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**Building Materials Evaluation
Commission**

**Commission d'évaluation des
matériaux de construction**

BMEC AUTHORIZATION: 18-05-386 ENVIRO-SEPTIC® SYSTEM

Date of Authorization: September 27, 2018
Date of Expiry¹: September 27, 2023

1. Applicant

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2. Manufacturing Facility

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Engineering and Design
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¹ This Authorization expires on the date shown. It is the responsibility of Authorization holders to make a complete application considering the time for review and complexity of the new application.

3. Authorization

The Enviro-Septic® System is a combined treatment and dispersal system. The Enviro-Septic® System is comprised of a septic tank, an effluent filter, distribution box, Advanced Enviro-Septic® pipes, sampling device, and Enviro-Septic® system sand. The Enviro-Septic® System can be installed in-ground, partially raised, or fully raised.

Additional descriptive information is provided in documents supplied by the Applicant listed in Appendix A.

Reports and assessments provided by the Applicant demonstrate that if Enviro-Septic® System is manufactured, designed, constructed, installed, and maintained in accordance with the manufacturer's instructions and limitations, and the specific terms and conditions stated in this authorization, the use of Enviro-Septic® System shall be deemed to not be a contravention of Division B, Section 8.6. "Class 4 Sewage System" and Section 8.7. Leaching Beds" of Division B of the Building Code.

All other requirements pertaining to the manufacturing, design, construction, installation and maintenance are subject to the requirements of the Building Code, and subject to the following terms and conditions contained in 4 and 5 below:

4. Specific Terms and Conditions

1.0 General Requirements

- 1.1. This Authorization is valid only for Presby Environmental Inc.'s Enviro-Septic® System.
- 1.2. This authorization is valid only for use by Make-Way Environmental Technologies Inc. and DBO Expert Inc.

2.0 Definitions

- 2.1. Raised or Partially Raised means a sewage system in which any part of the system is above the natural ground elevation.
- 2.2. Vertical Separation means the depth of unsaturated soil below the system, as measured from the bottom of the system sand of the Enviro-Septic System, to a limiting layer such as a high groundwater table, bedrock, or soil with a percolation time (T) greater than 50 min/cm.
- 2.3. Enviro-Septic® System Sand is defined in section 4.6.2. of this Authorization.

3.0 Installation Requirements

- 3.1. The Enviro-Septic® System shall be installed as per the manufacturer's installation instructions as found in the "Enviro-Septic® System Design and Installation Manual for the Province of Ontario" Version 4.0 dated September 2018.

3.2. No person shall operate the Enviro-Septic® System unless the person has entered into an agreement whereby the servicing and maintenance of the Enviro-Septic® System and its related components will be carried out by a person who is authorized by the manufacturer to service and maintain the Enviro-Septic® System and who:

Inspection

3.2.1. Conduct and record at least once during every twelve (12) month period, an inspection and servicing, as specified by the Applicant, Presby Environmental Inc. the “Enviro-Septic® System: Design and Installation Manual - Province of Ontario”, Version 4.0 dated September 2018.

Testing

3.2.2. Every person operating an Enviro-Septic® System that is designed and constructed to produce effluent, as described in Table 3.2.2. below, shall take a sample of the effluent to determine whether it complies with maximum levels contained in Table 3.2.2., below:

Table 3.2.2.

Parameter	Effluent Quality Maximum concentration based on 30 day averages	Effluent Quality compliance with a single grab sample
CBOD ₅ (mg/L)	10	20
Suspended Solids(mg/L)	10	20
<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>

3.2.2.1. if a single grab sample is taken to demonstrate compliance with the values in Table 3.2.2. above, the results from a single grab sample shall not exceed the maximum concentrations listed in Column 3, above.

3.2.2.2. if the results of a sample do not comply with Table 3.2.2., then the Principal Authority shall be informed by the operator (home owner), and the course of action to remedy the problem shall be identified.

3.2.2.2.1. subsequent sampling results, submitted to the Principal Authority, within six (6) months of the first non-compliant sample, must demonstrate the problem has been rectified.

3.2.3. All sampling results shall be promptly submitted to the person operating (home owner) the Enviro-Septic® System, and the Principal Authority.

3.2.3.1. once during the first twelve (12) months after the Enviro-Septic® System is put into use, and

3.2.3.2. thereafter, at least ten (10) months and not more than eighteen (18) months after the previous sampling has been completed

- 3.3. Make-Way Environmental Technologies Inc. shall retain records of the sampling test results for each Enviro-Septic® System received pursuant to the terms and conditions set out in 3.2. above, for a period of ten (10) years and shall promptly forward copies of those records to the Principal Authority, when requested.

4.0 System Requirements

- 4.1. The Enviro-Septic System Components; there are five (5) main components to the Enviro-Septic System®. They are:
 - 4.1.1. The septic tank;
 - 4.1.2. The effluent filter;
 - 4.1.3. The distribution device;
 - 4.1.4. The Advanced Enviro-Septic® pipe;
 - 4.1.5. The Enviro-Septic® System Sand.
- 4.2. The Septic Tank - The Enviro-Septic System® is designed to receive septic tank effluent for treatment and dispersal. All raw sewage will enter into a septic tank sized in accordance with Article 8.2.2.3. of Division B, of the Building Code.
- 4.3. The Effluent Filter - An effluent filter, meeting the requirements of Article 8.6.2.1. of Division B of the Building Code, shall be connected to the outlet of the septic tank.
- 4.4. The Distribution Device - The distribution device may be a distribution box and equalizer, a combination of distribution valve and distribution box, or a low pressure distribution system.
- 4.5. The Advanced Enviro-Septic® Pipe
 - 4.5.1. The Advanced Enviro-Septic® Pipe consists of:
 - 4.5.1.1. A 300 mm diameter, high-density plastic pipe, which is corrugated and perforated; skimmer tabs extend into the pipe at the point of each perforation,
 - 4.5.1.2. A dense mat of coarse, randomly oriented plastic fibres surrounding the outside of the pipe,
 - 4.5.1.3. A Bio-Accelerator™ geo-textile fabric layer, which partially covers the fibres on the lower half of the pipes, located between the pipe and the plastic fibres, and
 - 4.5.1.4. The outer layer of non-woven geo-textile fabric that holds the other components in place and provides a protected surface on which the biomat develops.
 - 4.5.2. A row of Advanced Enviro-Septic® pipe is a combination of a single offset adaptor, Advanced Enviro-Septic® pipes, couplings, and double offset adaptor.
 - 4.5.2.1. Each row of Advanced Enviro-Septic® pipe is fed with a PVC pipe through the opening of a single offset adaptor in the top position,
 - 4.5.2.2. each row of the Advanced Enviro-Septic® pipe is completed with a piezometer or a horizontal pipe leading to a piezometer through the bottom opening of a double offset adaptor,

- 4.5.2.3. each row of the Advanced Enviro-Septic® pipe is completed with a vent or an aeration pipe leading to a vent through the top opening of a double offset adaptor, and
- 4.5.2.4. the minimum equivalent length of any row is 6.1 m of Advanced Enviro-Septic® pipe and the maximum length is 30 m.

4.6. The Enviro-Septic® System Sand and Imported Sand

4.6.1. All Enviro-Septic® System configurations require Enviro-Septic® System Sand to surround the Advanced Enviro-Septic® pipe, herein after called system sand and shall be a minimum of:

- 4.6.1.1. 300 mm below the Advanced Enviro-Septic® pipes,
- 4.6.1.2. 75 mm beside each of the Advanced Enviro-Septic® pipes,
- 4.6.1.3. 75 mm from the ends of the Advanced Enviro-Septic® pipes, and
- 4.6.1.4. 100 mm above the Advanced Enviro-Septic® pipe.

4.6.2. The Enviro-Septic® System Sand must meet all of the following requirements:

- 4.6.2.1. Effective diameter of between 0.20 and 0.50 mm,
- 4.6.2.2. Uniformity of Coefficient (Cu) less than or equal to 4.5,
- 4.6.2.3. less than 3% of the material smaller than 80 µm, and
- 4.6.2.4. less than 20% of material larger than 2.5. mm
- 4.6.2.5. Following installation of the system sand for each row of Advanced Enviro-Septic® pipe, imported sand or system sand must be used to fill in the area between the rows of Advanced Enviro-Septic® pipe (c/w system sand as per above item 4.6.1.), to cover the complete dispersal surface / contact area. The thickness of imported sand / system, sand between the rows of Advanced Enviro-Septic® pipes / system sand shall be a minimum of 700 mm.
- 4.6.2.6. The imported sand must meet all the following requirements:
 - 4.6.2.6.1. A percolation time of between 6 and 10 min/cm.
 - 4.6.2.6.2. Not have more than 5% fines passing through a 0.0074 mm (no.200) sieve.

4.6.3. For each Enviro-Septic® project, the system installer is to receive a copy of both the sieve analysis and system sand analyzer results, and these results are to be available upon request to the Principal Authority and the operator (homeowner).

5.0 Design

5.1. Vertical Separation

5.1.1. The percolation time (T) of the natural soil shall determine the minimum vertical distance from the bottom of the Enviro-Septic® System Sand to the high ground water table, bedrock or soil with a percolation time (T) less than 1 min/cm or greater than 50 min/cm:

- 5.1.1.1. if T is less than or equal to 6 min/cm, or greater than 50 min/cm, then the vertical separation distance shall be at least 600 mm, or

- 5.1.1.2. if T is greater than 6 cm/min, or less than or equal to 50 cm/min, then the vertical separation shall be at least 450 mm

5.2. Number of Advanced Enviro-Septic® Pipes Required

- 5.2.1. This step applies to all options for the Enviro-Septic® System. Each 3050 mm section of the Advanced Enviro-Septic® pipe has the capacity to treat 126 L of wastewater per day, or 41.3 L per metre of pipe. Therefore, the number of Advanced Enviro-Septic® pipes required is determined by:

- 5.2.1.1. The formula to determine the number of Advanced Enviro-Septic® pipes (NAES) required is: $NAES = Q/126$.
- 5.2.1.2. The number of Advanced Enviro-Septic® pipes obtained must be rounded up at all times.

5.3. Pipe Spacing Requirements

- 5.3.1. The Advanced Enviro-Septic® pipes shall be spaced using the following criteria:
- 5.3.1.1. Centre to centre spacing is the horizontal distance from the centre of one Enviro-Septic® row to the centre of the adjacent row. The minimum centre to centre spacing is 450 mm,
- 5.3.1.2. Lateral Extension Distance is the distance filled with additional sand material extending from the centre of the last lateral row to the side of the Enviro-Septic® System. The minimum lateral extension is 450 mm, and
- 5.3.1.3. End Extension Distance is the distance filled with additional sand material extended from the end of a row to the side of the Enviro-Septic® System, the minimum end extension distance is 300 mm.

5.4. Dispersal Surface (DS) – In-ground, partially raised, or above ground

- 5.4.1. The area (m²) to be covered by the system sand/imported sand in the Enviro-Septic® System shall be equal to or larger than the area determined by the formula $DS = QT/400$, in which the T is the percolation time (T) in min/cm of the native soil – to a maximum of 50 min/cm, and Q is the total daily design sewage flow in (L).
- 5.4.2. In all Enviro-Septic® System designs, the minimum spacing requirement of 5.3. above shall be met.
- 5.4.3. Where the area determined using $QT/400$ is larger than that required by the minimum spacing required by 5.3. above, the Advanced Enviro-Septic® pipes shall be evenly spaced over the entire area of the dispersal surface.
- 5.4.4. The dispersal surface shall have the long dimension perpendicular to the direction in which effluent entering the soil will move horizontally.

5.5. The Enviro-Septic® System shall be designed, installed, operated, and maintained using these criteria:

- 5.5.1. The system sand shall extend a minimum of 300 mm around the

perimeter of the Advanced Enviro-Septic® Pipe, for systems on ground sloping 10% or less.

- 5.5.2. The system sand shall extend a minimum of 300 mm on three (3) sides and 1200 mm beyond the Advanced Enviro-Septic® pipe on the down-slope side, for systems on ground sloping greater than 10%.
- 5.5.3. No system shall be installed in an area in which the original ground has a slope in excess of 25%.
- 5.5.4. Enviro-Septic® System rows shall be laid level, of equal lengths, and not greater than 30 m in any one row.
- 5.5.5. All pump systems shall use differential venting.
- 5.5.6. Except when used with a “Low Pressure Distribution System”, all Enviro-Septic® Systems that have a pump must use a velocity reducer.
- 5.5.7. Venting - Enviro-Septic® Systems shall have a venting system, which is connected to the end of each row of Advanced Enviro-Septic® pipe, and
 - 5.5.7.1. the entry vent must be at least 3000 mm lower than the exit vent,
 - 5.5.7.2. not less than 2000 mm above the ground,
 - 5.5.7.3. not less than 1000 mm above and not less than 3500 mm in any other direction from every other air inlet, openable window, or door, and
 - 5.5.7.4. a minimum of one (1) vent is required for every 300 m of Advanced Enviro-Septic® pipe.
- 5.5.8. The Enviro-Septic® System shall have a sampling device for the purpose of sampling the effluent at the bottom of the system sand.
- 5.5.9. The site shall be protected from erosion by proper grading, mulching, seeding, and runoff control.
- 5.5.10. The Advanced Enviro-Septic® pipes, measured from the centre of the pipes, shall meet the set back requirements outlined in Article 8.2.1.4. of Division B, of the Building Code.
- 5.5.11. No reduction in size of the Enviro-Septic® System is permitted with the use of treatment device beyond that of a septic tank.
- 5.5.12. The Enviro-Septic® System shall comply with the requirements of Article 8.7.2.2. of Division B of Ontario’s 2012 Building Code effective January 1, 2018

5. General Conditions

1. The use of the Enviro-Septic® System as described in Section 3. and the Specific Terms and Conditions set out in Section 4 must comply with:
 - (a) the *Building Code Act, 1992*, (the “Act”) as amended or re-enacted,
 - (b) except as specifically authorized herein, the Building Code as amended or remade, and
 - (c) all other applicable legislation.
2. A copy of this Authorization shall accompany each application for a building permit and shall be maintained on the site of the construction with the building permit.
3. The Applicant specified in Section 1. shall promptly notify the BMEC of:
 - (a) the failure of the Applicant to comply with any of the Specific Terms and Conditions set out in Section 4,
 - (b) the failure of the material, system or building design that is the subject matter of this Authorization to
 - (i) comply with any of the Specific Terms and Conditions set out in Section 4, or
 - (ii) provide a satisfactory level of performance in situ, or
 - (c) the occurrence of any of the events described in General Conditions 5.4.(a), (b), (e) or (f).
4. The BMEC may amend or revoke this Authorization at any time on its own initiative, or at the request of the Applicant specified in Section 1. Without restricting the foregoing, the BMEC may amend or revoke this Authorization where it determines that:
 - (a) any change has been made to:
 - (i) the name of the Applicant specified in Section 1,
 - (ii) the address or other contact name information of the Applicant specified in Section 1,
 - (iii) the ownership of the Applicant specified in Section 1,
 - (iv) the manufacturing facilities specified in Section 2,
 - (v) the material, system, or building design that is the subject matter of this Authorization, or
 - (vi) a test method relevant to this Authorization,
 - (b) the Applicant has failed to comply with any of the terms and conditions set out in this Authorization,
 - (c) in the opinion of the BMEC, the use of the material, system or building design authorized herein provides an unsatisfactory level of performance in situ,
 - (d) in the opinion of the BMEC, amendment or revocation of the Authorization is appropriate on the basis of potential danger to public health and safety,

- (e) the *Act* or Building Code has been amended, re-enacted or remade in a manner relevant to this Authorization,
- (f) this Authorization was issued on mistaken, false or incorrect information, or
- (g) a revision of an editorial nature is appropriate.

Dated at Toronto this September 27, 2018

BUILDING MATERIALS EVALUATION COMMISSION

Andrew Hellebust

Vice Chair, Building Materials Evaluation Commission

ENCLOSURES: APPENDIX A - SUPPORTING INFORMATION

Appendix A – Supporting Information

The following is a list of the documents that were submitted and reviewed, but were not limited to:

1. Letter from Gunnell Engineering to the BMEC, Subject: Application for New Enviro-Septic® system BMEC Authorization #08-03-340, dated March 26, 2018;
2. BMEC Application Form dated March 23, 2018 and signed by Bert Knip;
3. Enviro-Septic® Wastewater Treatment System – BNQ Bench Test results;
4. Makeway Environmental Technologies Inc., Ontario Testing Summary, 4 pages;
5. BNQ Certificate of Conformity #890, dated October 6, 2008;
6. Bureau De Normalisation Du Quebec “NQ 3680-910/2000-06-16 M1 (2004-09-10) Wastewater Treatment – Stand Alone Wastewater Treatment System for Isolated Dwellings”, Performance Evaluation Report of Annex A, dated July 2006.
7. Bureau De Normalisation Du Quebec “NQ 3680-910/2000-0616 M1 (2004-09-10) Wastewater Treatment – Stand Alone Wastewater Treatment System for Isolated Dwellings”, Reliability and Performance Evaluation Report of Annex B, dated February 2007;
8. Presby Environmental, Inc. Technical Bulletin Advanced Enviro-Septic Receives NSF-40 Certification, 1 page, dated October 1, 2009;
9. Manufacturer’s Literature, Make-way Environmental Technologies Inc. “Enviro-Septic® System: Design and Installation Manual Province of Ontario”, dated September 2018;
10. Manufacturer’s Literature, Make-way Environmental Technologies Inc. “Ontario Home Owner’s User Guide – Enviro-Septic System”, dated April 01, 2018;
11. Manufacturer’s Literature, Make-way Environmental Technologies Inc. “Enviro-Septic System – Installation Summary”, dated April 2018, 2 pages;
12. Make-way Environmental Technologies Inc. Service Inspection Agreement, not dated;
13. Draft BMEC Authorization provided by manufacturer, 10 pages;
14. DBO Expert Inc. Power Point Presentation, presented April 26, 2018;

15. Letter with attachment from Gunnell Engineering Ltd. to the BMEC, Subject: BMEC Application 2018-01- Enviro-Septic® System Supplementary Information, dated May 22, 2018;
16. Letter from DBO Expert to the BMEC, Subject: BMEC Application 2018-01: The Enviro-Septic System, dated June 29, 2018;
17. Chowdhry, N. A., Domestic sewage treatment by underdrained filter systems, December 1974.