



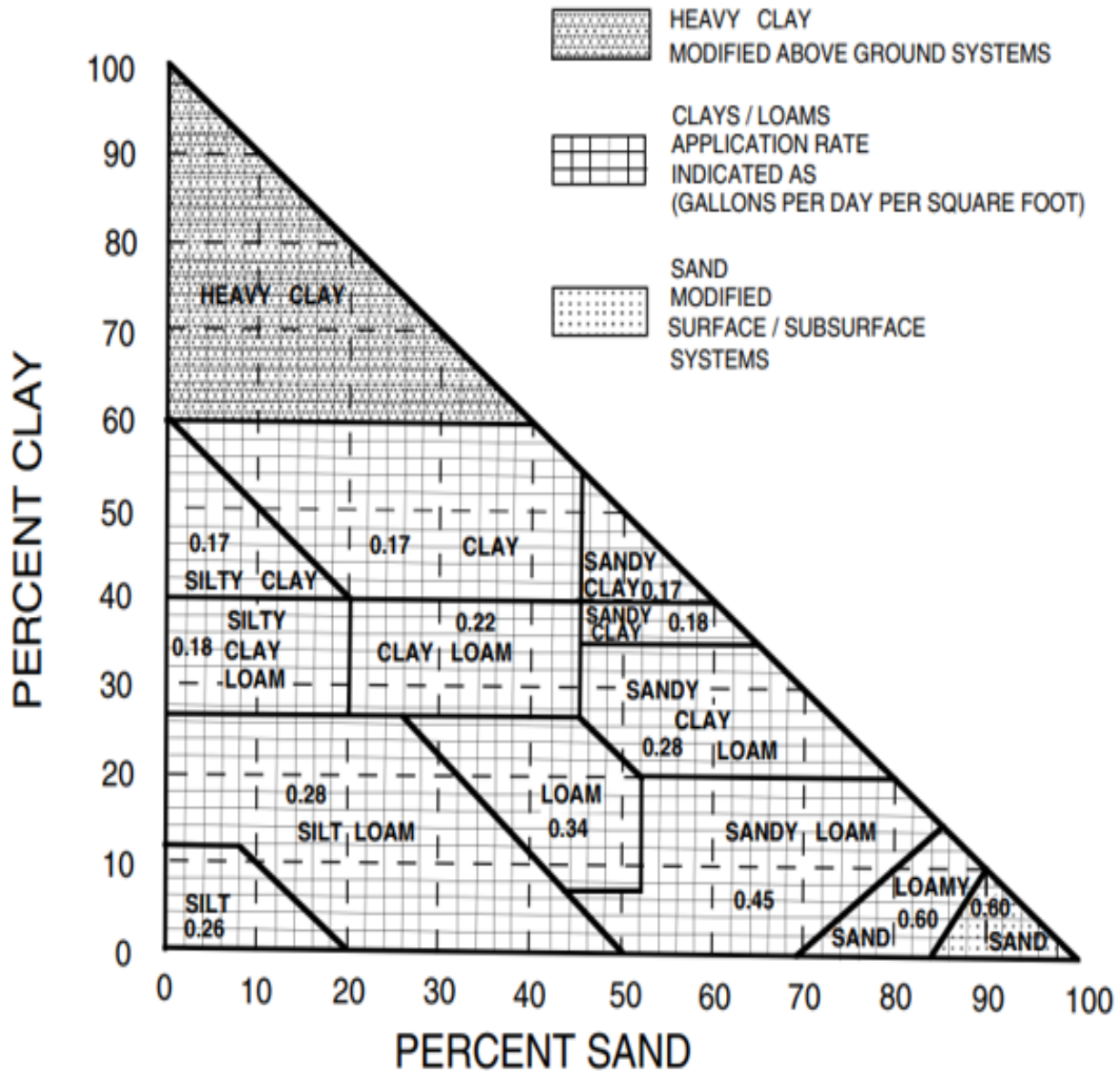
Supplementary Information  
for  
Onsite Wastewater Management  
System Installations  
Imperial Units

Updated July 2026

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Figure 1: Soil Texture Classification Triangle



Application Rate: Imperial gallons per day per square foot (gpd/ft<sup>2</sup>)

**Table 1: Application Rates**

When using the results of a soil texture classification to size a system, the disposal field shall be sized using the application rates applicable for the soil type. The application rate is the volume of effluent that can be applied to the given soil type per day. Application rates per day for various soil types are as follows:

| <b>Soil Type</b>                                | <b>Application Rate<br/>(gpd/ft<sup>2</sup>)</b>                      |
|-------------------------------------------------|-----------------------------------------------------------------------|
| Sand/Loamy Sand<br>(85 - 100% Sand)             | Modified systems<br>See Table 3<br><br>0.60                           |
| Loamy Sand (<85% Sand)                          | 0.60                                                                  |
| Sandy Loam                                      | 0.45                                                                  |
| Loam                                            | 0.34                                                                  |
| Silt Loam/ Sandy Clay Loam                      | 0.28                                                                  |
| Silt                                            | 0.26                                                                  |
| Clay Loam                                       | 0.22                                                                  |
| Sandy Clay (<40% Clay)/Silty Clay Loam          | 0.18                                                                  |
| Clay/ Silty Clay/ Sandy Clay<br>(40 - 60% Clay) | Modified systems<br>See Table 3<br><br>0.17                           |
| Heavy Clay<br>(>60 - 100% Clay)                 | Modified aboveground systems<br>No subsurface systems.<br>See Table 3 |

**Table 2: Average Daily Effluent Flows**

The daily effluent flow rate is required to calculate the area of the disposal field or the length of trench required. In Manitoba flow rates are based on the number of bedrooms in the dwelling. Flow rates for non-residential facilities (commercial, institutional, recreational) are shown in Table 10.

Manitoba effluent flow for dwellings is listed as follows:

| <b>Number of Bedrooms</b> | <b>Effluent Flow<br/>(Imperial Gallons per day)</b> |
|---------------------------|-----------------------------------------------------|
| 2                         | 220                                                 |
| 3                         | 330                                                 |
| 4                         | 440                                                 |
| 5                         | 550                                                 |

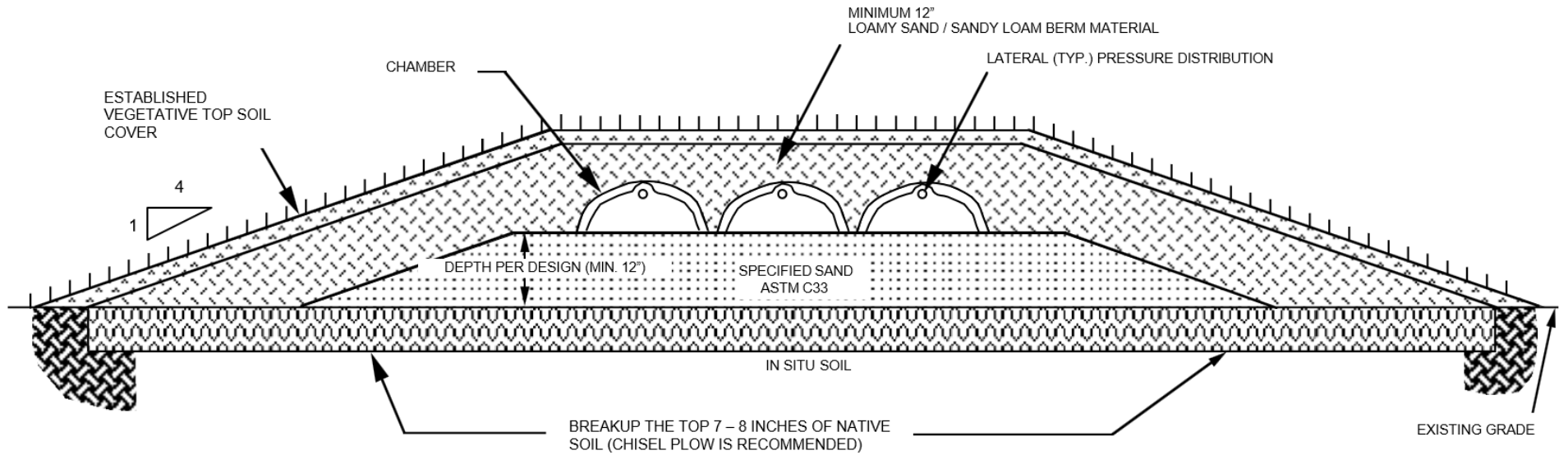
Note:

Manitoba Environment and Climate Change may consider the use of metered flow volumes for larger dwellings or other facilities (i.e., commercial, institutional, recreational).

**Table 3: Soil Texture Classification Matrix**

| <b>Soil Type</b>       | <b>Type of System</b>                                                                                                                                                                                                                                                                                                                                                                                             | <b>Minimum Requirements</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Intent</b>                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| >60 - 100% heavy clay  | <ul style="list-style-type: none"> <li>holding tank</li> <li>package sewage treatment plant to aboveground field</li> <li>peat system</li> <li>pressurized sand treatment mound</li> <li>sand filter</li> <li>modified aboveground total area field</li> </ul>                                                                                                                                                    | <ul style="list-style-type: none"> <li>NO SUBSURFACE SYSTEMS</li> <li>80% clay – sand treatment mound – pressure distribution</li> <li>70% clay – minimum 157 yd<sup>3</sup> stone (2538 sq. ft.)<br/>minimum 188 yd<sup>3</sup> sand</li> <li>60% clay – minimum 251 yd<sup>3</sup> stone (2538 sq. ft.)<br/>minimum 94 yd<sup>3</sup> sand<br/>(effluent must be pumped to the distribution box or laterals)</li> <li>perforated distribution pipe must be equally distributed over the total area of the field</li> <li>loamy top soil to be used as final cover material<br/>(based on 330 gal/day – 3 bedroom home)</li> </ul>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>to provide alternative systems in heavy clay soils as subsurface systems have insufficient evapotranspiration and absorption qualities</li> <li>field sizing shall increase per each additional bedroom</li> <li>Note: modified aboveground total area fields may be an alternative to sand treatment mounds</li> </ul>                                                         |
| 40 - 60% clay          | <ul style="list-style-type: none"> <li>modified total area (MTA)</li> <li>modified trenches <ul style="list-style-type: none"> <li>stone (MTS)</li> <li>chamber (MTC)</li> </ul> </li> <li>holding tank</li> <li>package sewage treatment plant to a modified field</li> <li>peat system</li> <li>pressurized sand treatment mound</li> <li>sand filter</li> <li>modified aboveground total area field</li> </ul> | <ul style="list-style-type: none"> <li>MTA - 192 yd<sup>3</sup> stone (1941 sq. ft.)<br/>- 72 yd<sup>3</sup> sand (high quality, clean, graded sand)<br/>- maximum depth 12"</li> <li>MTS - maximum depth 24"<br/>- minimum amount of stone under pipe is 14"<br/>(using - 24/36" bucket)<br/>- length of trench in tables for 0.17 app. rate<br/>- 555' for 24" W x 18" H<br/>- 431' for 36" W x 18" H</li> <li>MTC - maximum depth 12"<br/>- minimum amount of chamber 555' EQ 36/ARC 24</li> <li>loamy material to be used as cover<br/>(based on 330 gal/day – 3 bedroom home)</li> </ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>to allow for shallow depth subsurface system installations in clay soils</li> <li>to minimize the depth of the subsurface system to allow for adequate evapotranspiration and infiltration in these types of soils</li> <li>to use application rate of 0.17</li> <li>high quality, clean, graded sand with less than 5% No. 200 and must pass the jar test for fines</li> </ul> |
| <40% clay<br><85% sand | <ul style="list-style-type: none"> <li>traditional subsurface systems</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>minimum requirements as set out in regulation</li> <li>application rates vary from 0.18 - 0.60</li> <li>loamy material to be used as cover</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Note: the base of all fields must be 3.25 feet above the bedrock or high water table</li> </ul>                                                                                                                                                                                                                                                                                 |
| 85 - 100% sand         | <ul style="list-style-type: none"> <li>holding tank</li> <li>modified subsurface systems <ul style="list-style-type: none"> <li>lined trenches <ul style="list-style-type: none"> <li>stone</li> <li>chamber</li> </ul> </li> <li>lined total area field</li> <li>pressurized sand treatment mound</li> <li>peat system</li> <li>package plant to modified aboveground field</li> </ul> </li> </ul>               | <ul style="list-style-type: none"> <li>application rate 0.60</li> <li>the base of fields must be 3.25 feet above bedrock or high water table</li> <li>all systems must be pressurized</li> <li>lined trenches (stone) <ul style="list-style-type: none"> <li>12" minimum layer of ASTM C33 sand or loamy sand</li> </ul> </li> <li>lined trenches (chamber) <ul style="list-style-type: none"> <li>12" minimum layer of ASTM C33 sand or loamy sand on bottom and sides</li> </ul> </li> <li>lined total area field <ul style="list-style-type: none"> <li>12" minimum layer of ASTM C33 sand or loamy sand<br/>minimum of 110 yard<sup>3</sup> of stone (1100 sq. ft.)</li> </ul> </li> <li>loamy material to be used as cover</li> <li>saturated zones - sand treatment mounds – pressurized</li> </ul> | <ul style="list-style-type: none"> <li>to provide alternative systems in coarse grained soils</li> <li>to protect ground water sources</li> <li>to slow the percolation rate and to facilitate treatment, lined trenches and total area fields are to be used</li> <li>to provide alternate system in saturated soil conditions</li> </ul>                                                                             |

**Figure 2: Pressurized Sand Treatment Mound System - Chambers**

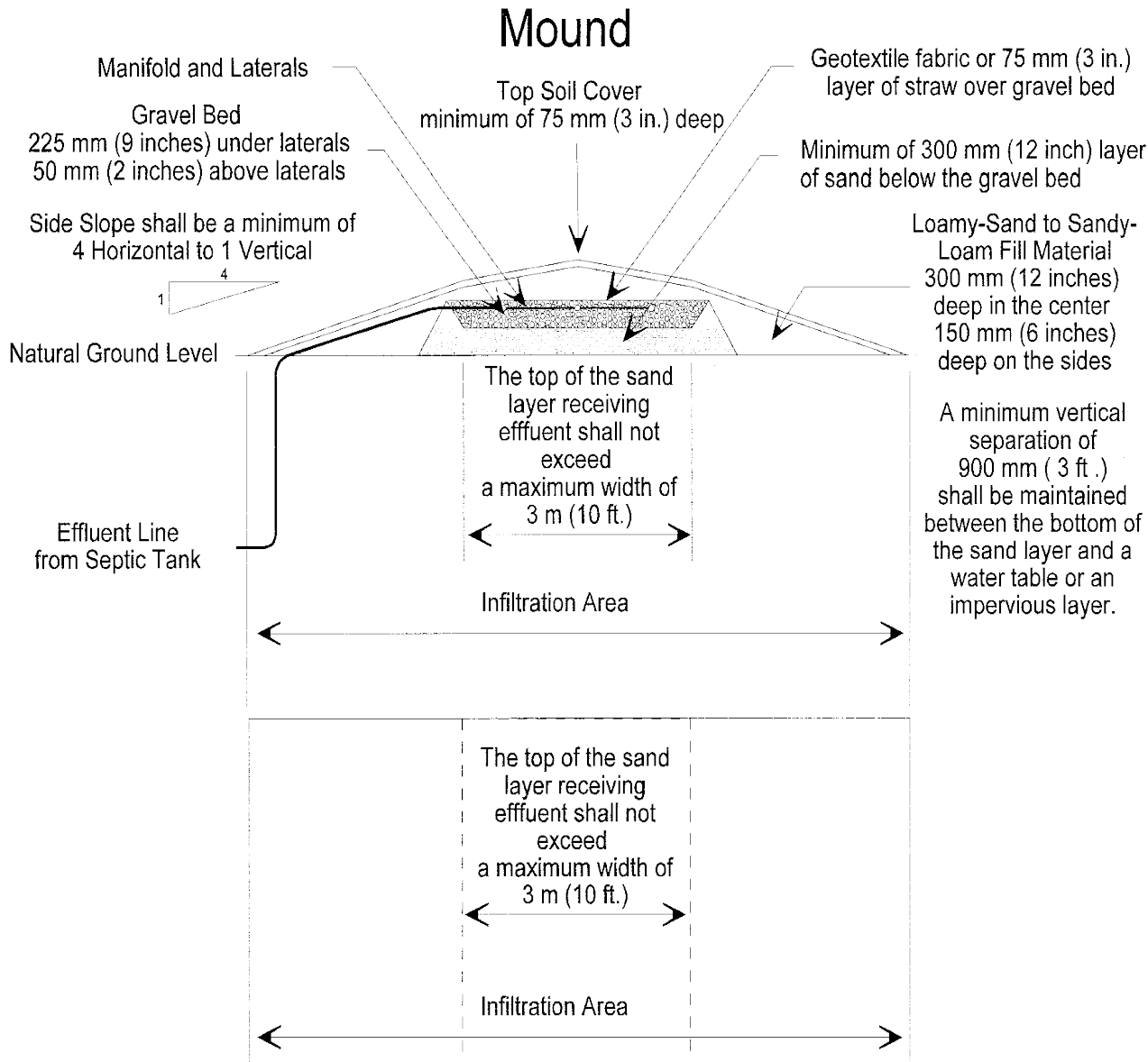


\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR >60 - 100% HEAVY CLAY SOILS

NOTE: BERM MATERIAL MUST BE LOAMY SAND / SANDY LOAM OR ASTM C33 SAND.

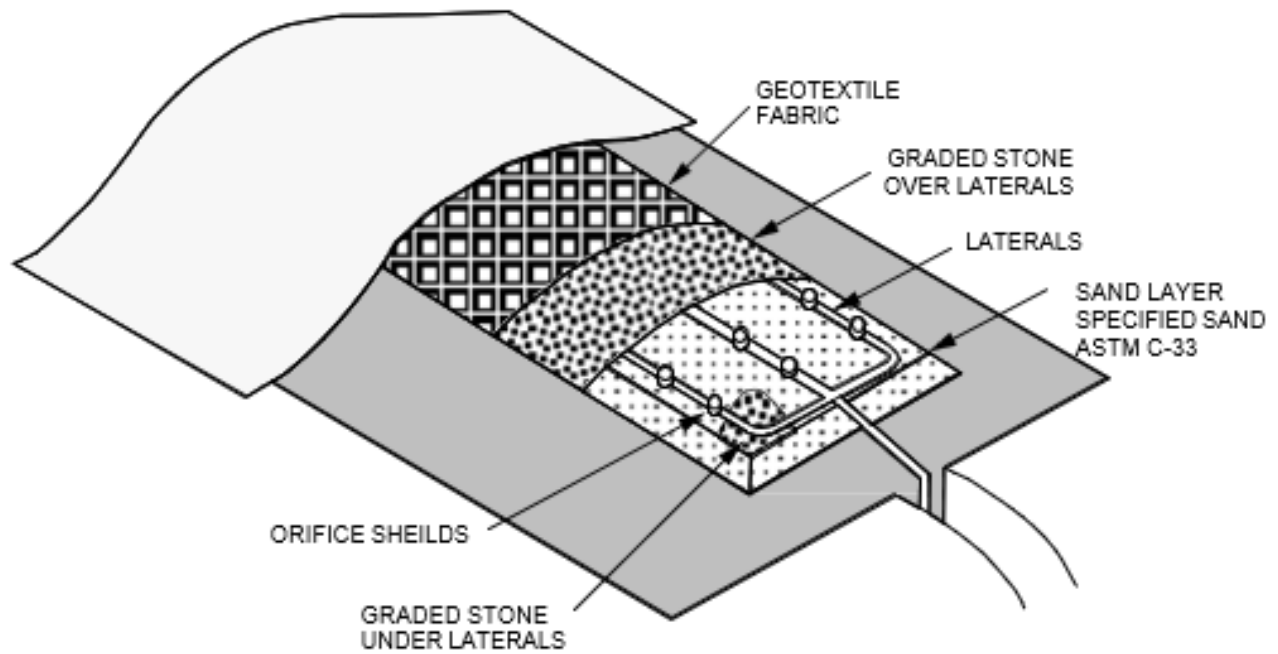
**Figure 3: Pressurized Sand Treatment Mound - Stone**



\*FOR ILLUSTRATIVE PURPOSES ONLY, NOT TO SCALE

Note: Wastewater Effluent Chambers may also be used.  
Intended for use in heavy clay soils

**Figure 4: Pressurized Sand Treatment Mound System - Stone**

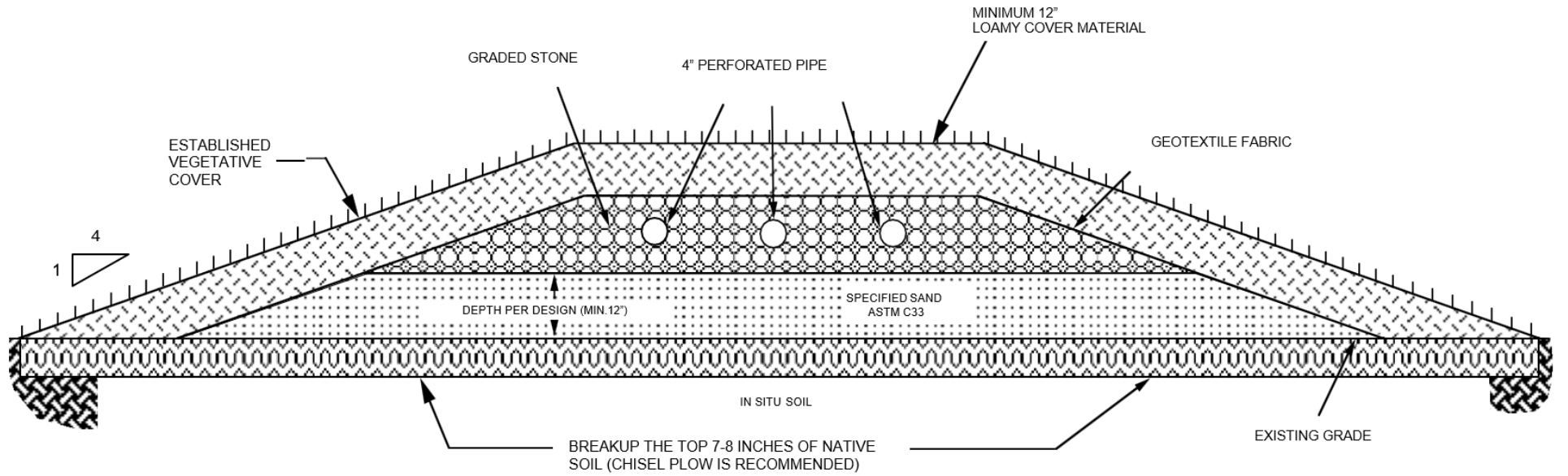


FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR >60 - 100% HEAVY CLAY SOILS

NOTE: ALL SEPTIC FIELDS MUST BE BERMED WITH SUITABLE MATERIAL.

**Figure 5: Modified Aboveground Total Area Field - Stone**

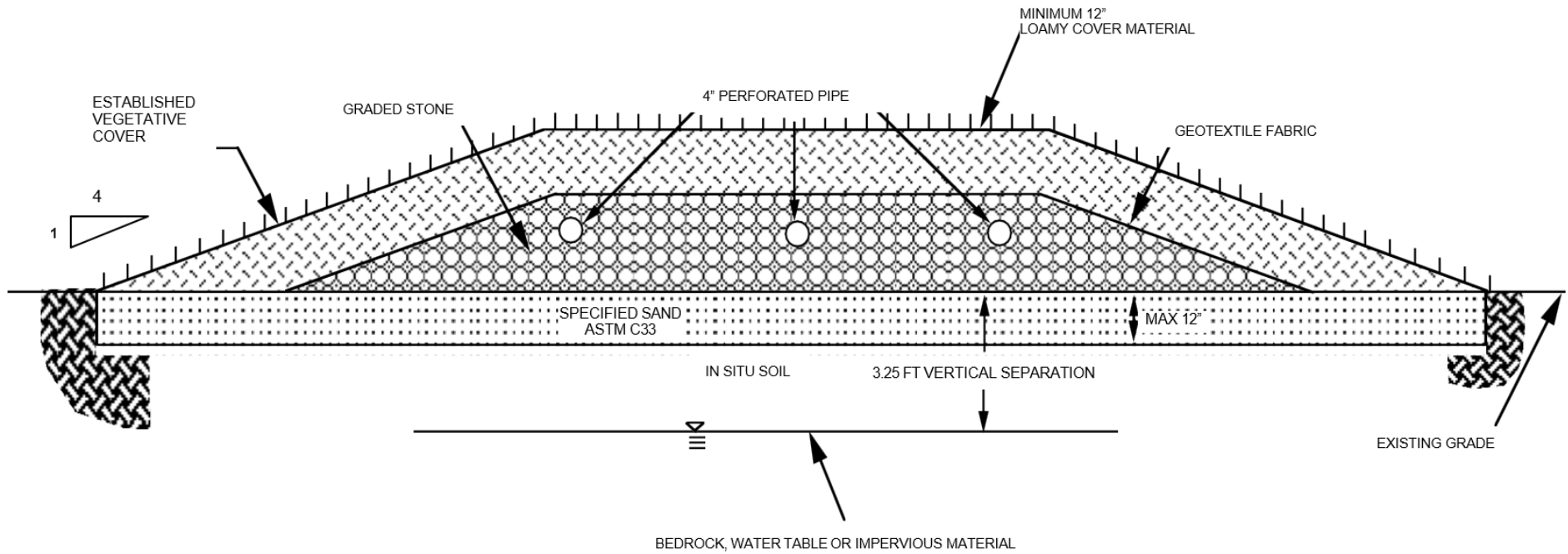


\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR > 60 - 100% HEAVY CLAY SOILS

NOTE: ALL SEPTIC FIELDS MUST BE BERMED WITH SUITABLE MATERIAL.

**Figure 6: Modified Total Area Field (MTA) - Stone**



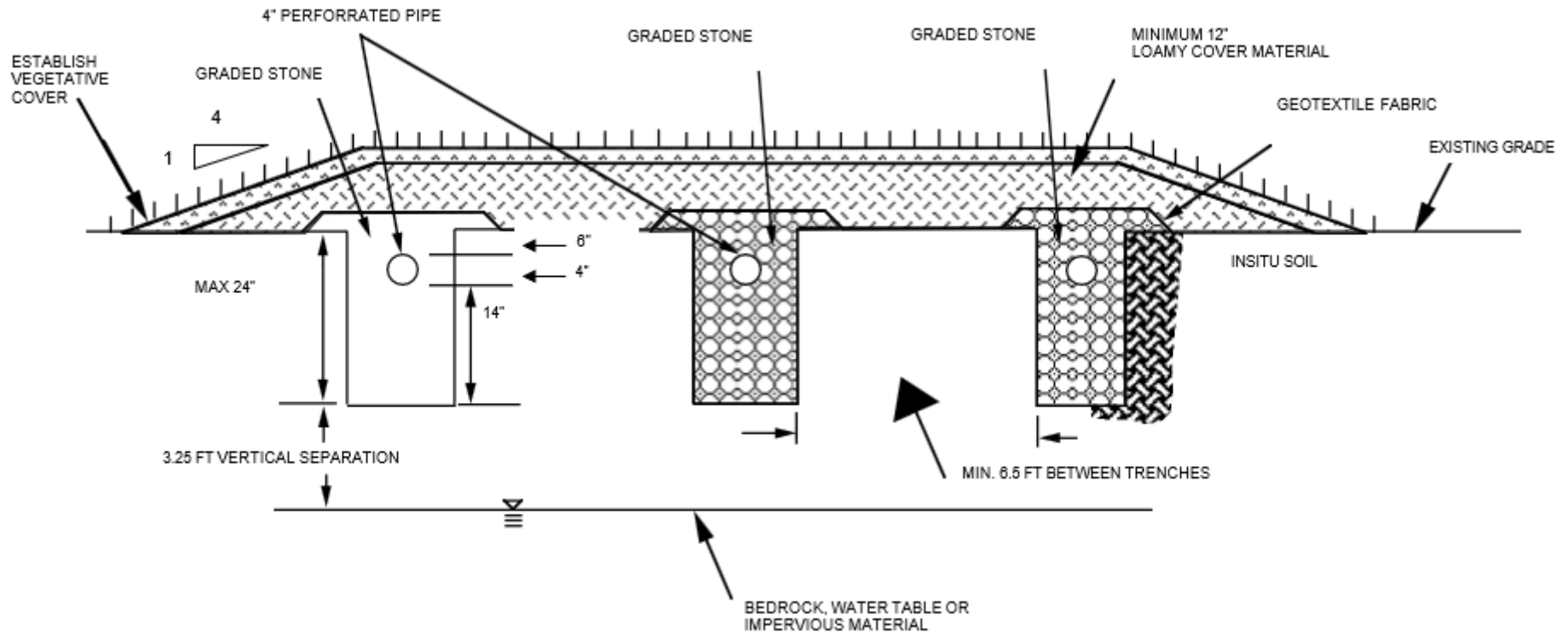
\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR 40 - 60% CLAY SOILS

NOTE: ALL SEPTIC FIELDS MUST BE BERMED WITH SUITABLE MATERIAL.

**Figure 7: Modified Trench - Stone (MTS)**

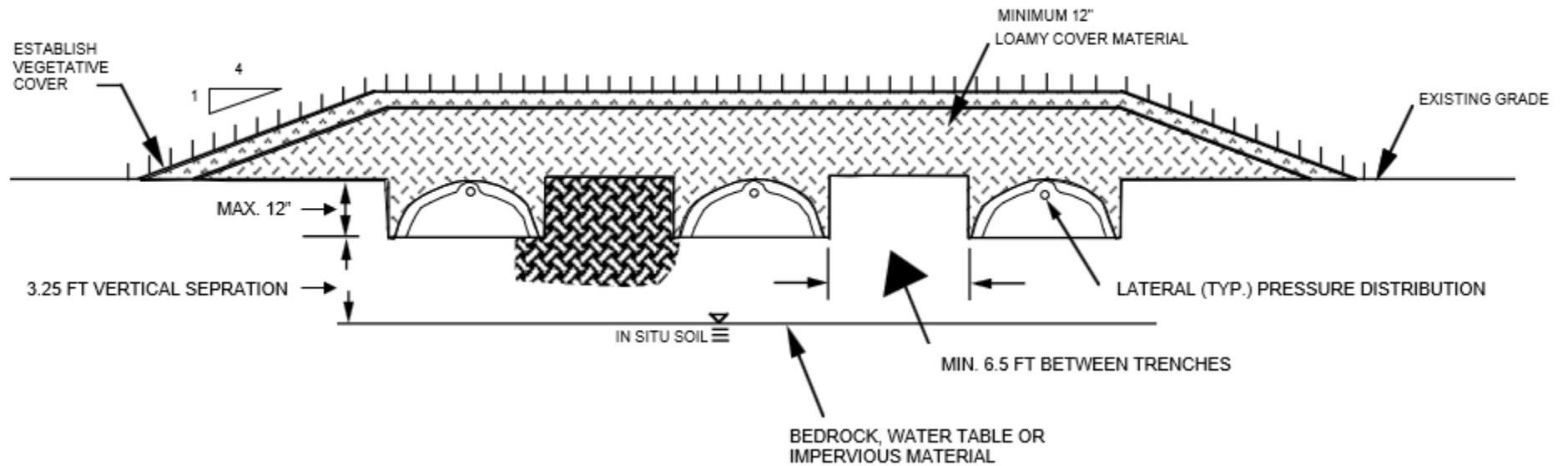
**Shallow In-Ground System**



\* FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR 40 - 60% CLAY SOILS

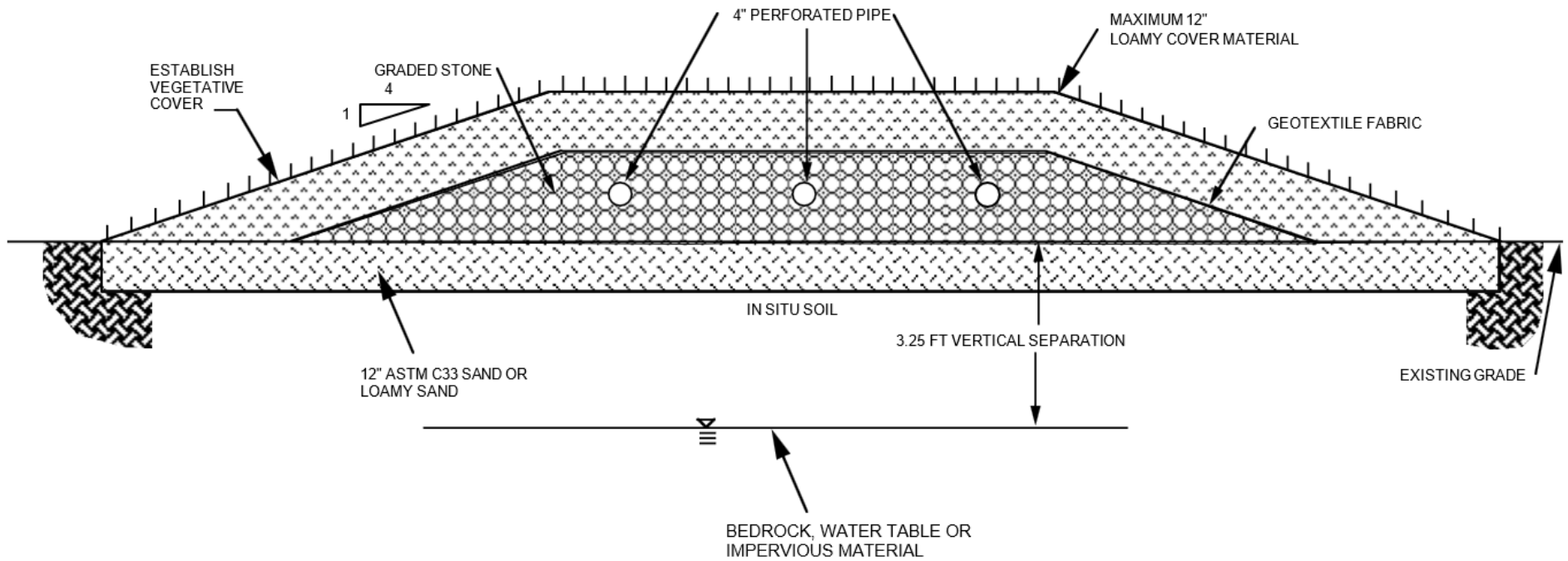
**Figure 8: Modified Trench - Chamber (MTC)**



\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR 40 - 60% CLAY SOILS

**Figure 9: Lined Total Area Field - Stone**

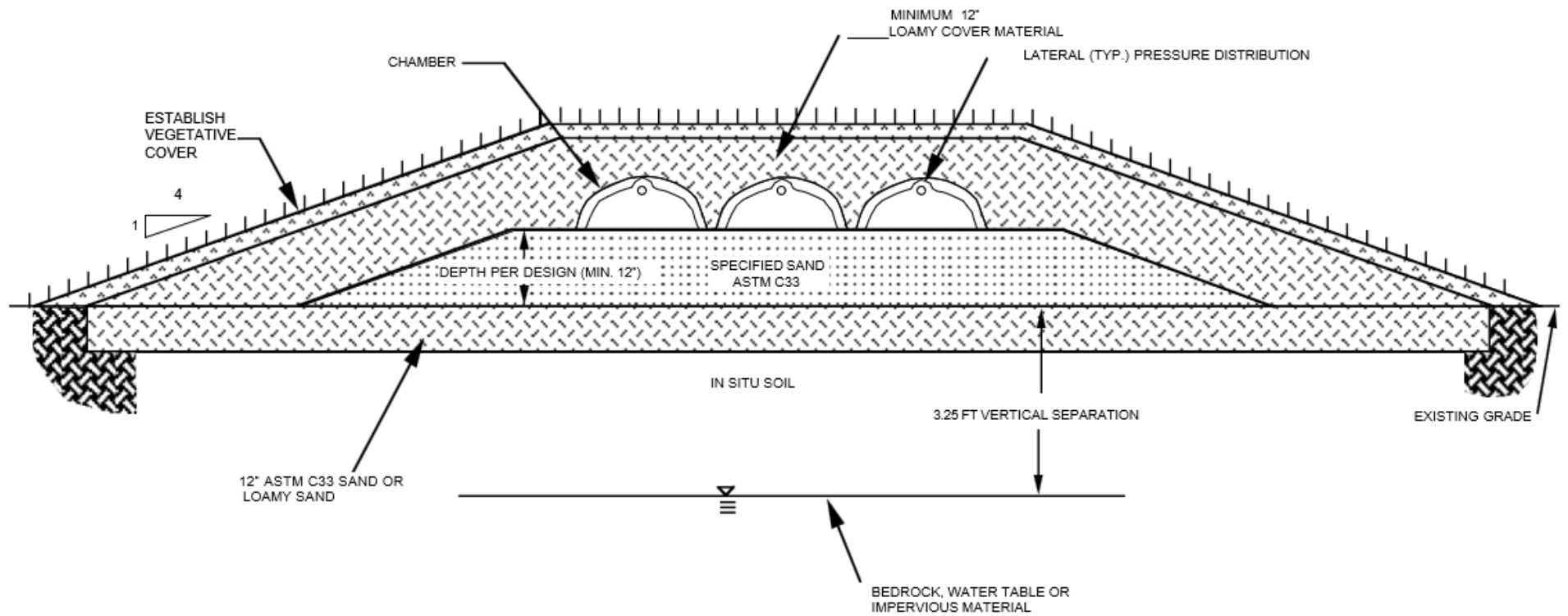


\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

NOTE: INTENDED FOR 85 - 100% SAND

NOTE: ALL SEPTIC FIELDS MUST BE BERMED WITH SUITABLE MATERIAL.

**Figure 10: Lined Total Area Field - Chambers**



NOTE: INTENDED FOR 85 - 100% SAND

NOTE: ALL SEPTIC FIELDS MUST BE BERMED WITH SUITABLE MATERIAL.

\*FOR ILLUSTRATIVE PURPOSE ONLY, NOT TO SCALE

## Lined Trenches For Porous Soils

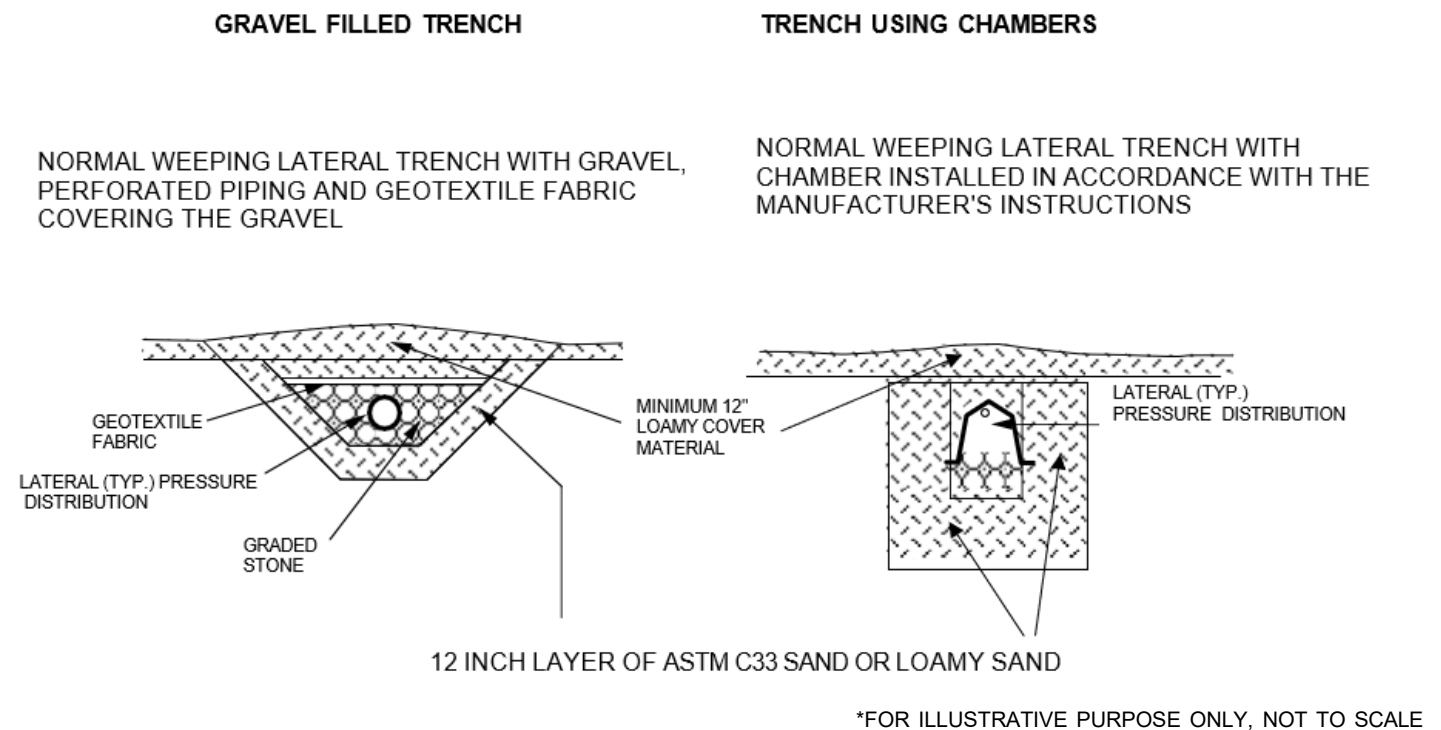
FOR INSTALLATIONS WHERE THE EXISTING SOIL HAS A SOIL ANALYSIS GREATER THAN OR EQUAL TO 85% SAND THE TRENCH MAY BE OVER EXCAVATED AND A 12 INCH LAYER OF ASTM C33 SAND OR LOAMY SAND IS INSTALLED ACROSS THE BOTTOM, AND UP THE SIDES OF THE TRENCH.

THIS LAYER OF SOIL IS INTENDED TO SLOW THE MOVEMENT OF THE EFFLUENT AND PREVENT SATURATED FLOW OF EFFLUENT THROUGH THE MORE POROUS SURROUNDING SOILS.

LEAVE THE SOIL MOUNDED OVER THE TRENCH TO ALLOW FOR SETTLEMENT.

PRESSURE DISTRIBUTION LATERALS SHALL BE USED TO ENSURE EVEN DISTRIBUTION OF THE EFFLUENT AND REDUCE THE POSSIBILITY THAT EFFLUENT WILL QUICKLY ESCAPE THROUGH CRACKS IN THE IMPORTED SOILS.

**Figure 11: Lined Trenches for Porous Soils**



NOTE: INTENDED FOR 85 - 100% SAND

**Table 4: Sizing for 24" Wide Trench Fields – Stone**

|                                               |                                           | Number of Bedrooms (gpd shown below bedrooms) - Length of Trench (feet) |          |          |          |              |                            |          |          |          |              |                            |          |          |          |              |
|-----------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|----------|----------|----------|--------------|----------------------------|----------|----------|----------|--------------|----------------------------|----------|----------|----------|--------------|
|                                               |                                           | Stone Trench (24"W x 12"H)                                              |          |          |          |              | Stone Trench (24"W x 18"H) |          |          |          |              | Stone Trench (24"W x 24"H) |          |          |          |              |
| Soil Type                                     | App. Rate (gpd/ft <sup>2</sup> )          | 2<br>220                                                                | 3<br>330 | 4<br>440 | 5<br>550 | Each Add. BR | 2<br>220                   | 3<br>330 | 4<br>440 | 5<br>550 | Each Add. BR | 2<br>220                   | 3<br>330 | 4<br>440 | 5<br>550 | Each Add. BR |
| Sand/Loamy Sand (85-100% Sand)<br>See Table 3 | 0.60                                      | 122                                                                     | 183      | 244      | 306      | 61           | 105                        | 157      | 210      | 262      | 52           | 92                         | 138      | 183      | 229      | 46           |
| Loamy Sand (<85% Sand)                        | 0.60                                      | 122                                                                     | 183      | 244      | 306      | 61           | 105                        | 157      | 210      | 262      | 52           | 92                         | 138      | 183      | 229      | 46           |
| Sandy Loam                                    | 0.45                                      | 163                                                                     | 244      | 326      | 407      | 81           | 140                        | 210      | 279      | 349      | 70           | 122                        | 183      | 244      | 306      | 61           |
| Loam                                          | 0.34                                      | 216                                                                     | 324      | 431      | 539      | 108          | 185                        | 277      | 370      | 462      | 93           | 162                        | 243      | 324      | 404      | 81           |
| Silt Loam/ Sandy Clay Loam                    | 0.28                                      | 262                                                                     | 393      | 524      | 655      | 131          | 224                        | 337      | 449      | 561      | 112          | 196                        | 295      | 393      | 491      | 98           |
| Silt                                          | 0.26                                      | 282                                                                     | 423      | 564      | 705      | 141          | 242                        | 363      | 484      | 604      | 121          | 212                        | 317      | 423      | 529      | 106          |
| Clay Loam                                     | 0.22                                      | 333                                                                     | 500      | 667      | 833      | 167          | 286                        | 429      | 571      | 714      | 143          | 250                        | 375      | 500      | 625      | 125          |
| Sandy Clay (<40% Clay)/ Silty Clay Loam       | 0.18                                      | 407                                                                     | 611      | 815      | 1019     | 204          | 349                        | 524      | 698      | 873      | 175          | 306                        | 458      | 611      | 764      | 153          |
| Clay/Silty Clay/Sandy Clay (40-60% Clay)      | 0.17                                      | 431                                                                     | 647      | 863      | 1078     | 216          | 370                        | 555      | 739      | 924      | 185          | 324                        | 485      | 647      | 809      | 162          |
| Heavy Clay (>60-100% Clay)                    | Modified aboveground systems. See Table 3 |                                                                         |          |          |          |              |                            |          |          |          |              |                            |          |          |          |              |

**Notes:**

- Application areas for stone trench systems are listed below:  
 Stone Trench Rating (24"W x 12"H) = 3 ft<sup>2</sup>/ft  
 Stone Trench Rating (24"W x 18"H) = 3.5 ft<sup>2</sup>/ft  
 Stone Trench Rating (24"W x 24"H) = 4 ft<sup>2</sup>/ft
- The minimum size home for wastewater system design shall be a 2 bedroom house
- Length of System Based upon the following: Length of Trench = (Daily Effluent Flow)/[(Application Rate) x Application Area]  
 Length of Trench (ft) - lineal length of trench required for field  
 Daily Effluent Flow (gpd) - volume produced on a daily basis, 110 gpd/bedroom  
 Application Rate (gpd/ ft<sup>2</sup>) – See Figure 1 or Table 1  
 Application Area (ft<sup>2</sup>) - area of base of trench plus area of 0.5 of height of trench

**Table 5: Sizing for 36" Wide Trench Fields – Stone**

|                                               |                                           | Number of Bedrooms (gpd shown below bedrooms) - Length of Trench (feet) |          |          |          |                    |                            |          |          |          |                    |                            |          |          |          |                 |
|-----------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|----------|----------|----------|--------------------|----------------------------|----------|----------|----------|--------------------|----------------------------|----------|----------|----------|-----------------|
|                                               |                                           | Stone Trench (36"W x 12"H)                                              |          |          |          |                    | Stone Trench (36"W x 18"H) |          |          |          |                    | Stone Trench (36"W x 24"H) |          |          |          |                 |
| Soil Type                                     | App. Rate (gpd/ft <sup>2</sup> )          | 2<br>220                                                                | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add.<br>BR | 2<br>220                   | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add.<br>BR | 2<br>220                   | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add. BR |
| Sand/Loamy Sand (85-100% Sand)<br>See Table 3 | 0.60                                      | 92                                                                      | 138      | 183      | 229      | 46                 | 81                         | 122      | 163      | 204      | 41                 | 73                         | 110      | 147      | 183      | 37              |
| Loamy Sand (<85% Sand)                        | 0.60                                      | 92                                                                      | 138      | 183      | 229      | 46                 | 81                         | 122      | 163      | 204      | 41                 | 73                         | 110      | 147      | 183      | 37              |
| Sandy Loam                                    | 0.45                                      | 122                                                                     | 183      | 244      | 306      | 61                 | 109                        | 163      | 217      | 272      | 54                 | 98                         | 147      | 196      | 244      | 49              |
| Loam                                          | 0.34                                      | 162                                                                     | 243      | 324      | 404      | 81                 | 144                        | 216      | 288      | 359      | 72                 | 129                        | 194      | 259      | 324      | 65              |
| Silt Loam/Sandy Clay Loam                     | 0.28                                      | 196                                                                     | 295      | 393      | 491      | 98                 | 175                        | 262      | 349      | 437      | 87                 | 157                        | 236      | 314      | 393      | 79              |
| Silt                                          | 0.26                                      | 212                                                                     | 317      | 423      | 529      | 106                | 188                        | 282      | 376      | 470      | 94                 | 169                        | 254      | 338      | 423      | 85              |
| Clay Loam                                     | 0.22                                      | 250                                                                     | 375      | 500      | 625      | 125                | 222                        | 333      | 444      | 556      | 111                | 200                        | 300      | 400      | 500      | 100             |
| Sandy Clay (<40% Clay)<br>Silty Clay Loam     | 0.18                                      | 306                                                                     | 458      | 611      | 764      | 153                | 272                        | 407      | 543      | 679      | 136                | 244                        | 367      | 489      | 611      | 122             |
| Clay/Silty Clay/Sandy Clay (40-60% Clay)      | 0.17                                      | 324                                                                     | 485      | 647      | 809      | 162                | 288                        | 431      | 575      | 719      | 144                | 259                        | 388      | 518      | 647      | 129             |
| Heavy Clay (>60-100% Clay)                    | Modified aboveground systems. See Table 3 |                                                                         |          |          |          |                    |                            |          |          |          |                    |                            |          |          |          |                 |

**Notes:**

- Application Areas for stone trench systems are listed below:  
 Stone Trench Rating (36"W x 12"H) = 4 ft<sup>2</sup>/ft.  
 Stone Trench Rating (36"W x 18"H) = 4.5 ft<sup>2</sup>/ft.  
 Stone Trench Rating (36"W x 24"H) = 5 ft<sup>2</sup>/ft.
- The minimum size home for wastewater system design shall be a 2 bedroom house.
- Length of System Based upon the following: Length of Trench = (Daily Effluent Flow)/[(Application Rate) x (Application Area)]  
 Length of Trench (ft) - lineal length of trench required for field  
 Daily Effluent Flow (gpd) - volume produced on a daily basis, 110 gpd/bedroom  
 Application Rate (gpd/ ft<sup>2</sup>.) – See Figure 1 or Table 1  
 Application Area (ft<sup>2</sup>) - area of base of trench plus area of 0.5 of height of trench

**Table 6: Sizing for Trench Fields - Chambers**

|                                               |                                            | Number of Bedrooms (gpd shown below bedrooms) - Length of Trench (feet) |          |          |          |                    |                         |          |          |          |                    |                                 |          |          |          |                    |
|-----------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------|----------|----------|----------|--------------------|-------------------------|----------|----------|----------|--------------------|---------------------------------|----------|----------|----------|--------------------|
|                                               |                                            | Quick4 Equalizer® 36/ARC 24                                             |          |          |          |                    | Quick 4 Standard/ARC 36 |          |          |          |                    | Quick 4 High Capacity/ARC 36 HC |          |          |          |                    |
| Soil Type                                     | App. Rate (gpd/ft <sup>2</sup> )           | 2<br>220                                                                | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add.<br>BR | 2<br>220                | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add.<br>BR | 2<br>220                        | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add.<br>BR |
| Sand/Loamy Sand (85-100% Sand)<br>See Table 3 | 0.60                                       | 105                                                                     | 157      | 210      | 262      | 52                 | 85                      | 128      | 171      | 213      | 43                 | 76                              | 115      | 153      | 191      | 38                 |
| Loamy Sand (<85% Sand)                        | 0.60                                       | 105                                                                     | 157      | 210      | 262      | 52                 | 85                      | 128      | 171      | 213      | 43                 | 76                              | 115      | 153      | 191      | 38                 |
| Sandy Loam                                    | 0.45                                       | 140                                                                     | 210      | 279      | 349      | 70                 | 114                     | 171      | 227      | 284      | 57                 | 102                             | 153      | 204      | 255      | 51                 |
| Loam                                          | 0.34                                       | 185                                                                     | 277      | 370      | 462      | 92                 | 150                     | 226      | 301      | 376      | 75                 | 135                             | 202      | 270      | 337      | 67                 |
| Silt Loam/Sandy Clay Loam                     | 0.28                                       | 224                                                                     | 337      | 449      | 561      | 112                | 183                     | 274      | 365      | 457      | 91                 | 164                             | 246      | 327      | 409      | 82                 |
| Silt                                          | 0.26                                       | 242                                                                     | 363      | 484      | 604      | 121                | 197                     | 295      | 394      | 492      | 98                 | 176                             | 264      | 353      | 441      | 88                 |
| Clay Loam                                     | 0.22                                       | 286                                                                     | 429      | 571      | 714      | 143                | 233                     | 349      | 465      | 581      | 116                | 208                             | 313      | 417      | 521      | 104                |
| Sandy Clay (<40% Clay)<br>Silty Clay Loam     | 0.18                                       | 349                                                                     | 524      | 698      | 873      | 175                | 284                     | 426      | 568      | 711      | 142                | 255                             | 382      | 509      | 637      | 127                |
| Clay/Silty Clay/Sandy Clay (40-60% Clay)      | 0.17                                       | 370                                                                     | 555      | 739      | 924      | 185                | 301                     | 451      | 602      | 752      | 150                | 270                             | 404      | 539      | 674      | 135                |
| Heavy Clay (>60-100% Clay)                    | Modified aboveground systems. See Table 3. |                                                                         |          |          |          |                    |                         |          |          |          |                    |                                 |          |          |          |                    |

**Notes:**

- Application Areas for chamber systems are listed below:  
Q4 EQ36 / ARC 24 Rating = 3.5 ft<sup>2</sup>/ft  
Q4 Standard / ARC 36 Rating = 4.3 ft<sup>2</sup>/ft  
Q4 High Capacity / ARC 36 HC = 4.8 ft<sup>2</sup>/ft
- The minimum size home for wastewater system design shall be a 2 bedroom house.
- Length of System Based upon the following: Length of Trench = (Daily Effluent Flow)/[(Application Rate) x (Application Area)]  
Length of Trench (ft) - lineal length of trench required for field  
Daily Effluent Flow (gpd) - volume produced on a daily basis, 110 gpd/bedroom  
Application Rate (gpd/ ft<sup>2</sup>.) – See Figure 1 or Table 1  
Application Area (ft<sup>2</sup>) - area of base of trench plus area of 0.5 of height of trench

**Table 7: Sizing for Subsurface Total Area Fields - Chambers**

|                                               |                                            | Number of Bedrooms<br>(gpd shown below bedrooms) - Area of Field (ft <sup>2</sup> ) |      |      |      |                 |
|-----------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|------|------|------|-----------------|
|                                               |                                            | Quick 4/ARC Chamber                                                                 |      |      |      |                 |
| Soil Type                                     | App. Rate<br>(gpd/ ft <sup>2</sup> )       | 2                                                                                   | 3    | 4    | 5    | Each<br>Add. BR |
|                                               |                                            | 220                                                                                 | 330  | 440  | 550  |                 |
| Sand/Loamy Sand (85-100% Sand)<br>See Table 3 | 0.6                                        | 550                                                                                 | 825  | 1100 | 1375 | 275             |
| Loamy Sand (<85% Sand)                        | 0.6                                        | 550                                                                                 | 825  | 1100 | 1375 | 275             |
| Sandy Loam                                    | 0.45                                       | 733                                                                                 | 1100 | 1467 | 1833 | 367             |
| Loam                                          | 0.34                                       | 971                                                                                 | 1456 | 1941 | 2426 | 485             |
| Silt Loam/Sandy Clay Loam                     | 0.28                                       | 1179                                                                                | 1768 | 2357 | 2946 | 589             |
| Silt                                          | 0.26                                       | 1269                                                                                | 1904 | 2538 | 3173 | 635             |
| Clay Loam                                     | 0.22                                       | 1500                                                                                | 2250 | 3000 | 3750 | 750             |
| Sandy Clay (<40% Clay)/Silty Clay<br>Loam     | 0.18                                       | 1833                                                                                | 2750 | 3667 | 4583 | 917             |
| Clay (40-60% Clay)                            | Modified systems. See Table 3.             |                                                                                     |      |      |      |                 |
| Heavy Clay (>60-100% Clay)                    | Modified aboveground systems. See Table 3. |                                                                                     |      |      |      |                 |

Notes:

- Application Areas for chamber systems are listed below:  
Q4 EQ36 / ARC 24 Rating = 3.5 ft<sup>2</sup>/ft  
Q4 Standard / ARC 36 Rating = 4.3 ft<sup>2</sup>/ft  
Q4 High Capacity / ARC 36 HC = 4.8 ft<sup>2</sup>/ft
- Area of Field =  $\frac{\text{Daily Effluent Flow} \times \text{Safety Factor}}{\text{Application Rate}}$
- Area of Field (ft<sup>2</sup>) – total required disposal field surface area  
Daily Effluent Flow (gpd) – volume produced on a daily basis, 110 gpd/bedroom  
Application Rate (gpd/ ft<sup>2</sup>) – See Figure 1 or Table 1  
Safety factor –1.5 for chamber/aggregate-free systems

**Table 8: Sizing for Subsurface Total Area Fields - Stone**

|                                                  |                                            | Number of Bedrooms (gpd shown below bedrooms)       |          |          |          |                 |
|--------------------------------------------------|--------------------------------------------|-----------------------------------------------------|----------|----------|----------|-----------------|
|                                                  |                                            | Area of Field (ft <sup>2</sup> )                    |          |          |          |                 |
|                                                  |                                            | Volume of stone required (yd <sup>3</sup> )         |          |          |          |                 |
|                                                  |                                            | Volume of ASTM C33 sand required (yd <sup>3</sup> ) |          |          |          |                 |
| Soil Type                                        | App. Rate (gpd/ft <sup>2</sup> )           | 2<br>220                                            | 3<br>330 | 4<br>440 | 5<br>550 | Each<br>Add. BR |
| Sand/Loamy Sand<br>(85-100% Sand)<br>See Table 3 | 0.6                                        | 733                                                 | 1100     | 1467     | 1833     | 367             |
|                                                  |                                            | 73                                                  | 109      | 145      | 181      | 36              |
|                                                  |                                            | 27                                                  | 41       | 54       | 68       | 14              |
| Loamy Sand<br>(<85% Sand)                        | 0.6                                        | 733                                                 | 1100     | 1467     | 1833     | 367             |
|                                                  |                                            | 73                                                  | 109      | 145      | 181      | 36              |
| Sandy Loam                                       | 0.45                                       | 978                                                 | 1467     | 1956     | 2444     | 489             |
|                                                  |                                            | 97                                                  | 145      | 193      | 242      | 48              |
| Loam                                             | 0.34                                       | 1294                                                | 1941     | 2588     | 3235     | 647             |
|                                                  |                                            | 128                                                 | 192      | 256      | 320      | 64              |
| Silt Loam/Sandy Clay<br>Loam                     | 0.28                                       | 1571                                                | 2357     | 3143     | 3929     | 786             |
|                                                  |                                            | 155                                                 | 233      | 311      | 388      | 78              |
| Silt                                             | 0.26                                       | 1692                                                | 2538     | 3385     | 4231     | 846             |
|                                                  |                                            | 167                                                 | 251      | 335      | 418      | 84              |
| Clay Loam                                        | 0.22                                       | 2000                                                | 3000     | 4000     | 5000     | 1000            |
|                                                  |                                            | 198                                                 | 297      | 396      | 494      | 99              |
| Sandy Clay (<40% Clay)/<br>Silty Clay Loam       | 0.18                                       | 2444                                                | 3667     | 4889     | 6111     | 1222            |
|                                                  |                                            | 242                                                 | 363      | 483      | 604      | 121             |
| Clay<br>(40-60% Clay)                            | Modified systems. See Table 3.             |                                                     |          |          |          |                 |
| Heavy Clay<br>(>60-100% Clay)                    | Modified aboveground systems. See Table 3. |                                                     |          |          |          |                 |

**Notes:**

1. The minimum size home for wastewater system design shall be a 2 bedroom house.
2. Area of Field Based upon the following: Area of Field = (Daily Effluent Flow) x (Safety Factor) / (Application Rate)  
 Area of Field (ft<sup>2</sup>.) - total required disposal field surface area  
 Daily Effluent Flow (gpd) - volume produced on a daily basis, 110 gpd/bedroom  
 Application Rate (gpd/ ft<sup>2</sup>.) – See Figure 1 or Table 1  
 Safety Factor - is a factor of 2.0 for graded stone and pipe systems

**Table 9: Sizing for Modified Aboveground Total Area Fields - Stone**

| Soil Type                                        | App. Rate<br>(gpd/ft <sup>2</sup> ) | Number of Bedrooms (gpd shown below bedrooms)       |      |      |      |                 |
|--------------------------------------------------|-------------------------------------|-----------------------------------------------------|------|------|------|-----------------|
|                                                  |                                     | Area of Field (ft <sup>2</sup> )                    |      |      |      |                 |
|                                                  |                                     | Volume of stone required (yd <sup>3</sup> )         |      |      |      |                 |
|                                                  |                                     | Volume of ASTM C33 sand required (yd <sup>3</sup> ) |      |      |      |                 |
|                                                  |                                     | 2                                                   | 3    | 4    | 5    | Each<br>Add. BR |
| Sand/Loamy Sand<br>(85-100% Sand)<br>See Table 3 | 0.60                                | 733                                                 | 1100 | 1467 | 1833 | 367             |
|                                                  |                                     | 73                                                  | 109  | 145  | 181  | 36              |
|                                                  |                                     | 27                                                  | 41   | 54   | 68   | 14              |
| Loamy Sand<br>(<85% Sand)                        | 0.60                                | 367                                                 | 550  | 733  | 917  | 183             |
|                                                  |                                     | 36                                                  | 54   | 73   | 91   | 18              |
|                                                  |                                     | 14                                                  | 20   | 27   | 34   | 7               |
| Sandy Loam                                       | 0.45                                | 489                                                 | 733  | 978  | 1222 | 244             |
|                                                  |                                     | 48                                                  | 73   | 97   | 121  | 24              |
|                                                  |                                     | 18                                                  | 27   | 36   | 45   | 9               |
| Loam                                             | 0.34                                | 647                                                 | 971  | 1294 | 1618 | 324             |
|                                                  |                                     | 64                                                  | 96   | 128  | 160  | 32              |
|                                                  |                                     | 24                                                  | 36   | 48   | 60   | 12              |
| Silt Loam/ Sandy Clay<br>Loam                    | 0.28                                | 786                                                 | 1179 | 1571 | 1964 | 393             |
|                                                  |                                     | 78                                                  | 117  | 155  | 194  | 39              |
|                                                  |                                     | 29                                                  | 44   | 58   | 73   | 15              |
| Silt                                             | 0.26                                | 846                                                 | 1269 | 1692 | 2115 | 423             |
|                                                  |                                     | 84                                                  | 126  | 167  | 209  | 42              |
|                                                  |                                     | 31                                                  | 47   | 63   | 78   | 16              |
| Clay Loam                                        | 0.22                                | 1000                                                | 1500 | 2000 | 2500 | 500             |
|                                                  |                                     | 99                                                  | 148  | 198  | 247  | 49              |
|                                                  |                                     | 37                                                  | 56   | 74   | 93   | 19              |
| Sandy Clay (<40% Clay)/<br>Silty Clay Loam       | 0.18                                | 1222                                                | 1833 | 2444 | 3056 | 611             |
|                                                  |                                     | 121                                                 | 181  | 242  | 302  | 60              |
|                                                  |                                     | 45                                                  | 68   | 91   | 113  | 23              |
| Clay/Silty Clay/Sandy<br>Clay (40-60% Clay)      | 0.17                                | 1294                                                | 1941 | 2588 | 3235 | 647             |
|                                                  |                                     | 128                                                 | 192  | 256  | 320  | 64              |
|                                                  |                                     | 48                                                  | 72   | 96   | 120  | 24              |
| Heavy Clay<br>(>60-69% Clay)                     | 0.13                                | 1692                                                | 2538 | 3385 | 4231 | 846             |
|                                                  |                                     | 167                                                 | 251  | 335  | 418  | 84              |
|                                                  |                                     | 63                                                  | 94   | 125  | 157  | 31              |
| Heavy Clay<br>(70-100% Clay)                     | 0.13                                | 1692                                                | 2538 | 3385 | 4231 | 846             |
|                                                  |                                     | 105                                                 | 157  | 209  | 262  | 52              |
|                                                  |                                     | 125                                                 | 188  | 251  | 313  | 63              |

**Notes:**

- The minimum size home for wastewater system design shall be a 2 bedroom house.
- Area of Field Based upon the following: Area of Field = (Daily Effluent Flow) x (Safety Factor) / (Application Rate)  
 Area of Field (ft<sup>2</sup>) - total required disposal field surface area  
 Daily Effluent Flow (gpd) - volume produced on a daily basis, 110 gpd/bedroom  
 Safety Factor - is a factor of 2.0 for graded stone for 85-100% sand/loamy sand
- Minimum Depth of Stone and ASTM C33 Sand:

| % Clay                | Min. Depth of Graded Stone                                                                      | Min. Depth of ASTM C33 Sand |
|-----------------------|-------------------------------------------------------------------------------------------------|-----------------------------|
| <60% and<br>>60 – 69% | Total depth = 32 inches (2.67 feet)<br>24" below pipes + 4" to top of pipes + 4" to cover pipes | 12 inches (1.0 feet)        |
| 70 - 100%             | Total depth = 20 inches (1.67 feet)<br>12" below pipes + 4" to top of pipes + 4" to cover pipes | 24 inches (2.0 feet)        |

## Soil Sampling Protocol for Onsite Wastewater Management Systems

Soil types can vary from region to region within the province and from one sampling point to another within a few metres of one another. **Never assume soil is uniform.**

Soil properties can change dramatically over a very short distance. There may be clay at one point and sandy soil just a few metres away. Soil properties change dramatically with depth as well; surface soil is usually very different than the material present a metre below the surface.

### Step 1. Site Assessment and Suitability

- ▶ Assess the property for a suitable septic field location.
  - Septic fields should be located on high ground in a well drained area.
  - Do not locate the septic field near trees as tree roots may eventually penetrate and damage the field.
  - Locate the field in an area that will allow adequate space for future repairs or expansion.
  -

### Step 2. Obtaining the Soil Sample

- ▶ Dig or auger a hole to a depth of 3.25 ft near the centre of the proposed septic field area.
  - A 2 inch hand auger is beneficial in helping to locate an appropriate test area.
- ▶ Record the soil colour and texture, noting the different layers.
  - Watch for evidence of saturation or standing water. These are signs that the water table is too near the surface.
  - In some instances, it may be necessary to obtain more than one soil sample to determine the soil type in the area.
  - The Environment Officer or Onsite Wastewater Inspector may request that an additional test hole be dug using a backhoe to determine depth to high groundwater level.
  -

### Step 3. Collecting the Soil Sample

- ▶ Collect approximately 1.0 pound of soil from the base of the hole at the 1.0 m depth. Place the soil in a plastic zip lock bag or in a bag that has been supplied by the laboratory.
  - Some laboratories may require more than one sample. Check with the laboratory that you are using.

### Step 4. Laboratory Analysis

- ▶ Have the laboratory conduct a particle size analysis. ASTM Standard Test Method for Particle-Size Analysis of Soils D422-63 (2002).

#### Notes

Soil samples are required for treatment mounds, modified aboveground systems and subsurface systems.

The holes you make during an investigation should not interfere with the operation of the system when it is installed. They should be strategically placed and not located where the trenches for the system will be dug. Alternatively, they may be filled with bentonite to ensure they do not become conduits for effluent flow.

**Table 10: Minimum Expected Volume of Effluent Per Day for Non-Residential Facilities****Typical Wastewater Flow Rates from Commercial Sources**

| Facility                                  | Unit                           | Expected Effluent Volume<br>(Imperial gallons per day) |
|-------------------------------------------|--------------------------------|--------------------------------------------------------|
| Boarding House                            | person                         | 33                                                     |
| Automobile Service Station                | vehicle served                 | 10                                                     |
|                                           | employee                       | 10.8                                                   |
| Bar                                       | customer                       | 2.4                                                    |
|                                           | employee                       | 10.8                                                   |
| Hotel                                     | guest                          | 41.8                                                   |
|                                           | employee                       | 8.4                                                    |
| Industrial Building (sanitary waste only) | employee                       | 10.8                                                   |
| Laundry (self-service)                    | machine                        | 462                                                    |
|                                           | wash                           | 41.8                                                   |
| Office                                    | employee                       | 10.8                                                   |
| Public lavatory                           | user                           | 4.2                                                    |
| Restaurant (w/toilet)                     | meal                           | 2.4                                                    |
|                                           | conventional - customer        | 7.5                                                    |
|                                           | short order - customer         | 5                                                      |
|                                           | bar/cocktail lounge - customer | 2.4                                                    |
| Theatre                                   | seat                           | 2.4                                                    |

Source: USEPA Onsite Wastewater Treatment Systems Manual, 2002

**Typical Wastewater Flow Rate from Institutional Sources**

| Facility          | Unit                                        | Expected Effluent Volume<br>(Imperial gallons per day) |
|-------------------|---------------------------------------------|--------------------------------------------------------|
| Assembly Hall     | seat                                        | 2.4                                                    |
| Hospital, medical | bed                                         | 138.6                                                  |
|                   | employee                                    | 8.4                                                    |
| Hospital, mental  | bed                                         | 83.6                                                   |
|                   | employee                                    | 8.4                                                    |
| Rest Home         | resident                                    | 74.8                                                   |
|                   | employee                                    | 8.4                                                    |
| School, day only  | w/cafeteria, gym, showers - per student     | 21                                                     |
|                   | w/cafeteria only - per student              | 12.5                                                   |
|                   | w/o cafeteria, gym or showers - per student | 9.2                                                    |

Source: USEPA Onsite Wastewater Treatment Systems Manual, 2002

### Typical Wastewater Flow Rates from Recreational Sources

| Facility                   | Unit                                       | Expected Effluent Volume in Imperial gallons per day |
|----------------------------|--------------------------------------------|------------------------------------------------------|
| Bowling alley              | alley                                      | 167                                                  |
| Cabin, resort              | person                                     | 33                                                   |
| Cafeteria                  | customer                                   | 1.8                                                  |
|                            | employee                                   | 8.4                                                  |
| Camps                      | pioneer type - person                      | 21                                                   |
|                            | children's, w/central toilet/bath - person | 37.4                                                 |
|                            | day, w/meals - person                      | 12.5                                                 |
|                            | day, w/o meals - person                    | 10.8                                                 |
|                            | luxury, private bath - person              | 74.8                                                 |
|                            | trailer camp - trailer                     | 103.4                                                |
| Campground - developed     | person                                     | 24.2                                                 |
| Cocktail lounge            | seat                                       | 16.7                                                 |
| Coffee shop                | customer                                   | 5                                                    |
|                            | employee                                   | 8.4                                                  |
| Country club               | guest's onsite                             | 83.6                                                 |
|                            | employee                                   | 10.8                                                 |
| Dining hall                | meal served                                | 5.7                                                  |
| Fairground                 | visitor                                    | 1.8                                                  |
| Hotel, resort              | person                                     | 41.8                                                 |
| Picnic park, flush toilets | visitor                                    | 6.6                                                  |
| Store, resort              | customer                                   | 2.4                                                  |
|                            | employee                                   | 8.4                                                  |
| Swimming pool              | customer                                   | 8.4                                                  |
|                            | employee                                   | 8.4                                                  |
| Theatre                    | seat                                       | 2.4                                                  |
| Visitor centre             | visitor                                    | 4.2                                                  |

*Source: USEPA Onsite Wastewater Treatment Systems Manual, 2002*

### Additional Typical Wastewater Flow Rates

| Facility                  | Unit                   | Expected Effluent Volume in Imperial gallons per day |
|---------------------------|------------------------|------------------------------------------------------|
| Car Wash                  | hand wash - per car    | 44                                                   |
|                           | truck wash - per truck | 88                                                   |
| Recreational vehicle park | per space              | 39.6                                                 |

