Disposal System Selection Example

Site conditions:

- Slope 9%
- Test pit data:  
  - Organic Mat - 100 mm  
  - Silty sand - 200 mm, loose, brown  
  - Sandy Silt - 790 mm, loose, brown, dry  
  - Clay - 700 mm, dense, moist  
  - Silty sand - 200 mm, loose, saturated

- this is not a permeable soil
- permeable soil
- permeable soil
- not (or slow) permeable
- permeable but saturated, not usable for disposal field installation

Water at 50 mm from test pit bottom and rising
Roots penetration approximately 500 mm

Project: 3 bedroom single family home

SELECTION:
1. Calculate total soil depth of test pit
   • 200 + 790 + 700 + 200 = 1890 mm
2. Calculate permeable soil depth
   • 200 + 790 = 990 mm  (organic mat, clay and saturated sandy silt are not included)
3. Calculate depth to groundwater
   • 200 + 790 + 700 = 1690 mm  (Saturated silty sand is assumed to represent ground water level Fully trenched C1 system can be installed as there is more than 1650mm of soil above ground water level)
4. Although permeable soil consist of two different soil types, the one with lower permeability will be used to make system selection. In this example we assume that we have 990 mm of sandy silt.

Selection Criteria: Flow - 1000 l; Soil - 990 mm of sandy silt; Slope 9%

Table 4.2 indicates a following selection choices for the lot described in this example: C1, C2, C2(r), C3. Since the cost of the system increases with the amount of imported sand fill required for its construction the most economic choice will be a C1 type sewage disposal system. It will also offer the best health protection as sewage flow is contained entirely within soil matrix.

<table>
<thead>
<tr>
<th>Permeable Soil Depth (mm)</th>
<th>Slope less than 3 %</th>
<th>Slope of 3 % or greater and less than 10 %</th>
<th>Slope over 10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to less than 300</td>
<td>Mound</td>
<td>C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>300 to less than 600</td>
<td>Mound</td>
<td>C2, C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>600 to less than 750</td>
<td>Mound</td>
<td>C2, C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>750 to over 1300</td>
<td>Mound</td>
<td>C1, C1(r), C2, C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>780 and over</td>
<td>Area Bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>875 and over</td>
<td>Multiple Trench</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2 indicates a following selection choices for the lot described in this example: C1, C2, C2(r), C3. Since the cost of the system increases with the amount of imported sand fill required for its construction the most economic choice will be a C1 type sewage disposal system. It will also offer the best health protection as sewage flow is contained entirely within soil matrix.
After the decision has been made to select C1 type disposal bed, we select length of the system from tables in Appendix J, as shown in the example below. First we use Table 4.4A to see if a standard C1 can be selected.

A standard (fully trenched C1) cannot be selected for the site conditions described in this example. Next we try to select a Raised C1 from the Table 4.5A as shown below:
Table 4.5A shows the following system parameters for the selection criteria indicated below.

(Selection Criteria: Flow - 1000 l; Soil - 990 mm of sandy silt; Slope 9%)

- **L** (total system length) = 57 meters (Note: should the width of the lot permit it is advisable to install system as long as possible)
- **C** (front cut) = 0.3 meter
- **D** (minimum required soil depth above water, bedrock etc) = 1.4 meter, since calculated depth to groundwater is 1690 mm (1.69 m) a raised C1 system can be installed on this lot.

After selecting disposal bed length (L), the width (W) of the disposal bed should be selected from Table 4.12 of the Guidelines, as shown below.

The selected width for 57 m long system is:

\[ W(\text{width}) = 0.6 \text{ m} \]

Next we have to select septic tank size from Table 3.1 of the Guidelines.

For three bedroom house assumed in this example minimum required volume of the septic tank is:

\[ V = 2800\text{l} \quad \text{(Note: should a home owner wish to install a garbage grinder capacity of the tank should be increased by 20% i.e volume would increase to \(1.2 \times 2800 = 3360\text{l}\))} \]

After all the parameters of the disposal bed have been selected, sketch of the cross section should be prepared indicating all pertinent dimensions and specifications. A standard cross sections shown in Appendix H can be used for that purpose. To complete the process, a sketch of the proposed lot lay out should be prepared and Application to install disposal system completed and signed. (See example below)

When preparing lot lay out remember to indicate location of all buildings, wells on design and adjacent properties (including type), watercourses, water resources, bedrock outcrops, driveway and other features that may influence the selection or design of the system on the lot or within 60 meters of any part of the proposed system including a sketch of proposed on-site sewage disposal system selection/design. The test pit and proposed system location must be shown in reference to two fixed points on the property and be within 6 meters plus or minus of the system location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval. If this application is for the replacement of a malfunctioning system; show the location of the existing system. (Refer to Appendix H - Submission Standards for Applications).
All applications must comply with the Act, Regulations, Guidelines and any policies within the Department. A completed copy of this form must accompany each application.

**APPLICATIONS NAME:** John T Doe  
**APPLICATION #:**

**SUBDIVISION NAME:** Nice Place Estates  
**LOT NUMBER:** 100

### SOIL EVALUATION TESTS

<table>
<thead>
<tr>
<th>TEST PIT PROFILE (M)</th>
<th>Evaluation Date: July 5, 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL DEPTH:</td>
<td>1.89 m</td>
</tr>
<tr>
<td>SOIL STRATUM</td>
<td></td>
</tr>
<tr>
<td>SOIL TYPE</td>
<td></td>
</tr>
<tr>
<td>DEPTH OF SOIL (mm)</td>
<td></td>
</tr>
<tr>
<td>DENSITY</td>
<td></td>
</tr>
<tr>
<td>MOISTURE</td>
<td></td>
</tr>
<tr>
<td>BEDROCK AT:</td>
<td>over 1.69 m</td>
</tr>
<tr>
<td>WATER TABLE:</td>
<td>1.69 m</td>
</tr>
<tr>
<td>SLOPE:</td>
<td>9 %</td>
</tr>
<tr>
<td>ROOTS TO:</td>
<td>0.5 m</td>
</tr>
<tr>
<td>MOTTLING AT:</td>
<td>No Mottling m</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>ORGANIC</td>
<td>organic mat</td>
</tr>
<tr>
<td>1st layer</td>
<td>Silty Sand</td>
</tr>
<tr>
<td>2nd layer</td>
<td>Sandy Silt</td>
</tr>
<tr>
<td>3rd layer</td>
<td>Clay</td>
</tr>
<tr>
<td>4th layer</td>
<td>Silty Sand</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>DENSITY MOISTURE</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>loose</td>
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<tr>
<td>790</td>
<td>loose</td>
</tr>
<tr>
<td>600</td>
<td>dense</td>
</tr>
<tr>
<td>800</td>
<td>loose</td>
</tr>
<tr>
<td></td>
<td>saturated</td>
</tr>
</tbody>
</table>

### SYSTEM SELECTION CRITERIA

**Daily flow**  
*litres/day:* 1000

**Permeable soil type**  
*Sandy Silt*

**Depth of permeable soil**  
*mm:* 990

**Slope**  
*%:* 9

**Soil permeability (In-situ test)**  
*m/s:* 

### SYSTEM SELECTION FROM TECHNICAL GUIDELINES

<table>
<thead>
<tr>
<th>Type of Disposal Field:</th>
<th>Imported sand fill required</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Raised</td>
<td>☐ YES ☒ NO</td>
</tr>
</tbody>
</table>

**Distribution Trench**

**Dimensions:**  
*Length:* 57 m

**Width:** 0.6 m

**Permeability Rate**  
*n/a m/sec*

**Cut at Toe of Trench:**

*Width of Buffer:*  
- downslope: n/a m
- upslope: n/a m

**Interceptor Trench**

**Liner:**  
- ☐ YES ☒ NO depth: 1800 mm
- ☐ YES ☒ NO thickness: 20 mils

**Depth of Buffer**

(at 5 m from trench)  
*n/a mm*

**Pump or Siphon Capacity**

**Watertight Testing:**  
- ☐ YES ☒ NO

**Septic Tank Capacity**

**Watertight Testing:**  
- ☐ YES ☒ NO

**Septic Tank Capacity**  
*litres:* 2800

### Actual Clearance Distances**

<table>
<thead>
<tr>
<th>From Nearest</th>
<th>To System</th>
<th>To Tanks*</th>
<th>From Nearest</th>
<th>To System</th>
<th>To Tanks*</th>
<th>From Nearest</th>
<th>To System</th>
<th>To Tanks*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Boundary</td>
<td>7 m</td>
<td>25 m</td>
<td>Cistern</td>
<td>n/a m</td>
<td>n/a m</td>
<td>Water Distribution</td>
<td>n/a m</td>
<td>n/a m</td>
</tr>
<tr>
<td>Downslope Boundary</td>
<td>10 m</td>
<td>15 m</td>
<td>Watercourse</td>
<td>54 m</td>
<td>&gt;60 m</td>
<td>Foundation Drain</td>
<td>7 m</td>
<td>8 m</td>
</tr>
<tr>
<td>Drilled Well</td>
<td>20 m</td>
<td>30.4 m</td>
<td>Wetland</td>
<td>n/a m</td>
<td>n/a m</td>
<td>Other</td>
<td>n/a m</td>
<td>n/a m</td>
</tr>
<tr>
<td>Dug Well</td>
<td>35 m</td>
<td>31 m</td>
<td>Intermittent Drain</td>
<td>16 m</td>
<td>26 m</td>
<td>Other</td>
<td>n/a m</td>
<td>n/a m</td>
</tr>
</tbody>
</table>

* The shortest distance from any of the following: septic tank, pump or siphon chamber and effluent pipe

** Enter actual distance, or N/A or > 60 meters
SUBMISSION STANDARD

All applications must comply with the Act, Regulations, Guidelines and any policies within the Department. A completed copy of this form must accompany each application. (A separate sketch or drawing may be utilized provided it includes the requested information).

SITE EVALUATION OF LOT/PROPOSED SYSTEM

Sketch of lot, showing location of soil evaluation test pits, direction of slope, watercourse and other features that may influence the selection or design of the system on the lot or within 60 meters of any part of the proposed system including a sketch of proposed On-site Sewage Disposal System Selection/Design*. The test pit location is shown in reference to two fixed points on the property and is within 6 meters of the disposal field location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval. If this application is for the replacement of a malfunctioning system; show the location of the existing system.

* Cross sectional diagrams of proposal to be attached to this form for submission.

DATE: July 21, 2007
QUALIFIED PERSON: John Qualified
CERTIFICATE OF QUALIFICATION/APENS #: 123
C2 SELECTION EXAMPLE
Disposal System Selection Example
C2 System Selection

Site conditions:
- Slope 7%
- Test pit data:
  - Organic Mat - 100 mm - this is not a permeable soil
  - Sandy Silt - 300 mm, loose, brown - permeable soil
  - Silty Sand - 200 mm, loose, brown, dry - permeable soil
  - Clay - 700 mm, dense, moist - not (or slow) permeable
  - Silty Sand - 200 mm, loose, saturated - permeable but saturated, not usable for disposal field installation

Water at 50 mm from test pit bottom and rising
Roots penetration approximately 500 mm

Project: 3 bedroom single family home (Flow = 1000L/Day)

SELECTION:
1. Calculate total soil depth
   \[300 + 200 + 700 + 200 = 1400 \text{ mm}\] (organic mat not included)
2. Calculate permeable soil depth
   \[300 + 200 = 500 \text{ mm}\] (organic mat, clay and saturated sandy silt are not included)
3. Calculate depth to groundwater
   \[300 + 200 + 700 = 1200 \text{ mm}\] (Saturated silty sand is assumed to represent ground water level.
4. Although the permeable soil consist of two different soil types (sandy silt and silty sand), the one with lower permeability (sandy silt) will be used to make system selection. In this example we will assume that we have 500 mm of sandy silt.

Selection Criteria: Flow - 1000 l; Soil - 500 mm of sandy silt; Slope 7%

Table 4.2 indicates a following selection choices for the lot described in this example: C2, C2(r), C3. Since the cost of the system increases with the amount of imported sand fill required for its construction the most economic choice will be a C2 type sewage disposal system.

### Table 4.2

**Disposal System Selection Options**

<table>
<thead>
<tr>
<th>Permeable Soil Depth (mm)</th>
<th>Slope less than 3%</th>
<th>Slope of 3% or greater and less than 30%</th>
<th>Slope over 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to less than 300</td>
<td>Mound</td>
<td>C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>300 to less than 600</td>
<td>Mound</td>
<td>C2, C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>600 to less than 750</td>
<td>Mound</td>
<td>C2, C2(r), C3</td>
<td></td>
</tr>
<tr>
<td>750 to over 1300</td>
<td>Mound</td>
<td>C1, C1(r), C2, C2, C2(r), C3</td>
<td>Not Acceptable For Selection Design Only By A Level 1 Qualified Person</td>
</tr>
<tr>
<td>780 and over</td>
<td>Area Bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>875 and over</td>
<td>Multiple Trench</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not all options provided are suitable for each property being assessed. Separation distances to water table and bedrock etc must be taken into consideration.*
After the decision has been made to select a C2 type disposal field; first check if a standard C2 disposal field can be utilized (Table 4.6A). For this soil type, depth and slope, there is no selection available for a standard C2. Since a standard C2 cannot be utilized, the next step is to check table 4.7A for selection of a raised C2. Select length of the system from table 4.7A as shown in the example below.

### Table 4.7A (Imported Sand Fill, 3x10⁻³ m/s to 5x10⁻⁴ m/s) Raised C2 System Selection - Single Tank

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Depth of Permeable Soil (mm)</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium to coarse sand and fine sandy gravel (0.3 m/s)</td>
<td>150 to 299</td>
<td>N/S</td>
<td>L=49 D=1.0</td>
<td>L=49 D=1.0</td>
<td>L=35 D=1.0</td>
<td>L=35 D=1.0</td>
<td>L=33 D=1.1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>200 to 699</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>600 -</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7A shows following system parameters for the selection criteria indicated below.

**Selection Criteria: Flow - 1000 l; Soil - 500 mm of sandy silt; Slope 7%**

L (total system length) = 38 meters (Note: should the width of the lot permit it is advisable to install system as long as possible)

D (minimum required soil depth above water, bedrock etc) = 1.0 meter, since calculated depth to groundwater is 1200mm (1.2 m) a C2 system can be installed on this lot.

If the calculated depth to groundwater, bedrock or unacceptably high permeable soil (step 3 above) is not equal to or greater than the D required in table 4.7A (1.0 m in this example); a C2 cannot be used and a C3 will have to be selected.

After selecting disposal field length (L), the width of the disposal trench should be selected from table 4.12 of the Guidelines (see page E-3 for an example of the use of table 4.12).

The selected width for 38 m long system is:

\[ W_{\text{width}} = 0.8 \text{ m} \]
Next we have to select septic tank size from table 3.1 of the Guidelines. For three bedroom house assumed in this example minimum required volume of the septic tank is:

\[ V = 2800 \text{l} \]

(Note: should a home owner wish to install a garbage grinder capacity of the tank should be increased by 20\% i.e volume would increase to \( 1.2 \times 2800 = 3360 \text{l} \).)

After all the parameters of the disposal field have been selected, a sketch of the cross section should be prepared indicating all pertinent dimensions and specifications. The standard cross sections shown in Appendix H can be used for that purpose. To complete the process a sketch of the proposed lot lay out should be prepared and the Application to install the on-site sewage disposal system completed and signed. (See example of completed forms in the C1 selection example)

When preparing the lot lay out remember to indicate location of all buildings, wells on this lot and all adjacent properties (including type of well), watercourses, water resources, bedrock outcrops, driveway and other features that may influence the selection or design of the system on the lot or within 60 meters of any part of the proposed system including a sketch of proposed on-site sewage disposal system selection/design. The test pit and proposed system location must be shown in reference to two fixed points on the property and be within 6 meters plus or minus of the system location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval. If this application is for the replacement of a malfunctioning system; show the location of the existing system. (Refer to Appendix H - Submission Standards for Applications).
MOUND SELECTION EXAMPLE
Disposal System Selection Example
Mound Disposal Field

Site conditions:

Test pit observations:
- 0 to 25 mm- Organic mat (dark brown forest litter)
- 25 to 750 mm- Sandy silt (reddish brown with root penetration to 350mm but no mottles)
- below 750 mm- Silty clay (reddish and very compact soil, mottles give evidence that a seasonal water table could be present at the 750 mm level, no roots)
No evidence of water table or bedrock at the bottom of test pit, 1.5 m depth, but there has been no rain for three weeks and soil conditions are extremely dry.

Site inspection field notes included the following:
- Lot dimensions - 50 m x 100 m (existing lot created in 1954)
- Slope down slope of proposed system 2 %
- Long slope up hill of proposed system - interceptor will be required
- Driveway will be a concern. Line will have to cross under driveway between tank and disposal field. Also driveway cannot be located in area proposed by owner but must be kept within three metres of easterly lot line.
- The only suitable location for the dug well is on upper side of house at least 30.5 metres from system
- There is a consistent contour in area of proposed system where a system up to 40 m could be installed and still meet all separation distances.

Proposed development:
- Four bedroom house, two bathrooms with high flow fixtures but no hot tub or garbageator.

Selection Procedure:

1) Check selection options available from Table 4.2 (See C1 and C2 selection examples for use of Table 4.2)
   Options include: Mound for 2 % and 725 mm sandy silt

2) Check requirements of Section 4.8 to see if a Mound will be suitable
   - Flow 1500 l/day
   - Slope is less than 3%
   - Use table 4.9 to select the system length and the specification for the imported sand fill. Use table 4.12 to select the system width. For a flow of 1500 l/day select a 38 m mound from table 4.9 with an imported sand fill specification of $3 \times 10^{-5}$ to $5 \times 10^{-4}$ m/s and a width of 1.2 m from table 4.12.
   - Depth to water table is 750 mm below grade, once the organic layer is removed below the mound, the water table will be 725 mm below the bottom of the sand. The minimum amount of sand allowed under the bottom of the disposal trench is 600 mm. Therefore the separation from the bottom of the trench to high water table will be $600 + 725 = 1325$ mm. This is greater than the 1 m minimum requirement therefore use 600 mm imported sand fill under the trench.
   - Select other dimensions from figure 4.G for a 38 m Mound having 600 mm imported
sand fill under the tench. An Interceptor is also required up slope from the Mound.

This Mound will fit on the lot and meet all the requirements of the regulations and guidelines. If for any reason the selector feels that a longer Mound would be more appropriate, the length should be increased.

When preparing the lot lay out remember to indicate location of all buildings, wells on this lot and all adjacent properties (including type of well), watercourses, water resources, bedrock outcrops, driveway and other features that may influence the selection or design of the system on the lot or within 60 meters of any part of the proposed system including a sketch of proposed on-site sewage disposal system selection/design. The test pit and proposed system location must be shown in reference to two fixed points on the property and be within 6 meters plus or minus of the system location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval. If this application is for the replacement of a malfunctioning system; show the location of the existing system. (Refer to Appendix H - Submission Standards for Applications).

Note: If it were not possible to select a mound for this site, no system could be selected. The only way that approval to install a system could be obtained in that case would then be if a QP1 could design a system to fit on the lot. One situation in the above example where it would not have been possible to select a system would have occurred if the available length on the lot for the mound was less than 38 m.
C3 SELECTION EXAMPLE
Disposal System Selection Example
C3 Disposal Field

Site conditions:

Test pit observations:
- 0 to 50 mm- Organic mat (dark brown to back)
- 50 to 190 mm- Sandy silt (reddish brown with root penetration but no mottles)
- below 190 mm- Silty clay (reddish and very compact but no mottles and no roots)
- water table in the test pit at a depth of 600 mm

Site inspection field notes included the following:
- Lot dimensions - 100 m x 300 m
- Slope down slope of proposed system 16%
- Small brook approximately 85m down slope of proposed system-not a concern
- Long slope up hill of proposed system - interceptor will be required
- Keep driveway toward west boundary to avoid system
- Locate dug well on upper side of house at least 30.5 metres from system
- There is a consistent contour in area of proposed system where a contour system up to 100 m could be installed and still meet all separation distances.

Proposed development:
- Three bedroom house, two bathrooms but no hot tub or garborator.

Selection Procedure:

1) Check selection options available from Table 4.2 (See C1 and C2 selection examples for use of Table 4.2)
   Options include: C3, or C2(r) for 16% and 140 mm sandy silt

2) Check Table 4.7a to see if a C2(r) is suitable for 140 mm of sandy silt at 16% C2(r) is suitable, however the 1 meter separation to watertable cannot be achieved.

3) Check requirements of section 4.7 to see if a C3 will be suitable
   - Flow 1000l/day
   - Slope is greater than 3% (16% in this example)
   - Use table 4.12 to select the system width. For a flow of 1000 l/day select a 25 m C3 from table 4.9 with an imported sand fill specification of \(3 \times 10^{-5}\) to \(5 \times 10^{-4}\) m/s and a width of 1.2 m from table 4.12.
   - Separation to ground water, bedrock, or soil with unacceptable high permeability is a concern as watertable was observed at the 600 mm depth. The minimum amount of sand allowed under the bottom of the disposal trench is 600 mm.; therefore the separation from the bottom of the trench to high water table will be 600 + 600 = 1200 mm. This is greater than the 1 m minimum requirement; therefore use 600 mm imported sand fill under the trench.
   - Select other dimensions from figures 4.E and 4.F to go with the 25 m C3 having 600 mm imported sand fill under the rock trench

This C3, with interceptor, will fit on the lot and meet all requirements of the Guidelines. If for any reason the selector feels that a longer C3 would be more appropriate the length should be increased.
When preparing the lot lay out remember to indicate location of all buildings, wells on this lot and all adjacent properties (including type of well), watercourses, water resources, bedrock outcrops, driveway and other features that may influence the selection or design of the system on the lot or **within 60 meters of any part of the proposed system** including a sketch of proposed on-site sewage disposal system selection/design. **The test pit and proposed system location must be shown in reference to two fixed points on the property and be within 6 meters plus or minus of the system location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval.** If this application is for the replacement of a malfunctioning system; show the location of the existing system. (Refer to Appendix H - Submission Standards for Applications).
AREA BED AND MULTIPLE TRENCH SELECTION EXAMPLE
Disposal System Selection Example
Area Bed or Multiple Trench System

Site conditions:

Test pit observations:
- 0 to 60 mm- Organic mat (dark brown forest litter)
- 60 to 700 mm- silty sand (reddish brown and loose with root penetration to 600 mm appears well drained, a few cobbles up to 100 mm in diameter)
- 700 mm to 1500 mm- sandy silt (reddish, moderate compaction no evidence of soil mottles or water table, some rounded cobbles up to 150 mm in diameter)
No evidence of water table or bedrock to bottom of test pit, 1.5 m depth but there has been no rain for three weeks and soil conditions are extremely dry.

Site inspection field notes included the following:
- Lot dimensions - 40 m x 75 m (existing lot created in 1975)
- Slope down slope of proposed system 2.5%
- Long slope up hill of proposed system - interceptor swale will be required.
- Lot slopes away from house to rear of the lot so driveway will not be a concern however there is an existing drilled well 10 m beyond the downslope boundary System should be kept as far away as possible, at least 25 m up slope from the lot boundary.
- The most suitable location for the drilled well on this lot is on the upslope side of the house at least 15.2 m from the system
- Although there is little slope on the lot (2.5 %) the contour runs almost perpendicular to the 75 m lot line which leaves a distance of 40 m available along the contour for a system not counting separation distances.

Proposed development:
- Three bedroom house, two bathrooms, no hot tub or garborator, no plumbing in the basement.

Selection Procedure:

Check selection options available from Table 4.2 (See C1 and C2 selection examples for use of Table 4.2)
- Options include: Area Bed, Multiple Trench, or Mound for 1.5 m permeable soil and less than 3% slope. In this example, the selector decided to see if either a multiple trench or area bed could be used and then determine which system would be most appropriate for the lot.

NOTE: If an area bed or multiple trench system can be selected, one of these systems would be the preference to a mound system as either of these systems should be less expensive and should blend into the landscape better than a mound. In most cases the conditions that allow the selection of an area bed or multiple trench system are the same and it is up to the selector to decide which system is more appropriate. The only case where an area bed can be selected and a trench system cannot be selected is when there is between 780 and 875 mm of permeable soil on the lot. In situations where a multiple trench field can be selected an area bed can always also be selected.
Follow the selection procedure outlined in section 4.9.2 for the area bed
1) Average daily flow for 3 bedroom home 1000 l/day
2) Ground slope less than 3%
3) Total depth of permeable soil = 640 mm silty sand + 850 mm sandy silt = 1490 mm. Use the least permeable soil type i.e.. sandy silt.
4) As per Table 4.11(A), this depth of permeable soil and no restrictive layers will allow a fully trenched area bed system.
5) For sandy silt and 1000 l/day; **Table 4.11(B)** requires an area bed with an area of 125 m² and a minimum cross slope dimension of 25 m. Site inspection notes show that up to 40 m along the slope is available, not counting separation distances. If we allow 5 m to each lot boundary (3 m is the minimum) this leaves 30 m for the bed. Therefore make the bed 30 m x 5 m.

Follow the selection procedure outlined in section 4.9.3 for the multiple trench field.
1) Average daily flow for 3 bedroom home 1000 l/day
2) Ground slope less than 3%
3) Total depth of permeable soil = 640 mm silty sand + 850 mm sandy silt = 1490 mm. Use the least permeable soil type i.e.. sandy silt.
3) As per Table 4.10(A), this depth of permeable soil and no restrictive layers will allow a fully trenched system.
4) For sandy silt and 1000 l/day; **Table 4.10(B)** requires a total of 112 m of trench with a minimum cross slope of 28 m and four trenches. Site inspection notes show that up to 40 m along the slope is available, not counting separation distances. If we allow 5 m to each lot boundary (3 m is the minimum) this leaves 30 m for the field. Therefore, extend the trench length to 30 m but still use four trenches, giving a total trench length of 120 m. The minimum trench width is 600 mm.

The selector would then decide if the use of an area bed 30 m x 5 m or a multiple trench field consisting of 4 trenches 30 m long and 0.6 m wide would be the most suitable solution for the lot. Pipe location and other details would be obtained from Section 4.9 plus the system diagrams.

When preparing the lot lay out remember to indicate location of all buildings, wells on this lot and all adjacent properties (including type of well), watercourses, water resources, bedrock outcrops, driveway and other features that may influence the selection or design of the system on the lot or within 60 meters of any part of the proposed system including a sketch of proposed on-site sewage disposal system selection/design. **The test pit and proposed system location must be shown in reference to two fixed points on the property and be within 6 meters plus or minus of the system location. The placement of the system must at all times meet the minimum clearance distances in the regulations unless a variance is specified in the terms and conditions of the Approval.** If this application is for the replacement of a malfunctioning system; show the location of the existing system. (Refer to Appendix H - Submission Standards for Applications).

This area bed or multiple trench field will fit on the lot and meet all the requirements of the regulations and guidelines. If it were not possible to select an area bed or multiple trench field for this site it may be possible to select a mound. If a mound could not be selected, the only way that approval to install a system could then be obtained would be if a QP1 could design a system to fit on the lot.