Appendix H: Ways to Estimate SSO Volume

Permit staff may suggest the following methods for estimating the volume of SSOs to permit holders.

1. Puddle Volume Method

The volume of a puddle caused by an SSO can be estimated using the following equation:

\[
\text{Volume in gallons} = \pi \times \left(\frac{\text{diameter}}{2}\right) \times \left(\frac{\text{diameter}}{2}\right) \times \text{average depth} \times 7.48
\]

Where:
- \(\pi = 3.14\)
- Diameter = diameter of the puddle in feet
- Depth = average depth of the puddle in feet
- 7.48 = conversion factor from cubic feet to gallons

2. Houses Served Method

The volume of an SSO from a sewer main serving a residential area can be estimated from the number of houses served by the main as follows:

SSO volume in gallons = number of houses served \times 240 gallons/household per day \times \text{duration of SSO event}

3. Pump Rating Method

The volume of an SSO from a pump station can be estimated as follows:

SSO volume in gallons = \text{GPM rating of pump that is out of service} \times \text{no. of hours of outage} \times 60 \text{ minutes/hour}

4. Bucket Fill Time Method

Measure or estimate how long it takes the SSO to fill a 5 gallon bucket, and use the following 2 equations (or table and 2nd equation) to estimate the volume of the SSO.

SSO flow rate, GPM = \(5 \times \frac{60 \text{ seconds/minute}}{(\text{seconds to fill a 5 gallon bucket})}\)

<table>
<thead>
<tr>
<th>Time to Fill 5 gal. Bucket</th>
<th>GPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

SSO volume, gallons = GPM \times \text{no. of hours of flow} \times 60 \text{ minutes/hour}

5. Visual Estimating Method

See Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes developed by the City of San Diego Metropolitan Wastewater Department. This is available online at: http://lgvsd.org/docs/SSMP%20Appendix%20A.pdf. See page 27.