



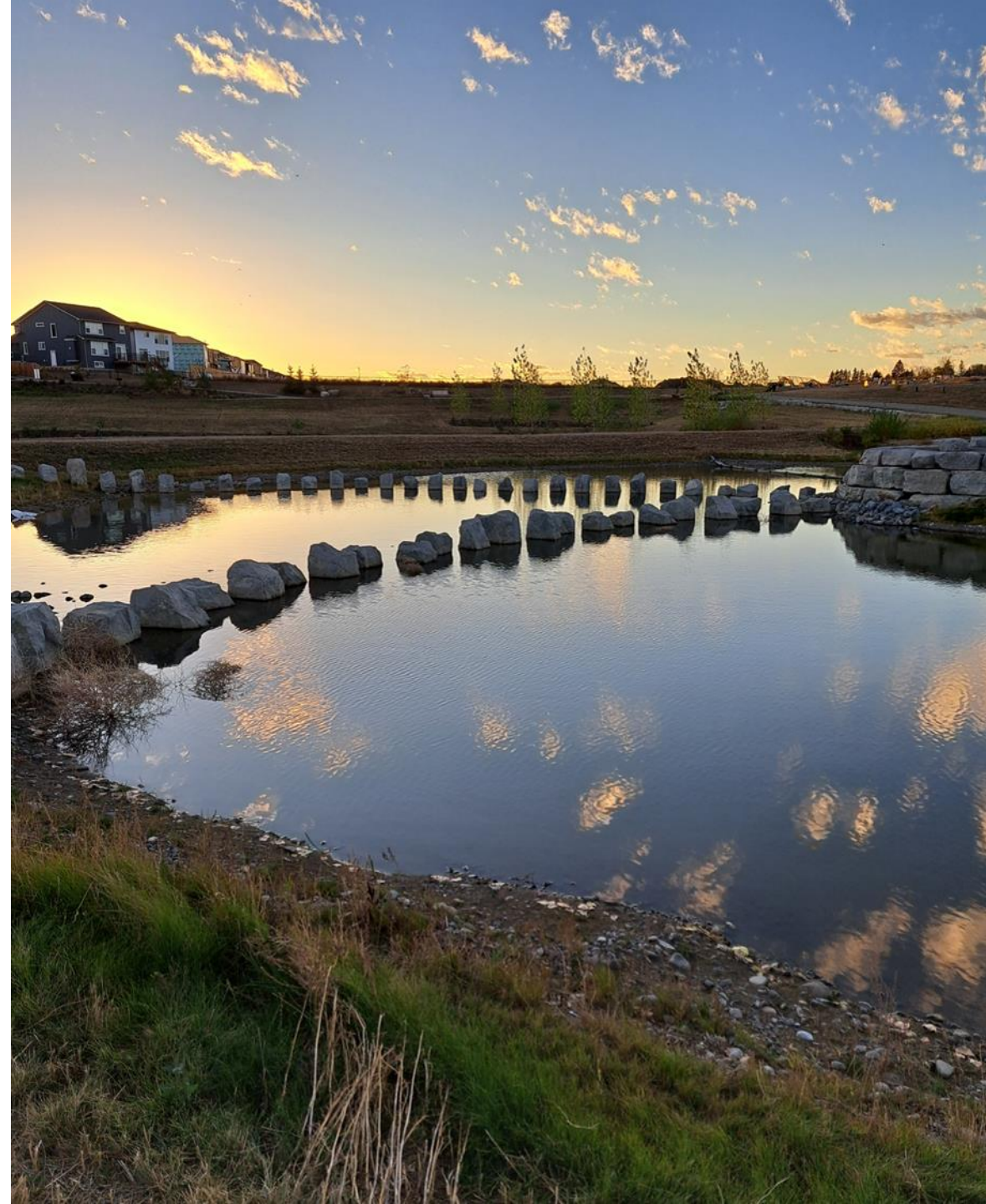
**NATURE BASED
STORMWATER
FEASIBILITY STUDY**

TOWN OF BON ACCORD



•••OVERVIEW

1. Background
2. Study Objectives
3. Stormwater Facility Options
 - a. Traditional Storm Pond
 - b. MAGNA Stormpark w treatment cells
 - c. MAGNA Stormpark w/o treatment cells
4. Costs & Phasing
5. Recommendations
6. Conclusions and Next Steps



••• BACKGROUND

Observed issues within Natural Area 2:

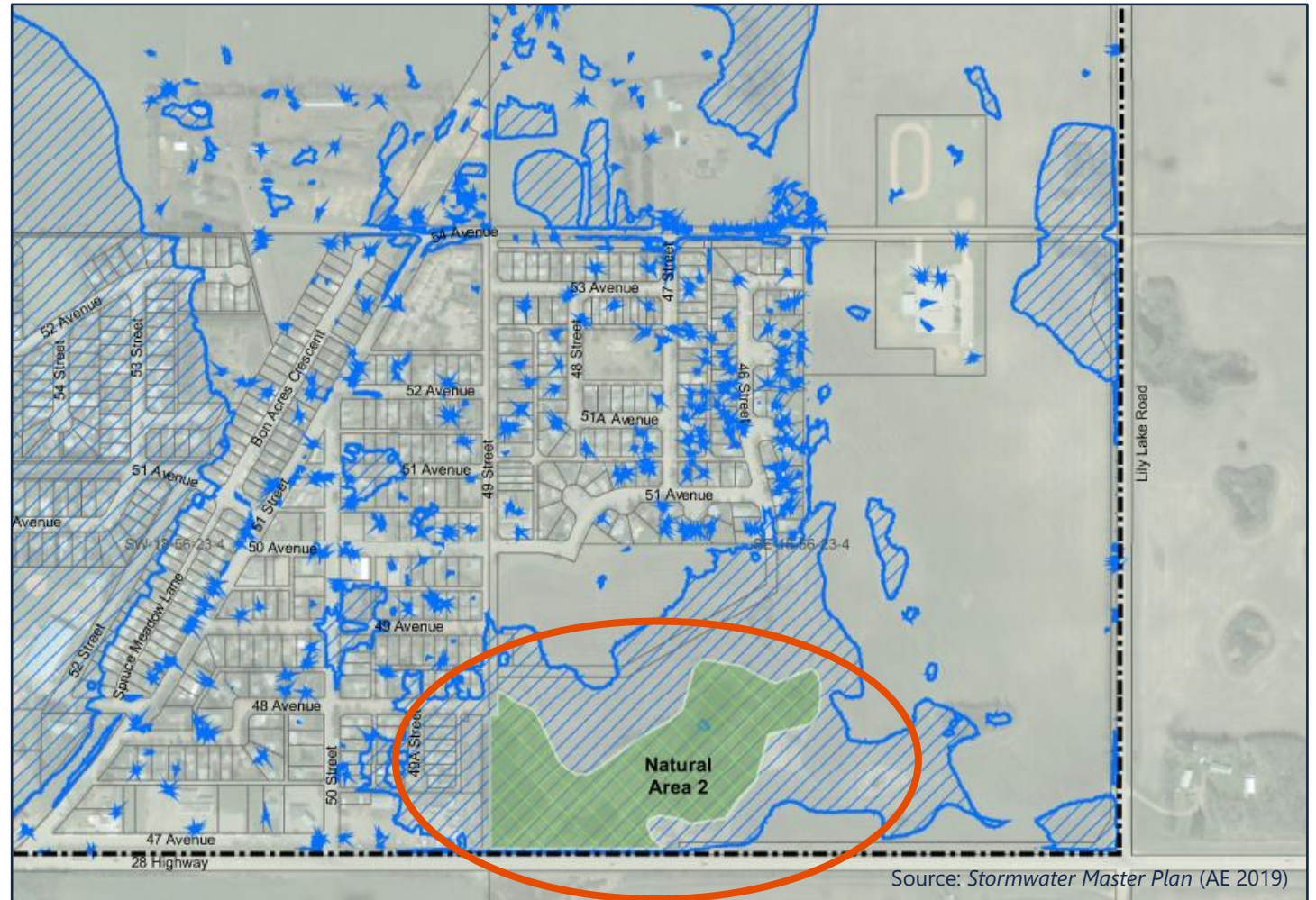
- Decreased stormwater storage capacity
- Flooding in adjacent areas during storm and snowmelt events
- Large sediment deposition
- Declining vegetation health

Stormwater Master Plan (AE 2019):

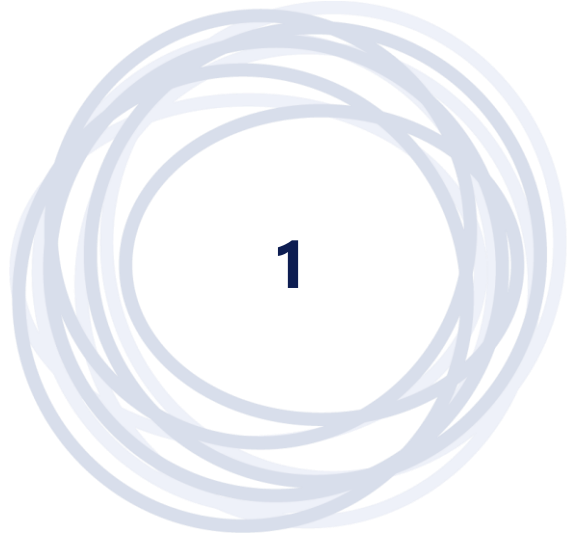
- Highlighted flooding potential near the wetland.
- Suggested expanding Natural Area 2 to increase capacity.

Wetland Storage Study (AE 2021):

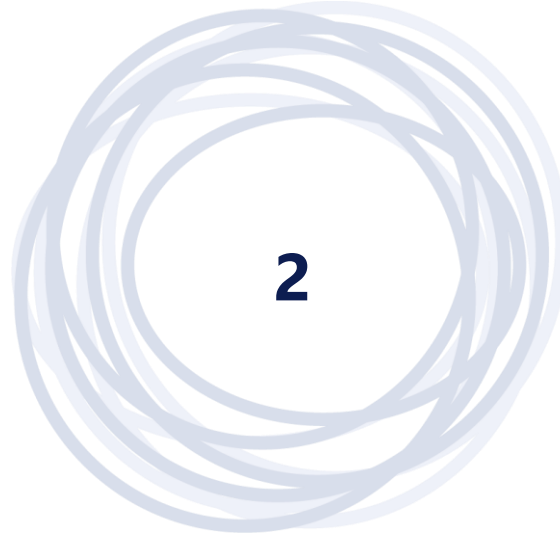
- Do not use Wetland as a storage element
- Construct new storm pond or constructed wetland east of Natural Area 2.



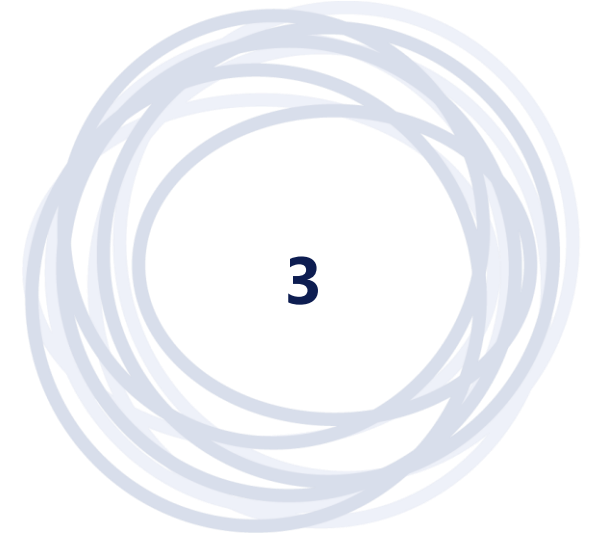
•••STUDY OBJECTIVES



IDENTIFY NATURE-BASED
STORMWATER SOLUTIONS TO
REPLACE OR RETROFIT NATURAL
AREA 2.



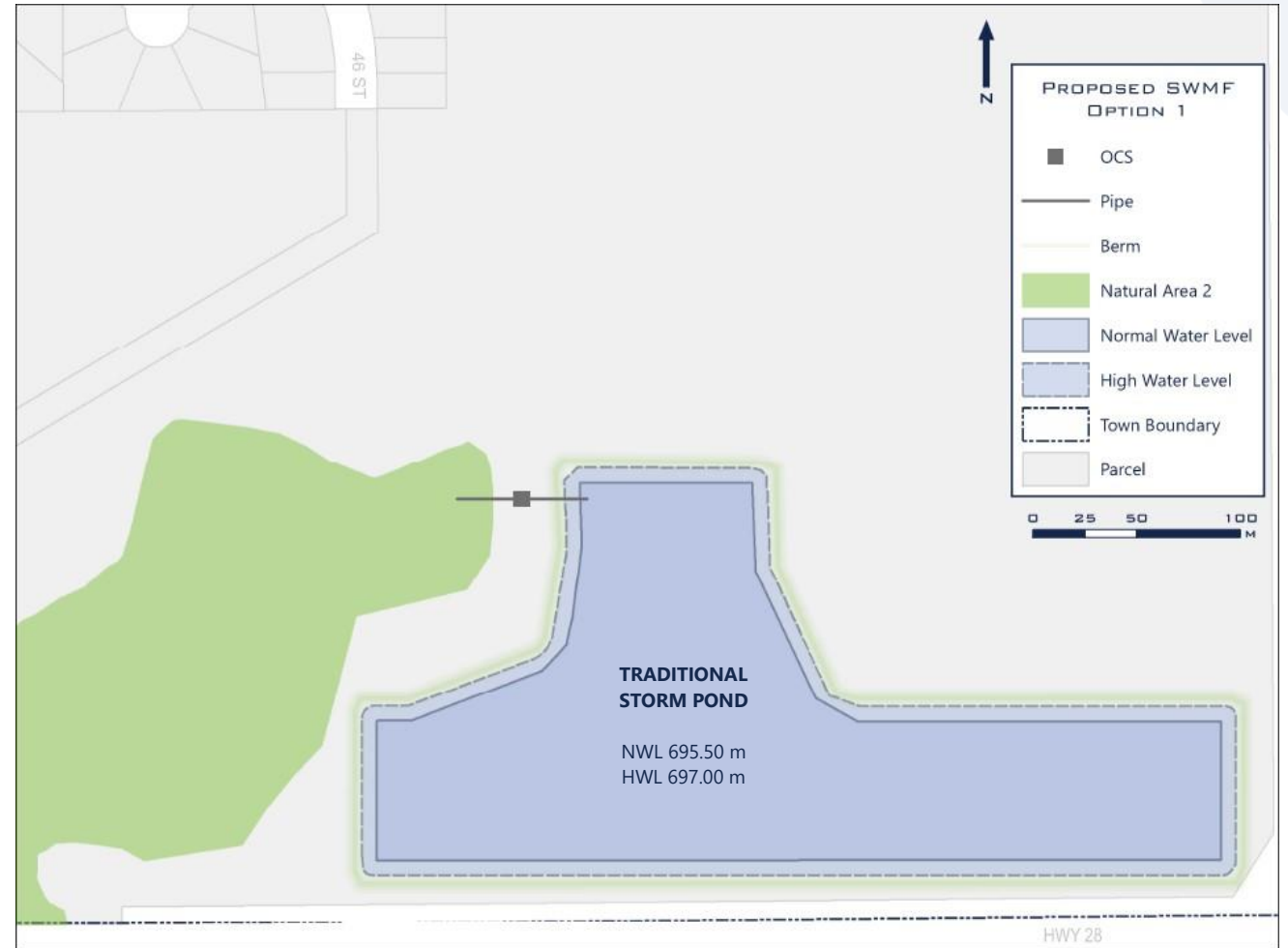
ASSESS OPTIONS BASED ON COSTS,
THE TOWN'S VALUES, AND
ENVIRONMENTAL AND AESTHETIC
BENEFITS.



INVESTIGATE POTENTIAL REUSE
OPPORTUNITIES FOR TREATED
STORMWATER AS A RESOURCE
WITHIN THE COMMUNITY.

••• OPTION 1: TRADITIONAL STORM POND

- A traditional pond is an engineered basin designed to collect rainwater and snowmelt from surrounding areas.
- It releases the accumulated water at a controlled rate, which helps prevent downstream flooding.
- Traditional ponds also improve water quality before discharge by capturing suspended sediments through gravitational settling.
- This option was retained from the Wetland Study (AE 2021) for comparison.

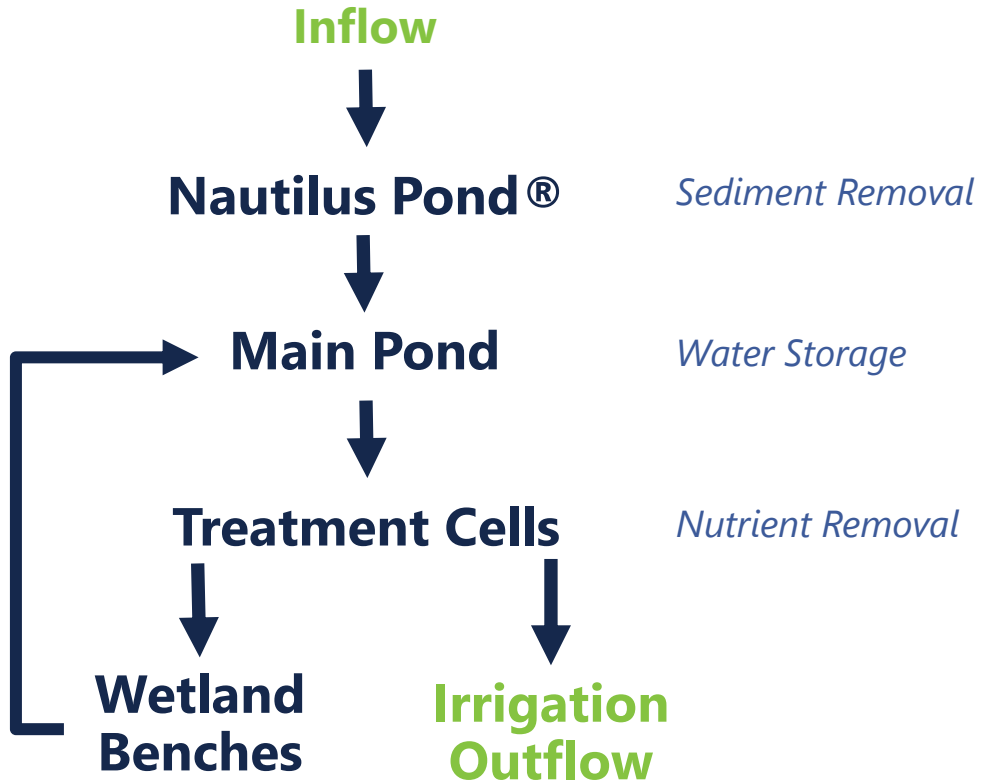


••• STORM PARK VS TRADITIONAL POND

- **Better Space Efficiency:** Integrates with wetland areas, making efficient use of available space.
- **Environmental Benefits:** Retains and promotes wetland ecosystems, contributing to overall environmental health.
- **Placemaking Advantages:** Serves as a community amenity and provides an ecological habitat.
- **Secondary Treatment:** Offers treatment for nutrients and microorganisms present in stormwater.
- **Water Reuse Opportunities:** Allows for irrigation supply using secondary-treated stormwater.



•••POND 2A STORM PARK



••• OPTION 2: STORM PARK W/ TREATMENT CELLS

- Potential to **integrate with Natural Area 2**
- **Flood protection** by storing runoff during rainfall events
- **Discharge by gravity** during wet weather
- **Recirculation during dry weather** for
 - Wetland maintenance
 - Secondary treatment and reuse
- **Enhanced wetland habitat** restores and preserves ecological habitat for **variety of wildlife, including migrating waterfowl, native animals, and other species.**
- Provides a **community amenity** with pathways and recreation spaces



*The proposed facility currently aligns with the existing Natural Area 2 boundary, but alternate alignments may be considered if required by the Town.

•••OPTION 3: STORM PARK W/O TREATMENT CELLS

- Potential to **integrate with Natural Area 2**
- **Flood protection** by storing runoff during rainfall events
- **Discharge by gravity** during wet weather
- **Enhanced wetland habitat** restores and preserves ecological habitat for **variety of wildlife, including migrating waterfowl, native animals, and other species.**
- Provides a **community amenity** with pathways and recreation spaces



*The proposed facility currently aligns with the existing Natural Area 2 boundary, but alternate alignments may be considered if required by the Town.

••• COSTS

Storm Park (both Options 2 and 3) construction and land costs are lower than the proposed traditional pond.

Other costs (to be determined through detailed design):

- Conveyance system tie-in
- Outlet/discharge alignments
- Wetland reconstruction credits

ESTIMATED COSTS FOR:	TRADITIONAL POND (AE 2021)	STORM PARK WITH TREATMENT WETLANDS	STORM PARK WITHOUT TREATMENT WETLANDS
CONSTRUCTION	\$9,705,000 ¹	\$5,375,000 ²	\$3,982,000 ²
LAND ACQUISITION	\$1,500,000	-	-
WETLAND DISTURBANCE	- ⁴	\$640,000 ³	\$640,000 ³
TOTAL	\$11,205,000	\$6,015,000	\$4,622,000

1 - Wetland Storage Study (AE 2021) reported the total construction cost as \$10,676,000 including 50% contingency and 15% design fees. Reported here without design fees.

2 - Does not include any contingency and design fees.

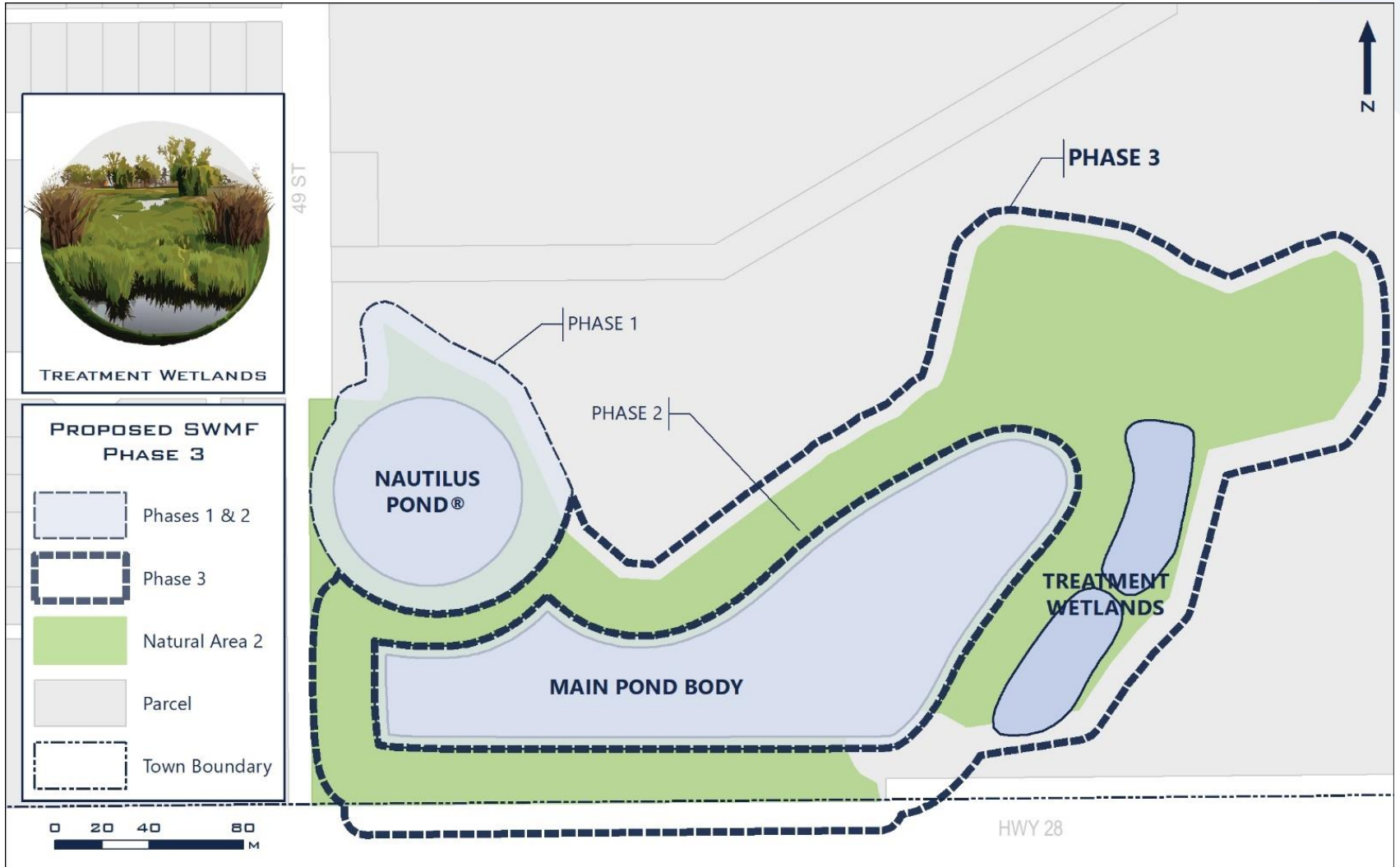
3 - Assumes \$160,000 max per hectare and 4 ha wetland disturbance. Does not consider classification of existing wetland, or potential reconstruction credits.

4 - No disturbance costs were reported by the *Wetland Study* (AE 2021); however, it is likely that some fees will be charged because the runoff is still routed through the wetland.

PHASING

PHASE	ELEMENTS	SUB-TOTAL
1	Nautilus Pond®	\$1,019,000
2	Main Pond	\$2,333,000
3	Wetland benches (Options 2 and 3)	\$630,000
	Pumps, treatment wetland cells (Option 2 only)	\$1,393,000

**Estimated construction costs only. Does not include contingency or design fees.*



••• RECOMMENDATIONS

- Based on the **technical benefits, costs**, and the **Town's values and expectations** from the facility, the **Storm Park solution (Options 2 & 3) is a better choice** than a traditional storm pond.
- The only **difference between Options 2 and 3 are the treatment wetland cells** included in Option 2 for secondary treatment, and not included in Option 3.
- **Secondary treatment** provides an alternate water source during dry weather (**drought resilience**) and allows flexible water volume management (**dewatering method if alternate means not available**).

CRITERIA		WEIGHTING SCORE	OPTION 1	OPTION 2	OPTION 3
Engineering & Planning Optimization	Footprint Size	3	1	3	3
	Water Quality (Regulatory Compliance)	1	2	3	2
	Site Servicing	2	2	1	2
Social	Public Perception / Aesthetic	3	2	3	3
	Water Reuse Opportunities	2	1	3	1
	Climate Change Resiliency	1	2	2	2
Economic	Capital Costs / Engineering Costs	3	1	2	3
	O&M Costs	3	3	2	3
Weighted Total (higher score indicates more favourable)			31	43	46

••• CONCLUSION & NEXT STEPS

CONCLUSION:

THE STORM PARK OPTIONS
ARE BEST ALIGNED WITH THE
TOWN'S VALUES AND
EXPECTATIONS

NEXT STEPS:

1. WETLAND CLASSIFICATION
2. OUTLET OPTIONS
3. CONVEYANCE TIE-IN



THANK YOU!



403-470-2333



JMASSIG@MAGNAENGINEERING.CA



WWW.MAGNAENGINEERING.CA