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Building Materials Evaluation
Commission

Commission d'évaluation des
matériaux de construction

BMEC Authorization Number 13-03-365
Date of Issuance September 26, 2013
BMEC Application A2013-06
Date of Expiration September 26, 2018

AUTHORIZATION REPORT – Enviro-Septic® System

1. Applicant

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2. Manufacturing Facilities

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3. Description

The Enviro-Septic® System is primarily comprised of a septic tank, an effluent filter, Advanced Enviro-Septic® pipes, and a layer of system sand. The Enviro-Septic® System can be installed in-ground, partially raised, or fully raised.

The Advanced Enviro-Septic® pipes, initially act by separating the particles by flotation and decantation. Effluent is dispersed thereafter through perforations located along the circumference of the pipes and is filtered by two membranes of synthetic fabrics, which surround the pipe. The manufacturer states that these membranes facilitate the growth of bacteria that supports effluent treatment, as well as longitudinal distribution. The system sand surrounding the pipes continues treatment and facilitates the dispersal of the effluent before infiltration into the underlying soil.

The dispersal area size of the sand layer is determined based on the characteristics of the underlying soil.

4. Authorization Requested

The applicant sought authorization for use of the Enviro-Septic® System, as a combined treatment and dispersal system, as an alternative to a “Class 4 Sewage System” regulated under Sections 8.6 and 8.7. of Division B of the Building Code.

5. Assessment

Reports and assessments provided by the applicant show that if the Enviro-Septic® System is designed, performance tested, installed, operated, and maintained in accordance with the limitations in the manufacturer's instructions and the conditions stated in this authorization, a level of performance will be provided as required by the Building Code, for Class 4 sewage systems.

Reports submitted and reviewed:

1. Letter from Gunnell Engineering to the BMEC, Subject: Renewal Application for Enviro-Septic® system BMEC Authorization #08-03-340, dated June 18, 2013;
2. Manual, Make-way Environmental Technologies Inc. “Enviro-Septic® System: Design and Installation Manual – Province of Ontario”, dated July 9, 2013, Version 2.3.1;
3. Letter from DBO Expert Inc. to the BMEC, Subject: BMEC Application- Enviro-Septic®, dated July 26, 2013;
4. DBO Expert Inc. Power Point Presentation, “Enviro-Septic renewal for BMEC Authorization #08-03-340”, dated July 25, 2013;
5. Letter from Makeway Environmental technologies Inc. to the BMEC, Re: Additional Information, dated July 12, 2013;
6. Manufacturer’s Literature, Make-way Environmental Technologies Inc. “Enviro-Septic® System Ontario User Guide–ESP-Ontario Model”, dated July 11, 2013;
7. Manufacturer’s Literature, Make-way Environmental Technologies Inc. “Installation Procedure Summary Enviro-Septic® System Province of Ontario”, dated July 11, 2013;
8. Make-way Environmental Technologies Inc. “Service/Maintenance Agreement”;

9. Report, Advanced Enviro-Septic® Field Results for Ontario - 2010-2012, undated, 4 pages;
10. Report, Advanced Enviro-Septic® installations for Ontario, undated, 5 pages;
11. Report, Enviro-Septic® Field Results for Ontario - 2010-2012, undated, 6 pages;
12. 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.
13. 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;
14. DBO Expert Inc. “Enviro-Septic® BNQ Certification Summary” issued July 4, 2013;
15. DBO Expert Inc., BNQ Certificate of Conformity, dated January 24, 2013;
16. Letter with attachment from DBO Expert Inc. to the BMEC, Subject: BMEC Application-Enviro-Septic®, dated August 14, 2013;
17. Letter from Gunnell Engineering to the BMEC, Subject: Application for New Enviro-Septic® System BMEC Authorization Existing Enviro- Septic® System BMEC Authorization #08-03-340 Certification of Submissions to the Building Materials Evaluation Commission Our File D1368 , dated August 15, 2013;
18. Letter from Gunnell Engineering to the BMEC, Subject: Application #2103-06 (sic) for New Enviro- Septic® System BMEC Authorization Existing Enviro- Septic® System BMEC Authorization #08-03-340 Our File D1368, dated August 28, 2013.

6. Authorization

The Enviro-Septic® System is authorized as a combined treatment and dispersal system as an alternative to a “Class 4 Sewage System” regulated under Sections 8.6. and 8.7 of Division B of the Building Code.

All other requirements not specifically noted herein, pertaining to the design, performance testing, installation, operation, and maintenance are subject to the requirements of the Building Code, and are subject to the following terms and conditions contained in 6A and 6B below:

Note: This authorization is not intended to be used as an approval for tertiary treatment units, where treatment units are permitted for use with a Class 4 sewage system.

A. Specific Terms and Conditions

1.0 Administrative

- 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.
- 1.3. This Authorization expires on September 26, 2018.

2.0. Definitions

A word or phrase used in this Authorization has the following meaning for the purposes of this Authorization:

- 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.

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" dated July 9, 2013.
- 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", dated July 9, 2013.

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
E Coli (CFU/100 mL)	50 000	100 000
<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, 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 The sampling required by 3.2.2. above shall be conducted:

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, once during every year after the previous sampling has been completed.

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

3.5. 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 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

4.6.1. All Enviro-Septic® System configurations require 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. 150 mm between the Advanced Enviro-Septic® pipes,

4.6.1.3. 300 mm around the perimeter of the Advanced Enviro-Septic® pipe,

and

4.6.1.4. 100 mm above the Advanced Enviro-Septic® pipe.

4.6.2. The 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.

5.0 Design

Vertical Separation

5.1. 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. 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

5.1.2. 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

Number of Advanced Enviro-Septic® Pipes Required

5.2. This step applies to all options for the Enviro-Septic® System. Each 3.0 m section of the Advanced Enviro-Septic® pipe has the capacity to treat 90 L of wastewater per day, or 30 L per metre of pipe. Thus, the number of Advanced Enviro-Septic® pipe required:

5.2.1. The formula to determine the number of Advanced Enviro-Septic® pipes (N_{AES}) required is: $N_{AES} = Q/90$.

5.2.2. The number of Advanced Enviro-Septic® pipes obtained must be rounded up at all times.

Pipe Spacing Requirements

5.3. The Advanced Enviro-Septic® pipes shall be spaced using the following criteria:

5.3.1 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 0.45 m,

- 5.3.2. 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 0.45 m, and
- 5.3.3. 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 0.30 m.

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

- 5.4. The area (m²) to be covered by the system sand in the Enviro-Septic® System shall be equal 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).
 - 5.4.1. In all Enviro-Septic® System designs the minimum spacing requirement of 5.3. above, shall be met.
 - 5.4.2. 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 Enviro-Septic® System sand.
 - 5.4.3. The dispersal surface shall have the long dimension perpendicular to the direction in which effluent entering the soil will move horizontally.

Other

- 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.
 - Venting*
 - 5.5.7 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, 2014.

B. General Conditions

1. The use of the Enviro-Septic® System must comply with the *Building Code Act, 1992*, ("BCA") as amended or re-enacted from time to time and except as specifically authorized herein, with the Building Code as amended or remade from time to time.
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 named in Part 1 hereof shall promptly notify the BMEC of:
 - (a) The failure of the Applicant or of the material, system or building design that is the subject matter of this Authorization, to comply with any of the terms and conditions set out in 6. A. above; or
 - (b) the occurrence of any of the events described in Conditions 6. B. 4. (a), or (b) (i), (v), (vi), (vii), or (viii) below.
4. The BMEC may:
 - (a) revise an authorization if the BMEC finds that the following information has changed:
 - (i) the name of the applicant, as specified on the authorization;
 - (ii) the contact information, as specified on the authorization; or
 - (iii) the ownership of the applicant, as specified on the authorization
 - (b) amend an authorization if the BMEC determines that:
 - (i) there is a change to the material, system, or building design;
 - (ii) there is a change to the relevant provision(s) to the BCA;
 - (iii) there is a change to the relevant provision(s) to the Building Code;
 - (iv) there is a change to the relevant test method standards;
 - (v) the applicant has failed to comply with the terms and conditions set out in the authorization;
 - (vi) there, after receiving additional information, is a potential health and safety concern;

- (vii) the material, system, or building design provides an unsatisfactory level of performance in situ; or
- (viii) the information contained in, or forming a part of, the application was erroneous, or false.

(c) revoke an authorization if the BMEC determines that:

- (i) the name of the applicant, as specified on the authorization has changed;
- (ii) the contact information, as specified on the authorization, has changed;
- (iii) the ownership of the applicant, as specified on the authorization has changed;
- (iv) there is a change to the material, system, or building design;
- (v) there is a change to the relevant provision(s) to the BCA;
- (vi) there is a change to the relevant provision(s) to the Building Code;
- (vii) there is a change to the relevant test method standards;
- (viii) the applicant has failed to comply with the terms and conditions set out in the authorization;
- (ix) there, after receiving additional information, is a potential health and safety concern;
- (x) the material, system, or building design provides an unsatisfactory level of performance in situ; or
- (xi) the information contained in, or forming a part of, the application was erroneous, or false.

5. Where the BMEC receives additional information concerning the material, system or building design authorized herein, the BMEC may review this Authorization and the BMEC may after the review amend or revoke this Authorization as in the opinion of the BMEC may be necessary.

Dated at Toronto this 26th day of September 2013.

BUILDING MATERIALS EVALUATION COMMISSION



Edward Link, P. Eng.
Chair, Building Materials Evaluation Commission