Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.

22 Appendix 22.0 Drawings
TIME DOSED SEPTIC TANK WITH SCREEN VAULT FILTER

SECTION 3.0

FINAL GRADE AWAY FROM RISER LIDS AT 6 INCHES PER 8 FEET.

SEALED WATERTIGHT PVC CONDUIT USED ACROSS AND INTO RISERS. CONDUIT ENTRANCE INTO RISER MUST BE WATERTIGHT. SECTION 8.4

RISERS EITHER MONOLITHICALLY POURED AS PART OF THE TANK OR RISER ADAPTERS ARE CAST IN THE LID OF THE TANK AND PVC RISERS USED. SECTION 3.11

RESERVE CAPACITY (RC) = 80%** DAILY DESIGN FLOW (DDF)

SURGE CAPACITY (SC) = 80%** DDF

** SURGE AND RESERVE VOLUMES MAY BE REDUCED BASED ON CRITERIA FOUND IN SECTION 3.4.4.

WATERTIGHT TWO COMPARTMENT SHARED LIQUID LEVEL SEPTIC TANK
SECTION 3.4.1

MINIMUM OPERATING CAPACITY (MOC) = 2.5 x DDF

ALL TANK INLETS AND OUTLETS SEALS ARE WATERTIGHT AND MUST BE BOOT STYLE CONNECTORS OR COMPRESSION SEALS WITH MATERIALS MEETING OR EXCEEDING ASTM C-923. TANKS WILL BE WATER TESTED FOR WATERTIGHTNESS, SECTION 3.7

ALL TANKS MUST BE BEDDED ON, AND BACKFILLED WITH GRAVEL MEETING HEALTH DISTRICT APPROVED MANUFACTURERS SPECIFICATIONS.

Profile View
Not to Scale
Septic Tank And Dosing Tank Configuration

ALL TANK INLETS AND OUTLETS SEALS ARE WATERTIGHT AND MUST BE BOOT STYLE CONNECTORS OR COMPRESSION SEALS WITH MATERIALS MEETING OR EXCEEDING ASTM C-923. TANKS WILL BE WATER TESTED FOR WATERTIGHTNESS, SECTION 3.7

ALL TANKS MUST BE BEDDED ON, AND BACKFILLED WITH GRAVEL MEETING HEALTH DISTRICT APPROVED MANUFACTURERS SPECIFICATIONS.
1. The required aggregate backfill varies with the width of the excavated trench. See Section 7.2 and 7.6 for requirements. For aggregate specifications, See Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.

2. **Gravity Discharge Segment**

   - 4" pipe used dependent on the following:
     - **Slope > 1/16" per ft.**  
       - Corrugated or smooth interior solid walled pipe meeting ASTM F-405 and bedded in gravel; or,  
       - Solid SDR 35 or SCH 40 properly backfilled.
     - **Slope < 1/16" per ft.**  
       - Solid SDR 35 or SCH 40 properly backfilled.
     - **Areas with < 12" cover.**  
       - SCH 40 PVC used regardless of slope.
     - **Last 10' of Discharge Segment.**  
       - SCH 40 PVC with animal guard.

3. A minimum of 3' separation to any pressure main, and 8' from any lateral or leaching trench must be maintained to a gradient drain. A minimum of 3' separation to any pressure main, and 5' from any lateral or leaching trench must be maintained to an interceptor drain.

4. If a pressure main must cross a drain collector segment as part of an approved plan, then the drain is hard piped across the pressure main to 5' on either side, and is backfilled with tamped dirt.

(See Section 7.6 for Interceptor Drain Collector Portion Specifications)  
(See Section 7.2 for Gradient Drain Collector Portion Specifications)
Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail.

STS contractors shall follow the approved STS design.

<table>
<thead>
<tr>
<th>#</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gradient Drain Pump Vault - 18&quot; Min. Road Drain Tile Or One Piece Manufactured Concrete Or Sealed Seam Unit.</td>
</tr>
<tr>
<td>2</td>
<td>Child Proof Cover - Heavy Concrete Lid Or 3/16&quot; Hex/#3S Bolt Down Fiberglass / Plastic Lid.</td>
</tr>
<tr>
<td>3</td>
<td>Drainage Pump - Sized To Meet Inflow Volumes And Ability To Overcome Head Requirements.</td>
</tr>
<tr>
<td>4</td>
<td>6&quot;(min.) Concrete Block</td>
</tr>
<tr>
<td>5</td>
<td>Glued Union Or Quick Disconnect</td>
</tr>
<tr>
<td>6</td>
<td>Min.1&quot; - 1-1/2&quot; SCH 40 PVC With Pressure Rated Fittings.</td>
</tr>
<tr>
<td>7</td>
<td>All Pipe Penetrations Are Sealed From Gravel And Dirt With Product Meant For This Intended Application.</td>
</tr>
<tr>
<td>8</td>
<td>Check Valve - Where Required By Pump Manufacturer or Installation Situation.</td>
</tr>
<tr>
<td>10</td>
<td>Final Grade - Sloped Away From Sump Basin</td>
</tr>
<tr>
<td>11</td>
<td>Lifting Rope - Nylon Marine Grade</td>
</tr>
</tbody>
</table>

Notes:
1. The 'ON' Switch For The Pump Is To Be Min. Of 6" Below the Invert Of The Inlet Pipe.
2. Multiple Drain Tiles Are To Be Connected Together Outside Of The Sump. Only One Penetration Should Be Made Into The Basin.
3. If A Bottomless Sump Basin Is Used, Gravel Must Be Used To Line The Bottom Of The Vault.
4. Electrical Wiring And Connections To Be Made Per Local and National Electric Codes.

### Profile View

Not to Scale

<table>
<thead>
<tr>
<th>Sump Diameter</th>
<th>Distance H</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Inch</td>
<td>10&quot; - 11&quot;</td>
</tr>
<tr>
<td>21 Inch</td>
<td>13&quot; - 14&quot;</td>
</tr>
<tr>
<td>20 Inch</td>
<td>15&quot; - 16&quot;</td>
</tr>
<tr>
<td>18 Inch</td>
<td>18&quot; - 19&quot;</td>
</tr>
</tbody>
</table>

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Drainage Enhancements
Disinfection Devices Must Be Tied Into The HSTS Control Panel. If Maintenance Is Needed The Controls Must Shut Down The Primary System Pump And Sound An Alarm. See Section 9.4. All Components Must Be Installed To Health District Approved Manufacturers Specifications. Additionally System Components and Piping Must Be Properly Bedded.
TYPICAL CHLORINATOR, CHLORINE CONTACT CHAMBER AND DECHLORINATOR

Section 9.4.2 - 9.4.2.2

Contact Chamber May Be Replaced With One Made By The Installer Or Other Manufacturer. See Section 9.4.2.1 For Requirements.

Disinfection Devices Must Be Tied Into The HSTS Control Panel. If Maintenance Is Needed The Controls Must Shut Down The Primary System Pump And Sound An Alarm. See Section 9.4

Chlorine Tablets To Be Calcium Hypochlorite And Formulated For Residential Flow Rates. Dechlorination Tablets To Be Sodium Sulfite.

All Components Must Be Installed To Manufacturers Specifications. Additionally System Components and Piping Must Be Properly Bedded.

Profile View

Commercially Manufactured Chlorinator
Section 9.4.2

Commercially Manufactured De-Chlorinator
Section 9.4.2.2

Final Grade Away From Components. Plan To Install Components Flush With Finished Grade.

Chlorine Contact Chambers Shown As Made By American Manufacturing Co. Or Equal. See Note Below. Section 9.4.2.1

All Pipe Penetrations To Be Watertight.

All Piping To Be 4" SCH 40 PVC ASTM 1785 or 2665. Piping From Treatment Unit, Between Components And To Discharge Point To Have 1/8" Per Foot Slope. Section 5.4

Notes:

Sample Well Located Downslope Where Required. Section 9.5

Discharge Line Animal Guard And 6" Freeboard Under Discharge Pipe Required. Section 5.4.4

Disinfection Components

ANIMAL GUARD DETAIL

4" SCH 40 PVC With 1/4" Nuts And Bolts (Corrosion Resistant)
Typical Sample Well

Section 9.5

Profile View
Not to Scale

Installed With Lid Flush With Finished Grade

Final Grade Sloped Away From Sample Well.

Lid Made of Heavy Concrete, or Plastic Fiberglass That Can Be Bolted Down. (Bolts Must Be Stainless Steel and be 3/16" Hex or Square #3)

Rigid Watertight Basin With A Sealed Bottom. Having the Ability To Withstand Backfill Without Deflection

4" SCH 40 PVC (1/8" Per Foot. Slope) Section 5.4.0

Flow From Treatment System (Usually Disinfection Device) Section 9.4

Rigid Watertight Basin With A Sealed Bottom. Having the Ability To Withstand Backfill Without Deflection

Typical Watertight Seals

Discharge Line Animal Guard And 6" Freeboard Under Discharge Pipe Required. Section 5.4.4

Gravel Base And Pipe Bedding (Usually Disinfection Device)

Section 9.4

HAMILTON COUNTY GENERAL HEALTH DISTRICT Division of Water Quality

Monitoring Devices

SAMPLE WELL

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contactors shall follow the approved STS design.
Observation Ports

Section 9.7

Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contactors shall follow the approved STS design.

**Elevation View**

(No Scale)

**Bottom View**

(No Scale)

- **Height Will Vary**
  - Based upon depth of surface to be observed

- **4 in Slot Height**

- **3 in or 4 in Ø Schedule 40 PVC Toilet Flange with Bottom Knocked Out**

- **Filter Fabric Wrap; Wrap Must Extend Above the Slot; Use "Zip Ties" or Duct Tape to Fasten to Observation Port Riser**

- **3 in or 4 in Ø Schedule 40 PVC Test Cap (No Threaded Caps)**

- **Knock Plug of Toilet Flange Removed**

- **Typical Slot, 4 Required, 90 Degrees Apart**

- **3 in or 4 in Schedule 40 PVC**

- **1/8 to 1/4 in wide (Typ)**

- **4 Slots Required, See Bottom View (Below) for Orientation**

- **Ø = Pipe Diameter**
Gradient drain centerline. Min. slope of invert = 1/2% (or 1/16 in per foot).

Inside edge of Gradient Drain

Outside edge of Gradient Drain

Observation Port Location
(Sand/gravel interface)

Observation Port Location (Sand/plowed surface interface)

Observation Port Location
(Sand/gravel interface)

Observation Port Location (Sand/plowed surface interface)

Limit of Sand

Limit of Basal Area

Basal Area (Plowed Area) Length = "L"

Absorption Bed Length = "B"

A

Limit of Cover "TL" & "TW"

A

Feature drain discharge, location may vary.

For Pressure Distribution Layout, See Approved Pressure Distribution Drawings

See Section 7.2 for width of trench requirements.

Examples of sub-main, freeze protected (Drainback)

For Pressure Distribution Layout, See Approved Pressure Distribution Drawings

NOTE: Lateral Layout Shown Could be up to 176 Feet. See Site Specific Approved Pressure Distribution Drawings For Further Information.

Flat Site Mound & Modified Mound Structure - Cross Section A-A (For Section A-A, See Drawing Flat Site Mound & Modified Mound Structure - Cross Section A-A)

Limit of Sand

Limit of Basal Area

Filter Gravel, See Section 4.0

3/4 in Ø Sweeping 90° Pressure Rated Ell, with 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø 1/4 turn, slip x threaded, ball valve

Lateral Cleanup Setup (No Scale)

Filter Gravel, See Section 4.0

3/4 in Ø 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

Lateral Cleanup Setup (No Scale)

3/4 in Ø Distribution Lateral. See Note 4.

Lateral Cleanup Setup (No Scale)

3/4 in Ø 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø Distribution Lateral. See Note 4.
Notes:

1) The required aggregate backfill varies with the width of the excavated trench, See Section 7.2 for requirements. For aggregate specifications, See Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.

2) The specified aggregate(s) in this component are summarized in Table 4.1. See Sections 4.5, 4.6 or 4.7 for individual aggregate type specifications.

3) The sub-mains and force main must be sloped to allow drainback to the point where two (2) feet of cover over the mains is maintained. The minimum slope of the force main and sub-mains for drainback is 1% (1/8 inch per foot). The mains must not penetrate the basal area.

4) The thickness of gravel above the lateral depends upon the orientation of the orifices. If the orifices are required to be at the 6 O’Clock position (Down), the laterals are to be installed flat. The gravel thickness is to be such that the distribution lateral is covered, but no more than 1 inch below the surface of the gravel. If the orifices are required to be at the 12 O’Clock position (Up), the laterals are to be installed at a minimum slope of 0.83% (1 in per 10 ft) sloping back (draining back) to the manifold. The thickness of gravel over the top of the lateral will vary, but the minimum thickness below the manifold (lowest point) is 3 inches.

5) Sand type complies with Section 4 (Table 4.2). Sand thickness is dependent on Approved Plan. Minimum sand thickness is based on the highest elevations found under the gravel area. Top of sand area is to be level.
Sloping Site Mound & Modified Mound Structure - General Plan

Notes:
1) Observation ports to be located per Section 10.11.
2) See Approved Plan for dimensions of various mound components.
3) Buffer area to be protected. Compaction, excavation, or plowing in this area is NOT permitted.
4) Orifice spacing and orientation varies. See Approved Pressure Distribution Drawings for further information.
5) Interceptor Drain and Gradient Drain Do Not share a common discharge line without a sample well on each.
6) Drains do not share a trench with pressure mains. Isolation distance is 3' minimum. If they must cross as part of an approved plan, then the drain is hard piped to 5' on either side of the pressure main and backfilled with tamped dirt. Interceptor drain maintains 5' from any distribution lateral. Curtain Drain maintains 8' from any distribution lateral. Both drain types maintain at least 12" from any basal area sand fill.
7) Sub-main(s) are to be sloped at a minimum of 1% (1/8 in per ft) to promote drainage back towards the force main after dosage completion.
8) Sand type complies with Section 4 (Table 4.2). Sand thickness is dependent on Approved Plan. Minimum sand thickness is based on the highest elevations found under the gravel area. Top of sand area is to be level.

Inside edge of Gradient Drain
Min. slope of invert = 1/2% (or 1/16 in per foot).

Outside edge of Gradient Drain
Gradient drain centerline.

Access port w/ lid, flush with grade

Cover Soil

Filter Gravel, See Section 4.0

3/4 in Ø Sweeping 90° Pressure Rated Ell, with 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø 1/4 turn, slip x threaded, ball valve

Lateral Cleanout Setup

(No Scale)

Sloping Site Mound & Modified Mound Structure - Cross Section A-A

Examples of Sub­ mains And Force Main, freeze protected. See Note 6

For Pressure Distribution Layout, See Approved Pressure Distribution Drawings

See Section 7.2 for width of trench requirements.

Interceptor drain discharge, location may vary. See Note 5

Limit of Cover "TW" & "TL"

Access port w/ lid, flush with grade

Cover Soil

Filter Gravel, See Section 4.0

3/4 in Ø Sweeping 90° Pressure Rated Ell, with 1/4 turn, slip x threaded, ball valve

3/4 in Ø Distribution Lateral. See Note 4.

3/4 in Ø 1/4 turn, slip x threaded, ball valve

Lateral Cleanout Setup

(No Scale)
Notes:

1) The required aggregate backfill varies with the width of the excavated trench. See Section 7.2 & 7.6 for requirements. For aggregate specifications, See Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.

2) The specified aggregate(s) in this component are summarized in Table 4.1. See Sections 4.5, 4.6 or 4.7 for individual aggregate type specifications.

3) The sub-mains and force main must be sloped to allow drainback to the point where two (2) feet of cover over the mains is maintained. The minimum slope of the force main and sub-mains for drainback is 1% (1/8 inch per foot). The mains must not penetrate the basal area.

4) The thickness of gravel above the lateral depends upon the orientation of the orifices. If the orifices are required to be at the 6 O’Clock position (Down), the laterals are to be installed flat. The gravel thickness is to be such that the distribution lateral is covered, but no more than 1 inch below the surface of the gravel. If the orifices are required to be at the 12 O’Clock position (Up), the laterals are to be installed at a minimum slope of 0.83% (1 in 10 ft) sloping back (draining back) to the manifold. The thickness of gravel over the top of the lateral will vary, but the minimum thickness below the manifold (lowest point) is 3 inches.

5) Sand type complies with Section 4 (Table 4.2). Sand thickness is dependent on Approved Plan. Minimum sand thickness is based on the highest elevations found under the gravel area. Top of sand area is to be level.
**Notes:**

1) This dimension may vary, but can be no less than 24 in. (Same as orifice center to center spacing)

2) The sub-main and force main must be sloped to allow drainage of pipe sections with less than 2 feet of cover. The minimum slope for drainback is 1% (1/8 in per ft).

3) Laterals may overlap or abut in these location. Ball valves on both laterals may be within a common access port. Conditions of Note 1) apply.

4) Refer to the approved plan set to determine exact lateral layout. Information given here is for reference only.

5) Lateral is 3/4" SCH 40 PVC and laid level within gravel with lateral clean outs slightly elevated and well supported.

6) Orifices are 1/8" and drilled on a press with a "Dreamer" bit. Buried or improperly sized orifices will result in disapproval.

7) Orifice orientation is in the 6 o'clock position.

8) Sub-mains must be installed at the same elevation as other sub-mains within the system. Additionally, equal amount of drainback should result. See Section 5.0, Piping.

---

**HAMILTON COUNTY GENERAL HEALTH DISTRICT**

Division of Water Quality

**Mound & Modified Structure Pressure Distribution Network Detail (Two Foot Orifice Spacings)**

**Drawn By:** CMG  
**Date:** 1/31/05  
**Revision #:** 3.0

Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, it conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.
Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code (OAC) 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.

Notes:
1) This dimension may vary, but can be no less than 36 in. (Same as orifice center to center spacing)
2) The sub-main and force main must be sloped to allow drainage of pipe sections with less than 2 feet of cover. The minimum slope for drainback is 1% (1/8 in per ft).
3) Laterals may overlap or abut in these location. Ball valves on both laterals may be within a common access port. Conditions of Note 1 apply.
4) Refer to the approved plan set to determine exact lateral layout. Information given here is for reference only.
5) Laterals are 3/4" SCH 40 PVC and sloped a minimum of 1 in 10 ft (0.83%) back to the manifold. Laterals and clean outs are firmly bedded in compacted aggregate.
6) Orifices are 1/8" and drilled on a press with a "Dreamer" bit. Burred or improperly sized orifices will result in disapproval.
7) Orifice orientation is in the 12 o'clock position (up).
8) Sub-mains must be installed at the same elevation as other sub-mains within the system. Additionally, equal amount of drainback should result. See Section 5.0, Piping.

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Mound & Modified Structure Pressure Distribution Network Detail (Three Foot Orifice Spacings)

Drawn By: CMG
Date: 1/31/05
Revision #: 3.0
Gradient drain centerline.
Min. slope of invert = 1/2% (or 1/16 in per foot).

Observation Port Location (Sand/gravel interface)
Observation Port Location (Sand/plowed surface interface)
Absorption Bed Length - "B"

Example of Sub-mains, freeze protected (Drainback)

For Pressure Distribution Layout, See Approved Pressure Distribution Drawings for Further Information.

Limit of Basal Area
Basal Area (Plowed Area) Length - "L"

Lids of access well must not exert pressure on valve after settlement.

Filter Gravel (See Section 4.0)
3/4 in Ø Sweeping 90° Pressure Rated Ell, slip x threaded, ball valve
3/4 in Ø 1/4 turn, slip x threaded, ball valve
3/4 in Ø Distribution Lateral, See Note 4.
Filter Gravel (See Section 4.0)
3/4 in Ø Distribution Lateral

The cleanout must be raised slightly to ensure drainage

Access port w/ lid, flush with grade

3/4 in Ø Distribution Lateral

Limit of Cover - "TL" & "TW"
Limit of Sand
"X" All Sides 1.0 ft Min.
"C" 6" min.
"SW"
"A" (typ)
"A"
"W"
"K" See Section 7.2 for width of trench requirements.

45° Ell

See Section 4.0

Notes:
1) Observation ports to be located per Section 10.11.
2) See Approved Plan for dimensions of various mound components.
3) Buffer area to be protected. Compaction, excavation, or plowing in this area is NOT permitted.
4) Orifices are set at the 6 O’Clock position (down). See the Approved Plan for the pressure distribution layout detail.
5) Interceptor Drain and Gradient Drain Do Not share a common discharge line without a sample well on each.
6) Drains do not share a trench with pressure mains. Isolation distance is 3' minimum. If they must cross as part of an approved plan, then the drain is hard piped to 5' on either side of the pressure main and backfilled with tamped dirt. Interceptor drain maintains 5' from any distribution lateral. Curtain Drain maintains 6' from any distribution lateral. Both drain types maintain at least 12" from any basal area sand fill.

NOTE: Lateral Layout Shown Could be for up to 128 Feet. See Site Specific Approved Pressure Distribution Drawings for Further Information.

3/4 in Ø Distribution Lateral

For Section A-A, See Drawing Flat Site Modified At-Grade Structure - Cross Section A-A)

FSM 12-05 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.
Notes:

1) The required aggregate backfill varies with the width of the excavated trench, See Section 7.2 for requirements. For aggregate specifications, See Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.

2) The specified aggregate(s) in this component are summarized in Table 4.1. See Sections 4.5, 4.6 or 4.7 for individual aggregate type specifications.

3) The Sub-main and force main must be sloped to allow drainback to the point where two (2) feet of cover over the mains is maintained. The minimum slope for this drainback is 1% (1/8 in per ft). The mains must not penetrate the basal area.
Gradient drain centerline.

Min. slope of invert = 1/2% (or 1/16 in per foot).

Inside edge of Interceptor Drain

Outside edge of Interceptor Drain

Limit of Cover - "TL" & "TW"

Sloping Site Modified At-Grade Structure - General Plan

Example of Sub-mains And Force Main, freeze protected, See Note 6

See Section 7.6 for width of trench requirements.

Interceptor drain discharge, location may vary, See Note 5

Notes:
1) Observation ports to be located per Section 10.11.
2) See Approved Plan for dimensions of various mound components.
3) Buffer area to be protected. Compaction, excavation, or plowing in this area is NOT permitted.
4) Orifices are set at the 6 O'Clock position (down). See the Approved Plan for the pressure distribution layout detail.
5) Interceptor Drain and Gradient Drain Do Not share a common discharge line without a sample well on each.
6) Drains do not share a trench with pressure mains. Isolation distance is 3' minimum. If they must cross as part of an approved plan, then the drain is hard piped to 5' on either side of the pressure main and backfilled with tamped dirt. Interceptor drain maintains 5' from any distribution lateral. Curtain Drain maintains 8' from any distribution lateral. Both drain types maintain at least 12" from any basal area sand fill.

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Sloping Site Modified At-Grade Structure General Detail.

Drawn By: CMG  Date: 1/31/05  Revision #: 3.0
Notes:

1) The required aggregate backfill varies with the width of the excavated trench. See Section 7.2 & 7.6 for requirements. For aggregate specifications, see Section(s) 4.5, 4.6 or 4.7. If aggregate specified in Section 4.7 is used, then the requirements of Section 4.9 apply. This section requires special marking to allow for confirmation of pipe invert slope.

2) The specified aggregate(s) in this component are summarized in Table 4.1. See Sections 4.5, 4.6 or 4.7 for individual aggregate type specifications.

3) The Sub-main and force main must be sloped to allow drainback to the point where two (2) feet of cover over the mains is maintained. The minimum slope for this drainback is 1% (1/8 in per ft). The mains must not penetrate the basal area.

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Sloping Site Modified At-Grade Structure Cross Section A-A

(No Scale)
Typical Lateral Set Layout

(No Scale)

Note: Only (1) Pressure Distribution Lateral Set is shown for clarity.

Pressure Distribution Layout - Option A

See Adjacent Lateral Set Detail, this sheet

Pressure Distribution Layout - Option B

Lateral Layout Options

(No Scale)

Notes:

1) This dimension may vary, but can be no less than 24 in. (Same as orifice center to center spacing)

2) Laterals may overlap or abut in these location. Ball valves on both laterals may be within a common access port. Conditions of Note 1 apply.

3) The sub-main and force main must be sloped to allow drainage of pipe sections with less than 2 feet of cover. The minimum slope for drainage is 1% (1/8 in per ft).

4) Refer to the approved plan set to determine exact lateral layout. Information given here is for reference only.

5) Orifices are 1/8" and drilled on a press with a "Dreamer" bit. Burred or improperly sized orifices will result in disapproval.

6) Sub-mains must be installed at the same elevation as other sub-mains within the system. Additional, equal amount of drainage should result. See Section 5.0, Piping.
**Traditional Gravel Leaching Trench Installation With Drop Boxes**

- See All Requirements in Section 11.0.
- Layout lines to contour with paint or flags.
- Shallowly excavate headline trench. Do Not Overdig.
- Set drop boxes with lids at contour elevations; connect with headline segments; firmly backfill headline trench by hand after inspection.
- Excavate trenches 18" deep following contour. Trench bottom level.
- Install 18" long 4" Solid SCH 40 header / lateral connectors with end squarely cut.
- Inside the drop box, leave enough space between the ends of the pipes to insert 4" plugs (plugs may be needed later to rest selected leach lines).
- Install flow control devices on outlet pipes inside drop boxes with holes dialed down.
- Place gravel fill to 6" thickness.
- Connect 4" three hole distribution lateral pipe and fix in place roughly level.
- Place gravel fill to final 12" total thickness or to the invert of the outlet to the next trench, whichever is greater.
- Cover gravel with 2" straw layer or geotextile fabric.
- Call for inspection.
- Backfill to natural grade after approved inspection; crown fill to allow for settlement over trenches.

Gravel Must Be Placed Either 12" Thick Or To The Invert Of The Outlet To The Next Trench. Whichever Is Greater.
1. See all requirements in Section 11.0
2. Layout lines to contour with paint or flags.
3. Excavate trenches 12" deep and 24" wide, along the downslope edge of trench, following contour. Trench bottoms must be level.
4. Place 2" of approved gravel fill.
5. Place approved leaching pipe roughly level on top of gravel.
6. Place additional gravel fill to a total of 8" thick. Top of gravel must be level throughout trench.
7. Cover gravel with 2" of straw or geotextile fabric.
8. Carefully excavate headline trench, drop box holes, and header trench. DO NOT OVERDIG.
9. Install 36" long 4" Solid SCH 40 header pipe and properly connect it with the leaching pipe.
10. Set drop boxes on virgin ground, with the overflow outlet invert 6" below the lowest contour elevation on that leaching trench (LT); connect drop boxes with header pipe segments. If lid of drop box will not be above original and final grade, add 6" drop box extensions.
11. Connect drop boxes by installing headline pipes supported on virgin ground.
12. Install flow control devices on drop box outlet overflow pipes, with holes drilled to hold effluent 4" below the lowest contour elevation for that leaching trench (LT).
13. Call for inspection.
14. Backfill to 2" above natural grade after approved inspection; crown fill to allow for settlement over trenches.
15. Solidly backfill around drop boxes, headline and header pipes by hand. Final grade around drop boxes must be away from lids.

Note: Drop Box Location Will Vary With Slope Of The Site. In Some Cases Drop Box Extensions May Be Needed

Note: Leach Line Header Pipe Does Not Have To Contain Fittings Shown. Optional Installation Technique Shown

Note: Soil Backfill

24"
1. See All Requirements in Section 11.0
2. Layout lines to contour with paint or flags.
3. Excavate trenches 12" deep, along the downslope edge of trench, following contour. Trench bottoms must be level.
4. Place N12 "half-pipe" in trench with tops level.
5. Screw N12 pipe segments together at couplers and at end caps.
6. Cover couplers and end caps with geotextile fabric.
7. Carefully excavate headline trench, drop box holes, and header trench. **DO NOT OVERDIG.**
8. Install 36" long 4" Solid SCH 40 header pipe into N12 pipe cap with properly drilled hole.

9. Set drop boxes on virgin ground, with the outlet invert 6" below the lowest contour elevation for that leach line; connect with header segments. If lid of drop box will not be above original and final grade, add 6" drop box extensions.
10. Connect drop boxes by installing headline pipes supported on virgin ground.
11. Install flow control devices on overflow outlet pipes, with holes dialed to hold effluent in leaching trench 4" below lowest contour elevation for that leaching trench.
12. Call for inspection.
13. Backfill to 2" above natural grade after approved inspection; crown fill to allow for settlement over trenches.
14. Solidly backfill around drop boxes, headline and header pipes by hand. Final grade around drop boxes must be flush with and graded away from lids.
1. Filter area to be 240 sq. ft. per bedroom.
2. Distribution box to be set level with all entries sealed and to grade.
3. Lines from D-box into SF to be level with ≤ 2" of fall from distribution box to far end of filter.
4. Collection line to slope ≥1/8" per ft. Bottom of filter bed to be graded to drain to collection line.
5. Collection line to be 4" PVC pipe with 1/2" holes. This is to run the length of the sand filter one foot before the pipe leaves the filter area a 4" PVC coupler and solid 4" SCH 40 PVC is required from this point on to the discharge.
6. 4" SCH 40 PVC cleanout within 6ft. of end of sand filter and extent 10" above grade and fitted with female threaded adapter and plug.
7. Gravel and sand to be as specified in Section 4.0 of this manual.
8. Disinfection device and sample well per Section 9.0, both must be accessible to grade, and installed no closer that 10ft. from discharge point.
9. Discharge line must have 6" of freeboard under pipe.
10. Animal guard to be installed at discharge.

**ANIMAL GUARD DETAIL**

**SECTION VIEW A-A**

**SECTION VIEW B-B**

**PLAN VIEW**

**NOTES:**

1. Filter area to be 240 sq. ft. per bedroom.
2. Distribution box to be set level with all entries sealed and to grade.
3. Lines from D-box into SF to be level with ≤ 2" of fall from distribution box to far end of filter.
4. Collection line to slope ≥1/8" per ft. Bottom of filter bed to be graded to drain to collection line.
5. Collection line to be 4" PVC pipe with 1/2" holes. This is to run the length of the sand filter one foot before this pipe leaves the filter area a 4" PVC coupler and solid 4" SCH 40 PVC is required from this point on to the discharge.
6. 4" SCH 40 PVC cleanout within 6ft. of end of sand filter and extent 10" above grade and fitted with female threaded adapter and plug.
7. Gravel and sand to be as specified in Section 4.0 of this manual.
8. Disinfection device and sample well per Section 9.0, both must be accessible to grade, and installed no closer that 10ft. from discharge point.
9. Discharge line must have 6" of freeboard under pipe.
10. Animal guard to be installed at discharge.

**SECTION VIEW B-B**

**SECTION VIEW A-A**

**PLAN VIEW**

**NOTES:**

1. Filter area to be 240 sq. ft. per bedroom.
2. Distribution box to be set level with all entries sealed and to grade.
3. Lines from D-box into SF to be level with ≤ 2" of fall from distribution box to far end of filter.
4. Collection line to slope ≥1/8" per ft. Bottom of filter bed to be graded to drain to collection line.
5. Collection line to be 4" PVC pipe with 1/2" holes. This is to run the length of the sand filter one foot before this pipe leaves the filter area a 4" PVC coupler and solid 4" SCH 40 PVC is required from this point on to the discharge.
6. 4" SCH 40 PVC cleanout within 6ft. of end of sand filter and extent 10" above grade and fitted with female threaded adapter and plug.
7. Gravel and sand to be as specified in Section 4.0 of this manual.
8. Disinfection device and sample well per Section 9.0, both must be accessible to grade, and installed no closer that 10ft. from discharge point.
9. Discharge line must have 6" of freeboard under pipe.
10. Animal guard to be installed at discharge.

**SECTION VIEW B-B**

**SECTION VIEW A-A**

**PLAN VIEW**

**NOTES:**

1. Filter area to be 240 sq. ft. per bedroom.
2. Distribution box to be set level with all entries sealed and to grade.
3. Lines from D-box into SF to be level with ≤ 2" of fall from distribution box to far end of filter.
4. Collection line to slope ≥1/8" per ft. Bottom of filter bed to be graded to drain to collection line.
5. Collection line to be 4" PVC pipe with 1/2" holes. This is to run the length of the sand filter one foot before this pipe leaves the filter area a 4" PVC coupler and solid 4" SCH 40 PVC is required from this point on to the discharge.
6. 4" SCH 40 PVC cleanout within 6ft. of end of sand filter and extent 10" above grade and fitted with female threaded adapter and plug.
7. Gravel and sand to be as specified in Section 4.0 of this manual.
8. Disinfection device and sample well per Section 9.0, both must be accessible to grade, and installed no closer that 10ft. from discharge point.
9. Discharge line must have 6" of freeboard under pipe.
10. Animal guard to be installed at discharge.
Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail.

STS contactors shall follow the approved STS design.

**Intermittent Sand Filter (Shown With Pumped Discharge)**

![Intermittent Sand Filter Diagram](image)

**Plan View**

Not to Scale

- **“B”**
  - 2 Bedroom - 36 ft.
  - 3 Bedroom - 36 ft.
  - 4 Bedroom - 48 ft.
  - 5 Bedroom - 60 ft.

**Profile View**

(End Detail)

Not to Scale

- Support Frame, Section 13.7
- Pump Basin, Sections 3.1 & 3.1.4
- Typical Watertight Boot, Section 13.9.9
- 30 Mil PVC Liner, Section 13.7.1
- Vent Switching To SCH 40 PVC, Section 13.9.5
- 2" Sand Leveling Layer (Below Liner), Section 13.9.1
- **B** Sand (backfill between the plywood and the excavated walls), Section 13.9.1

**Profile View**

(Side Detail)

Not to Scale

- 4" SCH 40 PVC Lateral
- 4" SCH 40 PVC With Orifice Shields, (Refer To Lateral Layout Detail Sheet)
- Observation Port, Section 13.9.7
- Underdrain Vents Above Grade (4" SCH 40 PVC With Slitted Cap), Section 13.9.3
- Air Coil (Drip Tubing Brought To Surface With 1/2" SCH 40 PVC), Section 13.9.6
- Typical Valve Box, Sections 3.8 & 3.10
- On Float Must Be Lower Than Inlet, Sections 8.0 & 3.10
- Typical Pump, Sections 3.8 & 5.13
- Discharge Assembly, Sections 5.8 & 5.9

**Note:** If using a Lined Filter with a gravity discharge to a secondary treatment system (ex. LL's, wetlands), then the filter must have a liner drain installed outside the filter box which outlets away from the secondary treatment system.
Lateral Distribution Network For 1-3 Bedroom Intermittent Sand Filter

Manifold Line Cleanout Detail

- 1.25" SCH 40 PVC Manifold
- Orifice Shield
- Female Threaded Adapter
- Slip Reducer
- Threaded Plug

Orifice Shield Detail

- Orifice Size - 1/8"
- Total Orifices - 72
- Commercially Manufactured For The Use Intended Or Fabricated By The Installer Following Health District Specs.

Section 5.8.1 - 5.8.3

Typical Valve Box

- 3/4" Slip x Tread Ball Valve
- PVC Sweep Ell
- Cleanouts Elevated 1/2" Above Lateral To Drain Effluent Back To Orifices After Depressurization

Lateral Cleanout Detail

- Section 5.8.6
- Pressure Distribution Networks

Plan View

- Note: Measurements To First Orifice Are From The Centerline Of The Manifold
- Note: All orifices to be Drilled On A Press With A Sharp Bit A Reamer Should Be Used To Bring Orifice To Final Hole Size. Burred Or Improperly Sized Orifices Will Result In Rejection and Red Tag.
- These Lines Are For Drawing Purposes Only. Orifices Continue To Be Spaced Evenly Until The Lateral Cleanout Is Reached
- Slope Manifold Slightly Back To Supply Line For Freeze Protection After Depressurization.

Manifold Cleanout:

- Female Threaded Adapter and Plug Equal in Size to the Manifold.

Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail.

STS contactors shall follow the approved STS design.

Note: All orifices to be Drilled On A Press With A Sharp Bit A Reamer Should Be Used To Bring Orifice To Final Hole Size. Burred Or Improperly Sized Orifices Will Result In Rejection and Red Tag.

These Lines Are For Drawing Purposes Only. Orifices Continue To Be Spaced Evenly Until The Lateral Cleanout Is Reached

Slope Manifold Slightly Back To Supply Line For Freeze Protection After Depressurization.

Manifold Cleanout:

- Female Threaded Adapter and Plug Equal in Size to the Manifold.
Lateral Distribution Line Cleanout Detail

Manifold Cleanout Detail
1.25" SCH 40 PVC Manifold
3/4" SCH 40 PVC Lateral, Section 13.9.8
Female Threaded Adapter
Slip Reducer
Threaded Plug

Orifice Shield Detail
Orifice Size - 1/8" Total Orifices - 96
Commercially Manufactured For The Use Intended Or Fabricated By The Installer Following Health District Specs. Section 5.10.0

Lateral Cleanout Detail
Section 5.8.6
3/4" Slip x Tread Ball Valve
Typical Valve Box
PVC Sweep Ell

These Lines Are For Drawing Purposes Only. Orifices Continue To Be Spaced Evenly Until The Lateral Cleanout Is Reached

Note: All orifices to Be Drilled On A Press With A Sharp Bit A Reamer Should Be Used To Bring Orifice To Final Hole Size. Burred Or Improperly Sized Orifices Will Result In Rejection and Red Tag.

Note: Measurements To First Orifice Are From The Centerline Of The Manifold

Plan View
Not to Scale

Slope Manifold Slightly Back To Supply Line For Freeze Protection After Depressurization.

CLEANOUTS
CLEANOUTS
CLEANOUTS
CLEANOUTS

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality
Pressure Distribution Networks
Above Grade Intermittent Sand Filter General Plan

**Plan View**

- **TL**
- **L**
- **TW**
- **W**
- **A**
- **B**

**Profile View**

- **UW**
- **W**
- **A**
- **V**
- **DW**

**Profile View**

- **E**
- **SL**
- **K**
- **I**
- **J**
- **UW**
- **J**
- **I**

**Profile View**

- **E**
- **K**
- **SL**
- **I**
- **J**
- **UW**
- **J**
- **I**

**Note:**

Interceptor Drain Installed At Upslope Toe of Cover, Section 7.6
Lateral Distribution Network For A 1-3 Bedroom Above Grade Sand Filter

Supply Line Cleanout Detail
- 1.25" SCH 40 PVC Manifold
- Slip Reducer
- Female Threaded Adapter
- Orifice Shield

Orifice Shield Detail
- Orifice Size - 1/8"
- Total Orifices - 72
- Commercially Manufactured For The Use Intended Or Fabricated By The Installer Following Health District Specs. Section 5.10.0

Lateral Cleanout Detail
- 3/4" Slip x Tread Ball Valve
- PVC Sweep Ell
- 3/4" SCH 40 PVC Lateral

Note: Measurements To First Orifice Are From The Centerline Of The Manifold

Site Slope
- These Lines Are For Drawing Purposes Only. Orifices Continue To Be Spaced Evenly Until The Lateral Cleanout Is Reached

Plan View
Not to Scale
Note: All orifices to be drilled on a press with a sharp bit. A reamer should be used to bring orifice to final hole size. Burned or improperly sized orifices will result in rejection and red tag.

These lines are for drawing purposes only. Orifices continue to be spaced evenly until the lateral cleanout is reached.

Manifold Cleanout: Female threaded adapter and plug equal in size to the manifold.

Note: Measurements to first orifice are from the centerline of the manifold.

Commercially manufactured for the use intended or fabricated by the installer following health district specs. Section 5.10.0

Cleanouts elevated 1/2" above lateral to drain effluent back to orifices after depressurization. Section 5.8.6

Pressure Distribution Networks

HAMILTON COUNTY GENERAL HEALTH DISTRICT
Division of Water Quality

Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.
Update effective January 1, 2015 - This manual may be used as a reference by a STS designer when specifying standards for construction, installation notes and certain aggregate materials for STS components. STS designers are not be required to use this manual. When used, if conflicts exist between this manual and Ohio Administrative Code 3701-29, the state code shall prevail. STS contractors shall follow the approved STS design.

Generic Pressurized Leach Bed

**Section 18.0**

1. See all requirements of Section 18.0.
2. Layout the length of the filter bed as parallel as possible to the site contour +/- 8".
3. The highest point of the ground surface around the perimeter of the filter is used to set the excavation depth.
4. Pit excavated so that the bottom is level and roughened.
5. Pit walls must be vertical before material is added.
6. Health District inspection of "open pit" is required before material placement.