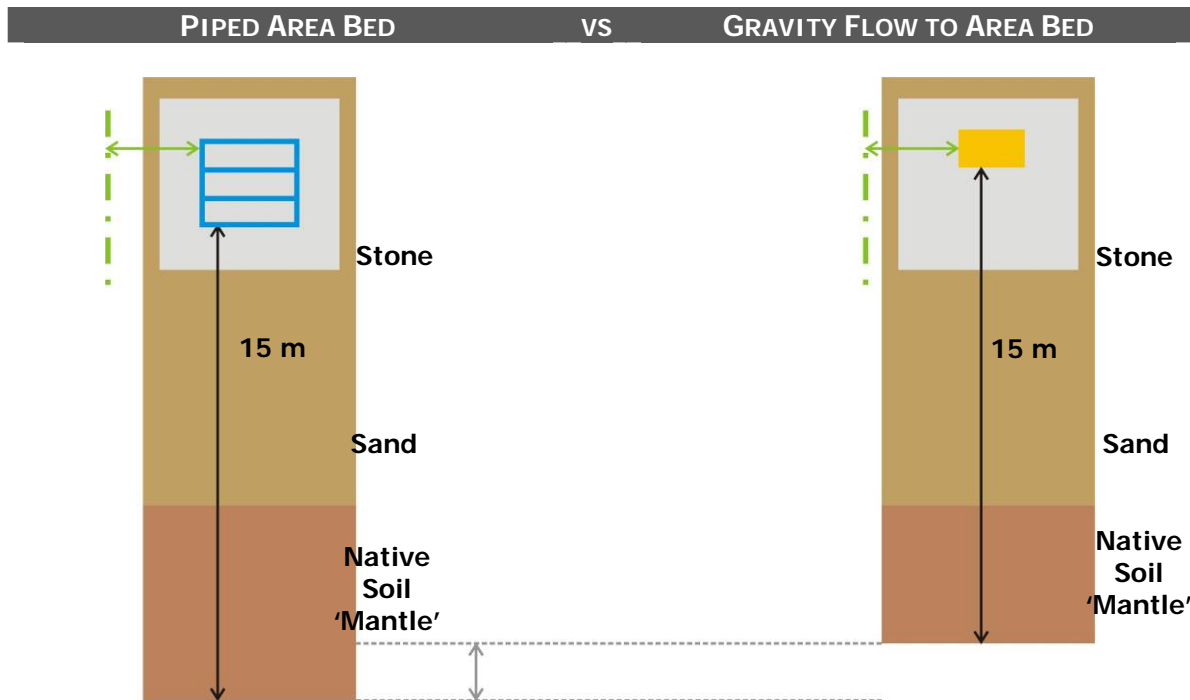




# Area Bed Information

There are two different types of Waterloo Biofilter area beds: the piped area bed and the gravity flow to area bed which is used in the above ground configurations. For tight lots where meeting OBC clearance distances is an issue, our above ground configurations with gravity disposal are advantageous.



- Extra 'mantle' area
- Setback distances are taken from edge of pipe
- Pipe in stone has larger footprint than shed enclosure
- Configurations 1 & 5

- Less 'mantle' area
- Setback distances are from edge of shed
- Bed can be placed closer to structures, property lines and water bodies comparing to a piped area bed
- Shed enclosure has a smaller footprint than pipe in stone
- Configurations 2, 3 & 4

## Design

- Size of Area Bed is calculated using the guidelines of the BMEC Authorization
- Area of stone layer in  $m^2$  is  $Q/75$  (if  $Q \leq 3000$  L/d);  $Q/50$  (if  $Q > 3000$  L/d)
- Area of sand layer in  $m^2$  is  $QT/850$
- Minimum of 50' (15 m) of 10" thick 'mantle' is required in the direction of subsurface flow measured from the edge of the last pipe (for piped area bed) or edge of shed (for gravity flow to area bed).
- Area Beds are best kept elongated 2:1 or 3:1 perpendicular to slope
- Pipes are perpendicular to the direction of subsurface flow (unlike sand filter beds).
- Consider using multiple beds for large flows.

## Materials

- Stone
  - ▶ Minimum depth: 250 mm
  - ▶ 19 mm clear aggregate washed to be free of fine material
  - ▶ Clean gravel screened to between 19 mm and 53 mm in size
- Sand
  - ▶ Minimum depth: 250 mm
  - ▶ T-time: 6 – 10 min/cm, <5% silt and clay

## Installation

- If clay soil is wet, GO HOME, or just install the tanks; keep off disposal area.
- Be careful not to smear soil as it impedes infiltration of air and Biofilter effluent into native soil. If soil is smeared, scarify or remove it when it is dry.
- Backhoe should stay on uphill side of Area Bed to avoid compacting soil the Biofilter effluent will infiltrate through. Rubber-tired vehicles should remain off the bed area.
- Use supplied filter fabric. Do not use cheaper, easily torn fabrics. Mantle is required when sand layer elevation is higher than original grade elevation.

## Piped Bed Procedure

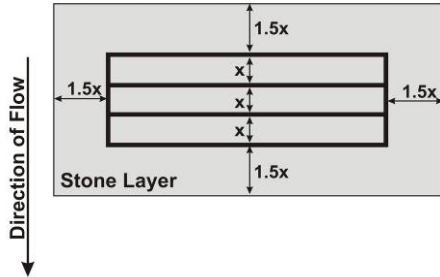


1. Bring Area Bed sand to site, ensure silt-clay content is <5%.
2. Remove about 6" – 10" of topsoil for sand area, keeping off of native topsoil "mantle" in direction of flow.
3. Scarify subsoil, but first make sure clay soil is dry.
4. If native soil has T-time <6 min/cm, use 24" of sand with T-time 6 – 10 min/cm; otherwise, use 10" of sand.
5. Add at least 6" of clean washed stone on soil, and install pipes, top with 4" of clean stone.
6. Cover stone layer with filter fabric before covering with 8" – 10" sandy topsoil.



## Spacing between Distribution Pipes

The goal is to lay out the distribution pipes evenly across the stone layer. Waterloo Biofilter Systems suggests laying out distribution pipes such that:



The distance between outermost pipes to stone layer edge is 1.0 - 1.5 times that between pipe centres (see Figure on left), and the ends connected together for better distribution.

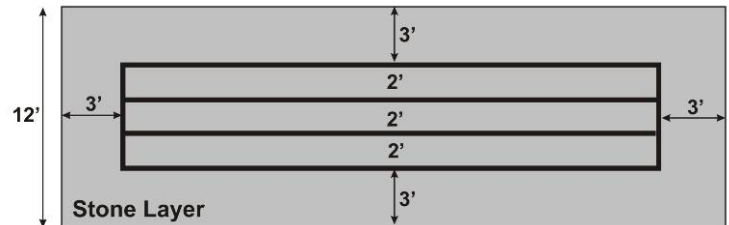
The following examples demonstrate how to space the distribution pipes.

### Example 1

Let the stone layer be 12' wide in the direction of flow (elongated perpendicular to flow).

Solution:

Pipes centred 2' apart.  
Pipes placed 2' - 3' from stone edge, in this case 4 pipes are required.

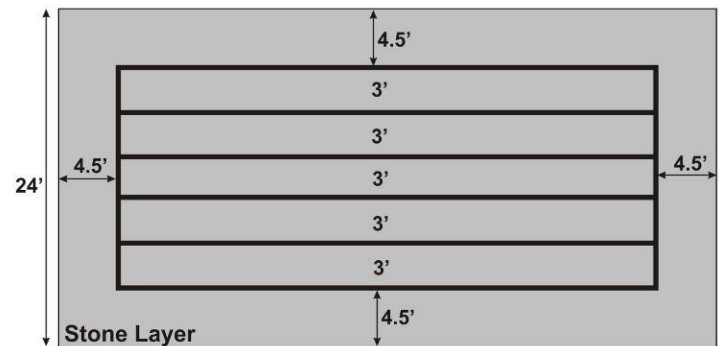


### Example 2

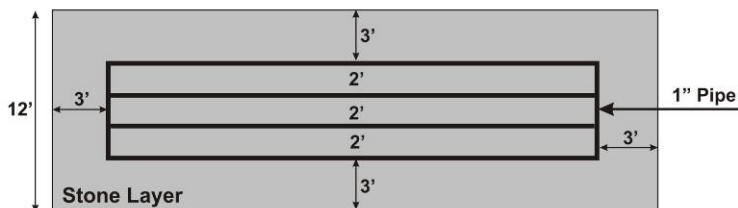
Let the stone layer be 24' wide in the direction of flow (elongated perpendicular to flow).

Solution:

Pipes centred 3' apart.  
Pipes placed 3' - 4.5' from stone edge, in this case 6 pipes are required.



## Connecting Forcemain Line



The 1" forcemain should cut in between the centre two runs of pipe. The effluent should come in and hit the back of the pipe wall before entering the distribution piping thus dissipating the energy (the effluent will be more evenly distributed this way).

## Gravity Flow to Area Bed Procedure



1. Bring Area Bed sand to site, ensure silt-clay content is <5%.
2. Remove about 6" – 10" of topsoil for sand area, keeping off of native topsoil "mantle" in direction of flow.
3. Scarify subsoil, but first make sure clay soil is dry.

4. If native soil has T-time <6 min/cm, use 24" of sand with T-time 6 – 10 min/cm; otherwise, use 10" of sand.
5. Add at least 6" of clean washed stone on soil, and install pan lysimeter (as per manufacturer's instruction), top with 4" of clean stone.
6. Place Biofilter<sup>®</sup> shed on stone (no fabric below).
7. Cover stone layer around shed with filter fabric before covering with 8" – 10" sandy topsoil.

