

Welcome!

Peel Wastewater Treatment Solutions

Clarkson Wastewater Treatment Plant Schedule C Class Environmental Assessment

**Virtual Public Information Event No. 3
On Display from Thursday, May 12, 2022**

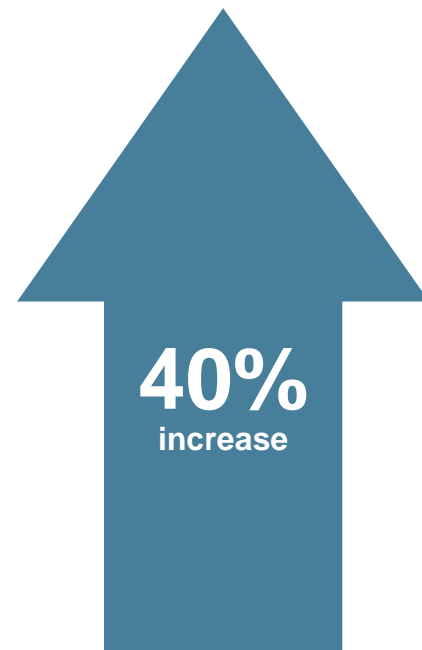
Background Information

- Wastewater from residential, commercial, institutional, and industrial users in the Region of Peel is collected through a network of sewers and pumping stations and treated at either the G.E. Booth wastewater treatment plant (WWTP) or the Clarkson WWTP.
- As population grows in Peel, there is insufficient capacity to meet future wastewater treatment needs at the WWTPs.

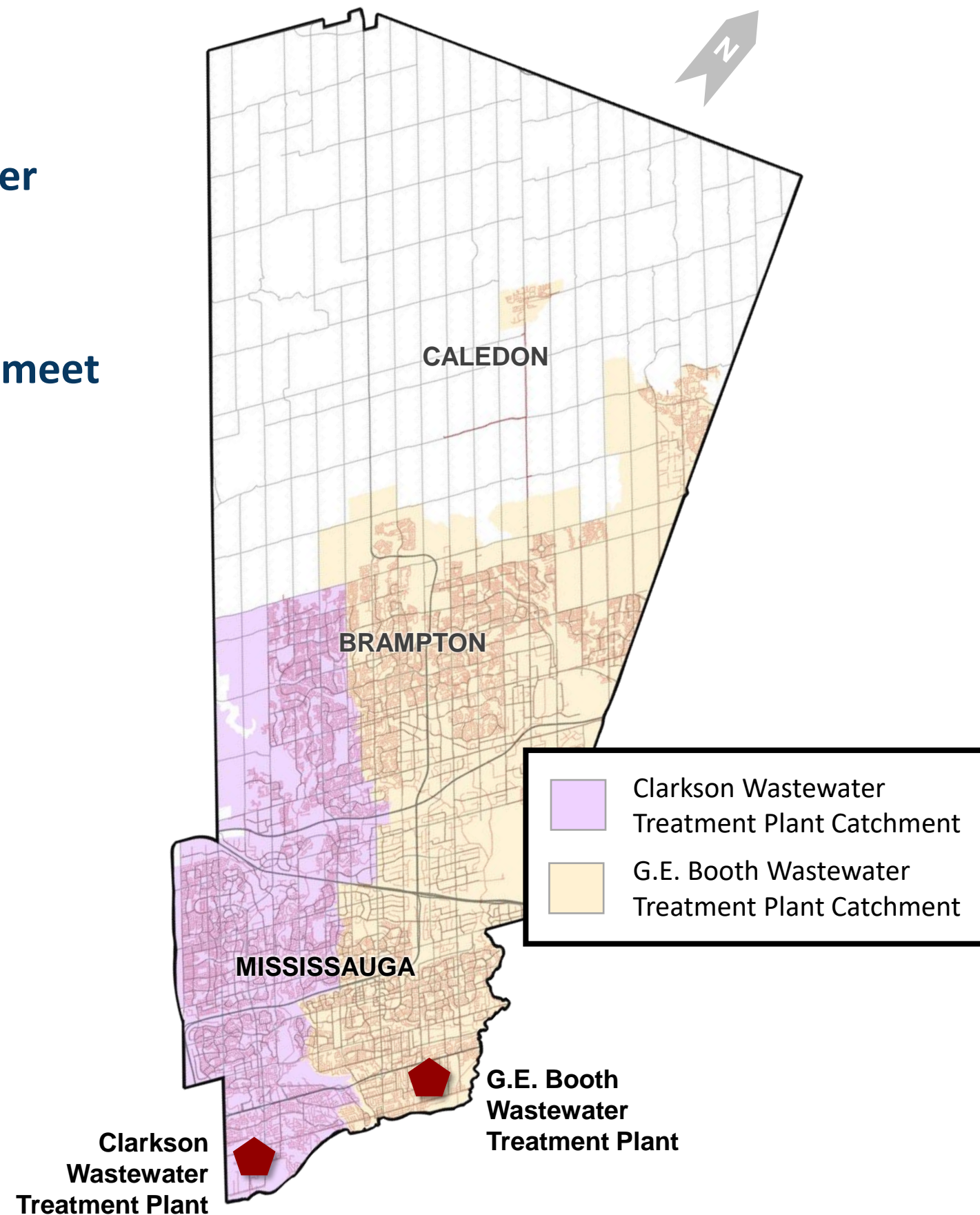
GROWING!

2016
2.12
Million

2041
2.94
Million



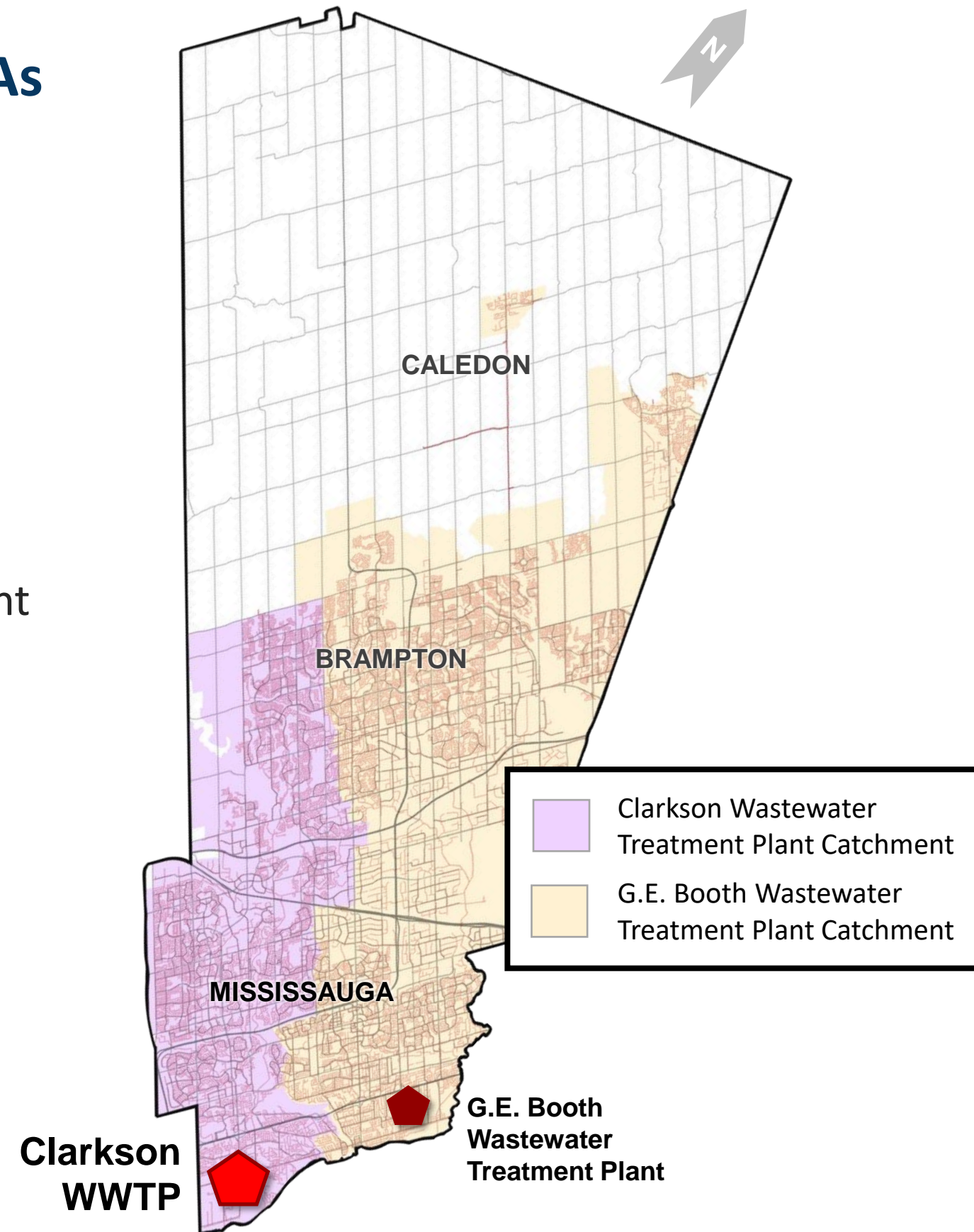
+ 542,000 people
+ 275,000 jobs



The Region is undertaking two Schedule C Class EAs to develop preferred solutions at the G.E Booth WWTP and the Clarkson WWTP that will:

- Meet future needs associated with population growth, new regulations, climate resiliency, energy efficiency, and wet weather flow management.
- Address community expectations regarding level of service, odour, air/noise, water quality, protection of the environment and aesthetics.
- Provide greater flexibility and reliability in wastewater and biosolids management.

This Public Information Centre focusses on the Schedule C Class EA for the Clarkson WWTP.



Peel's Wastewater Treatment System

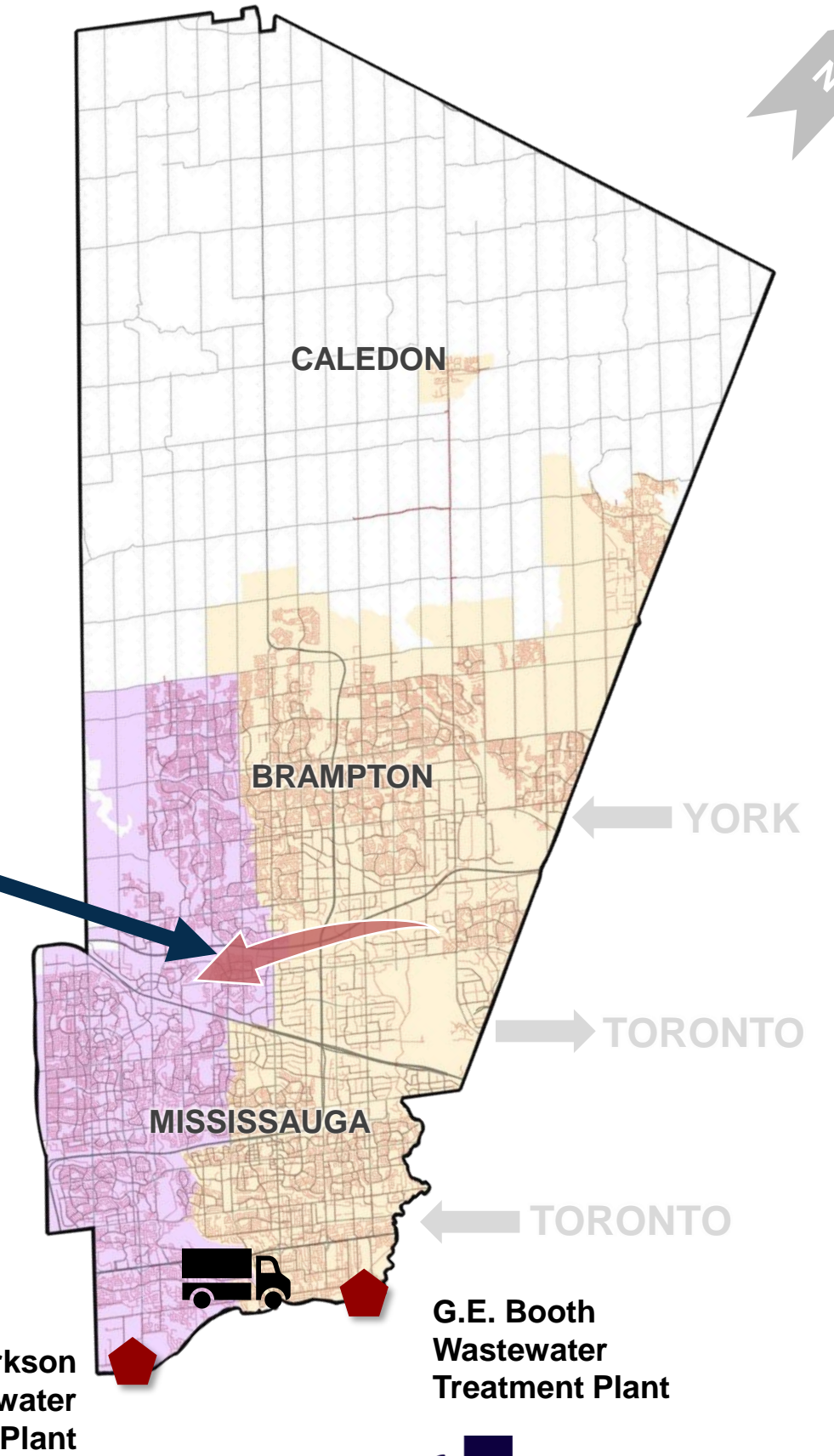


Clarkson Wastewater Treatment Plant
(350 MLD)



G.E. Booth Wastewater Treatment Plant
(518 MLD)

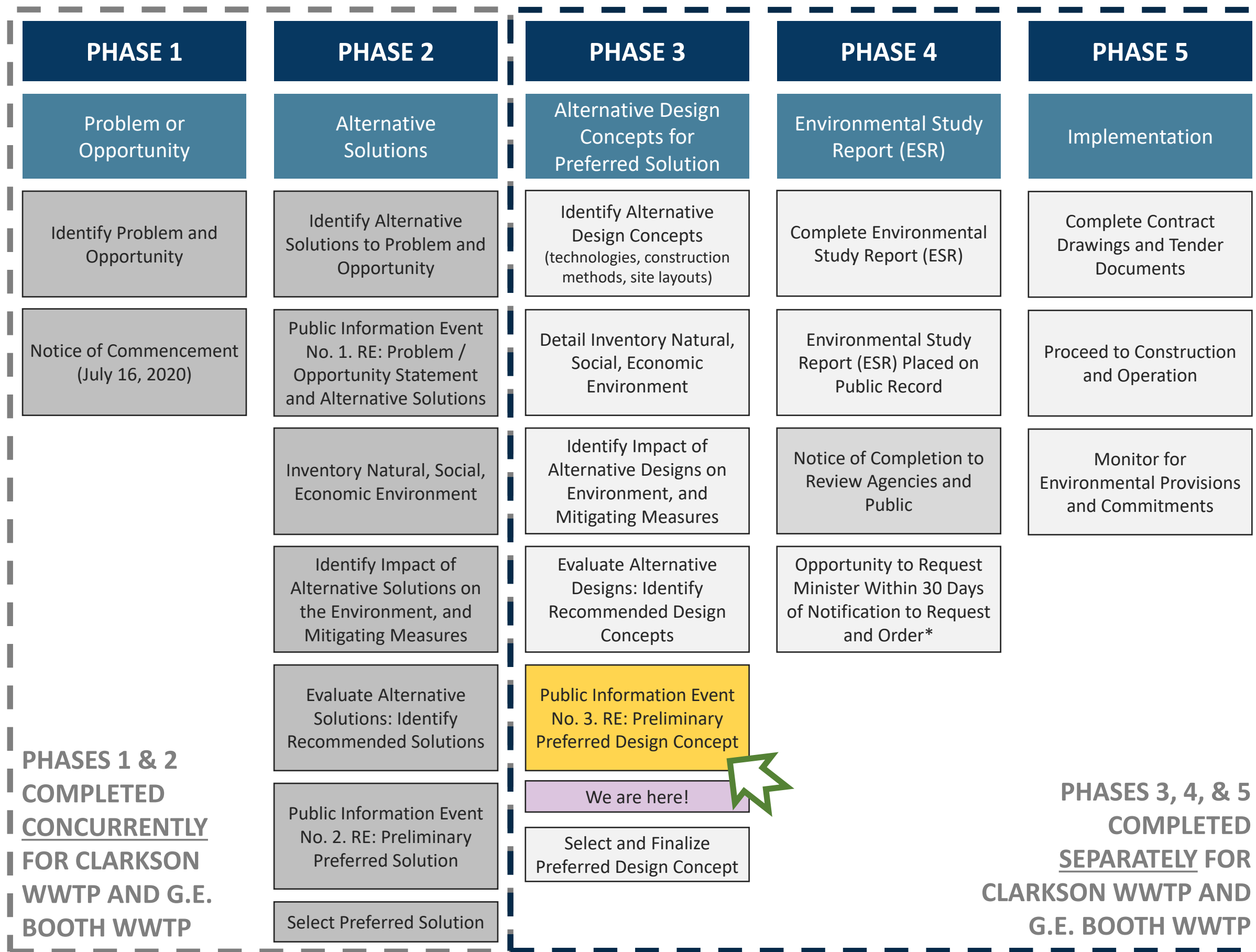
The East-West Diversion is a deep gravity trunk sewer of 2400 mm diameter currently being constructed along Derry Road. It is expected to be completed and operational by 2026. It allows Peel to divert flows from the G.E. Booth WWTP catchment area where there are capacity limitations, to the Clarkson WWTP catchment area which currently has surplus capacity.



Goals & Objectives of the Class EAs

	<p>Biosolids Management</p>	<ul style="list-style-type: none"> • Region Wide Biosolids Management with Operational Flexibility • Diversified Outlets with Reliable Biosolids Treatment and End Uses at Each Facility • Advanced Technologies with Energy and Resource Recovery • Community Compatible and Acceptable
	<p>Energy Efficiency</p>	<ul style="list-style-type: none"> • Reduce Greenhouse Gas (GHG) emissions • Energy Reduction and Reuse
	<p>Wet Weather Management</p>	<ul style="list-style-type: none"> • Real Time Control • Diverting Flow
	<p>Receiving Water Quality</p>	<ul style="list-style-type: none"> • Assimilative Capacity studies • Define Effluent Quality Limits • Protecting Intake Protection Zones (IPZs) and shoreline users/uses
	<p>Odour and Air Quality</p>	<ul style="list-style-type: none"> • Multi-barrier approaches
	<p>Visual Aesthetics</p>	<ul style="list-style-type: none"> • Landscaping • Best use of sites • Eliminate ash lagoons
	<p>Compatibility with Ongoing Initiatives</p>	<ul style="list-style-type: none"> • Real Time Control • Existing Plant Upgrades • Energy Efficiency Initiatives
	<p>Treatment Redundancy</p>	<ul style="list-style-type: none"> • Firm Capacity with one train out of service





Class EA Process



PHASES 1 & 2 COMPLETED CONCURRENTLY FOR CLARKSON WWTP AND G.E. BOOTH WWTP

PHASES 3, 4, & 5 COMPLETED SEPARATELY FOR CLARKSON WWTP AND G.E. BOOTH WWTP

Objective: Provide an overview of Phase 3 of the Class EA for the Clarkson WWTP

-  Present recommendations and preliminary preferred design concepts for key study components.
-  Provide clarity on the Municipal Class Environmental Assessment process and results.
-  Identify next steps and study commitments.
-  Receive feedback on the preliminary preferred design concepts.

This is the third and final PIC for this study.

Phase 3 Key Questions

- What technologies should we use to treat our wastewater (liquid and solids components)?
- Where should our treated biosolids go and be used?
- Do we require additional outfall capacity? How will it be provided?
- How should the wastewater plant site be laid out and look?
- How do we mitigate environmental and social impacts?



Existing Wastewater Treatment

- The existing treatment processes include screening, grit removal, primary clarification, aeration, secondary clarification, and chlorine disinfection and de-chlorination prior to discharge to Lake Ontario through the plant outfall.
- The existing plant capacity is 350 megalitres per day (MLD).
- The plant currently receives about 220 MLD flow, and therefore has excess capacity.
- The outfall has sufficient capacity to meet future requirements. No expansion to outfall capacity is required.



Recommended Wastewater Treatment Solution

- Divert flows from the G.E. Booth WWTP catchment to Clarkson WWTP through the East-to-West Diversion Trunk Sewer to take advantage of excess capacity at the Clarkson WWTP in the short-term.
- Expand the Clarkson WWTP from 350 MLD to 500 MLD by providing additional wastewater treatment capacity within the site boundaries.
- Expansion facilities to be located on the east part of the site.



Existing Biosolids Management

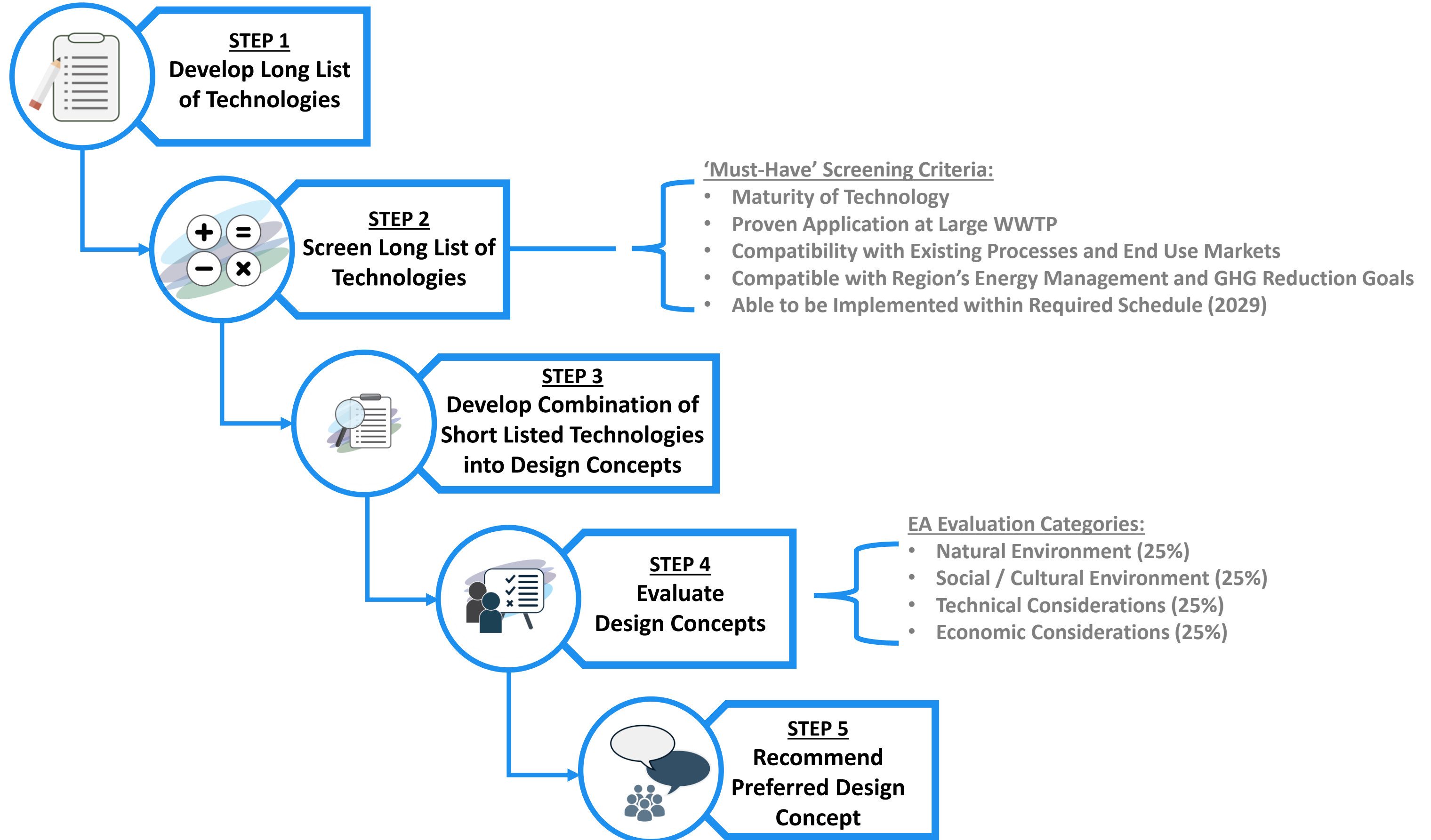
- The solids in the wastewater are collected for digestion and dewatering.
- The digested and dewatered biosolids are trucked to the G.E. Booth WWTP for incineration along with the G.E. Booth WWTP solids.



Recommended Biosolids Management Solution

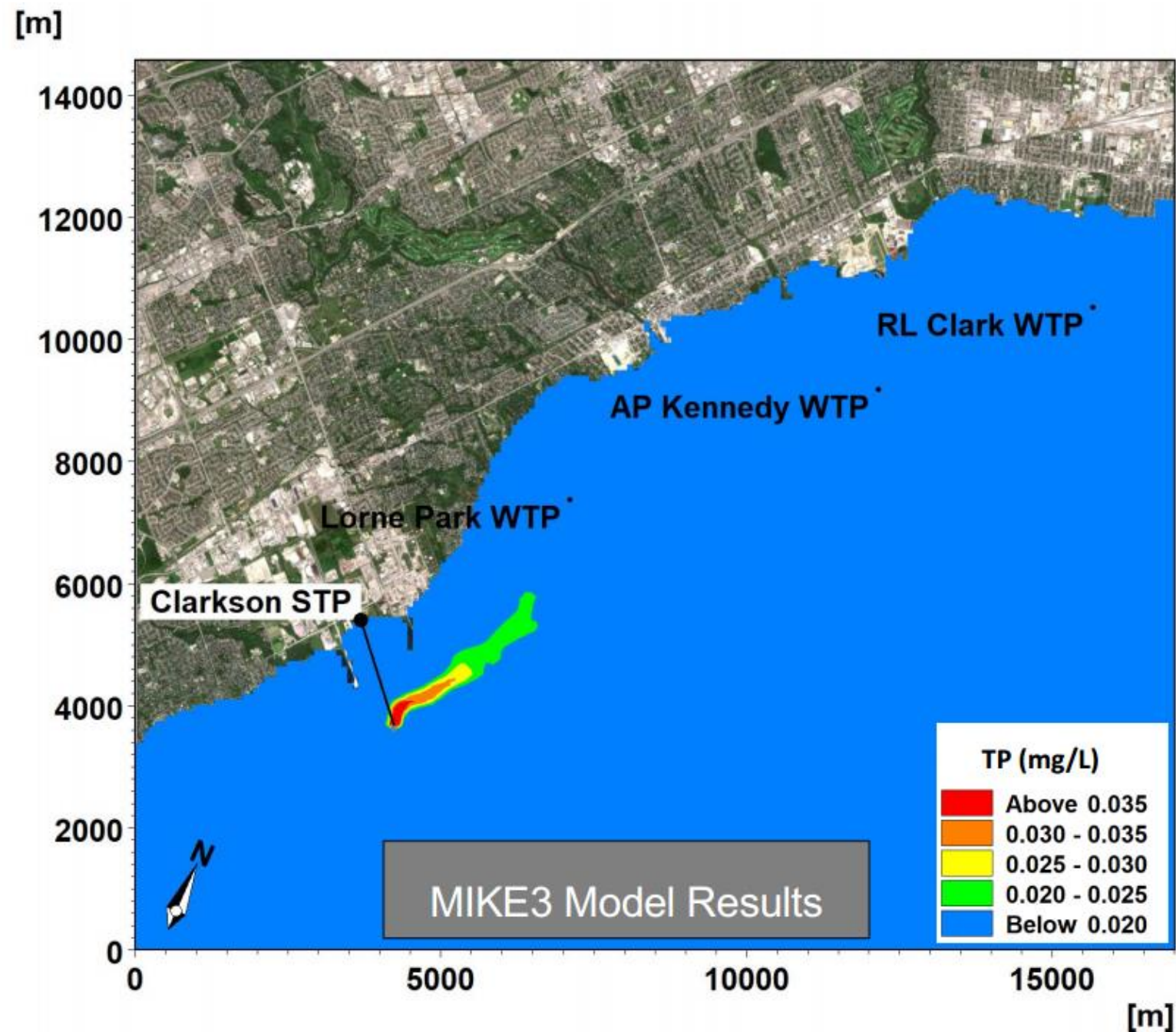
- Stop trucking Clarkson WWTP biosolids to the G.E. Booth WWTP for incineration.
- Provide additional solids stabilization and processing capacity at the Clarkson WWTP to effectively treat the solids and produce high-quality biosolids end-products.
- Beneficial reuse of biosolids such as:
 - Land applications including agricultural lands or silviculture (tree farming).
 - As soil amendments with fertilizers.

Phase 3 Evaluation Approach



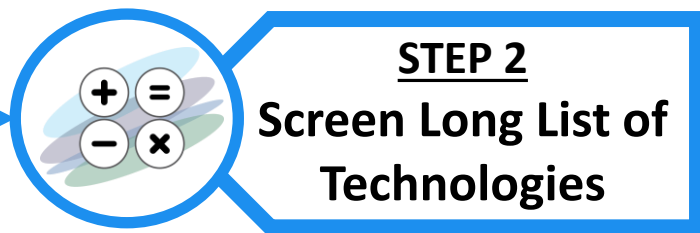
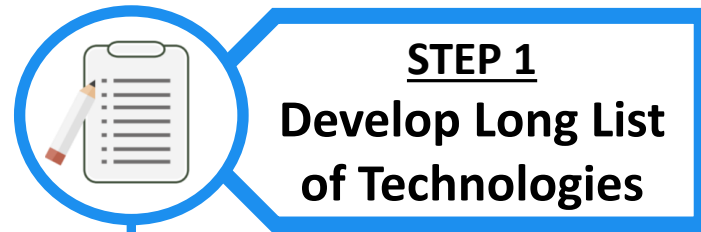
Wastewater Treatment – Design Parameters

Receiving Water Impact Assessment (RWIA) was completed to confirm the plant expansion's compliance with the Ministry of the Environment, Conservation and Parks (MECP) water quality guidelines.



Design Parameters	
Parameter	Design Value
Design Flows	
Average Day Flow	500 MLD
Peak Daily Flow	850 MLD
Peak Hourly Flow	1,200 MLD
Peak Instantaneous Flow	1,500 MLD
Wastewater Characteristics	
cBOD ₅	230 mg/L
TSS	305 mg/L
TKN	30 mg/L
TP	4.6 mg/L
Minimum Month Temperature	10.8°C
Alkalinity	233 mg/L
Design Basis	
Parameter	Design Value
Effluent Quality Limits	
cBOD ₅	25 mg/L
TSS	25 mg/L
TAN	13.0 mg/L (May 1 - May 31) 10.0 mg/L (Jun 1 – Sep 30) 13.0 mg/L (Oct 1 – Oct 31) 24.0 mg/L (Nov 1 - Apr 30)
TP	0.70 mg/L
E. Coli	200 organisms per 100 mL
Effluent Quality Objectives	
cBOD ₅	15 mg/L
TSS	15 mg/L
TAN	5.0 mg/L (May 1 - Oct 31) 12.0 mg/L (Nov 1 - Apr 30)
TP	0.60 mg/L
E. Coli	150 organisms per 100 mL

Wastewater Treatment – Long List Alternatives & Screening

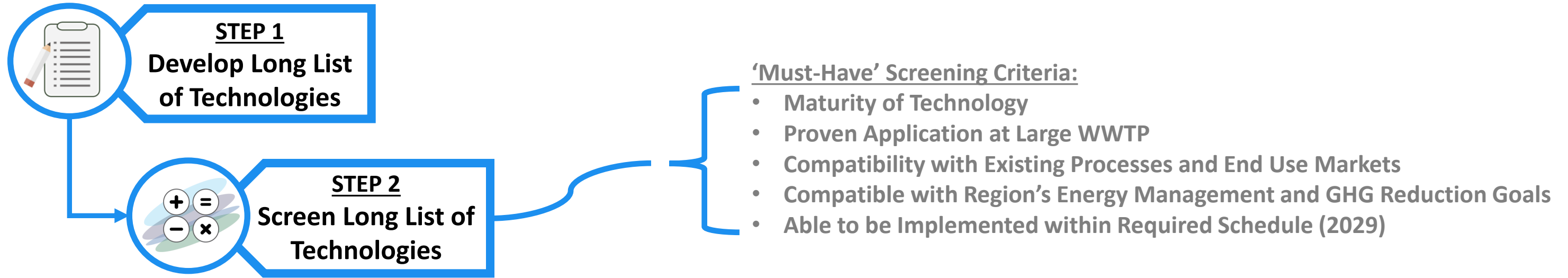


'Must-Have' Screening Criteria:

- Maturity of Technology
- Proven Application at Large WWTP
- Compatibility with Existing Processes and End Use Markets
- Compatible with Region's Energy Management and GHG Reduction Goals
- Able to be Implemented within Required Schedule (2029)

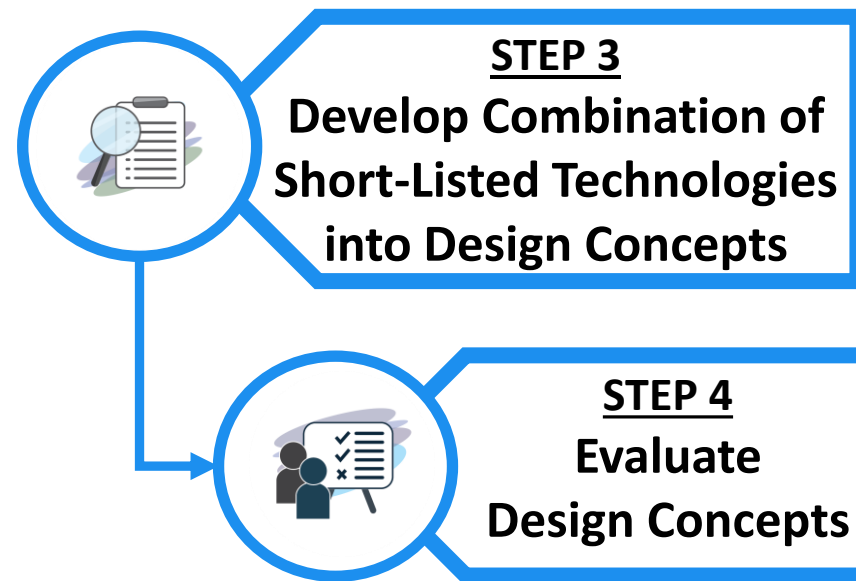
No.	Technology Alternative	Maturity of Technology	Proven Application at Large WWTPs	Compatibility with Existing and Future Processes	Compatibility with Regional Energy Management and GHG Reduction Goals	Ability to Implement within Required Schedule	SHORT-LISTED FOR EVALUATION
1	Conventional Activated Sludge (CAS)	Positive/No Impact	Positive/No Impact	Positive/No Impact	Moderate Impact	Positive/No Impact	Yes
2	CAS with Chemically Enhanced Primary Treatment (CEPT)	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Yes
3	CAS with Wet Weather Flow (WWF) Treatment	Positive/No Impact	Moderate Impact	High Impact	Moderate Impact	Moderate Impact	No
4	Ballasted Activated Sludge (BAS)	Moderate Impact	High Impact	Positive/No Impact	High Impact	High Impact	No
5	Biological Nutrient Removal (BNR)	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Yes
6	Membrane Bioreactor		Moderate Impact	Positive/No Impact	High Impact	Positive/No Impact	No
7	Membrane Aerated Biofilm Reactor	Moderate Impact	High Impact	Positive/No Impact	Positive/No Impact	High Impact	No
8	Integrated Fixed-Film Activated Sludge / Moving Bed Bioreactor	Moderate Impact	High Impact	High Impact	High Impact	High Impact	No
9	Sequencing Batch Reactor		Moderate Impact	High Impact	High Impact	Moderate Impact	No
10	Aerobic Granular Sludge	Moderate Impact	Moderate Impact	High Impact	Moderate Impact	High Impact	No
11	Biological Aerated Filter			High Impact	High Impact	Positive/No Impact	No

Wastewater Disinfection – Long List Alternatives & Screening



No.	Technology Alternative	Maturity of Technology	Proven Application at Large WWTPs	Compatibility with Existing and Future Processes	Compatibility with Regional Energy Management and GHG Reduction Goals	Ability to Implement within Required Schedule	SHORT-LISTED FOR EVALUATION
1	Chlorination/ dechlorination	Positive/No Impact	Positive/No Impact	Positive/No Impact	Moderate Impact	Positive/No Impact	Yes
2	UV Disinfection	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Positive/No Impact	Yes
3	Ozonation	Positive/No Impact	Moderate Impact	High Impact	Moderate Impact	Moderate Impact	No
4	Peracetic Acid	Moderate Impact	High Impact	Positive/No Impact	High Impact	High Impact	No

Wastewater Treatment and Disinfection: Design Concept Evaluation



EA Evaluation Categories:

- Natural Environment (25%)
- Social / Cultural Environment (25%)
- Technical Considerations (25%)
- Economic Considerations (25%)

Design Concepts	Natural Environment (25%)	Social – Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Wastewater Treatment Design Concepts					
Conventional Activated Sludge (CAS)	18.9	20.7	20.7	15.8	76.1
CAS with Chemically Enhanced Primary Treatment (CEPT)	19.3	20.2	20.5	15.8	75.8
Biological Nutrient Removal (BNR)	19.6	20.9	19.1	16.7	76.3
Wastewater Disinfection Design Concepts					
Chlorination / Dechlorination	20.4	22.3	22.5	19.2	84.4
Ultraviolet (UV) Disinfection	20.4	22.3	17.0	14.2	73.9

Wastewater Treatment – Preferred Design Concepts



STEP 5 Recommend Preferred Design Concept

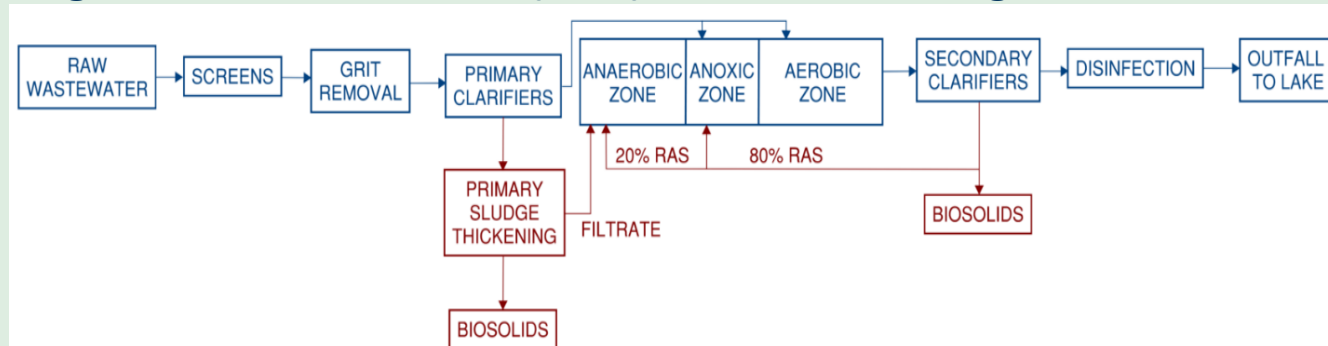
Recommended Wastewater Treatment Design Concept

Expansion of Existing Facility Using BNR Process

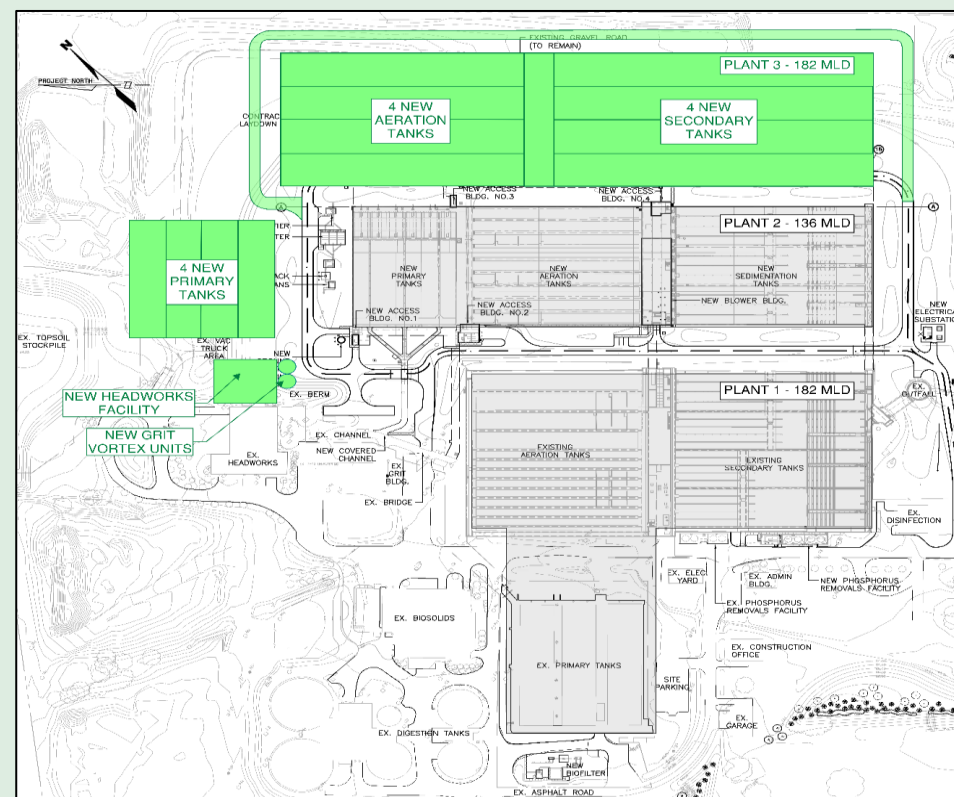
Recommended Wastewater Disinfection Design Concept

Chlorination / Dechlorination System

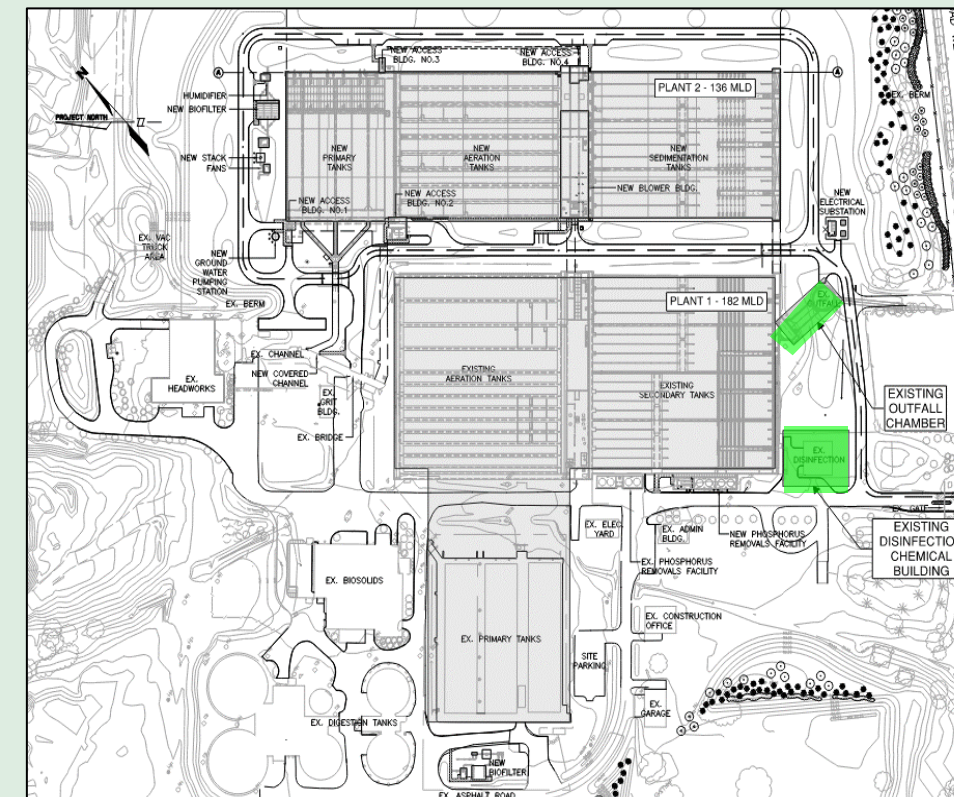
Biological Nutrient Removal (BNR) Process Flow Diagram



Conceptual Site Layout
Secondary tanks to be sized for CAS operation, a Sidestream Enhanced Phosphorus Removal Process (S2EBPR) will be incorporated for wet weather resiliency and operational flexibility.



- Existing outfall to be maintained; includes a chlorination / dechlorination disinfection system.
- Recommended design concept involves maintaining existing chlorination and dechlorination disinfection facilities with required chemical dosage increases equivalent to increased flows



Conceptual Site Layout
Existing disinfection building adjacent to existing outfall chamber. Sodium hypochlorite injected at outfall chamber and sodium bisulphite injected before effluent discharge to Lake Ontario. Outfall provides the required chlorine contact time for disinfection.

Biosolids Loading at Clarkson WWTP:

- **12,300 dry tonnes per year (DT/year)** of digested, dewatered biosolids produced in **2020**.
- **28,600 DT/year** of digested, dewatered biosolids anticipated by **2041**.



Anaerobic Digesters, Clarkson WWTP

Biosolids Market Assessment was completed to identify the demand and compliance limits of treated biosolids to be sent to beneficial end use markets.

Biosolids Management Options, Products, and Market End Users

BIOSOLIDS MANAGEMENT OPTIONS	BIOSOLID PROCESS AND PRODUCTS	MARKET END USERS
Beneficial Use	<ul style="list-style-type: none"> ▪ Digested biosolids (liquid) ▪ Digested biosolids (dewatered cake) ▪ Manufactured soil material ▪ Advanced digested biosolids; liquid or cake ▪ Thermal-dried biosolids ▪ Alkaline stabilized biosolids ▪ Thermal-alkaline hydrolysis biosolids ▪ Composted biosolids products 	<ul style="list-style-type: none"> ▪ Agricultural land application ▪ Silviculture (tree farming) ▪ Horticultural market ▪ Golf courses, parks and recreation ▪ Landscaping ▪ Land rehabilitation
Thermal Reduction	<ul style="list-style-type: none"> ▪ Incinerator residual ash disposal ▪ Incinerator residual ash use 	<ul style="list-style-type: none"> ▪ Municipal waste landfill ▪ Incorporation into cement ▪ Other ash reuse options
Landfilling	<ul style="list-style-type: none"> ▪ Unstabilized dewatered cake ▪ Stabilized dewatered cake ▪ Compost products ▪ Thermally dried product 	<ul style="list-style-type: none"> ▪ Municipal landfill and landfill cover ▪ Monofill (dedicated landfill)
Co-management with municipal solid waste	<ul style="list-style-type: none"> ▪ Compost products ▪ Biosolids cake (dewatered) 	<ul style="list-style-type: none"> ▪ Management with source separated organics

Biosolids Management: Market Assessment Recommendations

Potential Markets for Biosolids from Clarkson WWTP

OUTLET	PEEL REGION		GREATER GOLDEN HORSESHOE	
	LAND AREA (HECTARES)	ANNUAL MAXIMUM POTENTIAL DEMAND (DT/YR)	LAND AREA (HECTARES)	ANNUAL MAXIMUM POTENTIAL DEMAND (DT/YR)
Agriculture	27,000	108,000	296,000	1,184,000
Parks & Rec. Dept.	2,600	10,400		
Golf Courses	570	2,300		
TOTAL	30,170	120,700	296,000	1,184,000

Greatest market availability in agricultural cropland. Market demand exceeds the current biosolid quantities from the Clarkson & G.E. Booth plants. It is anticipated that the market will be able to absorb a significant portion of biosolids generated by both plants to 2041.

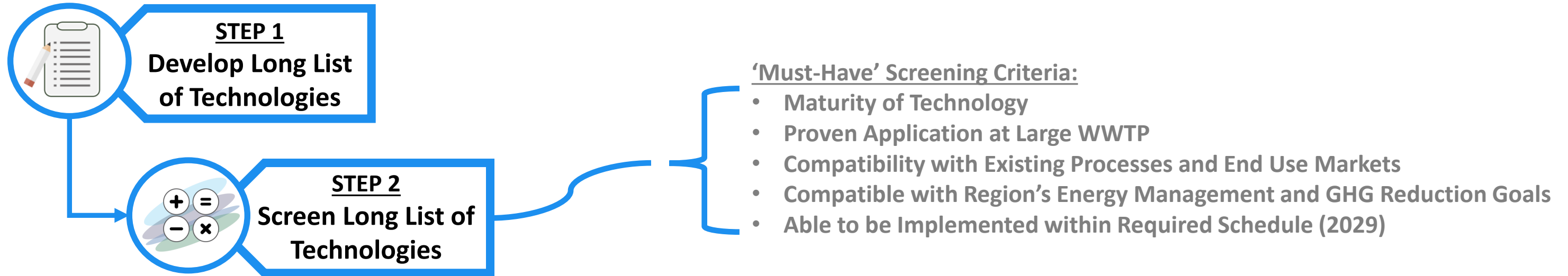
Biosolids currently produced at the Clarkson WWTP meet Canadian Food Inspection Agency (CFIA), Non-Agricultural Source Material (NASM) Category 3 CM1¹ and Category A & B feedstock metals limits. With anaerobic digestion, the Clarkson WWTP biosolids meet CP2² limits for faecal coliform and could meet the CP1³ and CFIA limits with further processing.

Note 1: Metal Category 1 based on metal content

Note 2: Pathogen Category 2 based on pathogen limit

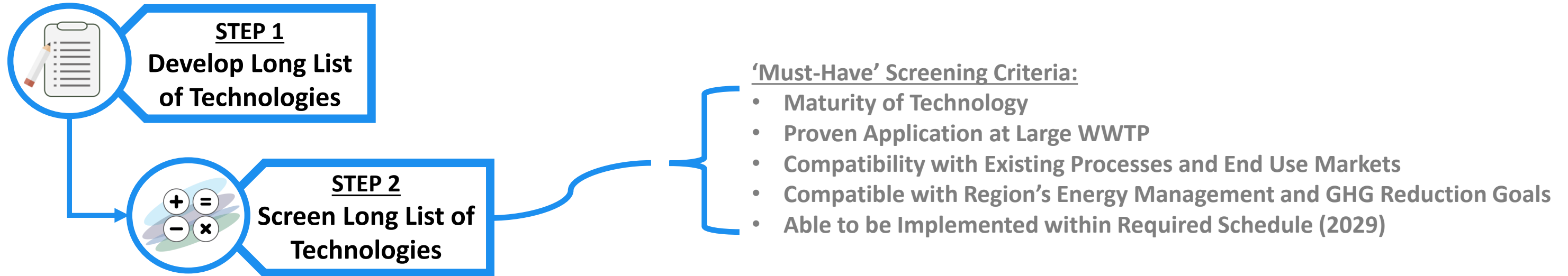
Note 3: Pathogen Category 1 based on pathogen limit

Biosolids Management – Long List Alternatives & Screening



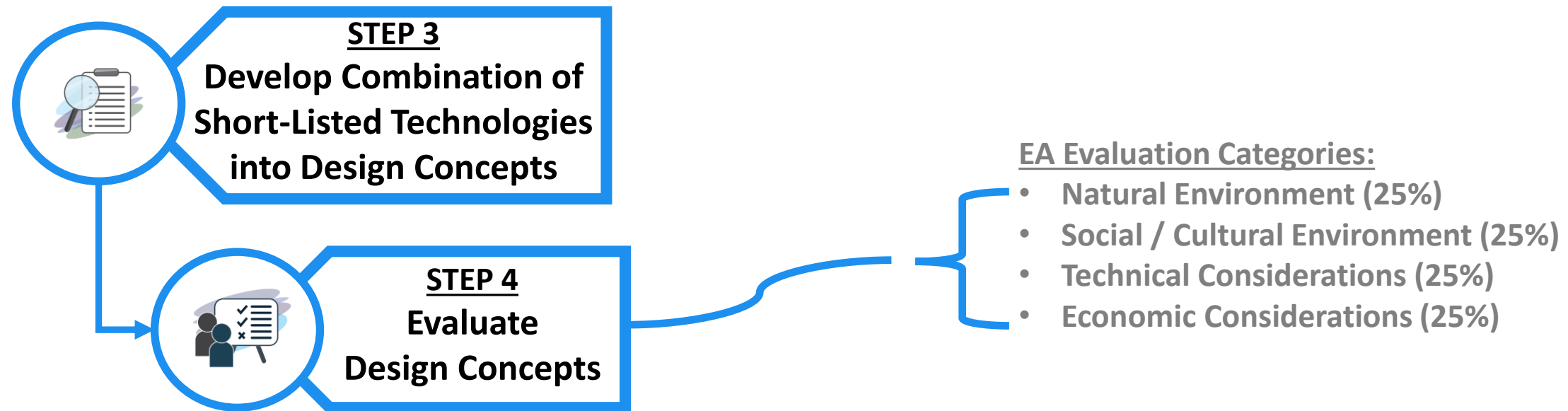
No.	Technology Alternative	Maturity of Technology	Proven Application at Large WWTPs	Compatibility with Existing and Future Processes	Compatibility with Regional Energy Management and GHG Reduction Goals	Ability to Implement within Required Schedule	SHORT-LISTED FOR EVALUATION
1	Anaerobic Digestion						
1a	Conventional Mesophilic Anaerobic Digestion	Mature Technology	Yes	Yes	Yes	Yes	Yes
1b	Temperature-Phased Anaerobic Digestion (TPAD)	Uncommon	Yes	Yes	Yes	Yes	No
1c	Acid/Gas Phased Anaerobic Digestion	Limited number of installations	Yes	Yes	Yes	Yes	No
2	Hydrolysis Pretreatment + Anaerobic Digestion						
2a	Thermal Hydrolysis Pre-treatment (THP)	Maturing technology becoming popular	Yes	Yes	Yes	Yes	Yes
2b	Thermo / Alkaline Hydrolysis Pre-treatment	Limited number of installations	Yes	No	Yes	Yes	No
3	Aerobic Digestion						
3a	Conventional Aerobic Digestion	Mature Technology	No	No	No	Yes	No
3b	Autothermal Thermophilic Aerobic Digestion (ATAD)	Maturing Technology Second Generation	No	No	No	Yes	No
4	Drying						
4a	Direct Thermal Dryer (Drum Dryer, Belt Dryer, Fluidized Bed Dryer)	Mature Technology	Yes	Yes	Yes	Yes	Yes
4b	Indirect Thermal Dryer (Paddle Dryer, Disc Dryer)	Mature Technology	Yes	No	Yes	Yes	No
4c	Solar Dryer	Newer, successful technology becoming popular	Yes	No	Yes	No	No

Biosolids Management – Long List Alternatives & Screening



No.	Technology Alternative	Maturity of Technology	Proven Application at Large WWTPs	Compatibility with Existing and Future Processes	Compatibility with Regional Energy Management and GHG Reduction Goals	Ability to Implement within Required Schedule	SHORT-LISTED FOR EVALUATION
5	Chemical Stabilization						
5a	Alkaline Stabilization	Mature Technology	No	Yes	Yes	Yes	No
5b	Alkaline Stabilization with Supplemental Heat or Acid	Mature Technology	Yes	Yes	Yes	Yes	Yes
5c	Alkaline Stabilization with Supplemental Heat and High-Speed Mixing	Maturing technology	Yes	Yes	Yes	Yes	Yes
6	Composting						
6a	Composting (Open Technologies Aerated Static Pile and Windrow Composting) or co-composting with Region of Halton	Mature Technology	No	Yes	Yes	No	No
7	Thermal Conversion						
7a	Incineration	Mature Technology	Yes	Yes	No	Yes	No
7b	Gasification	No	Yes	No	No	No	No
7c	Pyrolysis	No	Yes	No	No	No	No
7d	Wet Oxidation	No	Yes	No	No	No	No
7e	Hydrothermal Liquification	No	Yes	No	No	No	No

Biosolids Management - Design Concept Evaluation



Design Concepts	Natural Environment (25%)	Social - Cultural Environment (25%)	Technical Considerations (25%)	Economic Considerations (25%)	Total Score (100%)
Biosolids Management Design Concepts					
Expansion of Anaerobic Digestion System & Third-Party Beneficial Use	18.5	18.6	20.7	15.0	72.9
Thermal Hydrolysis Process (THP), Expansion of Anaerobic Digestion System & Third-Party Beneficial Use of CP1 Biosolids or Fertilizer Product	18.8	19.5	20.0	13.3	71.6
Expansion of Anaerobic Digestion System, Direct Thermal Drying & Third-Party Beneficial Use	17.8	20.2	20.9	15.0	73.9

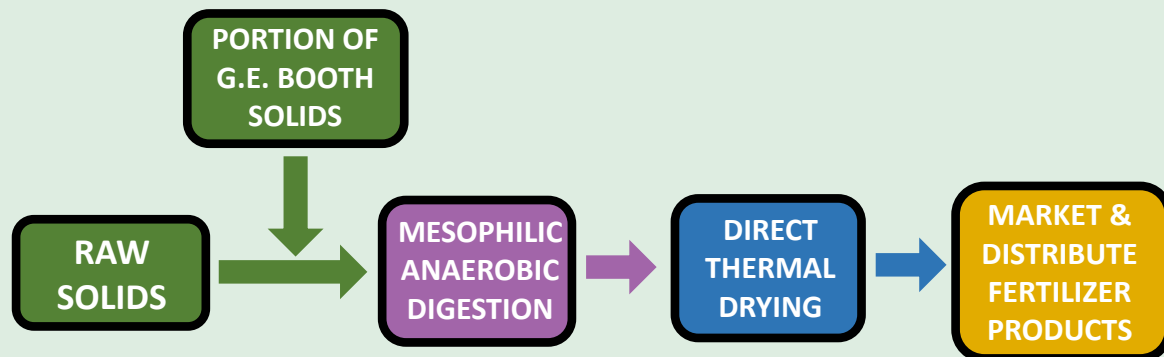


STEP 5
Recommend Preferred Design Concept

Recommended Biosolids Management Design Concept

Direct Thermal Drying of Anaerobically Digested Biosolids and Third-Party Distribution

Anaerobic Digestion + Dewatering + Drying Process Flow Diagram



Implementation Strategy

Outlet One: Distribute and market dried biosolids as a fertilizer for land application. Can be done through a third-party vendor.

Outlet Two: Establish contracts with third-party vendors to transport dewatered biosolids offsite for either land application or further processing to produce fertilizer for beneficial use. Allows diversified end users based on market conditions.

Conceptual Site Layout

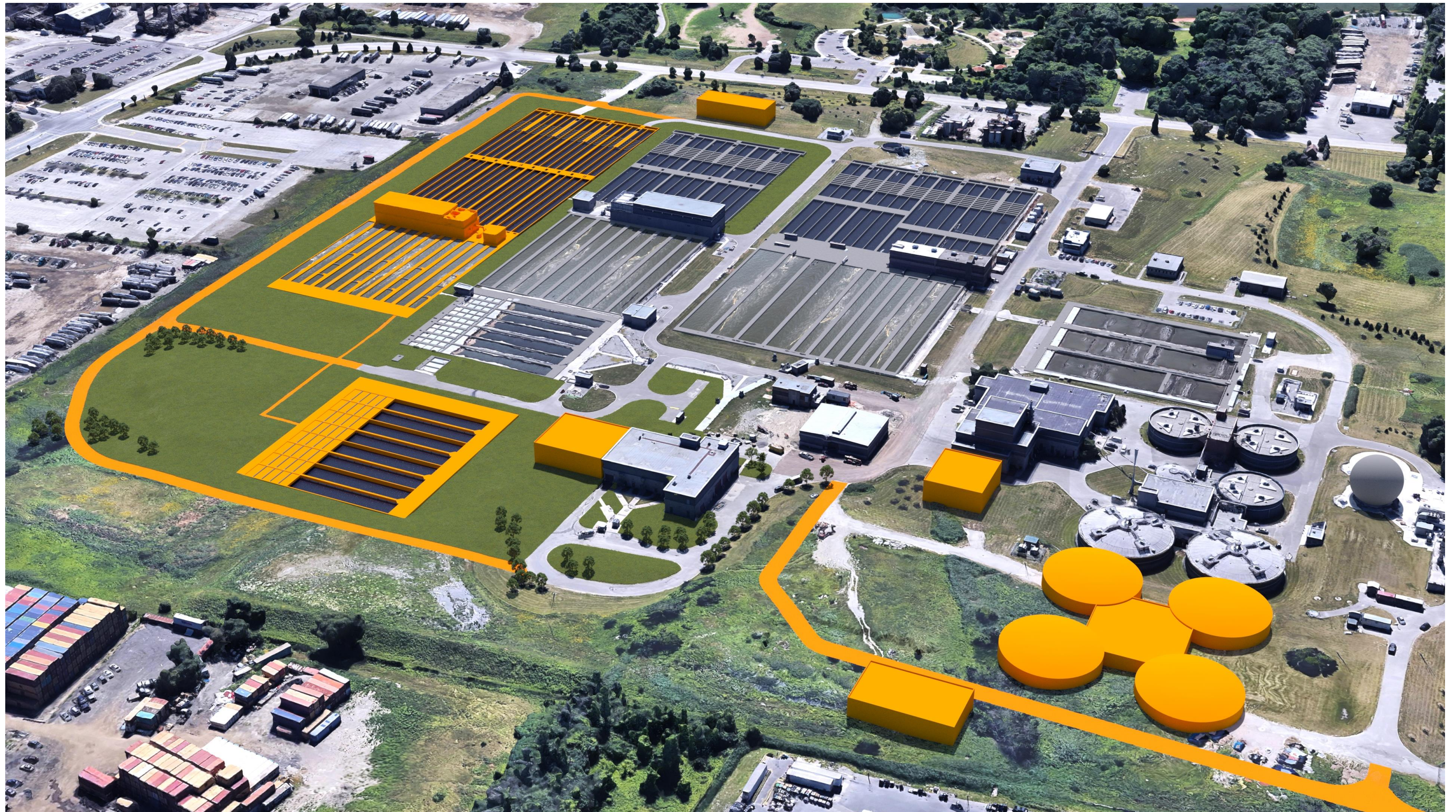
- Construct four (4) new digesters adjacent to existing Digesters 4 & 5.
- Decommission existing Digesters 1 & 2.
- Construct new thermal drying facility.
- Construct short-term storage (two product silos) along a widened portion of the access road.



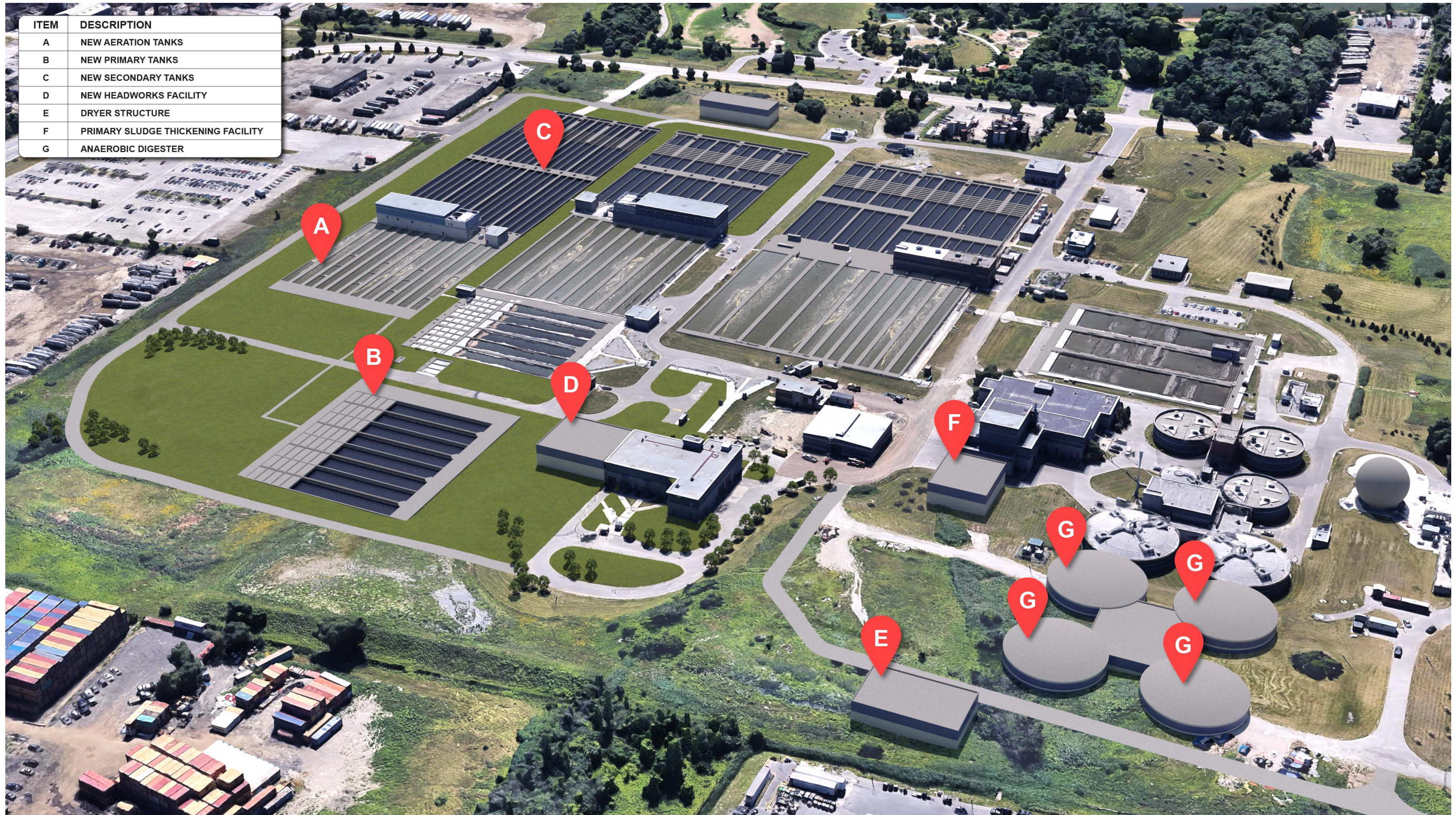
Clarkson WWTP: Current Site Layout



Clarkson WWTP: Overall Design Concept



Clarkson WWTP: Overall Design Concept



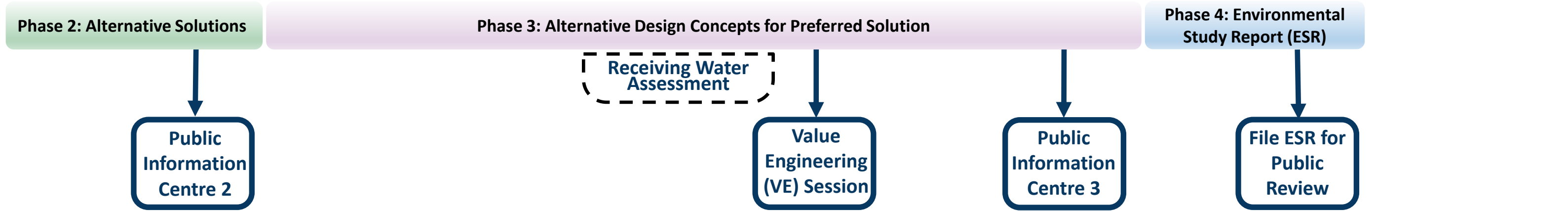
The Clarkson WWTP Environmental Assessment provides recommendations that will:

- Minimize impacts to environmental and archeological features
- Maximize buffer from existing and future neighbouring properties
- Meet MECP setback requirements
- Optimize the existing plant with flexibility for future treatment technologies, expansions, and changing environment
- Provide energy recovery and GHG emissions reduction through the proposed expansion strategy. The biosolids management approach produces biogas to be used on-site for energy reuse, along with a biosolids product which can be certified as a fertilizer, thereby resulting in carbon credits and further GHG emissions reduction.

Key Investigations required for detailed design:

- Stage 2 Archeological Assessment (AA) for portions of the existing Clarkson WWTP site
- Natural Environment Study for removal and replication of one wetland community (MAM2)
- Air/Odour/Noise Modelling to establish levels and mitigation measures to meet MECP requirements
- Receiving Water Assessment (Assimilative Capacity Study) to ensure no impacts to sensitive shoreline users or Intake Protection Zones (IPZ)
- Stormwater Management Plan

Project Timeline




Phase 2 Tasks (Completed)

- Prepare natural, hydrogeological, social, cultural, archaeological & economic inventory
- Identify potential impacts and how to address them
- Supporting technical analysis and studies
- Identify key factors and considerations
- Determine detailed criteria for overall strategy
- Identify alternative solutions
- **Public Information Centre No. 2**

Phase 3 Tasks (Ongoing)

- Validate preferred solution
- Identify design concept alternatives
- Prepare detailed inventory
- Identify impacts and how to address them
- Select preliminary preferred conceptual design and technologies
- **Public Information Centre No. 3 (May 11th, 2022)**

We are here!


- Two-week Question Submission Period (**May 12th to 26th, 2022**)
- Response to Questions (**June 9th, 2022**)

Phase 3 Studies (Ongoing)

- Air, Odour, & Noise Modelling
- Stage 2 Archeological Assessment

Phase 4 Tasks (Future)

- Confirm preferred design concepts and technologies
- Finalize Environmental Study Report
- Notice of study completion
- Finalize conceptual design
- File study report
- Public review period

Thank you for participating. Please Stay Engaged!

We want to hear from you!

- **Visit our website:**
www.peelregion.ca/Clarkson
- **Provide PIC No. 3 feedback** on the website from May 12 to 26, 2022
- **Sign-up to receive study notifications** on the website, including notice of study completion when the final report is available for public review.

For any Class EA questions, please contact the Project Manager:

Cindy Kambeitz, PMP, PMI-RMP
905-791-7800, ext. 5040
ClarksonEA@peelregion.ca

Next Steps:

