 246-260-090 paragraph (35) calls for a drinking fountain in Natatorium. None is provided.**

- Deck Graphics:
  Presently, there are minimal deck graphics denoting "No Diving" around the pool and the deck graphics denoting water depths are inadequate. **New deck graphics should be provided.**

- Lifeguard Chairs:
  One (1) lifeguard chair exists, is original, and in poor condition. **The lifeguard chair should be replaced when the pool tank and perimeter decks are renovated.**

MECHANICAL AND ELECTRICAL ANALYSIS

MECHANICAL AND ELECTRICAL SYSTEMS - GENERAL

Tres West Engineers, as a subconsultant to the ORB Organization, was tasked to evaluate the condition and adequacy of the Natatorium Mechanical and Electrical Systems, to provide an opinion on the necessary upgrade measures for a 30-year life, and to provide a cost estimate for the upgrade measures.

FIELD INVESTIGATION AND REVIEW COMMENTS

The Natatorium HVAC System consists of an air handler and exhaust/return fan. The air handler has a fan, heating water coil, filters, and dampers. The dampers appear to have full capability to modulate between 0% and 100 % outside air (in other words, a full economizer). The system dehumidifies with outside air. There is no heat reclaim installed in the system. The air-handling unit was installed in 1994. The return was re-used as part of the 1994 remodel, and could be the original installation. There was no sign of corrosion on the components we had access to. **There was no observable ventilation in the mechanical room.**

Existing Mechanical Systems – Pool Water

The pool water system was completely replaced in 1994. It consists of high-rate sand filters, a pool water circulation pump, an automatic liquid chlorine chemistry control system, a surge tank, a main drain float valve, and other appurtenances for a complete system. Heating water through a shell and tube heat exchanger does the heating.

Existing Central System Equipment

The source of heat is boilers that provide heating water for the entire school, and were not part of this evaluation. The boilers were re-tubed and the burners replaced as part of the 1994 upgrade. **The boilers should be good for another 15 years.**

Existing Domestic Water Heating

The domestic water is heated by a water tank with a heat exchanger, and uses the boilers as the source of heat. The water heater was replaced in 1995.

CALCULATIONS

a. Pool Water System:
- Pool water volume: 92,900 Gallons
- Flow rate for a 6 hour turnover: 92,900/(6 * 60) = 258 GPM
- Filter tank size: 36” diameter, 6’ – 6” long
- Sand filter area: 3 x 6.5 = 19.5 square feet
- Flow rate at 15 gpm/square foot = 292 gpm
- Pump capacity (manufacturer data): 300 GPM @ 70’ head

b. HVAC System:

- Natatorium volume: 88,000 cubic feet
- Air flow for 6 air changes per hour: 88,000 * 6/60 = 8,800 CFM
- Supply air flow (design): 7,120 CFM
- Return air flow (design): 8,505 CFM
- Natatorium area (pool and deck) = 5,550 square feet
- Spectator area = 814 square feet
- Outside air ventilation required by code: (0.05 cfm/ft^2 * 5,550 ft^2) + (15 cfm/person * 150 people per 1,000 square feet * 0.814) = 4,606 CFM

DISCUSSION AND RECOMMENDATIONS

Natatorium HVAC System

The airflow rate from the Natatorium HVAC System is fairly close to that recommended as a minimum in the ASHRAE Application handbook. We would not recommend making changes to the Natatorium HVAC system based on the air change rate alone. **The equipment appears to be in good condition, and does not merit a change based on deterioration or corrosion**. The pool HVAC Technician stated that they operate this system with 1,000 CFM of outside air. This is far below the quantity recommended by the Washington State Ventilation and Indoor Air Quality code. The Natatorium relative humidity was within "acceptable" limits (less than 60% relative humidity), but the area was oppressive. Negative pressure was being maintained in the Natatorium, which probably kept the condensation down. The air distribution pattern (location of grilles along the wall), while not optimum, was acceptable. There was air movement over exterior walls, but no air movement generally over the surface of the water. Gentle air movement over the surface of the water is desirable to remove chlorine and chloramine off-gassing.

The ability to maintain negative pressure is important in more ways than commonly recognized. Negative pressure in a natatorium is traditionally recommended to keep the moisture and chemicals in the air confined to the natatorium. However, in our experience, maintaining these facilities at a negative pressure is essential in controlling humidity. For whatever reason, Natatoriums that otherwise are controlled with the proper air flow and temperature can have poor humidity control under positive pressure. The latest issue of the ASHRAE Application Handbook is coming around to this point of view, and has stronger language with respect to pressure control than in previous editions.

During the 1994 retrofit, an energy management control system (DDC Controls) was installed. This system acts as a controller for both temperature and humidity. Temperature is controlled by modulation of the heating water control valve. Humidity is controlled by modulating the outside, return and exhaust dampers in order to vary the amount of outside air. There is no measurement or control of natatorium static pressure, nor is there any modulation of the economizer dampers to provide for a cooling set point. Maintenance personnel have indicated that they have had numerous problems with the heating water control valves. They fail open when control power is cut, and probably degrade because of the continuous heating water flow.

Our recommendation for this system is to maintain it generally as it is. Any type of retrofit done in order to reclaim heat would not pencil out as a result of a life cycle cost analysis. New heat reclaim equipment would not fit in the existing space, and the this equipment would also be expensive. Rising energy prices could change this recommendation in the future. **We recommend a retrofit to the controls system. We would like to see pressure measurement added to the inputs, as well as independent control of the exhaust air damper for pressure control. We recommend that the controller be programmed for economizer cooling. The minimum outside air should be set at 4,600 CFM (see above for the calculation). This will increase the energy cost to run the pool, but will result in a much improved pool atmosphere.** Do not use any type of night temperature setback, as this will increase the energy costs. Night setback of the outside air to a minimum position for relative humidity control is the only operational strategy that would save energy costs. **We also recommend replacing the heating water control valve actuators with an oil-filled gear type.**

Pool Water Circulation System

The pool water circulation system appears to be in good condition. Our calculations show that it meets all water recreation code flow and filtration criteria. The chemistry control system is in accordance with current code requirements. If the pool configuration is not changed, there are no changes we would recommend to the system.

Domestic Water Heating

The domestic water heat exchanger is of the tank/heat exchanger assembly type. Due to its recent replacement, it probably meets all functional and serviceability needs and no maintenance action is recommended.

Existing Electrical Systems

Lighting:

The existing general illumination lighting is a direct system. It consists of wall and ceiling mounted fluorescent light fixtures supplemented by metal halide, flood type fixtures. The fluorescent lamps are non-energy efficient T-12 type and do not comply with present energy codes. The fluorescent fixture housings are painted steel and are corroded due to the chlorine atmosphere exposure.

- **Lighting levels measured range between 5.6 to 28 foot-candles and is insufficient to comply with the code, required level of 30 foot-candles.**
- **Lighting control is performed by circuit breaker switching at the electrical panel.**
- The existing emergency and egress identification lighting consists of self-contained, battery powered, unit equipment. The equipment and locations are in compliance with current codes.

Power

The existing electrical power distribution system originates from a utility-owned, pad-mounted transformer located at the building's exterior. The transformer, through underground feeders, supplies a main service, distribution switchboard located in the building's lower level mechanical/electrical room. The system's electrical characteristics are 120/208 volt, 3 phase, 4 wire. The main service, distribution switchboard supplies power to various branch circuit panelboards located throughout the facility, to include the Mountain View Elementary School. The system appears to have electrical capacity and physical space for additional load.

- **Branch circuit panels in the pool facility are completely utilized. No space is available to install additional circuits.**

Fire Alarm

The fire alarm control panel is an Edwards System provided by Federal Fire Safety and is located in the office of Mountain View Elementary School. The pool facility is not provided with a separate alarm zone and when activated, will alarm the entire school facility. Spacing and placement of the existing manual pull stations and audio-visual/alarm, devices are adequate.

- **Automatic detection is provided by ceiling type, spot heat detectors. The placement and spacing of these devices is inadequate and is in violation of the National Fire Alarm Code**.

Recommendations for Electrical Improvements

Lighting

Completely demolish the existing lighting system. Provide new indirect metal halide lighting designed to provide a maintained level of illumination of 35 foot-candles for general illumination. Replace the existing emergency lights with new. Replace the existing egress identification (illuminated exit signs) with new LED type. Provide new branch circuit wiring from the panel to all lighting fixtures.

Power

Verify identification of all branch circuits in existing panel boards. Install power-monitoring equipment on the existing panel feeders to verify a non-overload condition. **Replace feeders if overloaded. Remove and replace existing panel boards with larger circuit capacity type. Provide branch circuits to new mechanical equipment.**

Fire Alarm

Remove existing ceiling spot type heat detectors. Replace detectors with new, spaced in accordance with the National Fire Alarm Code, or provide projection beam smoke detection.

EXTENDING THE LIFE EXPECTANCY OF POOL BY 30 YEARS

Extending the Life Expectancy of Existing Pool by 30 Years

The following changes and/or maintenance items will be required by the existing facility to extend the life of the existing pool 30 years. We have listed the various items in order of the priority we suggest they be accomplished.

	Immediate Changes Required (Does Not Include Bathhouse)	Estimated Cost
1.	Paint new deck graphics.	2,842.00
2.	Provide signs per WAC 246-290 (Par 33).	$592.00
3.	Electrical Check load condition of existing power circuits and replace overload circuits. Provide branch circuit to new mechanical equipment.	$21,649.00
4.	Mechanical Items Modify energy management system to provide constant monitoring and control of Natatorium pressure. Provide programming for the modification. Replace heating water control valve actuators.	$ 20,424.00
5.	Install Handicap pool lifter.	$5,920.00
6.	Install a drinking fountain on deck	$4,736.00
7.	Electrical Remove existing ceiling spot type heat detectors and replace with new per National Fire Alarm Code.	$10,147.00
8.	Provide new lifeguard chair	$3,078.00
9.	Paint underside of roof deck.	$16,783.00
10.	Electrical Completely demolish existing lighting system and provide new metal halide lighting to maintain code level of 35-foot candles. Replace emergency lighting with new fixtures. Replace existing egress identification lights with new fixtures.	$ 39,704.00
11.	Install new plaster surface on swimming pool tank.	$41,838.00
	Total	$167,713.00

EXTENDING THE LIFE EXPECTANCY OF POOL BY 30 YEARS

Maintenance Items required in 10-20 Years in 2001 dollars (Does Not Include Bathhouse) (We have estimated the year they are most likely to occur.)	Estimated Cost
1. Install new pool deck surface. (Year 2007)	$34,632.00
2. Repaint interior and exterior of building every 10 years. (Year 2011)	$86,291.00
3. Repair/re-coat plaster surface. (Year 2012)	$25,628.00
4. Install new roofing. (Year 2016)	$49,254.00
5. Mechanical Items- these replacements will occur periodically between 2006 and 2031.	
a. Air System Maintenance: Expected maintenance to the air handling system will be items such as replacing bearings and control dampers, replacing motors and updating control systems.	$70,803.00
b. Pool Water System Maintenance: Expected maintenance to the pool water circulation system would be pump replacement, pool water heater replacement, filter media replacement, valve replacement and chemistry controller replacement.	$88,504.00
Total	$355,112.00

NEW INTERIOR LAYOUT INCORPORATING A 25 YARD LAP POOL AND A SEPARATE SHALLOW WATER POOL

The City of Port Townsend requested the ORB Organization to investigate the possibility of providing a 75'-1" American Short Course Pool within the existing pool enclosure. They also wanted to incorporate a shallow water aerobics training pool and a spa or swirl pool. The following changes are required to accommodate the new pools.

1. Demolish existing pools, pool room decks, tunnel system and south wall of pool room.
2. Remove the bleacher seating area.
3. Expand the existing Natatorium (pool room) approximately 10'-0" to the south.
4. Provide several new columns to support the roof structure.
5. Construct additional mechanical room space.
6. Construct new 75'-1" x 28'-0" four (4) lane lap pool with depths ranging from 4'-0"to 9'-6".
7. Construct new zero depth family pool for youth and aerobics approximately 24' x 56' with depths ranging from the zero depth ramp at the North end of pool to 4'-6" at South end of pool.
8. Provide a 8' X 20' swirl pool (hot tub)
9. Provide new overhead HVAC Distribution System.

Area of Magnitude Cost Estimate for this pool is $1,392,108.00.

* This cost includes no changes to dressing rooms.

If the City decides to pursue this alternative a more detailed conceptual design should be accomplished to more accurately determine the cost before funding the project.

<u>New 25-Yard Pool</u>

The project cost to construct a new six lane 75'-1" x 44'-0" competitive pool with one and three meter diving, a 24'-0" x 56'-0" water aerobics/training pool, a 8'-0" x 20'-0" swirl pool (hot tub), and a new bathhouse would be approximately $ 3, 862,022.00.