

On-Site Sewage Facility Program  
 Plan Design Checklist

The following check sheets include the basic items Williamson County is looking for in a design. This list is a guideline. Since each design is site specific, Williamson County may ask for additional items that are not on this list.

**Criteria for Standard Absorptive Drainfield - Conventional, Evapotranspiration (ET), Graveless Pipe, Leaching Chamber:**

Also refer to TAC 285.32; TAC 285.33(b)(1) & (2) for conventional and ET; TAC 285.33(c)(1) & (2) for graveless pipe and leaching chambers. For graveless pipe and leaching chamber systems the manufacture's requirements must also be followed. Details of manufacturer requirements can be found in their product specific literature.

<input type="checkbox"/> Sign, date and seal the design <input type="checkbox"/> State the size of the house (square feet) and the number of bedrooms <input type="checkbox"/> State the wastewater flow <input type="checkbox"/> State the effluent application rate (gal/sq ft/day) <input type="checkbox"/> Provide a calculation for minimum drainfield sizing <input type="checkbox"/> State total square footage of treatment area provided – show calculations <input type="checkbox"/> State linear feet of lateral lines (Not required for bed configuration) <input type="checkbox"/> Provide scale drawing with scale noted <input type="checkbox"/> Provide site plan that shows north indicator, property lines, adjacent streets, property dimensions, location of buildings, easements, pools, pool equipment, water lines, septic system, and any other important features <input type="checkbox"/> Show slope % and direction or one foot contour lines in area of system (The drain field needs to be installed along contour – Per TAC 285.31) <input type="checkbox"/> Show drainage ways, cut and fill, breaks in grade and slopes where seeps may occur with setbacks <input type="checkbox"/> Show two-way cleanout between house and tank <input type="checkbox"/> Show cleanout after the tank (Williamson County OSSF order) <input type="checkbox"/> Show monitor port in drainfield (Williamson County OSSF order) <input type="checkbox"/> State and/or show setbacks on the site plan <input type="checkbox"/> Specify diversion valve, if applicable <input type="checkbox"/> Show water line with 10' setback shown <input type="checkbox"/> Show the locations of the profile holes <input type="checkbox"/> Show wells within 100' of property lines and their easements <input type="checkbox"/> Specify size and strength rating of the pipe that needs to be installed between house and tank <input type="checkbox"/> Specify minimum required slope/fall from house to tank (1/8" fall per linear foot)	<input type="checkbox"/> Specify size and strength rating of the pipe that needs to be installed between tank and drain field <input type="checkbox"/> Specify that a minimum of 12" of fall is required from the bottom of tank outlet to the bottom drainfield. <input type="checkbox"/> Provide labeled cross section diagram of tanks <input type="checkbox"/> State tank specifications/volumes <input type="checkbox"/> Show inlet and outlet Ts on the tank cross-section (Include that the outlet T should extend downward 0.25 D and .50 D, as shown on Figures 6 and 7 of Title 30 T.A.C. 285) <input type="checkbox"/> Specify filter at your discretion. If used must be an approved model listed with TCEQ – See TCEQ website for list of approved products. <input type="checkbox"/> Provide tank installation and backfill notes <input type="checkbox"/> Provide a cross section diagram of the drainfield <input type="checkbox"/> State the minimum and maximum bed/trench depths <input type="checkbox"/> State the minimum and maximum trench widths or the bed dimensions <input type="checkbox"/> State levelness requirement for trenches/bed (excavation) (Trenches/bed be level within +/- 1" every 25' and 3 inches total, whichever is less) <input type="checkbox"/> Show the pipe configuration in drain field including pipe or trench separation (Max 4' O.C. and Min 2' from sidewalls and for bed configurations) <input type="checkbox"/> Specify size and strength rating of the perforated pipe that needs to be installed in the drainfield <input type="checkbox"/> Provide size specifications for the gravel or other media, and indicate the depth of the gravel or other media under and around pipe (For ET systems the gravel may only surround the pipe allowing backfill to contact the bottom of the excavation) <input type="checkbox"/> Show geotextile fabric meeting the criteria in subsection TAC 285.33(b)(1)(E) of this section shall be placed over the media. <input type="checkbox"/> Provide class of backfill and height of backfill over the field (For ET systems only class II is allowed for backfill) <input type="checkbox"/> Provide landscape/vegetation plan <input type="checkbox"/> Provide manufacturer make and model specifications for
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	leaching chambers or graveless pipe <input type="checkbox"/> Show or specify endcaps at ends of leaching chambers (Trench length may need to be increased to accommodate endcaps. However, no additional absorptive credit is applied).
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**Criteria for Pump Tank (additional to Standard Absorptive Drainfield):**

Also refer to TAC 285.33 – ‘Other Requirements’ for TCEQ guidelines

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| <ul style="list-style-type: none"><li><input type="checkbox"/> State pump tank specifications/volumes</li><li><input type="checkbox"/> Provide labeled cross section diagram of pump tank; include float settings in inches and volumes; note the volume of reserve above the alarm (Williamson County OSSF Order requires a full day of capacity above alarm-on float.)</li><li><input type="checkbox"/> Note the reserve volume above the alarm-on float (Williamson County OSSF Order requires a full day of capacity above alarm-on float.)</li><li><input type="checkbox"/> Specify pressure valve, if necessary</li></ul> | <ul style="list-style-type: none"><li><input type="checkbox"/> Provide calculations for dosing volumes</li><li><input type="checkbox"/> Indicate the supply/manifold diameters and lateral diameters</li><li><input type="checkbox"/> Provide friction loss calculation for supply pipe</li><li><input type="checkbox"/> Specify the pump (size and model) and provide pump operating curve</li><li><input type="checkbox"/> Specify a high water alarm with visual and audible warning</li><li><input type="checkbox"/> Specify that the alarm is to be wired on a separate circuit from the pump</li><li><input type="checkbox"/> Indicate if a check valve or siphon hole is needed</li></ul> |
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**Prevention of Unauthorized Access to On-Site Sewage Facilities**  
**Refer to 285.38 for TCEQ guidelines.**

<p><input type="checkbox"/> All tanks must have inspection or cleanout ports located on the tank top over all inlet and outlet devices. Each inspection or cleanout port must be offset to allow for pumping of the tank. The ports may be configured in any manner as long as the smallest dimension of the opening is at least 12 inches, and is large enough to provide for maintenance and equipment removal.</p> <p><input type="checkbox"/> With the exception of septic tanks, all inspection and cleanout ports shall have risers over the port openings which extend to the ground surface.</p> <p><input type="checkbox"/> A secondary plug, cap, or other suitable restraint system shall be provided below the riser cap to prevent tank entry if the cap is unknowingly damaged or removed.</p> <p><input type="checkbox"/> All septic tanks buried more than 12 inches below the ground shall have risers over the port openings. The risers shall extend from the tank surface to no more than six inches below the ground.</p> <p><input type="checkbox"/> A secondary plug, cap, or other suitable restraint system shall be provided below the riser cap to prevent tank entry if the cap is unknowingly damaged or removed.</p> <p><input type="checkbox"/> The risers shall have inside diameters which are equal to or larger than the inspection or cleanout ports.</p> <p><input type="checkbox"/> Risers must be permanently fastened to the tank lid or cast into the tank. The connection between the riser and the tank lid must be watertight.</p>	<p><input type="checkbox"/> Risers must be fitted with removable watertight caps and protected against unauthorized intrusions. Acceptable protective measures include:</p> <ul style="list-style-type: none"> <li>A. a padlock;</li> <li>B. a cover that can be removed with tools;</li> <li>C. a cover having a minimum net weight of 29.5 kilograms (65 pounds) set into a recess of the tank lid; or</li> <li>D. any other means approved by the executive director.</li> </ul> <p><input type="checkbox"/> Risers and riser caps exposed to sunlight must have ultraviolet light protection.</p> <p><input type="checkbox"/> Installation of a riser to any component of a new OSSF is considered construction under this chapter and must be performed by a licensed installer.</p> <p><b>WILLIAMSON COUNTY SPECIFIC ITEM:</b></p> <p><input type="checkbox"/> Williamson County is requiring risers over both ports (inlet side and outlet side) of the pump tank regardless of where the pump is in the tank.</p>
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**Criteria for Low Pressure Dosed Systems (additional to Standard Absorptive Drainfield):**

Refer to TAC 285.33(d)(1). Pressure dosing systems shall be installed according to either design criteria in the North Carolina State University Sea Grant College Publication UNC-S82-03 (1982) or other publications containing criteria or data on pressure dosed systems which are acceptable to the permitting authority. Additionally, the sizing parameters (calculations) in TAC 285.33(d)(1) are required for all low pressure dosed drainfields and shall be used in place of the sizing parameters in the North Carolina State University Sea Grant College Publication or other acceptable publications. A link to Title 30 T.A.C. 285 and to the North Carolina State University Sea Grant College Publication UNC-S82-03 (1982) can be found on our website.

- ☐ State pump tank specifications/volumes
- ☐ Provide labeled cross section diagram of pump tank; include float settings in inches and volumes; note the volume of reserve above the alarm (Williamson County OSSF Order requires a full day of capacity above alarm-on float.)
- ☐ Specify pressure valve
- ☐ Provide a lateral hole chart which includes:
  - Equalize lateral and system flow (gal/min)
  - Hole size and hole spacing
  - Static pressure head (ft)
  - Lengths of laterals
  - Number of holes in each lateral
- ☐ Each dosing pipe shall be placed with the drain holes facing down and placed on top of at least six inches of media (pea gravel or media up to two inches measured along the greatest dimension).
- ☐ Geotextile fabric meeting the criteria in subsection TAC 285.33(b)(1)(E) of this section shall be placed over the media.
- ☐ There shall be a minimum of one foot of soil (with less than 30% gravel) between the bottom of the excavation and solid or fractured rock. There shall be a minimum of two feet of soil (with less than 30% gravel) between the bottom of the excavation and groundwater.

- ☐ Provide calculations for dosing volumes
- ☐ Indicate the supply/manifold size and strength and lateral line size and strength
- ☐ Provide friction loss calculation for supply pipe
- ☐ Specify the pump (size and model) and provide pump operating curve
- ☐ Specify a high water alarm with visual and audible warning
- ☐ Specify that the alarm is to be wired on a separate circuit from the pump
- ☐ Indicate if a check valve or siphon hole is needed
- ☐ The excavation shall be backfilled with Class Ib, II, or III soil.

**Criteria for Mound Systems (additional to low pressure dosed):**

Refer to TAC 285.33(d)(3). A mound drainfield is an absorptive drainfield constructed above the native soil. The mound consists of a distribution area installed within fill material placed on the native surface. The required area of the fill material is a function of the texture of the native soil surface, the depth of the native soil, basal area sizing considerations, and sideslope requirements. A description of mound construction, as well as construction requirements not addressed in this section - TAC 285.33(d)(3) – can be found in the North Carolina State University Sea Grant College Publication UNC-S82-03 (1982)

A link to Title 30 T.A.C. 285 and to the North Carolina State University Sea Grant College Publication UNC-S82-03 (1982) can be found on our website.

- ☐ Specify and provide dimensions for the distribution and basal areas, on blow up aerial view or site plan
- ☐ Calculate basal on total mound height not height of pad
- ☐ A mound drainfield shall only be installed at a site where there is at least one foot of native soil; however, approval for installation on sites with less than one foot of native soil may be granted by the permitting authority on a case-by-case basis.
- ☐ Mounds shall only be installed on sites with less than 10% slope.
- ☐ Mounds and mound distribution systems must be constructed with the longest dimension parallel to the contour of the site.
- ☐ Soil classification, loading rates (R(a)), and wastewater usage rates (Q) shall all be obtained from this chapter.
- ☐ The depth of soil material (with less than 30% gravel) between the bottom of the media and a restrictive horizon must be at least 1.5 feet to the restrictive horizon or two feet to groundwater. The soil material includes both the fill and the native soil.
- ☐ The distribution area is defined as the interface area between the media containing the distribution piping and the fill material or the native soil, if applicable. The distribution length is the dimension parallel with the contour and equivalent to the length of the distribution media which must also run parallel with the contour. The distribution lines within the distribution media must extend to 12 inches of the end of the distribution media. The distribution width is defined as the distribution area divided by the distribution length.
- ☐ See TAC 285.33(d)(3)(E)(i) & (ii) for sizing formulas
- ☐ For sites with greater than 2% slopes and solid bedrock, saturated zones, or class IV horizons within two feet of the native soil surface, the length to width ratio of the distribution area must be at least 7:1.

- ☐ For sites with greater than 2% slopes and no solid bedrock, saturated zones, or class IV horizons within two feet of the native soil surface, the length to width ratio of the distribution area must be at least 4:1.
- ☐ Specify that the basal area must be scarified/tilled
- ☐ Specify soil class of the fill to be used
- ☐ No length to width ratio is required on a site with 2% slope or less.
- ☐ On sites with 2% slopes or less, the area credited toward the minimum required basal area sizing includes all areas below the distribution system as well as the side slope area on all side slope areas greater than six inches deep.
- ☐ Effluent must be pressure dosed into the distribution piping.
- ☐ The dosing holes must not be greater than three feet apart.
- ☐ If a continuous layer of media is used, the dosing lines must not be spaced more than three feet apart. If rows of media are used, the rows may be as close as three feet apart, measured edge to edge.
- ☐ The basal area is calculated according to TAC §285.33(d)(3)(F)(i) & (ii)
- ☐ Provide calculation for basal from the top of the finished mound.
- ☐ The toe of the mound is considered the edge of the soil absorption system for setback distances.
- ☐ The side slopes must be no steeper than three to one.
- ☐ There must be at least six inches of backfill over the distribution media and the mound shall be crowned to shed water.

**Criteria for Soil Substitution Systems:**

(Criteria are in addition to standard absorptive drainfield system requirements for a gravity flow substitution systems. These criteria are in addition to a low-pressure dosed system for a pressure dosed soil substitution system.)

A soil substitution drainfield is constructed similar to a standard absorptive drainfield.

Refer to TAC 285.33(d)(4) for TCEQ guidelines.

- ☐ Soil substitution drainfields may be constructed in Class Ia soils, highly permeable fractured rock, highly permeable fissured rock, or Class II and III soils with greater than 30% gravel.
- ☐ A soil substitution drainfield must not be used in Class IV soils or Class IV soils with greater than 30% gravel.
- ☐ A minimum two foot thick Class Ib or Class II soil buffer shall be placed below and on all sides of the drainfield excavation. The soil buffer must extend at least to the top of the media. The two-foot buffer area along the sides of the excavation is not credited as bottom area in calculating absorptive area. However, the interface between the media and the substituted soil is credited as absorptive area.
- ☐ Soil substitution drainfields must be designed to address soil compaction to prevent unlevel disposal. It is recommended that low-pressure dosing be used for effluent distribution.
- ☐ The edge of the substituted soil is considered the edge of the soil absorption drainfield in determining the appropriate separation distances as listed in §285.91(10) of this title.
- ☐ Refer to TAC 285.33(d)(4)(D – F) for sizing criteria.
- ☐ Specify and provide dimensions, including depth, for the distribution area and the total excavation; show dimensions for both on the site plan
- ☐ Specify soil class of the fill to be used for the soil substitution pad
- ☐ Specify the thickness of the soil substitution pad and show that it is to extend to the top of the porous media



**Criteria for Drip Irrigation Systems (additional to Standard Absorptive Drainfield):**

Drip irrigation systems using secondary treatment may be used in all soil classes including Class IV soils.  
 For Drip systems, refer to TAC 285.33(c)(3) for TCEQ guidelines, and manufacturer product specific design literature.  
 For Aerobic Treatment Units (ATU) requirements refer to product specific literature.

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| <ul style="list-style-type: none"> <li><input type="checkbox"/> The system must be equipped with a filtering device capable of filtering particles larger than 100 microns and that meets the manufacturer's requirements.</li> <li><input type="checkbox"/> The drip tubing shall be buried at least six inches deep.</li> <li><input type="checkbox"/> Systems must be equipped to flush the contents of the lines back to the pretreatment unit when intermittent flushing is used. If continuous flushing is used during the pumping cycle, the contents of the lines must be returned to the pump tank.</li> <li><input type="checkbox"/> Loading rates. Pressure reducing emitters can be used in all classes of soils using loading rates specified in §285.91(1) of this title. Pressure reducing emitters are assumed to wet four square feet of absorptive area per emitter; however, overlapping areas shall only be counted once toward absorptive area requirements. The loading rate shall be based on the most restrictive soil horizon within one foot of the pressure reducing emitter. When solid rock is less than 12 inches below the pressure reducing emitter, the loading rate shall be based on Class IV soils.</li> <li><input type="checkbox"/> Vertical separation distance. There shall be a minimum of one foot of soil (with less than 60% gravel) between the pressure reducing emitter and groundwater and six inches between the pressure reducing emitter and solid rock, or fractured rock. For proprietary disposal systems that do not pretreat to secondary treatment, there shall be two feet of soil (with less than 30% gravel) between the groundwater and pressure reducing emitter and one foot of soil between solid rock or fractured rock and the pressure reducing emitter.</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide specifications for the trash tank, aerobic treatment unit and pump tank</li> <li><input type="checkbox"/> For ATU, provide manufacturer's make and model.</li> <li><input type="checkbox"/> Provide the model number and brand name specifications for the control panel</li> <li><input type="checkbox"/> Provide labeled cross section diagram of the tanks; include float settings in inches and volumes.</li> <li><input type="checkbox"/> State the volume of reserve above the alarm float in the pump tank.</li> <li><input type="checkbox"/> Show the drip line configuration and calculations (including flow, dosing volume and flushing velocity) for drip irrigation systems</li> <li><input type="checkbox"/> Indicate how system pressure is to be set/maintained</li> <li><input type="checkbox"/> For drip irrigation systems, provide a cross section diagram of the drain field; label vertical and horizontal distances</li> <li><input type="checkbox"/> Specify the pump (size and model).</li> <li><input type="checkbox"/> Provide head calculations.</li> <li><input type="checkbox"/> Specify a high water alarm with visual and audible warning.</li> <li><input type="checkbox"/> Specify that the alarm is to be wired on a separate circuit from the pump</li> </ul> |
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**OWNER / BUILDER ITEMS:**

- ☐ A completed maintenance agreement must be submitted to this office. The maintenance contract must be signed and dated by the property owner and the maintenance contractor.
- ☐ A notarized Affidavit (provided by the Williamson County which has been filed with deed records, must be submitted to this office.



**Criteria for Surface Application Systems (additional to Standard Absorptive Drainfield):**

For Surface Application Systems, refer to TAC 285.33(d)(2) for TCEQ guidelines, and manufacturer product specific design literature.

For Aerobic Treatment Units (ATU) requirements refer to product specific literature.

- ☐ Land acceptable for surface application shall have a flat terrain (with less than or equal to 15% slope). Sloped land (with greater than 15%) may be acceptable if it is properly landscaped and terraced to minimize runoff.
- ☐ Land that is used for growing food, gardens, orchards, or crops that may be used for human consumption, as well as unseeded bare ground, shall not be used for surface application.
- ☐ Treated effluent must be disinfected before surface application. See TAC §285.91(4) of this title.
- ☐ Disinfection devices shall be accredited under ANSI/NSF Standard 46 and listed on the TCEQ website for approved products.
- ☐ Minimum surface application area required shall be determined using calculation in TAC §285.33(d)(2)(E).
- ☐ There shall be nothing in the surface application area within ten feet of the sprinkler which would interfere with the uniform application of the effluent.
- ☐ Provide a landscaping and vegetation plan describing vegetation to be maintain in the disposal area. Any bare or unvegetated areas shall be covered with suitable soil and seeded to allow for growth.
- ☐ The maximum inlet pressure for sprinklers shall be 40 pounds per square inch.
- ☐ Low angle nozzles (15 degrees or less in trajectory) shall be used in the sprinklers to keep the spray stream low and reduce aerosols.
- ☐ Specify the nozzle number and gallons per minute.
- ☐ Calculate the dose time to dispose of daily flow.
- ☐ Separation distances shall be 20' from the edge of the spray area to the property lines.
- ☐ Separation distances shall be 10' from any part of a residence or occupied business.
- ☐ Surface irrigation shall be limited to spray applications only.
- ☐ Surface application systems shall not be equipped with an automatic override below the alarm on level.

- ☐ Spray irrigation shall be conducted during nighttime hours (between midnight and 5:00 AM).
- ☐ Circular spray patterns may overlap to cover all irrigated area including rectangular shapes. The overlapped area will be counted only once toward the total application area. For large systems, multiple sprinkler heads are preferred to single gun delivery systems.
- ☐ There shall be at least one day of storage between the alarm-on level and the pump-on level, and a storage volume of one full day above the alarm-on level and the inlet to the pump tank.
- ☐ An unthreaded sampling port shall be provided in the treated effluent line in the pump tank.
- ☐ All new distribution piping, fittings, valve box covers, and sprinkler tops shall be permanently colored purple to identify the system as a reclaimed water system
- ☐ Provide specifications for the trash tank, aerobic treatment unit and pump tank
- ☐ For ATU, provide manufacturer's make and model.
- ☐ Provide the model number and brand name specifications for the control panel (see [www.Wilco.org](http://www.Wilco.org) for a list of approved panels and other guidance).
- ☐ Provide labeled cross section diagram of the tanks; include float settings in inches and volumes.
- ☐ Indicate how system pressure is to be set/maintained.
- ☐ Specify the pump (size and model).
- ☐ Provide head calculations.
- ☐ Specify a high water alarm with visual and audible warning.
- ☐ Specify that the alarm is to be wired on a separate circuit from the pump.

**OWNER / BUILDER ITEMS:**

- ☐ A completed maintenance agreement must be submitted to this office. The maintenance contract must be signed and dated by the property owner and the maintenance contractor.
- ☐ A notarized Affidavit (provided by the Williamson County), which has been filed with deed records, must be submitted to this office.

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**Criteria for Flood Plain:**

(An OSSF site within a 100-year flood plain is subject to special planning requirements. Please refer to TAC 285.31(c)(2) for more information.)

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| <input type="checkbox"/> Provide information in the design that addresses the operation of this system during flood events   | <input type="checkbox"/> Provide information concerning protection of the drain field                   |
| <input type="checkbox"/> Indicate how tank floatation is eliminated in planning materials (For pump tanks, and septic tanks and ATU tanks with attached pump tanks, calculations will need to be provided) | <input type="checkbox"/> Provide information concerning protection of the environment and public health |

**Criteria for Floodway:**

(If an OSSF site is also located within a regulated floodway, a professional engineer must demonstrate certain criteria. Please refer to TAC 285.31(c)(2) for more information.)

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| <input type="checkbox"/> Demonstrate that the system shall not increase the height of the flood  | <input type="checkbox"/> Demonstrate that non-buried components shall be elevated above the 100-year flood elevation.  |
| <input type="checkbox"/> Demonstrate that all components, with the exception of risers, cleanouts, and inspection ports shall be completely buried without adding fill | <input type="checkbox"/> Provide Flood Plain Development Permits from the County Engineer's office, if flood way or large mound brings soil into flood plain |

**Further Comments:**

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