July 10, 2025

Municipality of Casselman Sewage Treatment System Schedule ‘C’ Class Environmental Assessment

Public Information Centre #2

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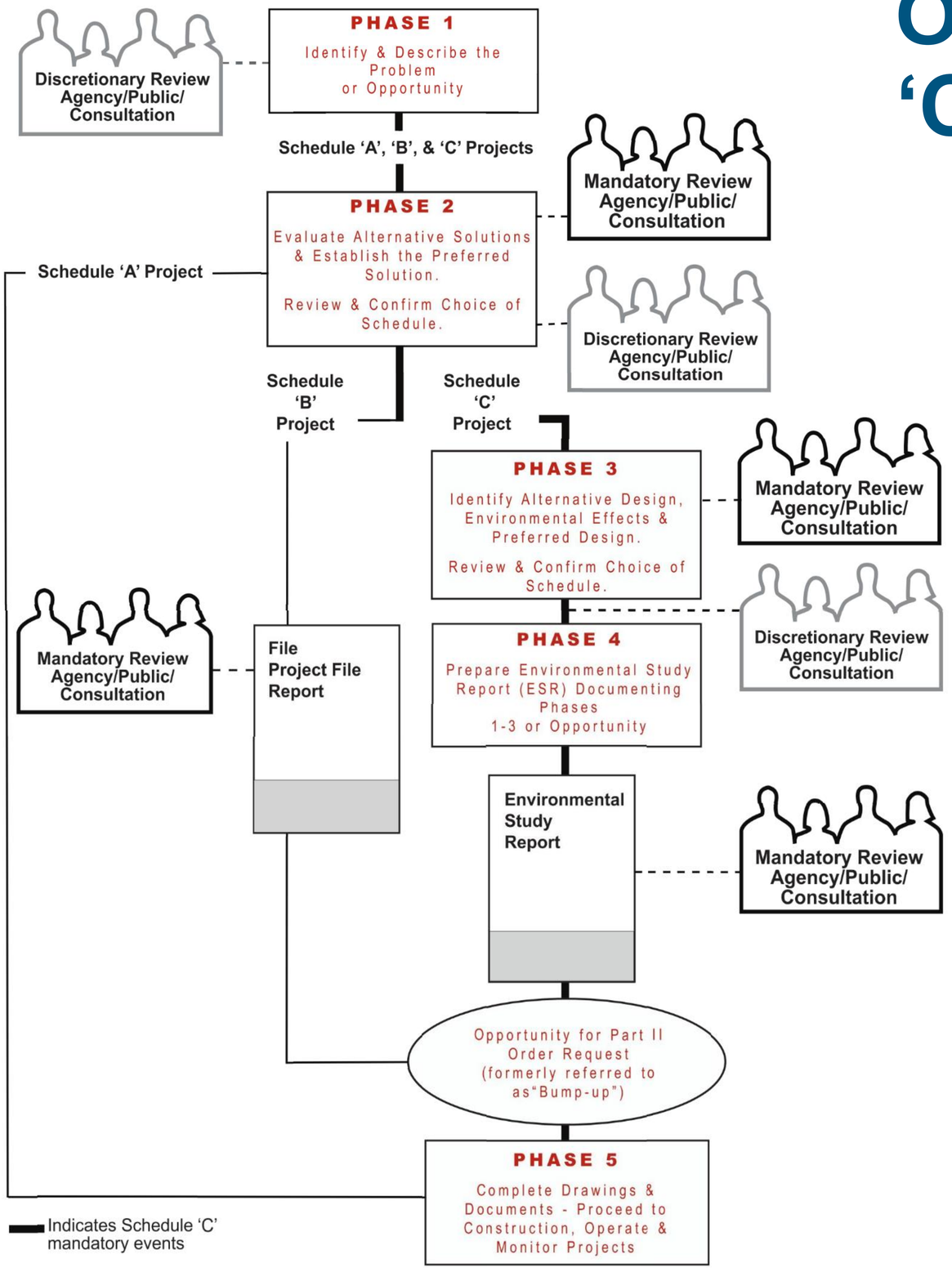
Overview of Casselman Sewage Treatment System Schedule ‘C’ Class EA

- The Municipality is undertaking this Schedule ‘C’ Municipal Class Environmental Assessment to determine the preferred expansion design concept for the Casselman Sewage Treatment System (STS) to effectively treat wastewater generated from existing and projected future development areas.
- The Casselman Water and Wastewater Infrastructure Master Plan was completed in July 2024:
  - The following 25-year development was forecasted: Short-Term (0-5 Years) – 980 Units, Mid-Term (5-10 Years) – 742 Units, and Long-Term (10-25 Years) – 329 Units
  - Preferred Solution to Accommodate Forecasted Growth:
    - **Maintain Lagoon-Based Treatment System**
    - **Expand Lagoon Rated Capacity** – 2,050 m3/day to 4,050 m3/day
    - **Expand Lagoon Discharge Window to Year-Round**

Overview of the Schedule ‘C’ Class EA Process



Casselman Water and Wastewater Infrastructure Master Plan (Approach 1)

- ✓Notice of Study Commencement
- ✓Phase 1 – Identification of Problem or Opportunity
- ✓Phase 2A – Identification and Screening of Alternative Solutions
- ✓Public Information Centre No. 1 – Review of Recommended Solution with Public and Agency Stakeholders
- ✓Phase 2B - Evaluation of Screened Alternative Solutions, Identification of a Preferred Solution and Review of Class EA Schedule

Casselman Sewage Treatment System Schedule ‘C’ Class EA

- ✓Phase 3A – Identification and Screening of Alternative Designs
- ✓Phase 3B – Evaluation of Screened Alternative Designs, Identification of a Preferred Design and Review of Class EA Schedule
- ❑**Public Information Centre No. 2**
- ❑Phase 4 – Environmental Study Report
- ❑Place Project File Report on Public Record for 30-day Review Period
- ❑Notice of Study Completion

Class EA Phase 3 - Design Basis

Preferred Solution:

- Maintain existing lagoon storage and treatment facilities and improve flow path within the existing lagoon cells through the implementation of baffles.
- Maintain existing MBBR treatment process and its rated capacities (monthly variable).
- Provision of a second Disc filter for the treatment of higher monthly flows, higher solids removal requirements and additional redundancy.
- Provision of a coagulation chamber to provide a secondary point of coagulant dosing, to ensure that all reactive phosphorus is precipitated into particulate form prior to filtration.
- Provision of a disinfection system to provide tertiary disinfection of Disc Filter effluent.
- Construction of a new building to house the disc filters and chemical systems.
- Opinion of Probable Cost (including design and construction) = $9,000,000 +/- 30% (excluding HST)

Class EA Phase 3 - Design Basis (continued)

Existing and Proposed Maximum Daily Discharge Rates.

MONTH	EXISTING (1)		PROPOSED	
	MAXIMUM DAILY DISCHARGE RATE	MINIMUM DILUTION RATIO	MAXIMUM DAILY DISCHARGE RATE	MINIMUM DILUTION RATIO
January	5,000 m^3/d	SNR Flow/10	5,750 m^3/d	12.4
February	5,000 m^3/d	SNR Flow/10	5,600 m^3/d	12.4
March	5,000 m^3/d	SNR Flow/40	7,250 m^3/d	12.3
April	7,000 m^3/d	SNR Flow/60	10,000 m^3/d	72.9
May 1-15	7,000 m^3/d	SNR Flow/60	4,500 m^3/d	40.5
May 16-31	N/A	N/A	4,500 m^3/d	40.5
June	N/A	N/A	2,150 m^3/d	26.2
July	N/A	N/A	1,050 m^3/d	26.2
August	N/A	N/A	900 m^3/d	26.3
September	N/A	N/A	910 m^3/d	26.2
October	4,000 m^3/d	SNR Flow/15	2,250 m^3/d	13.1
November	4,000 m^3/d	SNR Flow/10	6,050 m^3/d	13.1
December	5,000 m^3/d	SNR Flow/15	8,750 m^3/d	12.4

Notes:
(1) Per ECA No. 8160-BAHPRF (April 19, 2019).

Existing and Proposed Effluent Criteria.

PARAMETER	AVERAGING PERIOD	EXISTING (1)		PROPOSED	
		OBJECTIVE	LIMIT	OBJECTIVE	LIMIT
$cBOD_5$					
Jan 1 to May 15	Monthly	15 mg/L	25 mg/L	10 mg/L	12 mg/L
May 15 to Sep 30	Monthly	N/A	N/A	10 mg/L	12 mg/L
Oct 1 to Dec 31	Monthly	10 mg/L	15 mg/L	10 mg/L	12 mg/L
TSS					
Jan 1 to May 15	Monthly	15 mg/L	25 mg/L	10 mg/L	12 mg/L
May 15 to Sep 30	Monthly	N/A	N/A	10 mg/L	12 mg/L
Oct 1 to Dec 31	Monthly	10 mg/L	25 mg/L	10 mg/L	12 mg/L
TP	Monthly	0.8 mg/L	1.0 mg/L	0.2 mg/L	0.3 mg/L
TAN					
Jan 1 to Mar 31	Monthly	12.0 mg/L	12.0 mg/L	9.2 mg/L	11.5 mg/L
Apr 1 to May 15	Monthly	6.0 mg/L	6.0 mg/L	4.8 mg/L	6.0 mg/L
May 15 to May 31	Monthly	N/A	N/A	4.8 mg/L	6.0 mg/L
Jun 1 to Sep 30	Monthly	N/A	N/A	1.0 mg/L	1.3 mg/L
Oct 1 to Nov 30	Monthly	5.0 mg/L	5.0 mg/L	4.0 mg/L	5.0 mg/L
Dec 1 to Dec 31	Monthly	12.0 mg/L	12.0 mg/L	9.2 mg/L	11.5 mg/L
E. coli	Monthly	100 CFU/100 mL	200 CFU/100 mL	150 CFU/100 mL	200 CFU/100 mL
Hydrogen Sulphide					
Jan 1 to May 15	Monthly	0.1 mg/L	0.1 mg/L	N/A	N/A
Oct 1 to Dec 31	Monthly	Not Detected	Not Detected	N/A	N/A
pH	Single Grab	6.8 to 7.8	6.0 to 8.0	6.8 to 7.8	6.0 to 8.0

Notes:
(1) Per ECA No. 8160-BAHPRF (April 19, 2019).

Class EA Phase 3 – Review of Treatment Technologies – TAN and BOD Removal

- BOD = Biochemical Oxygen Demand, TAN = Total Ammonia Nitrogen
- Existing system uses facultative lagoons (Cells ‘A’ and ‘B’) and aerated lagoon (Cell ‘C’) for pre-treatment of BOD and TAN, and a Moving Bed Biofilm Reactor (MBBR) to achieve low levels of BOD and TAN, including in cold weather conditions.
- The following upgrades are proposed to accommodate the 25-year BOD and TAN criteria, based on discussions with the MBBR supplier:
  - Increase aeration capacity to MBBR by replacing existing blowers and variable frequency drives.
  - Install a direct pipe connection between Cell ‘A’ and the MBBR inlet to maintain a healthy biomass in the MBBR between Summer and Winter.
  - Add floating baffles in Cell ‘A’ and Cell ‘B’ to minimize short-circuiting upstream of the MBBR.
- Given that existing MBBR could be re-utilized, no alternatives were reviewed for TAN and BOD removal. These upgrades will be included as part of preferred design concept.
- OCWA noted that the existing MBBR produced a lot of foam. A review of cover options will be recommended as part of the Class EA.

Class EA Phase 3 – Review of Treatment Technologies – TSS and TP Removal

- TSS = Total Suspended Solids, TP = Total Phosphorous
- Existing system uses alum dosing, facultative lagoons (Cells ‘A’ and ‘B’), aerated lagoon (Cell ‘C’) and a Disc Filter to achieve TSS and TP removal.
- The following upgrades are proposed to accommodate the 25-year TP and TSS criteria, based on discussions with the disc filter supplier:
  - Additional identical disc filter parallel to existing to treat the higher discharge flows, higher solids loading and for system redundancy.
  - Coagulation-flocculation system, consisting of a tank, chemical dosing system and polymer automatic preparation system to achieve effluent TP concentrations of 0.2 mg/L.
- South Nation Conservation also has the Total Phosphorous Management (TPM) program, which allows municipalities to purchase TP offset credits instead of adding an enhanced treatment process.
- <u>Alternative Design Concepts</u>:
  - TP1 – Total Phosphorous Management Program
  - TP2 – Coagulation/Flocculation System

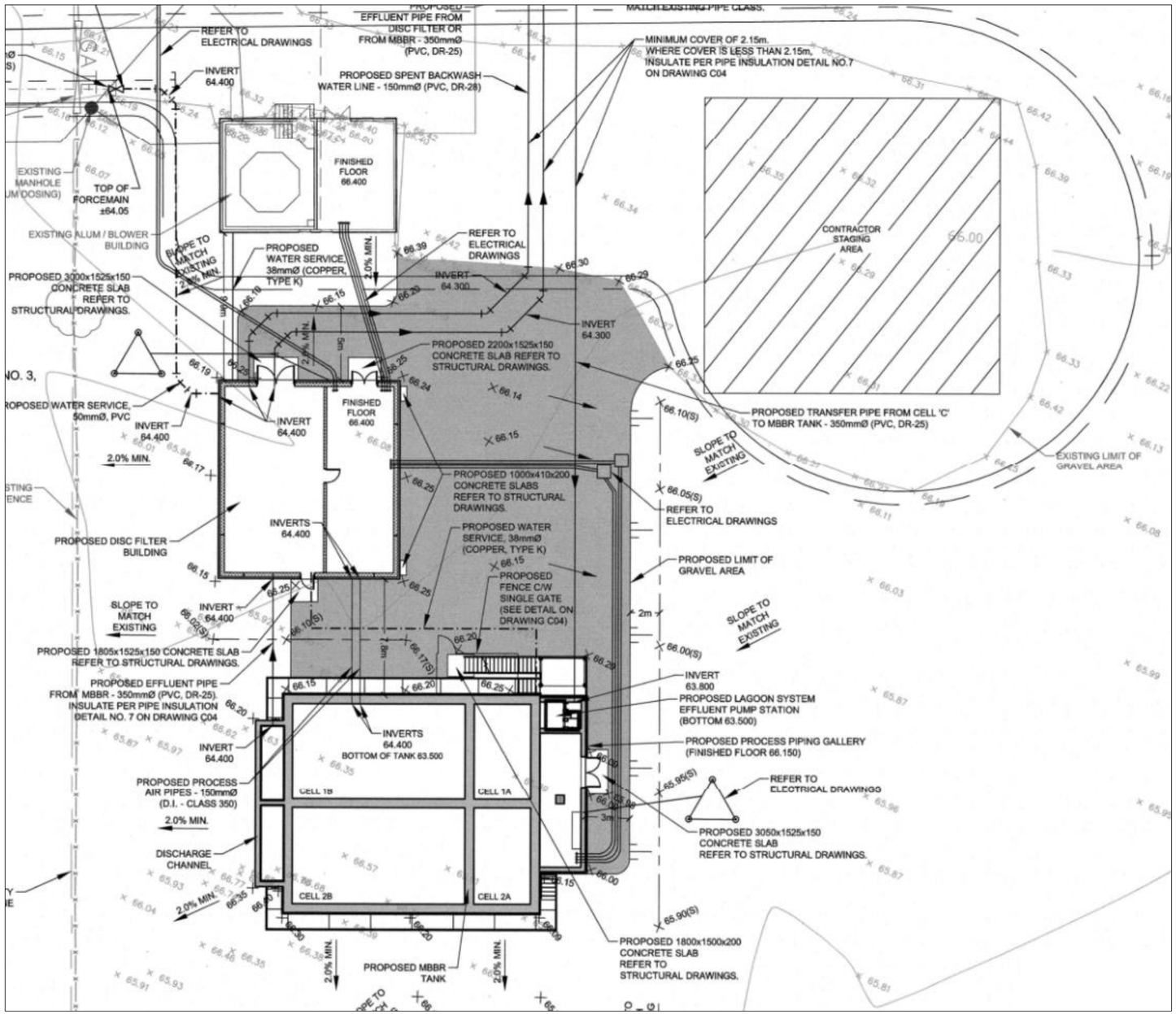
Class EA Phase 3 – Review of Treatment Technologies – Disinfection

- Existing system does not have a disinfection system.
- Disinfection is required for the upgraded system due to discharge occurring during summer months. However, an E. Coli design criteria of 150 CFU/100 mL is included for all months.
- UV Disinfection (large installation shown in figure) was screened as the preferred disinfection technology due to the following:
    - Reduced spacing requirements compared to other technologies.
    - Ease of implementation with the existing system.
    - Ease of operation and control.
    - No generation of disinfection byproducts.
    - No post-treatment residuals.
    - No requirement for additional chemicals.
    - Competitive costing.

Class EA Phase 3 – Development of Alternative Design Concepts

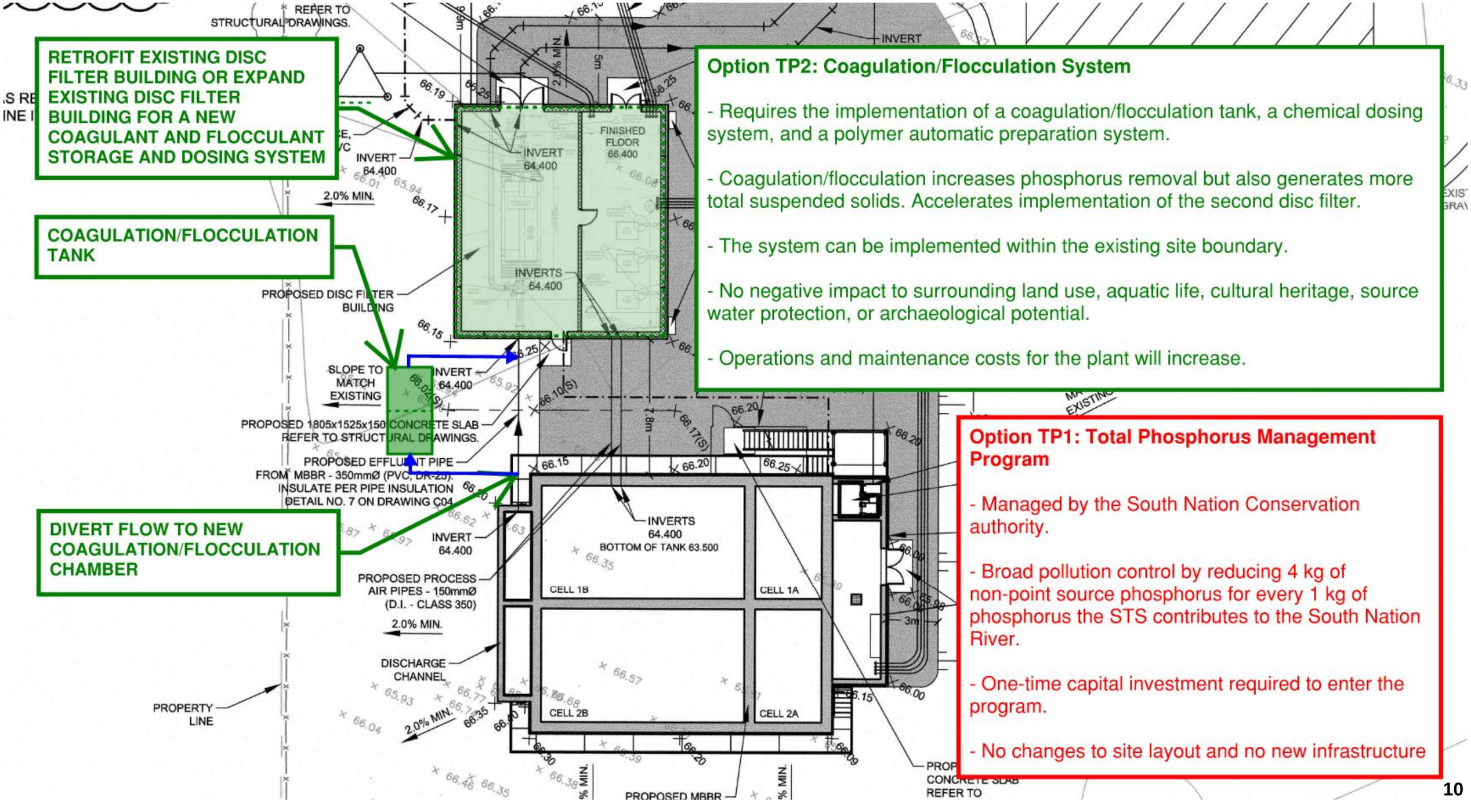
- <u>Disc Filter and UV Implementation Options</u>:
  - DF1 – Expansion of Existing Disc Filter Building
  - DF2 – Install New Building to the West of the Existing Disc Filter Building
  - ~~DF3 – Install New Building to the East of the Existing Disc Filter Building~~ (not carried forward as not feasible from a process hydraulics perspective)

- <u>TP Removal Options</u>:
  - TP1 – Total Phosphorous Management Program
  - TP2 – Coagulation/Flocculation System



Civil Site Plan Drawing of Existing System

Class EA Phase 3 – TP Removal Options



Option TP2: Coagulation/Flocculation System

- Requires the implementation of a coagulation/flocculation tank, a chemical dosing system, and a polymer automatic preparation system.

- Coagulation/flocculation increases phosphorus removal but also generates more total suspended solids. Accelerates implementation of the second disc filter.

- The system can be implemented within the existing site boundary.

- No negative impact to surrounding land use, aquatic life, cultural heritage, source water protection, or archaeological potential.

- Operations and maintenance costs for the plant will increase.

Option TP1: Total Phosphorus Management Program

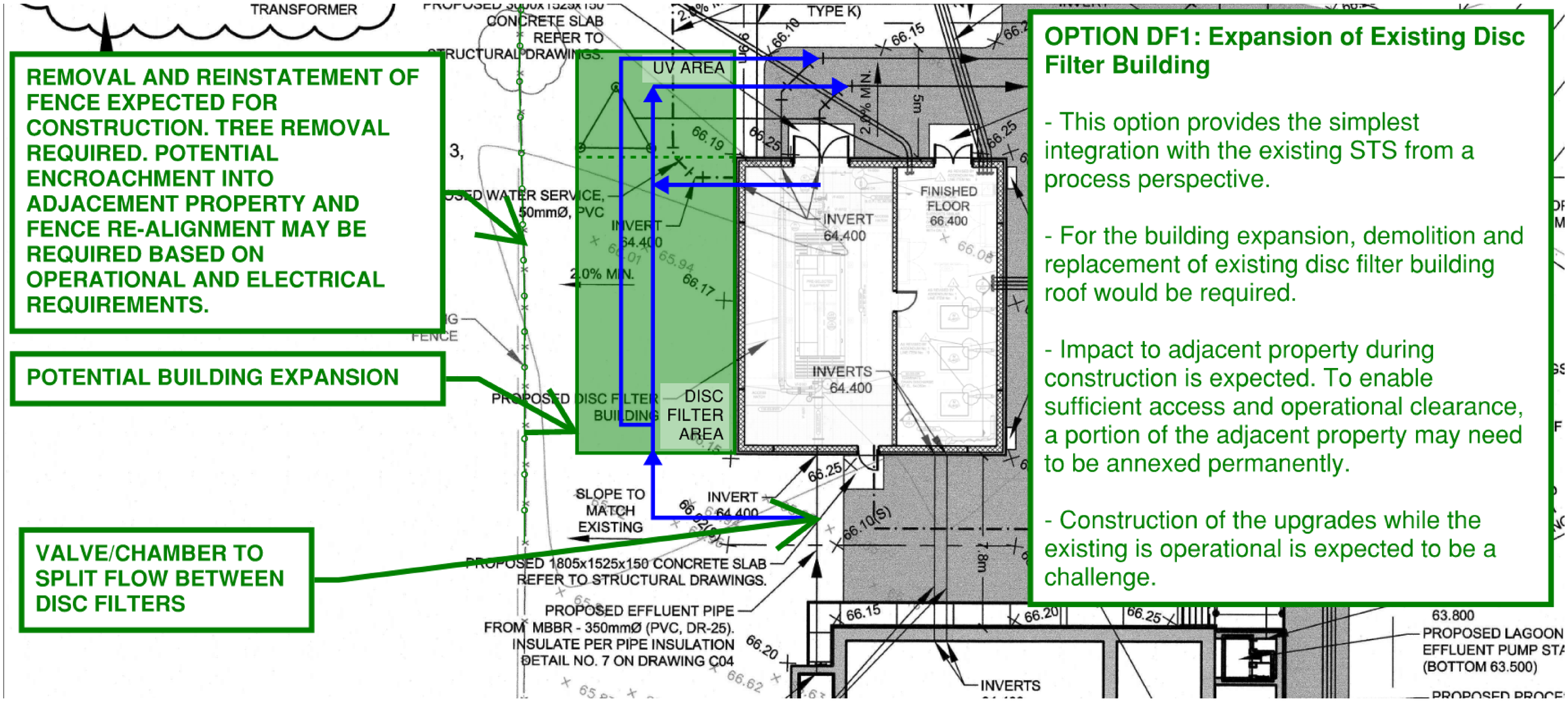
- Managed by the South Nation Conservation authority.

- Broad pollution control by reducing 4 kg of non-point source phosphorus for every 1 kg of phosphorus the STS contributes to the South Nation River.

- One-time capital investment required to enter the program.

- No changes to site layout and no new infrastructure

Class EA Phase 3 – Disc Filter and UV Implementation Options – Option DF1, Expansion



OPTION DF1: Expansion of Existing Disc Filter Building

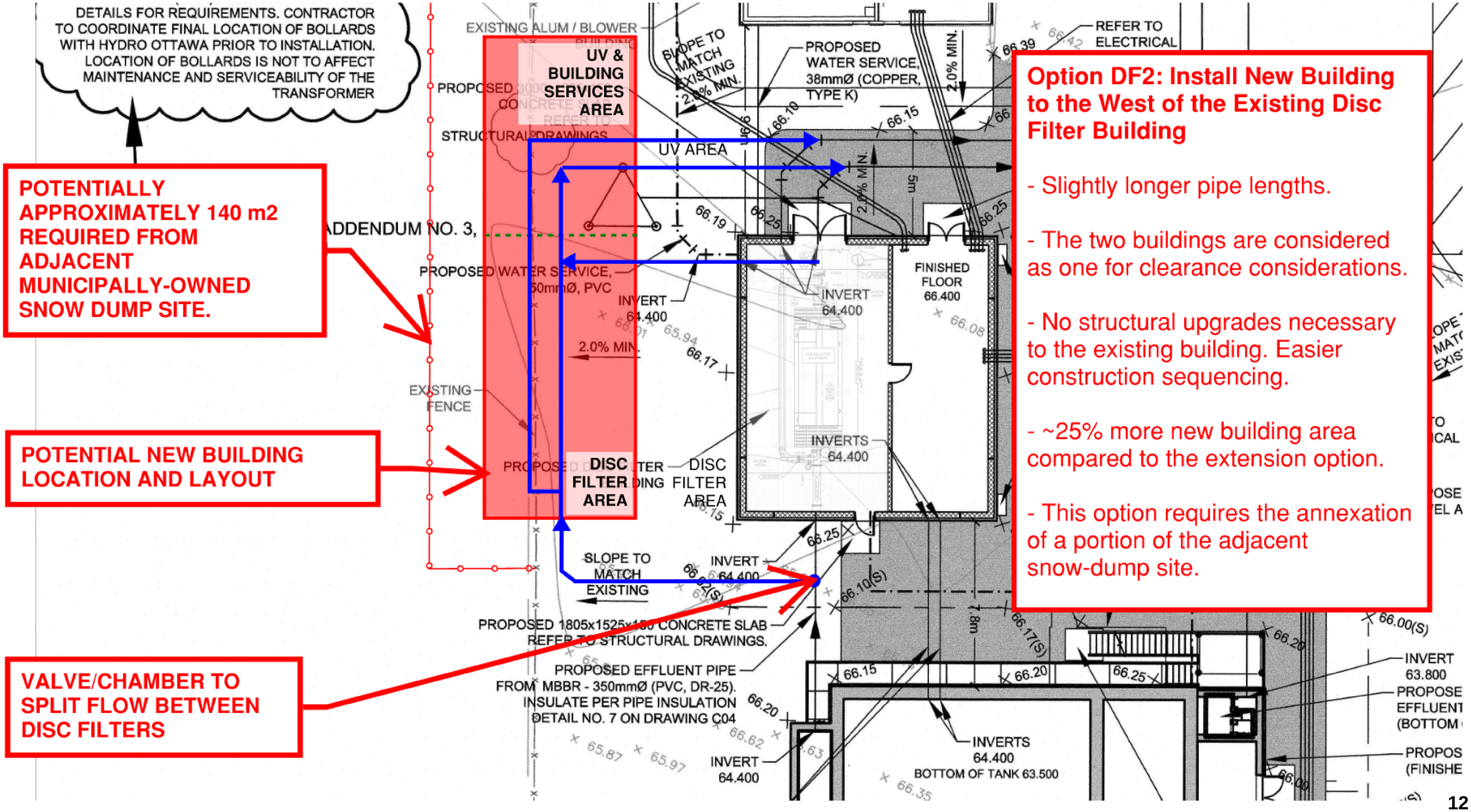
- This option provides the simplest integration with the existing STS from a process perspective.

- For the building expansion, demolition and replacement of existing disc filter building roof would be required.

- Impact to adjacent property during construction is expected. To enable sufficient access and operational clearance, a portion of the adjacent property may need to be annexed permanently.

- Construction of the upgrades while the existing is operational is expected to be a challenge.

Class EA Phase 3 – Disc Filter and UV Implementation Options – Option DF2, New Building



Class EA Phase 3 – TP Removal Options Evaluation

Criteria	Description	Alternative TP1 Participation in the TPM Program	Alternative TP2 Install a Coagulation/Flocculation System
Natural Environment Considerations	Impact to natural features including natural heritage areas, species at risk, areas of natural and significant interest, designated natural areas, water courses and aquatic habitat.		
Evaluation		**Equal Impact**	**Equal Impact**
Social and Cultural Environment	Impact to social and cultural environment features including residential, commercial and institutional areas, archaeological resources and areas of archaeological potential, known and potential built heritage resources and cultural heritage landscapes.		
Evaluation		**Equal Impact**	**Equal Impact**
Impacts to Neighbouring Lands	Construction impacts to adjacent lands, and need for purchase or annexation of land.		
Evaluation		**Equal Impact**	**Equal Impact**
Technical Feasibility - Constructability	Ease of connecting to existing infrastructure, ease of construction due to site conditions (geotechnical, hydrogeological, etc.), and ease of sequencing construction of the works.	• No construction required. • Implementation of program is dependent on an established approvals process.	• Established technology that can be integrated into the treatment process rather simply. • Geotechnical conditions on site, which necessitated a specialized foundation for the MBBR, may require a specialized foundation to support the new coagulation/flocculation tank. • Equipment and piping can largely be constructed with minimal impacts to the existing system.
Evaluation		**Preferred**	**Less Preferred**
Technical Feasibility - Expandability	Ease of phasing the proposed upgrades and accommodating additional future expansion of the system.	• If phasing construction, increase in loading can also be phased, and payment would only be for loading being offset by the first phase. • Offsetting can also be integrated with other phosphorus removal technologies for increased future demand.	• Treatment process (tanks, chemical dosing) can be designed to be phased and to have operational flexibility. • Process generates additional TSS which may necessitate the need for another disc filter earlier than for TP1.
Evaluation		**Preferred**	**Less Preferred**
Financial Considerations - Capital	Capital cost of the upgrades.	• The Municipality pays a fixed upfront capital cost to enter the program, based on the estimate of annual loading to be offset. Depending on feedback from the MECP, capital investment is estimated to be within the range of $160,000 to $745,000 (excluding HST) for the 20-year upgrades. • Once cost is confirmed, the only variable to cost is the change in offsetting cost, which is updated each year (currently $585.00/kg).	• Capital investment of approximately $920,000 (Class ‘D’ Opinion of Probable Cost). • Less capital cost certainty compared to TP1.
Evaluation		**Preferred**	**Least Preferred**
Financial Considerations – O&M	Costs to operate and maintain the works following the upgrades.	There are no O&M costs of the TPM program. One time fee.	Higher O&M cost due to chemical and energy usage, and additional equipment to operate and maintain (e.g., mixers, chemical pumps, tanks, etc.).
Evaluation		**Preferred**	**Less Preferred**
Overall Evaluation			

Class EA Phase 3 – Disc Filter and UV Implementation Options Evaluation

Criteria	Description	**Alternative DF1** **Expansion of Existing Disc Filter Building**	**Alternative DF2** **Install New Building to the West of the Existing Disc Filter Building**
Natural Environment Considerations	Impact to natural features including natural heritage areas, species at risk, areas of natural and significant interest, designated natural areas, water courses and aquatic habitat.		
Evaluation		**Equal Impact**	**Equal Impact**
Social and Cultural Environment	Impact to social and cultural environment features including residential, commercial and institutional areas, archaeological resources and areas of archaeological potential, known and potential built heritage resources and cultural heritage landscapes.		
Evaluation		**Equal Impact**	**Equal Impact**
Impacts to Neighbouring Lands	Construction impacts to adjacent lands, and need for purchase or annexation of land.	• The expansion of the existing building is expected to disturb the adjacent site (potentially new fencing, access to site, etc.) during construction, and may also require the partial annexation of the adjacent land (dependent on building size, access requirements, etc.). It is expected that annexation area is less than 100 m2.	• New building will require the partial annexation of the adjacent municipally owned snow dump site. A minimum area of 130 m2 is expected to be required. • Construction impacts are expected to be greater than Option DF2 given that a larger area of the site is expected to be impacted.
Evaluation		**Preferred**	**Less Preferred**
Evaluation		**Preferred**	**Less Preferred**
Technical Feasibility - Constructability	Ease of connecting to existing infrastructure, ease of construction due to site conditions (geotechnical, hydrogeological, etc.), and ease of sequencing construction of the works.	• Equipment and connections along the west wall of the current disc filter building may need to be relocated to accommodate the expansion. • Construction of expansion to existing building is feasible but will require additional effort during the design phase and construction to sequence works such that impacts to current operations are minimized. • Site conditions are expected to be similar between the two options. Specialized foundation is not expected to be required. • Construction may be limited to summer months when facility is not actively being operated. However, if an initial construction phase is completed to allow discharge for all months, construction sequencing is further complicated.	• Building can be constructed separately from the existing system, with impacts only seen during installation of tie-ins to existing infrastructure. • Site conditions are expected to be similar between the two options. Specialized foundation is not expected to be required.
Evaluation		**Less Preferred**	**Preferred**
Technical Feasibility - Expandability	Ease of phasing the proposed upgrades and accommodating additional future expansion of the system.		
Evaluation		**Equal Impact**	**Equal Impact**
Financial Considerations - Capital	Capital cost of the upgrades.	• Capital investment for building of approximately $1.22M (Class ‘D’ Opinion of Probable Cost).	• Capital investment for building of approximately $1.28M (Class ‘D’ Opinion of Probable Cost).
Evaluation		**Equal Impact**	**Equal Impact**
Financial Considerations – O&M	Costs to operate and maintain the works following the upgrades.		
Evaluation		**Equal Impact**	**Equal Impact**
Overall Evaluation			

Class EA Phase 3 – Phasing of the Upgrades

- Phasing is being reviewed to provide the Municipality financial flexibility in implementing the proposed upgrades to the system. A 2-phase upgrade strategy is being reviewed.
- **Phase 1 -** Interim construction phase which aims to expand the rated capacity of the system without completing large-scale upgrades (e.g., new disc filter, significant new infrastructure, etc.).
  - Increased Rated Capacity to between 2,871 m3/day and 3,019 m3/day, dependent on review by the MECP.
  - Will enable development near mid-term (5-10 year) average daily flow of 2,930 m3/day (1,722 residential units & 3 ha of Industrial Commercial, Institutional area).
  - Installation of floating baffles, upgrade of blowers, installation of direct connection between Cell ‘C’ and the MBBR inlet, installation of UV system and construction of infrastructure to house new UV system.
  - High-level opinion of probable cost of $2M.
  - Phased approach awaiting MECP approval.
- **Phase 2 –** Upgrade facility to the developed preferred design concept.

Next Steps

- ❑Phase 4 – Environmental Study Report
- ❑Place Project File Report on Public Record for 30-day Review Period
- ❑Notice of Study Completion

THANK YOU
Your Comments Are Important to Us

Please complete a comment sheet and place it in the box provided or e-mail it to us at the noted addresses by July 24, 2025.

YOUR COMMENTS WILL BE CONSIDERED IN FINALIZING THE PREFERRED DESIGN CONCEPT AND THE ENVIRONMENTAL STUDY REPORT

Ongoing information about this project can be found at www.casselman.ca

Email Addresses for comments**:** **jmorrissette@jlrichards.ca and ppbeauchamp@casselman.ca**