On-site Water & Wastewater System Research

Summary Of Volume II "*Long-Term Water And Wastewater Servicing Study, September 2009*" [1]

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VOLUME II: WASTEWATER NEEDS ASSESSMENT

1. Introduction

North Shore Community adopted policies in its 2004 Official Plan for the purposes of growth regulations, and to preserve the integrity of the environment and groundwater quality. Two zones were created by the Community and labeled as Coastal Zone (CZ) and Agricultural Zone (A). 1/3 of the community is in the Coastal Zone and 2/3 is zoned Agricultural (A). With 72% of the existing residential or potential residential parcels in the Coastal Zone, 48% of which don't meet minimum lot size requirements.

Coastal Zone's land use is mainly for large-scale residential developments and tourist related operations. While in the Agricultural Zone, is to allow for the current agricultural developments to continue operating, by regulating the non-agricultural development.

A centralized water distribution system study for the Stanhope Peninsula was investigated during 2007, yielding a cost estimate of $4.5 million.

2. Wastewater Needs Assessment Approach

The process included assembling, compiling and reviewing information on existing conditions in the community, and past planning efforts.

All property owners were surveyed to gather information about their well construction, contamination, septic system type and location, malfunctions and other topics. This was established by a questionnaire that was mailed to all property owners.

Further information was obtained from the steering committee, councilors, residents, PEI government, well drillers and septic system installers.

3. Assembling And Compiling Background Information

3.1. *Resident Survey*

3.1.1. Methodology

Survey included 29 questions about owner's property and existing on-site water and wastewater systems. Where each survey was pre-populated with owner's name, mailing addresses, civic address and PID number.

3.1.2. Results

Surveys were from:

- 34% year-round dwellings owners
- 28% seasonal dwellings owners
- 2% commercial lots
- 36% owners of undeveloped lots

Collected surveys for developed property owners answered:

- 15% reported having a concrete block tank
- 17% reported not knowing type of septic tank
- 30% reported that their tanks being twenty years old or didn't know the age
- 34% reported that their disposal field being more than twenty years old or didn't know
- 17% reported well contamination or water quality problems
- 67% said their septic tank was pumped within the last 6 years
- 6% said it was pumped more than 6 years ago
- 21% reported never pumping their septic tank or didn't know
- 5% reported having or had malfunctions with their septic system
- 24% felt that septic systems were not suitable for long term use in their area of the Community

98% felt that their septic system was sustainable but only 76% felt that their neighbors' septic system was sustainable.

4. Wastewater Needs Assessment Methodology

4.1. *CCA Septic Permit & IWMC Acquisition*

Data was collected from both Island Waste Management Corporation (IWMC) and PEI Dept. of Communities and Cultural Affairs. IWMC provided information regarding which properties was paying seasonal or yearly rates.

While PEICCA's database contained information on all new septic systems installed and those, which were repaired or replaced since 1996. Also it included property location, permit status and installer.

4.2. *Student Septic Survey*
The Community commissioned a survey in the Stanhope Peninsula in the summer of 2008. Information extracted from the survey was regarding property usage, fire access and septic system information such as age, upgrades and last septic tank pumping.

4.3. *Interviews with Septic Installers, Members of Council and Residents*
Two septic installers were interviewed; both reported that new septic systems were mostly installed *in-ground*. Neither knew of any existing unresolved system malfunctions, similarly with Members of Council.

4.4. *Geographic Information Systems (GIS) Analysis and Creation of Thematic Maps*
Utilizing the 1988 PEI Soil Survey descriptions and the CCA septic permit database, a soil map classification for the Community was developed. Where Category I and II soil conditions apply to the majority of the land within the Community.

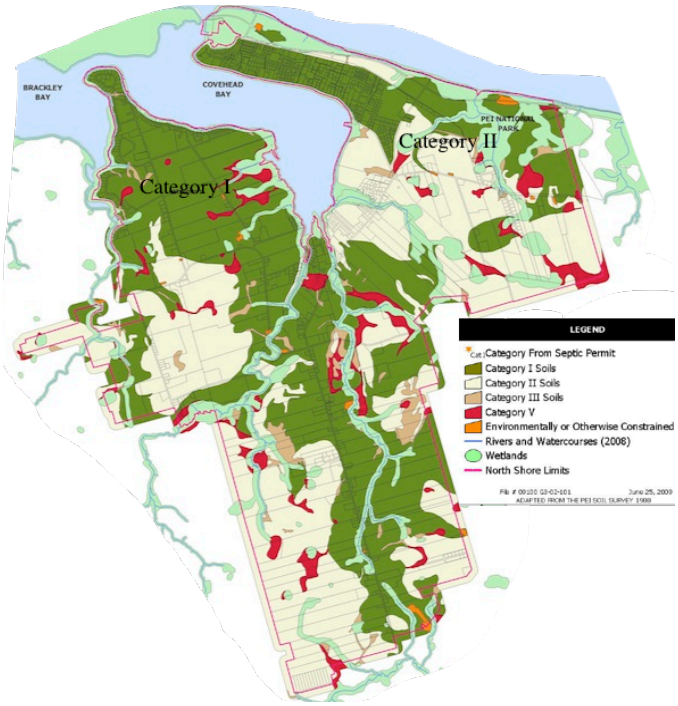

Figure 1: Soil Category Mapping

4.4.1. Development Status and Property Usage
The following sources of information were used to determine property development status, year-round versus seasonal usage.

- Civic addresses
- CCA Septic Permit Records
- Resident Survey response
- 2008 Student Survey
- IWMC database
- Ortho-photos
- Committee members or residents

4.4.2. Septic System Age

Table 1: Septic system age

Description	Total	% of Total
Septic system 0-5 years old	118	14.5
Septic system 5-10 years old	80	10
Septic system 10-20 years old	74	9.5
Septic system > 20 years old, or unknown	537	66
Total	**809**	**100**

4.5. *Lot-by Lot Needs Definition Criteria*
Lots in the Community were classified under the following conditions where they applied, to assess their wastewater need:

- No solution is required: Category I soil area greater than 2323 m^2 (25,000ft^2) and can accommodate a circle with minimum diameter of 45.7 m (150 ft.)
- Properties Requiring an Off-site Solution:
  - Denied a septic system permit due to small lot size or unsuitable condition
  - Utilize a holding tank for sewage disposal and have an area less than 2323 m^2 (25,000ft^2)
  - Five or more bedrooms and have an area less than 3252 m^2 (35,000 ft^2
  - With an area less than 1394 m^2 (15,000 ft^2) regardless of soil condition
  -
- Advanced (I/A) Treatment System: Properties that meet the following criteria where an on-site dispersal field is possible but due to subsurface conditions an *above grade* dispersal field wouldn't be adequate and due to area/size constraints:
  - Category I, II, II and IV soil area greater than 1394 m^2 (15,000 ft^2) and less than 2323 m^2 (25,000 ft^2) and can accommodate a circle with minimum diameter of 37.2 m (122 ft.)

- On-site solution using Above-ground Dispersal Field:
  - Category II soils where area of Category I soil is less than 2322 m^2 (25,000 ft^2) and Category I and II soil is greater than 3252 m^2 (35,000 ft^2) and can accommodate circle with minimum diameter of 91.5 m (300 ft.)
  - Category III soils where area of Category I and II soils is less than 3252 m^2 (35,000 ft^2) and area of Category I, II, III is greater than 4738 m^2 (51,000 ft^2) and can accommodate a circle with minimum diameter of 68.6 m (225 ft.)
  - Category IV soils where area of Category I, II, III and IV soils is less than 4738 m^2 (51,000 ft^2) and area of Category I, II, III and IV is greater than 6975 m^2 (75,000 ft^2) and can accommodate a circle with minimum diameter of 91.5 m (300 ft.)
  - Lots where Category V soils area is greater than Wetlands area and category I, II, II and IV soils are less than 1394 m^2
  - Lots where Wetlands, Rivers and their Buffers area is greater than Category V soils area and Category I, II, III and IV soils are less than 1394 m^2.

Table 2: Soil category criteria [2]

Soil Category	Depth of permeable natural soil	Depth to bedrock	Depth to maximum groundwater
I	2 feet (0.61 m) or greater	4 feet (1.22 m)	4 feet (1.22 m)
II	Greater than 1 foot (0.3 m) but less than 2 feet (0.61 m)	4 feet (1.22 m) or greater	4 feet (1.22 m) or greater
III	1 foot (0.3 m) or greater	2 feet (0.61 m) or greater but less than 4 feet (1.22 m)	2 feet (0.61 m) or greater but less than 4 feet (1.22 m)
IV	less than 1 foot (0.3 m)	greater than 1 foot (0.3 m)	greater than 2 feet (0.61 m) but less than 4 feet (1.22 metre)
V	N/A	less than 1 foot (0.3 m)	less than 2 feet (0.6 m)

4.6. *Wastewater Needs Definition Results*

Utilizing the criteria in section 4.5, the following results for the Community were compiled:

Table 3: Results of Wastewater needs assessment for all properties

Wastewater Needs Assesment Categories	Total	% of Total
Property requires an eventual Off-site Solution:		
Due to lot size and/or soil constraints	508	39.4
Due to ground water seperation constraints	3	0.3
Due to wetland or watercourse buffer contraints	41	3.2
Property will accommodate an On-site solution:		
Advanced (I/A) treatment system	177	13.8
Above-ground dispersal field	92	7.1
No solution required:		
Property is viable with existing or future Conventional Septic	466	36.2
Total	1287	100

As Table 3 shows, 43% of all properties will require an eventual off-site wastewater servicing solution, where in adequate lot size is the main factor. 21% can accommodate an on-site solution, but would also require an above-ground dispersal field or an I/A treatment system. 36% are considered viable for long term on-site system with a conventional in-ground septic field.

4.7. **Preliminary Prioritization of Wastewater Needs**

4.7.1. *Designation of Wastewater Subareas*

Ten separate areas of the Community having similar wastewater needs were identified. They are assigned with the following names, from the largest to the smallest:

1. Stanhope Peninsula (532 Lots)
2. Golf Course (95 Lots)
3. Eagle's Path (103 Lots)
4. Covehead Road (67 Lots)
5. Eastern Road (45 Lots)
6. Union Road (31 Lots)
7. Community Centre (23 Lots)
8. Bell's Creek (26 Lots)
9. Auld's Creek (12 Lots)
10. Settler's Road (10 Lots)

4.7.2. *Stanhope Peninsula Category I Sensitivity Analysis*

The 1988 PEI Soil Survey designates the majority of Stanhope Peninsula soils as Category II. However, permit information and information provided by local septic installers and residents indicate that, the soil is typically classified as Category I.

Thus, a sensitivity analysis was conducted to compare the aforementioned results.

The results indicate that regardless of the soil category designated for the Peninsula, the level of need for an off-site solution is “very high”.

4.8. **Relative Level of Need by Subarea**

See appendix for detailed tabulated (Table 4) results of the Relative Level of Need for Wastewater Solution by Subarea analysis

References

[1]: *Long-Term Water & Wastewater Servicing Study, Volume: 1. By Engineering Technologies Canada Ltd. September 2009*

[2]: *Environmental Protection Act* R.S.P.E.I. 1988, Cap. E-9

APPENDIX

Table 4: Relative level of need for a Wastewater Solution by Subarea

Wastewater Servicing Subarea	Total # Developed Parcels	Subarea Characteristics	Relative Level of Need
Stanhope Peninsula	370	242 lots requiring off-site solution, 71% of properties require some type of solution now or in the future, 57% of the septic systems are older than 20 years or their age is unknown. 21 properties reported well contamination.	Very High
Golf Course	58	23 developed lots requiring an off-site solution, 100% of developed properties require some type of solution now or in the future, 85% of developed properties have systems > 20 yrs. old or unknown age.	High
Eagle's Path	52	48 developed lots requiring an off-site solution, 98% of properties require some type of solution now or in the future, one report of well contamination. 88% of the septic systems are more than 20 years old or their age is unknown	High
Covehead Road	50	21 developed properties require an off-site solution, 60% of developed lots require some type of solution now or in the future, 72% of the septic systems are older than 20 years or their age is unknown.	Moderate to High
Eastern Road	36	4 lots requiring an off-site solution, 100% of properties require some type of solution now or in the future, 75% of the septic systems are older than 20 years or their age is unknown.	Moderate
Union Road	23	4 off-site solution needed, 87% of properties require some type of solution now or in the future, 65% of the septic systems are more than 20 years old or their age is unknown	Moderate
Community Center	20	4 developed properties require an off-site solution, 50% of developed lots require some type of solution now or in the future, 80% of the septic systems are older than 20 years or their age is unknown	Low
Bell's Creek	18	Has 2 lots requiring an off-site solution, 33% of properties require some type of solution now or in the future, 72% of the septic systems are older than 20 years or their age is unknown.	Low
Auld's Creek	8	2 lots requiring an off-site solution, 100% of properties require some type of solution now or in the future, 75% of the septic systems are older than 20 years or their age is unknown	Very Low
Settler's Road	4	Has 4 lots requiring an off-site solution, 100% of properties require some type of solution now or in the future, 75% of the septic systems are older than 20 years or their age is unknown	Very Low