

Town of Lake Park

Department of Public Works

Kelsey Park Splash Pad Alternatives

Lifecycle Cost Analysis



Purpose

This cost analysis compares two system alternatives for the proposed Kelsey Park splash pad/water feature: a flow-through system and a recirculating system. The analysis evaluates initial capital cost, estimated annual operating cost, utility consumption, maintenance activities, and long-term lifecycle cost. The intent is to provide a planning-level financial comparison to support decision-making.

The planning-level cost estimates presented in this analysis were developed in coordination with, and corroborated by, Kimley-Horn, the Town's consulting engineering firm. These estimates are intended to provide a reasonable comparison of the anticipated capital, utility, operating, maintenance, and lifecycle cost impacts associated with the flow-through and recirculating system alternatives.

Final costs should be confirmed based on the final design, manufacturer equipment package, Seacoast Utility Authority billing classification, Florida Department of Health permitting requirements, the selected operational model, and market conditions at the time of procurement.

1. Summary of Key Assumptions

Cost Factor	Flow-Through System	Recirculating System
General Conditions	\$117,100.00	\$117,100.00
Civil and Utilities Infrastructure	\$57,360.00	\$57,360.00
Landscape Infrastructure	\$24,675.00	\$24,675.00
Irrigation Infrastructure	\$19,910.00	\$19,910.00
Site Furnishings	\$57,775.00	\$57,775.00
Splash Pad / Water Feature	\$259,000.00	\$334,000.00
Construction Estimate Subtotal	\$535,819.00	\$610,819.00
10% Contingency	\$53,582.00	\$53,582.00
Estimated Construction Cost	\$589,402.00	\$664,402.00
Design / Survey / Professional Services	\$128,125.65	\$128,125.65
Estimated Initial Project Cost	\$717,527.65	\$792,527.65
Operational Cost - Year 1 Utility Portion	\$35,545.00	\$13,718.00
Operational Cost - Year 1 Non-Utility O&M Portion	\$15,205.00	\$49,625.00
Estimated Project Year 1 Operating Cost	\$50,750.00	\$63,343.00
Water/Sewer Escalation Factor	4.8% annually	4.8% annually
Electric Escalation Factor	2.5% annually	2.5% annually
Maintenance/Material/Labor Escalation Factor	3.0% annually	3.0% annually
Net Present Value Discount Rate	4.0% annually	4.0% annually

Cost Factor	Flow-Through System	Recirculating System
Planning Horizon	20 years	20 years

2. Initial Capital Cost Comparison

Capital Cost Item	Flow-Through System	Recirculating System	Notes
Design / Survey / Professional Services	\$128,125.65	\$128,125.65	Same baseline soft cost for both alternatives.
Construction Cost	\$589,402.00	\$589,402.00	Base construction cost is assumed to be generally consistent before the recirculating system premium.
Recirculating System Premium	\$0.00	\$75,000.00	Additional cost for treatment, filtration, pump, control, and related recirculating system components.
Estimated Initial Project Cost	\$717,527.65	\$792,527.65	The recirculating option is approximately \$75,000 higher.

3. Utility Consumption and Annual Utility Cost

The flow-through system has higher water and sewer exposure because potable water is discharged after use. The recirculating system uses filtration, treatment, and storage to reuse water, requiring make-up water for splash-out, evaporation, backwash, cleaning, and periodic drain/refill. For planning purposes, the recirculating system is assumed to account for approximately 10% of the flow-through water demand.

Utility Assumption	Flow-Through System	Recirculating System
Peak-Month Water Use	700,000 gallons	70,000 gallons
Moderate-Month Water Use	350,000 gallons	35,000 gallons
Low-Use Month Water Use	100,000 gallons	10,000 gallons
Estimated Year 1 Annual Water/Sewer Cost	\$34,545	\$9,718
Estimated Year 1 Utility Savings from Recirculation	-	\$24,827

4. Annual Operating and Maintenance Cost

Operating / Maintenance Item	Flow-Through System	Recirculating System	Activity Description
Potable Water and Sewer	\$34,545	\$9,718	Based on the seasonal utility model. This is the highest operating cost for the flow-through system.

Operating / Maintenance Item	Flow-Through System	Recirculating System	Activity Description
Electricity	\$1,000	\$4,000	Flow-through requires limited power for controls/timer. Recirculating requires pumps, controls, chemical feed, and possible UV/disinfection equipment.
Chemicals / Water Treatment	\$250	\$5,750	Flow-through may require little to no chemical treatment. Recirculating requires regular treatment and water balancing.
Test Kits, Reagents, Logs, Calibration Supplies	\$100	\$1,125	Primarily required for water-quality testing and compliance records.
Daily Operator Checks / Water Testing	\$1,750	\$8,000	Assumes Town staff perform most daily checks and logs. Recirculating requires more water-quality documentation.
Certified Pool Operator / Technical Support	\$500	\$5,500	Assumes higher first-year technical support as Town staff become familiar with the recirculating system operation.
Routine Cleaning: Pad Surface, Deck, Drains, Debris	\$3,000	\$3,000	Assumed generally similar for both systems. Includes surface cleaning, debris removal, drain cleaning, and routine visual inspections.
Nozzle, Spray Feature, Actuator, Timer, Valve Maintenance	\$2,500	\$2,500	Assumed generally similar for both systems. Includes clogged nozzles, activators, and valves; timer repairs; and minor plumbing maintenance.
Drainage / Discharge Maintenance	\$1,000	\$1,000	Assumed generally similar for both systems, recognizing that recirculating systems still require overflow, backwash, and drain-down management.
Pump Maintenance	\$250	\$3,000	Recirculating requires inspection of the pump seals, bearings, and impellers, as well as preventive service.
Filter Maintenance / Cartridge or Media Replacement	\$0	\$4,000	Applies to recirculating systems only.
UV System Maintenance, Bulbs, Sleeves, Sensors	\$0	\$2,000	Applies if UV disinfection is included.
Chemical Feed Pump / Controller Maintenance	\$0	\$2,000	Includes tubing, injectors, probes, controller calibration, and minor feed-system repairs.

Operating / Maintenance Item	Flow-Through System	Recirculating System	Activity Description
Storage Tank / Mechanical Room Inspection and Cleaning	\$0	\$1,250	Includes tank inspection, cleaning, sediment removal, and mechanical-room housekeeping.
Backflow Prevention Testing / Plumbing Certification	\$1,000	\$1,000	Assumed generally similar for both systems.
DOH Permit / Inspection Support / Compliance Records	\$250	\$1,500	A recirculating system carries greater compliance and recordkeeping responsibilities.
Emergency Repairs / Callouts	\$2,000	\$4,000	Recirculating has more failure points, including pumps, filters, sensors, feed systems, and controls.
Equipment Replacement Reserve	\$2,605	\$4,000	Annual reserve for future replacement of valves, nozzles, controls, pumps, filters, UV components, sensors, and related equipment.
Insurance / Risk Allocation	Absorbed	Absorbed	Assumed covered under existing Town insurance unless Risk Management identifies an added premium.
Estimated Year 1 Annual Operating Cost	\$50,750	\$63,343	Planning-level annual operating estimate.

5. Annual Cost Difference

Category	Flow-Through System	Recirculating System	Difference
Year 1 Water/Sewer Utility Cost	\$34,545	\$9,718	Recirculating saves approximately \$24,827.
Year 1 Electric Utility Cost	\$1,000	\$4,000	Recirculating costs approximately \$3,000 more.
Year 1 Non-Utility O&M Cost	\$15,205	\$49,625	Recirculating costs approximately \$34,420 more.
Year 1 Total Annual Operating Cost	\$50,750	\$63,343	Recirculating is approximately \$12,593 higher annually.

6. Utility-Only Payback

Item	Amount
Added Capital Cost for Recirculating System	\$75,000
Estimated Year 1 Annual Utility Savings	\$24,827
Utility-Only Simple Payback	Approximately 3.0 years

The recirculating system may recover its additional capital cost through utility savings in approximately three years if only water and sewer savings are considered. However, this does not include the higher annual costs for chemicals, testing, filtration, pump maintenance, certified technical support, compliance records, and equipment replacement.

6. Annual Cost Escalation Snapshot

This table shows how annual operating costs may increase over time when water/sewer costs escalate by 4.8%, electric costs by 2.5%, and non-utility O&M costs by 3.0%.

Year	Flow-Through Annual Cost	Recirculating Annual Cost	Annual Difference
Year 1	\$50,750	\$63,343	\$12,593
Year 5	\$59,888	\$71,991	\$12,103
Year 10	\$73,767	\$84,564	\$10,797
Year 15	\$91,007	\$99,448	\$8,441
Year 20	\$112,449	\$117,096	\$4,647

The recirculating system remains more expensive to operate annually under the current assumptions. However, the annual difference narrows over time because the flow-through system has higher water and sewer exposure, and those utility costs are assumed to escalate faster than general maintenance costs.

7. Cash Cost Over Time with Escalation

This table shows estimated total dollars spent over time, including initial capital cost and annual operating costs with escalation.

Planning Period	Flow-Through System	Recirculating System	Difference
5 years	\$993,631	\$1,130,503	Recirculating higher by \$136,872
10 years	\$1,333,508	\$1,527,333	Recirculating higher by \$193,825
15 years	\$1,752,565	\$1,993,798	Recirculating higher by \$241,233
20 years	\$2,270,051	\$2,542,775	Recirculating higher by \$272,724

The flow-through system is projected to have a lower total cash cost over each planning period shown. The recirculating system has lower water and sewer costs, but the higher initial capital cost and additional recurring maintenance and compliance costs offset those utility savings under the current assumptions.

8. Net Present Value with Escalation

This table discounts future operating costs back to today's dollars using a 4% discount rate.

Planning Period	Flow-Through System NPV	Recirculating System NPV	Difference
-----------------	-------------------------	--------------------------	------------

Planning Period	Flow-Through System NPV	Recirculating System NPV	Difference
5 years	\$962,564	\$1,092,695	Recirculating higher by \$130,131
10 years	\$1,210,478	\$1,382,368	Recirculating higher by \$171,890
15 years	\$1,461,711	\$1,662,233	Recirculating higher by \$200,522
20 years	\$1,716,701	\$1,932,945	Recirculating higher by \$216,244

Even after adjusting future costs to today's dollars, the flow-through system remains the lower-cost alternative under the current assumptions. The recirculating system provides water-conservation benefits but is projected to have higher lifecycle costs due to additional maintenance, treatment, testing, mechanical equipment, and compliance obligations.

9. Interpretation

The flow-through system has a lower initial capital cost and a lower projected lifecycle cost. Its primary financial weakness is water and sewer consumption, estimated at approximately \$34,545 in Year 1 under the seasonal usage model.

The recirculating system has a higher initial capital cost and lower annual water/sewer cost. It is estimated to save approximately \$24,827 in water/sewer utility costs in Year 1. However, the recirculating system also creates additional annual costs for chemical treatment, water testing, certified technical support, filtration, pump maintenance, UV system maintenance, chemical-feed equipment, compliance records, and equipment replacement reserves.

When escalation and lifecycle costs are considered, the recirculating system remains more expensive across the 5-, 10-, 15-, and 20-year planning periods. The difference between the two alternatives narrows over time because the flow-through system has higher water and sewer exposure, and those utility costs are assumed to escalate faster than general maintenance costs.

10. Professional Cost Estimator Opinion

The flow-through system remains the lower-lifecycle-cost alternative and has a simpler operating model. The recirculating system may still be justified if the Town prioritizes water conservation, reduced potable water use, reduced discharge, and reduced utility rate exposure. However, it should be characterized as a water-conservation alternative with higher capital cost, higher maintenance complexity, and higher total lifecycle cost, not as a guaranteed cost-saving alternative.

11. Recommended Statement

The flow-through alternative has lower initial and lifecycle costs, but it results in higher water and sewer consumption. The recirculating alternative reduces potable water use and annual water/sewer costs, but it introduces additional treatment, testing, filtration, pump maintenance, operator support, compliance records, and replacement-reserve obligations. Based on the current planning assumptions, the recirculating system is still

projected to cost more over the facility's lifecycle, although it provides water conservation and reduced-discharge benefits.