DBO Expert's comments on proposed OBC changes

(Sewage Systems and Energy Efficiency)

Following proposed changes to the Ontario Building Code, DBO Expert promoter of System O)) wastewater treatment technology (based on Advanced Enviro))Septic pipes), wishes to provide comments on how said changes will impact the homeowner, the environment and the promoter.

General comments

CAN/BNQ 3680-600 certification

We support the introduction of combined and treatment dispersal (CTD) systems and the requirement for them to be tested and certified to the CAN/BNQ 3680-600 standard.

Inconsistency from the BMECs

The reason behind the need to codify combined treatment and dispersal systems is because their principle is no longer innovative – which is why BMECs were awarded in the first place. While we applaud the initiative, the proposed changes do not reflect the way CTDs have been installed over the past 15 years – and in DBO Expert's case, three separate BMEC approvals – and no supporting technical justification was provided to justify these inconsistencies. The Building Code should implement CTDs as they have demonstrated their effectiveness, that is, as they have been approved. The proposed changes are completely different and do not reflect current CTDs. The 2 main subjects discussed below (Vertical Separation and Sand Requirement) demonstrate this point.

Affordability of CTDs

A cost analysis between our technology under its BMEC and as proposed in the code demonstrates the financial impact on the homeowner. CTDs have demonstrated for 15 years that they reach required treatment levels; adding additional sand requirements without any technical justifications pushes them out of the market indiscriminately. A homeowner interested in a passive CTD because of its advantages will have to pay much more.

Passive treatment solutions like CTDs ensure lower maintenance costs to the homeowner as there are no moving parts to repair or replace. In addition, CTDs do not require any electricity, which represent additional cost reductions for the homeowner, reduces strain on the electric grid and augments the benefits for the environment in reduced GHGs – in addition to its existing benefits of clean water. Removing CTDs from the Ontario market, as the proposed changes could imply, will have a significant financial impact for homeowners.

Comparison between treatment units

Under the Building Code, all treatment units in Ontario must be certified CAN/BNQ 3680-600 with a minimum of Class IV treatment. The effluent following the treatment unit complies to strict levels of TSS, BOD_5 and even coliforms. The required area used for dispersing the treated effluent should be the same between these treatment units, whether they incorporate the dispersal method or not. Treating CTDs differently from other treatment technologies when it comes to required area would be considered discriminatory as their certifications considers them equal.

The comparison between treatment units over Type A beds and CTDs should stop at the required area. When it comes to construction requirements and material required for dispersal, there are no similarities since the method for dispersal differs. Obviously, if a treatment technology concentrates its effluent in one specific area, it requires a dispersal method such as Type A beds in addition to the treatment technology. But since CTDs already provide dispersal, adding a separate leaching bed with specific requirements under a CTD is unjustified. In fact, the only construction parameter for CTDs should be the required area or dispersal surface as called in BMECs.

Specific Comments

Vertical Separation

Proposal 8.7.9.1 (4) (d) states that the bottom of the treatment unit shall be at least 600 mm above a limiting layer. However, CTDs authorized by BMECs have been built for over 15 years with different requirements:

- 600 mm if T is less than or equal to 6 min. or greater than 50 min.
- 450 mm if T is greater than 6 min., or less than or equal to 50 min.

Although 450 mm may seem less than the 600 mm required for Type A beds, the suggested 450 mm is spread out over the entire QT/400 area, while the 600 mm for Type A beds is only under the stone layer. Allowing a vertical separation of 450 mm for specific T times over the entire dispersal area further protects the environment because it results in more total material under the treatment system. In other words, QT/400 x 450 mm (as suggested) is much more material than Q/B x 600 mm (as required for Type A beds) and is therefore safer for the environment. This principle is also accepted by BMEC who has been allowing it for the past 15 years, and annual sampling of installed systems demonstrates that the desired TSS and BOD_5 levels are reached.

The actual proposal is contrary to our current and previous BMEC authorizations, does not provide more protection for the environment, limits the competitivity of CTDs and raises costs for the homeowner as extra material would often be required to reach the proposed vertical separation over the large area.

Suggestion: When the underlying soil has T time greater than 6, or less than or equal to 50, the bottom of the CTD should be at least 450 mm above the limiting layer.

Sand requirement

Proposal 8.7.9.1 (4) (b) states that a layer of sand with a minimum thickness of 300 mm is required directly beneath the CTD unit, as also required for Type A beds (8.7.7.1 (4) (b)). It is believed that this layer of sand helps with the dispersal of the treated water over the contact area. Treatment units used in conjunction with a Type A bed need this additional sand layer to disperse the effluent because they concentrate their effluent over a very small percentage of the required contact area. However, CTDs, by taking up the entire contact area, are already ensuring proper water dispersal through their components.

The additional sand layer of 300 mm is contrary to our previously authorized BMECs and the layer of sand serves no additional dispersal purpose for CTDs. DBO Expert has done independent testing with multiple depths of sand under our CTD pipes on official CAN/BNQ 3680-600 testing sites and have found that the treatment of TSS and BOD_5 is already at its best at 300 mm of sand, with average results way below Class IV requirement of 10 mg/L. Additional sand does not provide better TSS and BOD_5 treatment and we are able to provide this technical data. Also, we have not seen any technical documentation behind this additional sand requirement, making it totally random and unjustified. Annual sampling of current CTDs also demonstrates that 300 mm of sand provide sufficient treatment to reach required TSS and BOD_5 levels. Furthermore, the additional layer will only result in an increased cost for CTDs for homeowners, as we will discuss below.

From our calculations, we have found that the proposed way of installing CTDs will result in doubling the material under the pipes, resulting in a minimum price increase of 42.5% in material costs compared to how a System O)) is installed today. This excludes the additional time to prepare a bigger site, the labour to install the material and the additional transportation costs. Depending on the flow (Q) and T-time, 42.5% can result in hundreds of tons of additional material and thousands of extra dollars for the homeowners. This invalidates the Cost/Benefit Implications from the Rationale for change of document B-08-07-09 claiming that “No cost impact is expected”.

We would also like to point out that we are facing a well-known sand scarcity, and that this unnecessary additional sand requirement will make it even rarer. Adding more sand will not only result in more truck deliveries needed to the site, which is already a step back for the environment, but also consumes aggregates that would be more beneficial for another usage. And we won’t even go into the impact on GHGs.

Suggestion: Remove the 300 mm layer of sand as a requirement for CTDs.

Area of contact

Treatment units used in conjunction with a Type A bed require an area of contact determined by the formula QT/850, as well as a mantle of at least 15 m with an area calculated with the formula QT/400, when T is more than 15. In other words, when T is less than or equal to 15, the required area is only QT/850 for Type A beds.

This principle should also be applicable to CTDs when T is less than or equal to 15 since both treatment units and CTDs are classified as Class IV treatment. We believe that the one parameter that should be comparable between Type A beds and CTDs is the required area. Treating CTDs differently from other treatment technologies in terms of area would be considered discriminatory as their certifications prove them equal. The same areas should then be required. The area of a CTD should be calculated using the QT/850 formula when T is less than or equal to 15.

Suggestion: Afford CTDs the same principles of area than Type A beds, by also considering the comment on the unnecessary additional sand.

(4) The CTD shall have an area that is not less than the value determined the formula:

$$A = QT/850$$

where,

A = the area of contact in square metres between the base of the sand layer and the underlying soil or sand,

Q = the total daily design sanitary sewage flow in litres, and

T = the lesser of 50 and the percolation time of the underlying soil

(5) Where the underlying soil has a percolation time of more than 15 min, the area referred to in Sentence (4) shall have an area that is not less than the value determined by the formula,

$$A = QT/400$$

where,

A = the area of contact in square metres between the base of the sand and the underlying soil, or leaching bed fill if utilized,

Q = the total daily design sanitary sewage flow in litres, and

T = the lesser of 50 and the percolation time of the underlying soil.

Sampling vs maintenance

We believe annual samplings was a good initiative for the protection of the environment, and that it was completely justified because treatment units or systems had no certification or way of demonstrating their long-term efficiency. With the required CAN/BNQ 3680-600 certification, specifically, the introduction of field audits, the efficiency of certified systems will already be tested on the field. This could easily save over a hundred dollars per year for homeowners without putting the environment at

greater risk. We are also aware of the administrative burden that the annual sampling brings on regulatory officials. Removing sampling requirements in no way impedes annual inspection requirements, but it does save homeowners significant annual costs.

Suggestion: Remove annual sampling requirements for CAN/BNQ 3680-600-certified technologies that are already subject to annual field audits.

Final comment

Beds and units vs systems

We do not agree with the approach taken to introduce CTDs in the Code. The innovative principle behind CTDs is that they combine both the treatment unit and dispersal done by the leaching bed. The way the changes are proposed now considers that CTDs are simply treatment units built over a large "CTD bed". There should be no principle of CTD unit and CTD beds since they are both part of one single system. The term "system" would be appropriate since CTDs are already associated with the term "system sand". Considering CTDs as complete systems instead of comparing them to treatment units over Type A beds would resolve most of the comments regarding the fact that the proposed CTDs do not reflect the actual way they are built. As mentioned earlier, we believe that only the required area should be comparable to Type A bed because both CTD systems and Type A beds disperse Class IV effluents. All mentions of construction materials should be subject to the manufacturers' guides and certifications and not by the Code. While treatment units over Type A beds need construction requirements for the effluent dispersal, CTDs don't.

Also, while every known CTD uses system sand, the proposed definition for CTDs including a layer of system sand limits future innovation. We suggest removing this mention in the definition.

Furthermore, a dispersal surface should not automatically be associated with a bed or a construction. A dispersal surface could only be referred to an area of soil on which the effluent is dispersed. Removing this principle from the definition does not limit the possibility of having a bed or construction over the area of soil.

Suggestion: We suggest completely reviewing the way CTDs are introduced in the Code and rewriting Article 8.7.9.1 to address multiple comments. A "treatment unit used in conjunction with a leaching bed constructed as a combined treatment and dispersal bed" should simply be called a "combined treatment and dispersal system".

(1) The ~~treatment unit used in conjunction with a leaching bed constructed as a combined treatment and dispersal bed~~ combined treatment and dispersal system shall provide an effluent quality that does not exceed the maximum concentrations set out opposite a Level IV treatment unit in Columns 2 and 3 of Table 8.6.2.2.

(2) A ~~combined treatment and dispersal bed~~ combined treatment and dispersal system shall be backfilled with leaching bed fill so as to ensure that, after the leaching bed fill settles, the surface of the leaching bed will not form any depressions.

(3) The contact area of the dispersal surface shall be rectangular in shape with the long dimension parallel to the site contours and the treatment unit shall be protected in the manner described in Sentence 8.7.3.3.(2) or as per the manufacturer's instructions.

(4) ~~A layer of sand shall be installed directly beneath the *treatment unit* that shall,~~

~~(a) be comprised of a sand that has, (i) a *percolation time* of at least 6 and not more than 10 min, and~~

~~(ii) not more that 5% fines passing through a 0.074 mm (No. 200) sieve,~~

~~(b) have a minimum thickness of 300 mm, and~~

~~(c) have an area that is not less than the area determined by the formula:~~

~~A = QT/400~~

~~where,~~

~~A = the area of contact in square metres between the base of the sand layer and the underlying *soil* or sand,~~

~~Q = the total daily design *sanitary sewage* flow in litres, and~~

~~T = the lesser of 50 and the *percolation time* of the underlying *soil*. and,~~

~~(d) be *constructed* such that the bottom of the treatment unit is at least 600 mm above the *high ground water table*, rock or *soil* with a *percolation time* of 1 min or less or greater than 50 min.~~

The combined treatment and dispersal system shall

(a) have an area that is not less than the value determined by the formula:

$$A = QT/850$$

where,

A = the area of contact in square metres between the combined treatment and dispersal system and the underlying soil or sand,

Q = the total daily design sanitary sewage flow in litres, and

T = the lesser of 50 and the percolation time of the underlying soil

(b) be constructed such that the bottom of the system is at least

(i) 450 mm above the ground water table, rock or soil with a percolation time of 1 min or less or greater than 50 min if T is greater than 6 or less than or equal to 50.

(ii) 600 mm above the ground water table, rock or soil with a percolation time of 1 min or less or greater than 50 min if T is less than or equal to 6, or greater than 50.

(5) ~~Either imported sand meeting the specification of 8.7.9.1.(4)(a) or specified system sand or other filtering medium used in the *treatment unit* shall be used to fill in the area between the assembly of pipes, modules, or conduits.~~

Where the underlying soil has a percolation time of more than 15 min, the area referred to in Sentence (4) shall have an area that is not less than the value determined by the formula,

$$A = QT/400$$

where,

A = the area of contact in square metres between the base of the system and the underlying soil,

Q = the total daily design sanitary sewage flow in litres, and

T = the lesser of 50 and the percolation time of the underlying soil.

(6) The *effluent* shall be evenly distributed ~~within the specified system sand layer~~ to within 300 mm of the perimeter of the ~~sand layer~~ Area in Sentence (4) or (5), whichever is applicable.
(7) The perimeter of the ~~*treatment unit*~~ combined treatment and dispersal pipes, modules, or conduits shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.B. and these distances shall be increased when required by Sentence 8.7.4.2.(11).

(8) The *combined treatment and dispersal* ~~*bed*~~ *system* shall not be installed in an area where the original ground has a slope in excess of 25%.

Combined Treatment and Dispersal ~~*Unit*~~ *system*, means a type of treatment unit consisting of a series of pipes, modules, conduits, or other proprietary unit, which ~~when combined with a layer of system sand,~~ provides a specific degree of sanitary sewage treatment to reduce the contaminant load from that of sanitary sewage to a given effluent quality while also ensuring proper dispersal of the effluent over a specified dispersal surface.

Dispersal Surface, means the layer of *soil* ~~or leaching bed fill, constructed wholly in ground or raised or partly raised above ground,~~ as required by local conditions, to which effluent from a Combined Treatment and Dispersal ~~Unit~~ system is applied.