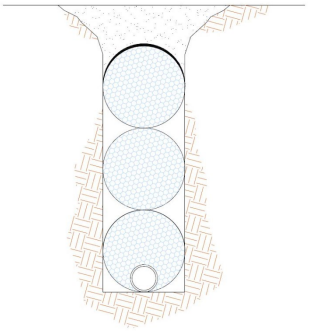


Design & Installation Manual for Use of EZ*flow* Subsurface Drainage Systems in Indiana

ISDH Approved 01/16/2020

Figure 1: EZ*flow* Subsurface Drainage System - cross-section of bundles

1. INTRODUCTION

The purpose of this manual is to provide specific design and installation requirements for the use of **EZ***flow* drainage products in interceptor, perimeter and segment drainage applications pursuant to Indiana Administrative Code 410 IAC 6-8.3 and 410 IAC 6-10.1 (ISDH Rules). Use of the **EZ***flow* Subsurface Drainage System products is subject to the applicable provisions of Rules 410 IAC 6-8.3 and IAC 6-10.1, the latest approved IWT, LLC **EZ***flow* Subsurface Drainage System Design and Installation Manual, ISDH *Standards for Drainage System*, the ISDH approval letter (including Limitation s of Use) for the **EZ***flow* Subsurface Drainage System product and any local jurisdiction ordinances and policies. If there is a conflict between design and/or installation requirements the most restrictive requirement for design and/or installation is to be utilized for specific products and situations. For more information, please contact **EZ***flow* by Infiltrator at 1-800-221-4436 or your local sales representative.

a. Limitations on Use in ISDH Approval

i. An on-site sewage absorption system proposing the use of an **EZ***flow* Subsurface Drainage System to amend a seasonal high, perched or apparent water table must use the two **EZ***flow* subsurface drainage system products (1201-A and 1201-FB) in the proposed subsurface drainage system. No other materials are allowed to be substituted for either the drainage conduit bundle or the substitute aggregate backfill bundle. [DHW 1.b., 1.g.]

ii. The **EZ***flow* subsurface drainage system shall not be used when the 4" diameter drainage pipe integrated into the 1201-FB product bundle (see Figure 2) is installed in soils which require the conventional subsurface drain pipe to be wrapped in geotextile fabric, as per 410 IAC 6-8.3.59(g) or 410 IAC 6-10.1-63(g).

iii. All **EZ***flow* Subsurface Drainage Systems must drain to an approved and confirmed gravity outlet. No pumps or siphons shall be utilized to impact the movement of the collected water.

b. Product Description

EZ*flow* drainage system products are 10 feet in length, 12 inches in diameter, and filled with expanded polystyrene (EPS) aggregate beads enclosed in polyethylene netting. Configurations are available as 12-inch bundles with or without an integrated 4-inch slotted drainage pipe. Accessories include 4-inch internal couplers, end caps, internal tees, and internal wyes.

Figure 2: EZ*flow* drainage products

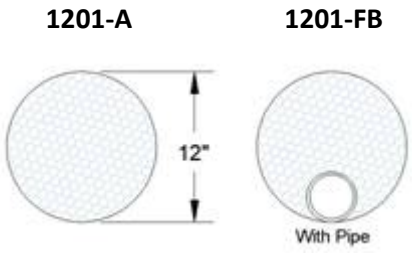


Figure 3: Accessories (all connections are to utilize internal couplers to join the 1201-FB bundles)



2. COMPONENT SPECIFICATIONS

a. Slotted Drainage Pipe

The black, single-walled, corrugated **EZ*flow*** drainage pipe is constructed of polyethylene resins with a high recycled content, typically greater than 90%. Nominal 4-inch-diameter pipe is utilized in the 12-inch diameter bundle. Pipe slots are punched during extrusion, their orientation is "random" and pipe rotation within each bundle is inconsequential to drainage function. **EZ*flow*** drainage pipe and fittings meet ASTM F667 Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings. A roughness coefficient of 0.015 (Manning's "n") should be used in flow calculations for 4-inch corrugated polyethylene pipe with a corrugated interior. Associated nominal 4-inch couplers, tees, wyes, elbows, and end caps are also black and constructed of polyethylene resins.

b. GeosyntheticAggregate

The geosynthetic **EZ*flow*** drainage aggregate is manufactured from 100% recycled materials. Made from expanded polystyrene (EPS), the aggregate beads have a fine to medium cell structure. The beads are cubical and have annotated protuberances that provide increased pore space and flow characteristics for drainage applications. A void space of 45% amongst the consolidated EPS aggregate is recommended for storage and flow calculations.

Figure 4: Geosynthetic aggregate used in the **EZ***flow* Subsurface Drainage System bundles. The aggregate can be either a pink or grey color in appearance.



c. Geotextile Netting

High density polyethylene (HDPE) netting holds the **EZ***flow* drainage bundle together. This extruded tubular diamond netting is black in color, weighs approximately 8 grams per foot and carries a stretch diameter of 11.5" to 12.5".

Figure 5: The Geotextile Netting used in manufacturing the **EZ***flow* Subsurface Drainage System bundles is manufactured as a fillable sleeve.



3. USAGE GUIDELINES

a. Safe Handling

Individual **EZ***flow* drainage bundles are 10 feet in length. Several bundles are wrapped together in clear plastic for shipping. ***The clear plastic wrapping must not be installed along with the bundle and should be disposed of properly***.

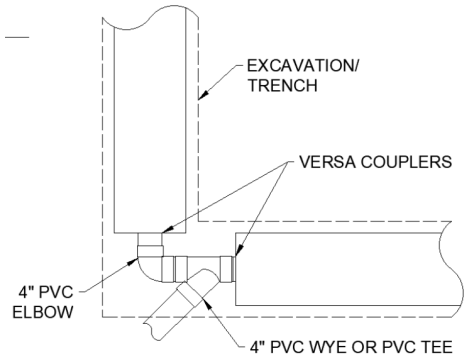
b. Bends and Corners

EZ*flow* drainage aggregate bundles can bend around and into most trench corners with ease (See Figure 6). Pipe bundles may require appropriate pipe couplers and elbows to accommodate sharp ninety-degree bends (See Figure 7 and 8). Indiana rule requirements for separation distances from the on-site sewage system soil absorption system, including any d-box, must be maintained with use of the **EZ***flow* subsurface drainage system. See Figures 7 & 8 for **EZ***flow* 1201-FB outlet utilizing PVC pipe and **EZ***flow* 1201-FB corner utilizing corrugated pipe.

Figure 6: Installing an **EZ***flow* Subsurface Drainage System and utilizing bend



Figure 7 (below left): Plan view - **EZ***flow* Subsurface Drainage System utilizing PVC pipe outlet



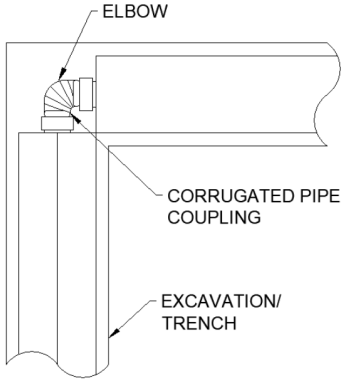


Figure 8 (above right): Plan view - **EZ***flow* Subsurface Drainage System utilizing a corrugated pipe corner

c. Pipe Connections: EZ*flow* 1201-FB Bundles

i. All 1201-FB bundles require internal couplers to make connections between the pipe within the bundle and other system piping components (See Figure 3). Insert the coupler into the 1201-FB **EZ***flow* bundle in the 4" diameter pipe until the coupler clicks into place; insert the remaining coupler end into the next bundle 4" pipe or the subsurface drainage system component and click into place to finish the connection.

ii. The 4" piping, couplers and other fittings must be positioned at the bottom of every 1201-FB bundle. A continuous positive grade (≥ 0.2%) of the 4" pipe must be maintained with the design of the **EZ***flow* 1201-FB subsurface drainage system product. None of the geosynthetic aggregate should be positioned under the 4" piping or fittings (See Figure 1).

d. Reducing Bundle Length

If a 10-foot **EZ***flow* bundle length is not required, the bundle can be cut and retied to the desired length with the original tie, a new tie, or wire, and the excess beads can be placed in the excavation. Bundle length can be reduced using the following steps (See Figures 9-12). The resulting shortened bundle must have a 12-inch diameter.

i. Measure the desired length plus five inches from one end of the bundle.
ii. Cut the netting around the bundle circumference at the measured distance; remove excessive EPS aggregate from the netting and place excessive EPS aggregated into the trench.
iii. Twist the netting until the EPS aggregate is held firmly inside the bundle and secure the mesh.
iv. For a pipe-containing bundle: gather the netting against the pipe until the aggregate is held firmly in place; apply a zip tie and tighten. Trim any excess pipe down to the desired length.



Figure 9: Step 1



Figure 10: Step 2



Figure 11: Step 3



Figure 12: Step 4

e. Product Storage

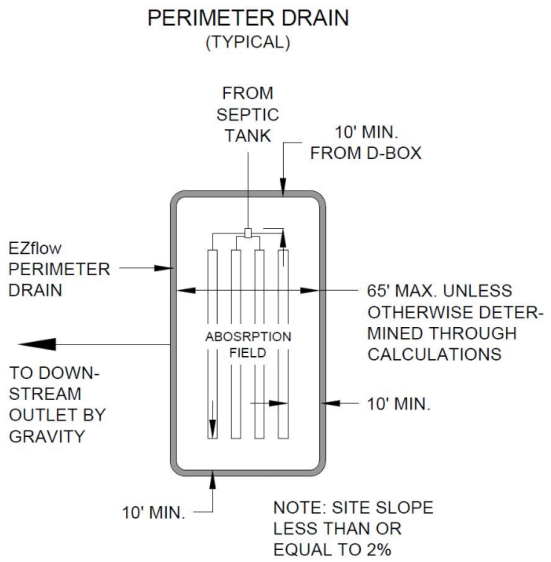
EZ*flow* subsurface drainage system 1201-A and 1201-FB bundles should not be exposed to direct sunlight for periods exceeding 60 days as the netting may become compromised. **EZ***flow* subsurface drainage system 1201-A and 1201-FB products must be stored inside away from direct sunlight, or covered securely with a light-blocking tarp if stored outside for extended periods.

4. INDIANA APPLICATIONS:

a. Perimeter Drain

Completely surrounds a soil absorption field for the purpose of lowering a seasonal high water table or preventing movement of subsurface water into a soil absorption area. (Perimeter drainage is required on all commercial OSS).

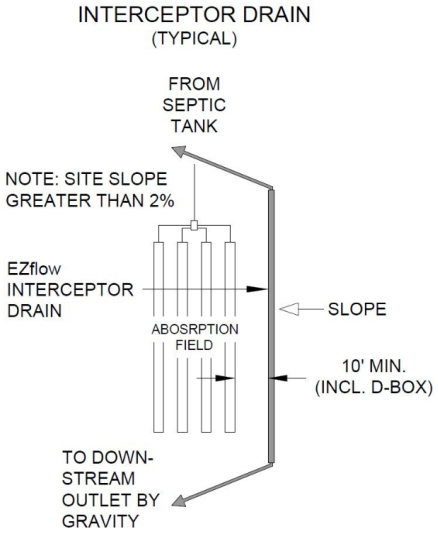
Figure 13: Perimeter Drain Layout



b. Interceptor Drain

Constructed on the upslope side of a soil absorption field for the purposes of diverting subsurface water around the soil absorption field.

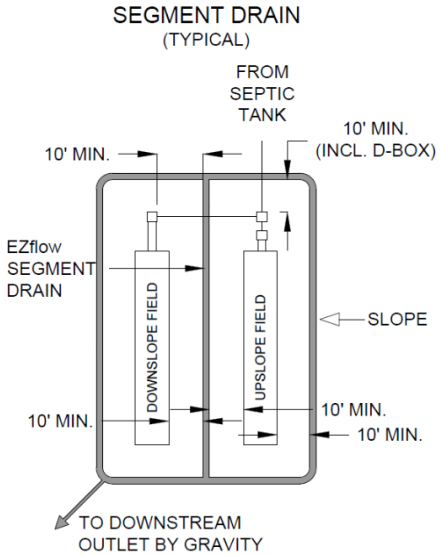
Figure 14: Interceptor Drain Layout



c. Segment Drain Used with a Perimeter Drain

Segment drains can be constructed between two or more soil absorption fields in the same on-site system for the purposes of intercepting and diverting subsurface water away from the downslope soil absorption field. Segments drains are commonly utilized to maintain proper spacing for subsurface drainage systems to ensure effectiveness of the entire drainage network; maximum separation for perimeter drains is 65 feet unless drainage calculations are provided to demonstrate a drainage plan that can overcome the limitation.

Figure 15: Segment Drain Used with a Perimeter Drain Layout



5. DESIGN REQUIREMENTS for INDIANA

a. Design Requirements Pursuant to 410 IAC 6-8.3 and 410 IAC 6-10.1:

1. For design requirements and rule interpretations concerning subsurface drainage for on-site sewage systems refer to the applicable rule sections, the ISDH product approval letter, the ISDH *Indiana Standards for Drainage Systems* and any local ordinances or policies.
2. The **EZ***flow* subsurface drainage system shall not be used when the 4" diameter drainage pipe integrated into the 1201-FB product bundle (see Figure 2) is installed in soils which require a conventional subsurface drain pipe to be wrapped in geotextile fabric, as per 410 IAC 6-8.3.59(g) or 410 IAC 6-10.1-63(g).
3. The **EZ***flow* subsurface drainage system must include a maximum trench width of 12" for the subsurface drainage trench for the **EZ***flow* Subsurface Drainage System utilizing the 1201-A and/or the 1201-FB products.
4. All portions of an **EZ***flow* subsurface drainage system must have a horizontal setback of at least ten (10) feet from the outside edge of any soil absorption field, or 10 feet from any INDOT Spec. 23 sand as part of an absorption field.
5. Pipe meeting or exceeding the specifications in the Indiana Rules must be used for the portion of the drainage system which will outlet to the environment. The daylight outlet pipe must be provided with a rodent guard.
6. For cross sectional design examples and rule interpretation concerning subsurface drainage for on-site sewage systems refer to the ISDH *Indiana Standards for Drainage Systems.*

6. INSTALLATION INSTRUCTIONS

Steps below are installation practices for subsurface perimeter, interceptor, and segment subsurface drainage systems.

1. Identify and mark off the perimeter, interceptor, or segment subsurface drain outline before excavation, identifying the location of the septic system absorption field(s) and maintaining all required horizontal setbacks.
2. Using only a 12" bucket, start excavating the drainage trench at the discharge point or where connections to downstream piping will be made. Cut all protruding woody roots cleanly back to the trench sidewall. Ensure proper slopes (0.2% min.) by using a transit and grade the trench bottom for proper drainage flow of collected water.
3. Place the **EZ***flow* 1201-FB drainage pipe bundles end-to-end on the ground surface along the edge of the trench. Fully insert the proper couplings at all bundle connections. Confirm that the trench excavation bottom and the 4" piping is positioned to maintain a consistent positive grade ($\geq$ 0.2%) throughout the subsurface drainage system consistent with the construction permit provisions.
4. Lay the connected bundles with pipe in the trench. Continue stacking the 1201-A aggregate bundles above the coupled 1201-FB pipe bundles as needed. All lengths of 1201-A bundles must be positioned so that the geosynthetic aggregate forms a continuous pattern of aggregate within the trench; this technique is to be followed for each layer or lift of **EZ***flow* product stacked within the subsurface drainage trench. Attention must be given during installation to stagger the lengths of 10 feet bundles to avoid having the joints between bundles extend from the top to the bottom of the subsurface drainage product in profile.

5. Care must be taken during installation to prevent snagging on and damage to the **EZ***flow* bundle netting. If the netting on an **EZ***flow* bundle is damaged and *any* EPS aggregate becomes loose from the bundle, the bundle must be removed from the subsurface drainage system and replaced with a new bundle.
6. If the excavated trench fills with water, clear any downstream obstructions to restore uninterrupted flow prior to installing **EZ***flow* drainage bundles. Installation shall not include any conditions which result in the **EZ***flow* bundles floating when placed in the excavation. If the **EZ***flow* bundles do float during installation the work shall be stopped. The **EZ***flow* product must be removed and inspected to ensure the 4" piping is properly positioned, free of debris and the connections and piping are maintaining at least the minimum approved positive slope. The subsurface drain trench must be emptied from any water or flow that would allow for the floatation of the **EZ***flow* product prior to continuing installation.
7. There shall be no gaps or spaces between the joints of the **EZ***flow* bundle ends.
8. Install geotextile fabric which meets the requirements outlined in ISDH Rules 410 IAC 6-8.3-69 and 410 IAC 6-10.1-77 over the top of the entire **EZ***flow* drainage system; the geotextile fabric must extend from edge to edge of the subsurface drainage trench and cover the entire exposed surface of the **EZ***flow* bundle.
9. Place a maximum of six (6) inches of permeable cover soil backfill over the bundles without compaction and seed to finish the installation (See Figure 1).