EZ-**Drain**™ Design and Installation Manual

JULY 2012

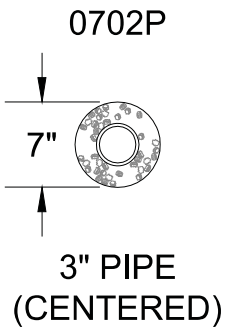
The purpose of this manual is to provide specific design and installation information pertinent to the use of **EZ-Drain** products in French, interceptor, curtain, landscape, foundation, retaining wall, roof runoff and basement/crawlspace drainage applications. Each revised version of this manual supersedes the previous version. For more information, please contact **NDS** at 1-877-301-5242 or your local sales representative.

EZ-Drain products must be used in conjunction with manufacturer's instructions and local and/or state code.

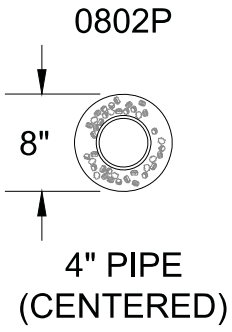
EZ-Drain Products

EZ-Drain bundles are 10 feet in length with a slotted pipe surrounded by expanded polystyrene aggregate and enclosed in geotextile mesh. Configurations are available in 7-inch diameter bundles with a 3-inch pipe (EZ-Drain 0702P), and 8-inch diameter bundles with a 4-inch pipe (EZ-Drain 0802P). Accessories include 3-inch and 4-inch internal couplers, end caps, internal tees, and internal wyes. **EZ-Drain** will work with standard internal connection corrugated pipe fittings.

7-inch Bundle



8-inch Bundle



Accessories


Coupler


Tee


Wye


End Cap


Elbow

Note: Couplers and endcaps are offered by NDS. Other accesories are available at your local plumbing supply store.

Slotted Drain Pipe

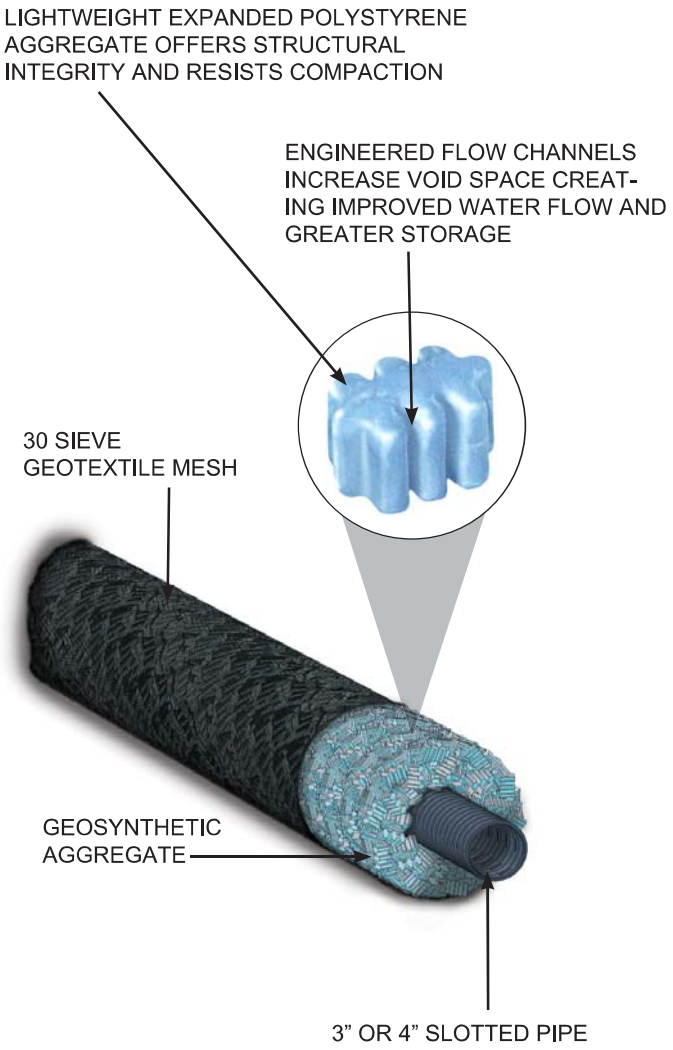
The black, single-wall, corrugated **EZ-Drain** drainage pipe is constructed of polyethylene resins with a high recycled content, typically greater than 90%. Nominal 3-inch diameter pipe is utilized in the 7-inch bundle, and 4-inch pipe in the 8-inch bundle. Slots are punched during extrusion of the pipe, slot orientation is "random" and pipe rotation within each bundle is inconsequential to drainage system function. The pipe is aligned along the center axis of the bundle. **EZ-Drain** drainage pipe meets ASTM F405 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 3 and 4-inch corrugated polyethylene pipe with a corrugated interior.

Geosynthetic Aggregate

The geosynthetic **EZ-Drain** aggregate is manufactured from 100% recycled materials. Made from expanded polystyrene (EPS), the aggregate beads have a fine to medium cell structure and two sizes are utilized; 7-inch bundles containing a 3-inch pipe and 8-inch bundles containing a 4-inch pipe. Beads are cubical and have protuberances that provide increased pore space and flow characteristics for drainage applications. For storage applications, a porosity of 45% is recommended for consolidated EPS aggregate within the bundle.

Geotextile Mesh

The black, knit geotextile mesh sock holds the **EZ-Drain** bundle together. The 30-sieve geotextile mesh fabric used for the sock provides appropriate permeability for drainage while limiting the migration of soils into the bundle and drainage system. The geotextile mesh has an apparent opening size of 0.60 mm, a unit weight between 2.5 to 3.5 ounces per square yard, and strength of 100 pounds per square inch in accordance with ASTM D-3786. The flow rate through the geotextile mesh, as provided by the manufacturer, is 300 gallons/square foot/ minute at 3 inches of head in accordance with ASTM D-4491.



Usage Guidelines

SAFE HANDLING

Individual **EZ-Drain** bundles are 10 feet in length and weigh approximately 5 pounds. 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 removed prior to installation and disposed of properly.

BENDS AND CORNERS

Bundles with pipe require appropriate pipe couplers and elbows to accommodate ninety-degree bends.

PIPE CONNECTIONS

Bundles with pipe require couplers to make connections between bundles and other system piping components. Insert the appropriately sized coupler into the **EZ-Drain** bundle until the coupler clicks into place, insert the remaining coupler end into the next bundle or system component and click into place to finish this connection. Connections to cleanouts, catch basins, manholes and other system components may require gaskets or the use of grout to form soil tight and watertight seals as needed.

REDUCING BUNDLE LENGTH

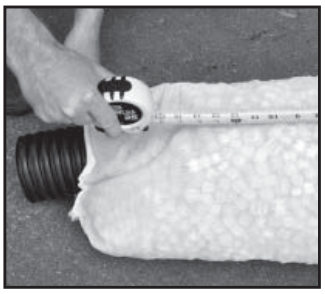
If a ten-foot **EZ-Drain** bundle length is not required, the bundle can be cut and retied to the desired length with the original tie, wire or duct tape, and the excess beads can be placed in the excavation. Bundle length can be reduced as follows:

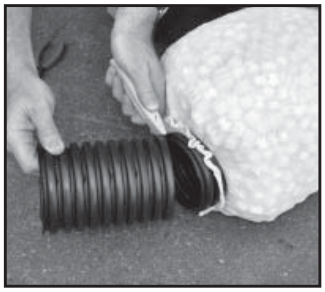
First, measure the desired length plus one-half the product diameter from one end of the bundle.

Second, cut the mesh around the bundle circumference at the measured distance, remove excessive EPS aggregate from mesh and place the excess EPS aggregate in the trench.

Third, twist the mesh until the EPS aggregate is held firmly inside the bundle and secure the mesh. If the bundle has a pipe, gather the mesh against the pipe until the aggregate is held firmly in place, secure mesh into place, apply a zip tie and tighten.

Lastly, for a bundle with pipe trim any excess pipe down to the desired length.



INSTALLATION IN FINE-GRAINED SOILS

If a system needs to be installed in soils that have more than 50% by content silt or clay particles, a secondary fabric with the appropriate apparent opening size to match soil conditions should be wrapped around the circumference of the system. An engineer or landscape architect should be consulted to determine the appropriate fabric for such conditions.

PRODUCT STORAGE

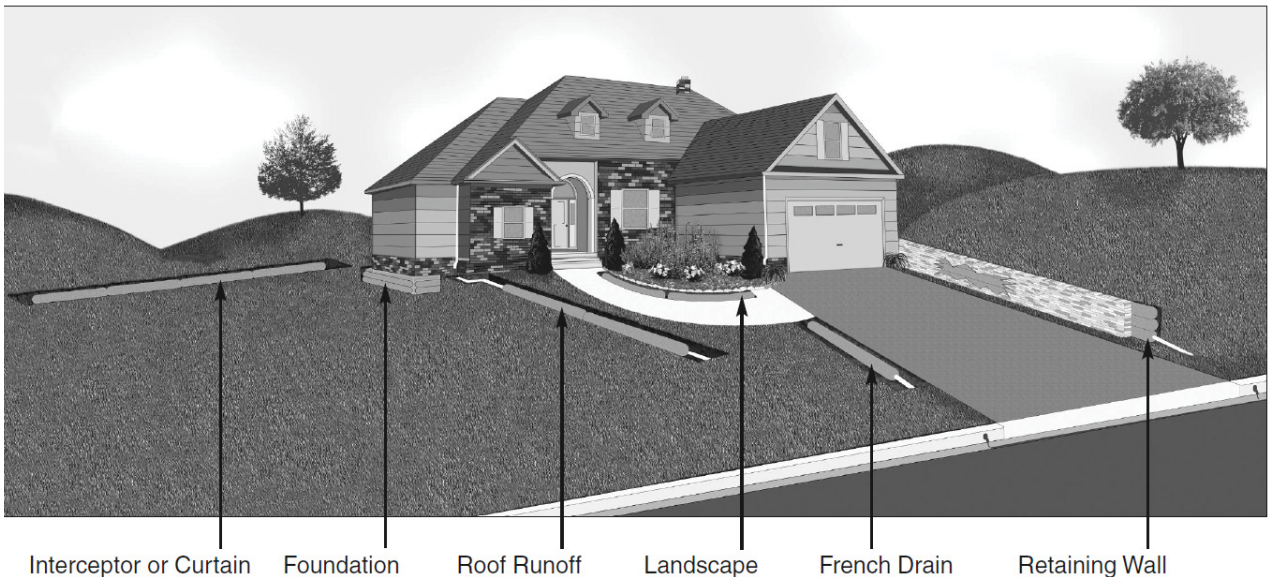
EZ-Drain products should not be exposed to direct sunlight for periods exceeding 60 days as the mesh fabric may become compromised and yellowing of the aggregate has been observed. It is recommended that **EZ-Drain** products be stored inside and away from direct sunlight. Product should be covered securely with a light-blocking tarp if stored outside for extended periods.

STRUCTURAL CAPABILITY

EZ-Drain drainage systems are designed for use in residential and light commercial non-traffic drainage applications. **EZ-Drain** systems are designed to withstand single pass construction wheel loading and occasional light vehicular load of up to 16,000 lbs per axle provided the product is installed in a trench with 12" of compacted fill placed over the bundles. **EZ-Drain** systems are not designed to be placed under live-load traffic conditions such as paved or non-paved roadways, driveways, or parking areas.

EZ-Drain™
Pre-Engineered French Drain System

Applications



EZ-Drain systems are appropriate for a wide range of applications and are a convenient alternative to traditional stone and pipe drainage, storage and infiltration systems. **EZ-Drain** systems can be used as a substitute for stone in most applications where the stone is not utilized for structural support. When stone does serve as structural support, such as a base course in a roadway or backfill in a mechanically-stabilized-earth retaining wall, **EZ-Drain** should not be used. A professional engineer, landscape architect or other qualified design professional should be consulted for complex applications.

Product selection is relative to the desired application and benefits from establishing anticipated flow into, through and out of a proposed drainage system configuration. Selection considerations include: bundle sizing and storage volume, pipe size and location within the bundle, and arrangement of bundles. Design factors may include: length of system, watershed area, soil type and permeability, groundwater levels and system discharge opportunities. **EZ-Drain** storage volumes and pipe discharge rates are listed below. Basic product selection, system configuration considerations and installation methods are discussed in each application description that follows.

Storage and Flow for **EZ-Drain** Bundles (45% void space amongst consolidated EPS aggregate)		
Pipe Bundles		
Product	Storage Volume (gallons/10-ft bundle)	Flow Capacity (gpm @ 1% slope)
0702P	11.4	80.8
0802P	15.8	112.7

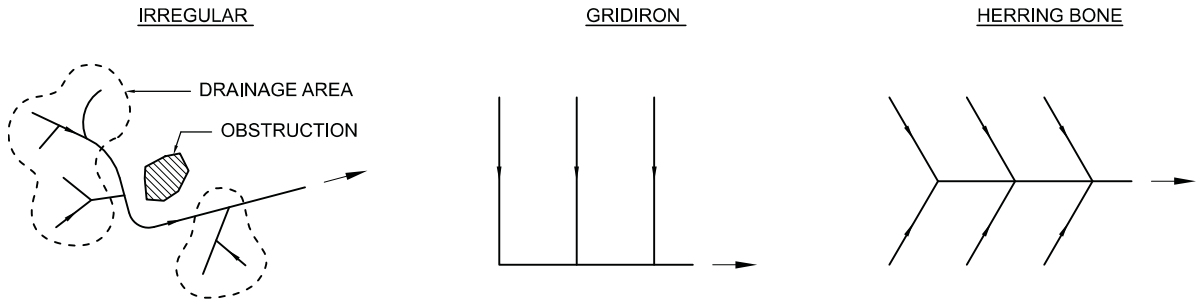
French Drains

Subsurface drainage systems have been in common use for centuries. They take many forms, but are all similar in design and function to the traditional French drain. French drains are excavated trenches filled with aggregate surrounding a slotted or perforated pipe that conveys excess surface and groundwater to a discharge point away from the drainage area. **EZ-Drain** products can be used as a substitution for conventional aggregate in French drain systems.

PLACEMENT

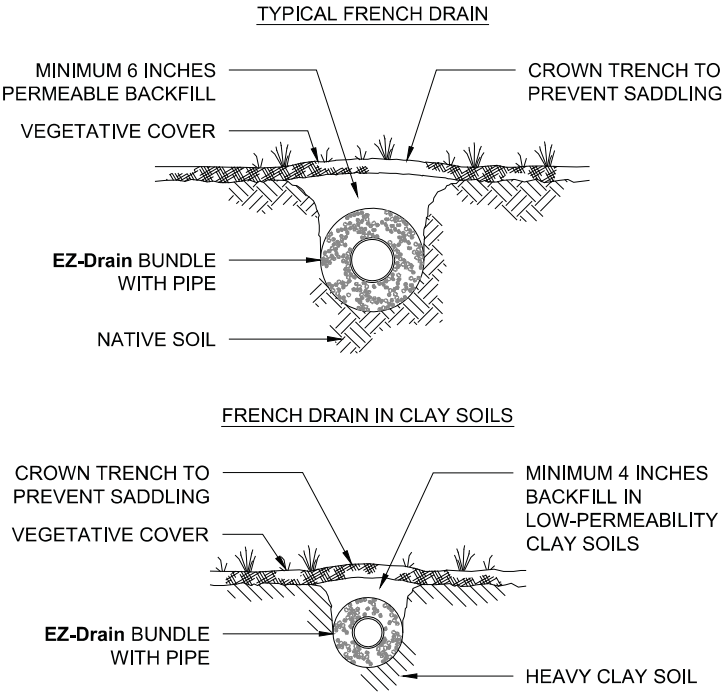
EZ-Drain French drains should be laid out strategically to dewater irregular, poorly drained areas. A defined pattern such as a herring bone and gridiron should be used to drain complete areas including lawns, athletic fields, golf course greens and sand traps. These patterns include laterals that drain to collectors that discharge to an outfall. In general, laterals should not be longer than 50 feet and collectors no longer than 100 feet without increasing the pipe diameter downstream. In addition, the slope of each downgradient run should increase throughout the length of the system.

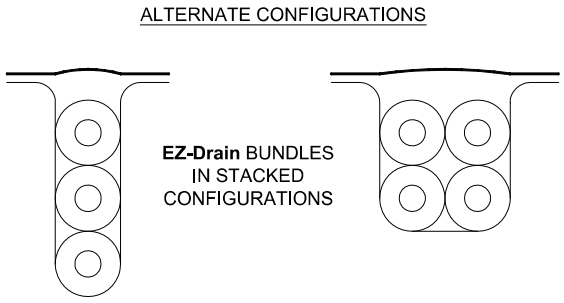
Trench depth and spacing will vary depending on soil texture of the area being drained. Trench depth can also be limited by outlet conditions in flatter areas. Lines may be spaced widely and deeply in sandy soils, and are generally placed shallower and closer together in clay soils.



PRODUCT

The 7-inch and 8-inch **EZ-Drain** bundles with integrated 3-inch and 4-inch pipe are appropriate for small area residential subsurface drainage systems. In larger areas or if there is over 200 feet of pipe upstream, a landcape architect or drainage specialist should be consulted.





Minimum Recommended Depth of Cover*	
Condition	Depth (in.)
Residential area, commercial lawn mowers	6**
Athletic fields with consistent activity	8
Areas with occasional light vehicular traffic	12

EZ-Drain™
Pre-Engineered French Drain System

French Drain Installation Instructions

The steps below offer typical installation practices for French drains and will vary based on site conditions. These practices are also applicable to landscape plant bed drains and for wet areas on golf courses.

1. Identify the area to be drained and mark off lateral and collector lines before beginning trench excavation.

2. Start excavating the trench at the discharge point or where connections to downstream piping will be made. Trench width should be equal to the diameter of the bundle being used. Trench depth will reflect existing terrain, desired drainage line slope and length, height of bundles(s) and required cover thickness. Ensure proper slopes by using a transit or builder's level and grade the trench bottom evenly for proper flow.

3. Place the **EZ-Drain** bundle with pipe end to end along the edge of the trench. Use an end cap at the system high point and fully insert the proper couplings at all bundle-to-bundle connections. Lay the connected bundles with pipe in trench, stacking additional bundles above these bundles as needed.

4. Place a minimum of 4-inches permeable backfill (see recommended depths of cover on page 6) over the bundles without compaction. Additional sand/backfill can be placed and compacted normally above the loose fill to prevent trench saddling. Cover trench with sod or topsoil and seed to finish installation.

Interceptor Drains

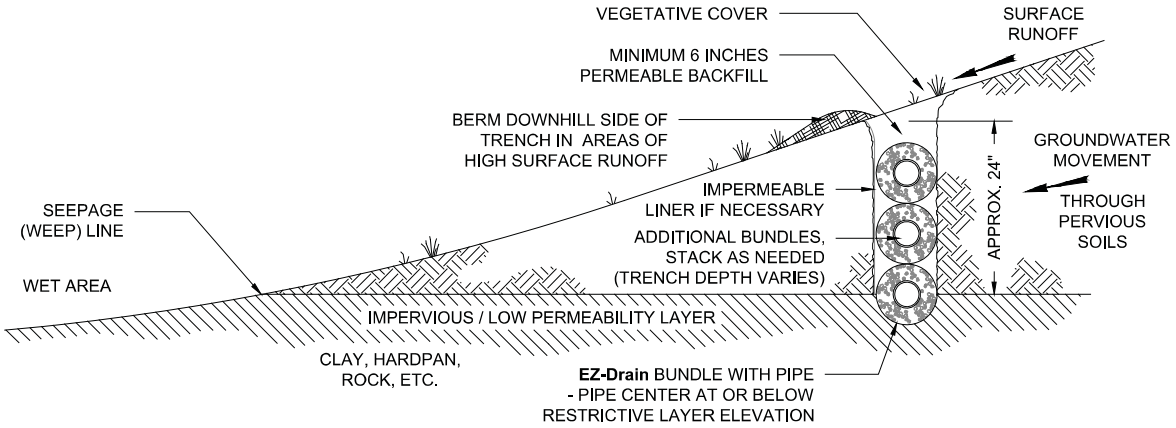
An interceptor drain is a type of French drain that collects surface water moving downhill and/or groundwater moving horizontally in the soil above an impervious or low-permeability layer. These drains prevent runoff and seepage from slopes onto areas below.

PLACEMENT

Interceptor drains should run along a contour above the area which is intended to be kept free from seepage and runoff. Interceptor drain trenches should penetrate one-half of an **EZ-Drain** diameter into the impervious layer below the water table, extend the length of the existing seepage line and run to daylight at a code-compliant outfall.

PRODUCT

The 7-inch or 8-inch **EZ-Drain** bundles with integrated pipe are appropriate for most interceptor drain situations. In conditions of excessive surface runoff or groundwater mounding, consult a drainage specialist.



INSTALLATION INSTRUCTIONS

The steps below offer typical installation practices for interceptor drains and will vary based on site conditions.

1. Identify and mark off a hillside contour parallel with the slope to intercept surface water runoff. Lay the system out to allow for at least two feet in elevation above the impervious layer causing a downgradient groundwater seep.

2. Start excavating the trench at the discharge point or where connections to downstream piping will be made. The trench width should be equal to the diameter of the bundle being used. The trench depth should be deep enough to excavate one-half of a bundle diameter into the impervious layer. It may be desirable to create a small soil berm on the downhill side of the trench in areas of high surface flow to encourage runoff infiltration into the drain. Ensure proper slopes by using a transit or builder's level and grade the trench bottom to promote the flow of collected water.

3. Place the **EZ-Drain** bundles with pipe end to end along the edge of the trench. Fully insert the proper couplings at all system connections. An impervious liner may also be installed the full depth on the downhill side of the trench to further control seepage below. Lay the connected bundles with pipe in the trench, stacking additional bundles above the pipe-containing bundles as needed.

4. Place a minimum of 6 inches of permeable backfill over the bundles without compaction. Additional sand/backfill can be placed and compacted normally above the loose fill to prevent trench saddling. Cover trench with sod, sand or topsoil and seed to finish installation.

Curtain Drains

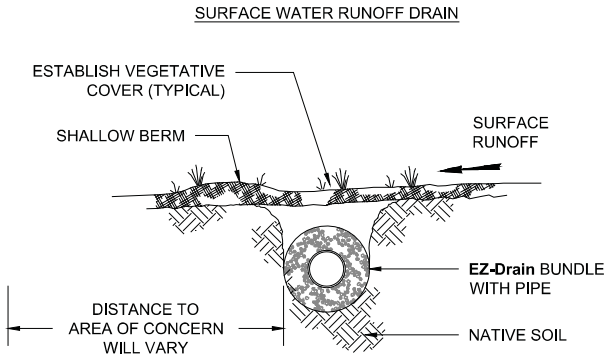
A curtain drain is a type of French drain that collects and diverts groundwater and surface runoff away from an area of concern, such as a septic system drainfield. For a drainfield, curtain drains are useful in controlling groundwater conditions that may compromise system function. **EZ-Drain** curtain drain systems can help preserve the proper functioning of septic system drainfields.

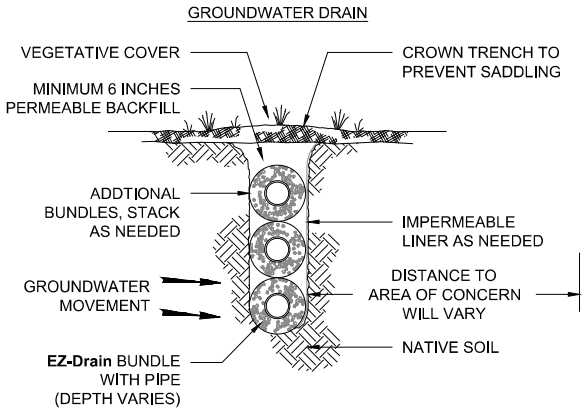
PLACEMENT

Curtain drain configuration, discharge, installation depth and horizontal setback from septic system drainfields vary based upon local conditions. Curtain drains can be placed deeply to collect and divert groundwater, shallower for controlling surface runoff, or in both configurations as needed. An observation port may be installed to monitor curtain drain function. An impervious liner may also be installed on the curtain drain trench sidewall as needed.

PRODUCT

Product selection will vary depending on applicable codes and the amount of water to be collected and diverted. The 7-inch or 8-inch **EZ-Drain** bundles with integrated 3-inch or 4-inch pipe are suitable for most curtain drain applications. For longer systems over 200 feet in length, consult a landscape architect or drainage specialist.





INSTALLATION INSTRUCTIONS[1]

The steps below offer typical installation practices for curtain drains and will vary based on site conditions.

1. Identify and mark off the curtain drain outline before excavation, noting the location of the area of concern, such as the septic system drainfield.

2. Start excavating the trench at the discharge point or where connections to downstream piping will be made. The trench width should be approximately equal to the diameter of the bundle being used. It may be desirable to create a small soil berm on the downhill side of the trench in areas of high surface flow to encourage runoff infiltration into the drain. Ensure proper slopes by using a transit or builder's level and grade the trench bottom evenly to promote the flow of collected water.

3. Place the **EZ-Drain** pipe-containing bundles end to end along the edge of the trench. Fully insert the proper couplings at all system connections. An impervious liner may also be installed the full depth of the trench sidewall as needed. Lay the connected bundles with pipe in the trench, stacking additional bundles above the pipe-containing bundles as needed.

4. Place a minimum of 6 inches of permeable backfill over the bundles without compaction. Additional backfill can be placed and compacted normally above the loose fill to prevent trench saddling. Cover the trench with sod or topsoil and seed to finish the installation.

1 EZ-Drain is not intended for use in wastewater or septic drainfield applications.

Landscape Drains

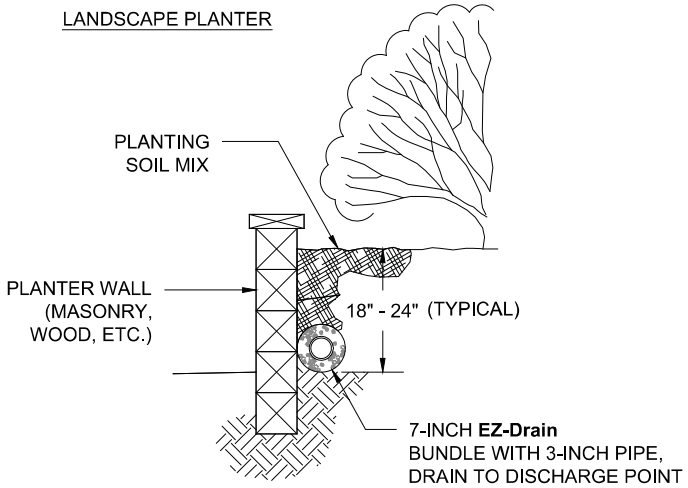
Landscape drains are used to prevent excess soil saturation in planting beds and structural planters that would otherwise compromise the health of landscape and ornamental plantings.

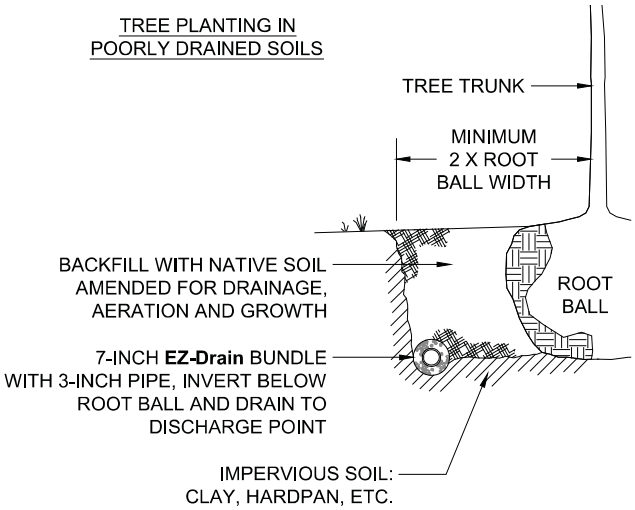
PLACEMENT

For landscape plant beds, **EZ-Drain** bundles can be placed along the bed edge at the interface with other landscape elements such as the lawn or a walkway, or may follow an irregular alignment to target problem areas and/or respond to plant placement within the bed. For raised masonry or wood planters, **EZ-Drain** bundles are typically placed on the inside edge of the planter a minimum of 18 inches below finished grade, and up to 24 inches below grade for trees and other deep-rooted upland landscape plants. Bundles should extend to within the bed in larger planters as needed. **EZ-Drain** bundles must drain to a weep hole or other outlet through the planter wall to be effective. Tree plantings in poorly drained soils should utilize **EZ-Drain** bundles to form a ring offset a minimum of twice the width of the root ball from the trunk. Trenches should be dug 18 to 24 inches deep for plant beds and below the depth of the rootball in tree planting applications. The bundles must drain away from the planted area to a downgradient discharge point.

PRODUCT

The 7-inch or 8-inch **EZ-Drain** bundles with integrated 3-inch or 4-inch pipe are appropriate for small raised planter, plant bed and tree planting drainage systems.





INSTALLATION INSTRUCTIONS

The steps below offer typical installation practices for landscape drains and will vary based on site conditions.

PLANT BEDS

Follow the general French drain installation instructions on Page 7 for **EZ-Drain** installation in plant beds.

RAISED PLANTER

1. Connect the **EZ-Drain** bundle to a planter weephole or other outlet through the planter wall. Arrange the **EZ-Drain** bundle length along the inside perimeter of the planter wall a minimum of 18 inches below finish grade for most plantings, deeper for trees and other deep-rooted species. Additional bundles may be connected in large planters.

2. Backfill using an appropriate planting soil over the bundles, add plants and mulch per the planting plan. No sand cover is required as planting soil mix is designed to drain well while preserving adequate soil moisture.

TREE PLANTING IN POORLY DRAINED SOILS

1. Mark off the desired tree planting location and excavate a planting hole twice the width of the rootball and to a depth equal to the height of the rootball.

2. Dig a 4-inch-deep, 7 or 8-inch-wide trench along the interior circumference of the hole and place a 7 or 8-inch **EZ-Drain** drainage bundle with pipe in the trench. The bundle must slope towards and be connected to additional piping that runs away from the planting hole to the discharge point.

3. Place the tree rootball in the center of the planting hole and backfill per the planting plan.

Foundation and Footing Perimeter Drains

The **EZ-Drain** foundation and footing perimeter drainage systems prevents moisture from entering a building basement or crawlspace through interception and removal subsurface water.

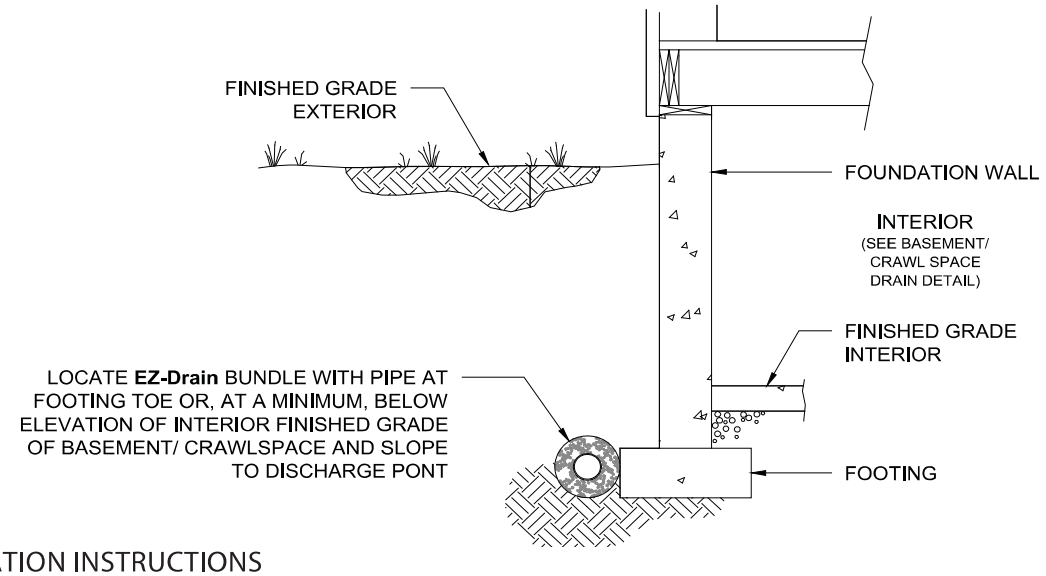
PLACEMENT

Ideal placement for the **EZ-Drain** bundle with pipe in a foundation drain is at the footing toe along the entire building foundation perimeter, or at a minimum, below the finished grade elevation of the interior basement or crawlspace. The drain should have a continuous slope and outlet that runs to the drainage point. The system outlet should slope greater than the footing perimeter drain and have a diameter equal to or preferably greater than that of the drain pipe.

Note: It is important that roof runoff not drain directly into foundation and footing drains, although it is acceptable to connect these systems in a manner that prevents roof runoff from entering the foundation and footing drain system and allows them to discharge together.

PRODUCT

The **EZ-Drain** 7-inch drainage bundle with integrated 3-inch pipe are suitable for foundation walls up to 42 inches high. The EZ-Drain 8-inch drainage bundles with integrated 4-inch pipe are suitable for foundation walls up to a maximum height of 144 inches. If there is over 200 feet of footing or high groundwater conditions, consider an additional outlet.



INSTALLATION INSTRUCTIONS

The steps below offer typical installation practices for perimeter drains and will vary based on site conditions.

1. Starting at the discharge point or where connections to downstream piping will be made, place the **EZ-Drain** bundles with pipe next to the foundation footing, or at a minimum below the basement or crawlspace finished floor elevation, but at a maximum of 12 feet deep. The bundles must run along the entire footing perimeter and be placed upon a prepared subgrade base sloped evenly to drain. Use an end cap at any high point and fully insert proper couplings at all system connections.

2. Bundles can be held in place with stakes as needed prior to backfilling. Avoid tearing the mesh fabric when staking.

3. Backfill the foundation excavation according to the site plans. Make sure that no large stones or debris are in contact with the **EZ-Drain** system.

Retaining Walls

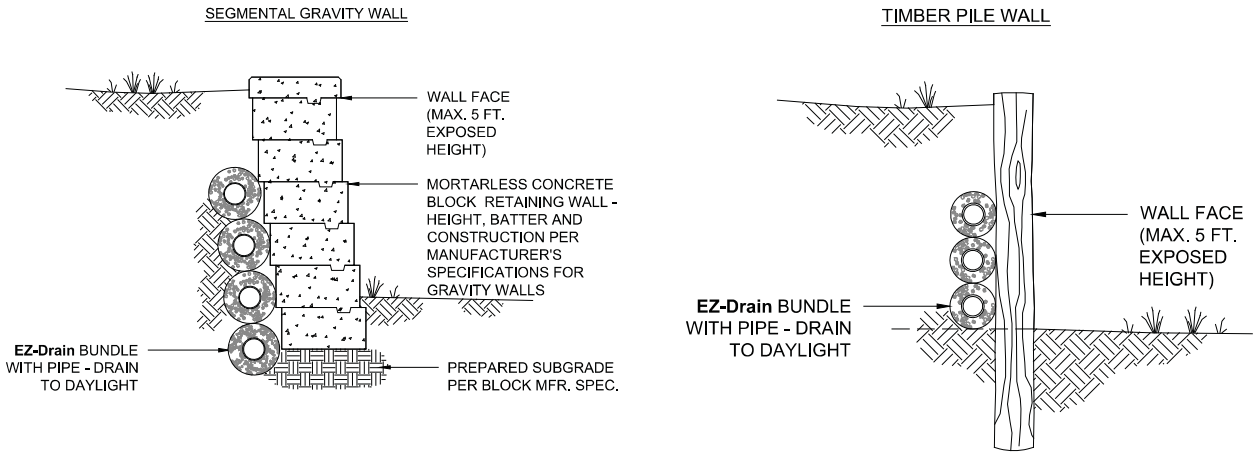
Retaining walls work to hold back earth in the landscape. Hydrostatic pressure from groundwater can cause even low retaining walls to fail, so drainage is critical to wall longevity. Also, groundwater weeping through dry-stacked masonry or timber pile retaining walls can cause unsightly staining and streaking. Similar to their function in foundation and footing drains, **EZ-Drain** systems intercept and convey groundwater from behind a retaining wall, relieving hydrostatic pressure and preventing weeps.

PLACEMENT

Depending on retaining wall design and groundwater conditions, **EZ-Drain** bundles can be placed at the base of the wall footing or stacked on the backside of the wall.

PRODUCT

EZ-Drain bundle selection for most gravity and piling retaining wall applications should correspond to the diameter of pipe and arrangement



INSTALLATION INSTRUCTIONS[1]

The steps below offer typical installation practices for retaining wall drains and will vary based on site conditions.

Note: It is not recommended that an installation contractor substitute **EZ-Drain** systems for stone where the stone is being utilized for wall support such as in backfill of cantilever, anchor and mechanically-stabilized-earth retaining wall systems. It is not recommended that **EZ-Drain**bundles be used in walls having greater than 5-feet of exposed wall face. A qualified design engineer can utilize **EZ-Drain** bundles in these walls with proper design protocol that considers the lightweight nature of these products.

1. Starting at the discharge point or where connections to downstream piping will be made, place the **EZ-Drain** bundles with pipe next to the retaining wall footing in gravity walls, or at a minimum below the finished grade elevation in front of the wall. In piling walls, place the bottom bundle behind the wall at an elevation equal to the finished grade elevation in front of the wall. Use an end cap at any system high point and fully insert the proper couplings at all system connections.

2. Place additional bundles above and touching the bottom pipe-containing bundle, ensuring hydraulic connectivity over the footing and up the foundation wall to the desired height, generally within 18 inches of finished grade. Bundles can be held in place with stakes as needed prior to backfilling. Avoid tearing the mesh fabric with stakes.

3. Backfill the retaining wall excavation according to the site plans. Make sure that no large stones or debris are in contact with **EZ-Drain** system.

1 An EZ-Drain system may be installed in walls less than or equal to 5 feet tall before an engineer design is required.

Roof Runoff Drains

Roof runoff drains divert rainwater collected in a gutter system away from the building foundation. Systems can be designed to allow for maximum groundwater recharge and to discharge peak flows into the landscape.

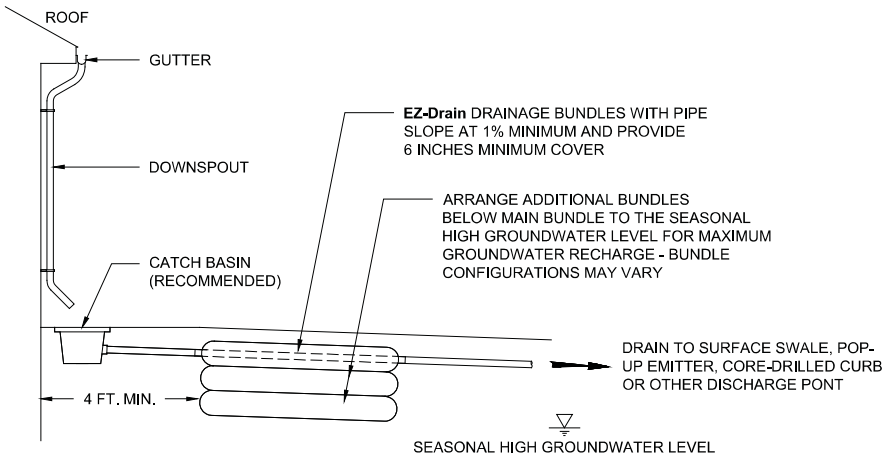
PLACEMENT

Roof runoff systems should not drain toward building foundations or retaining walls so as not to increase hydrostatic pressure on these elements or overload their relative drainage systems.

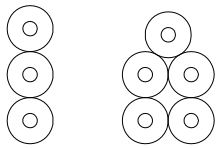
Gutter drain systems should utilize **EZ-Drain** bundles starting a minimum 4 feet from and aligned away from the building foundation. Catch basins combined with solid (unperforated) pipe systems and bends can receive direct gutter flow and convey it to the **EZ-Drain** bundles. Gutter drain systems should then discharge to a pop-up emitter, surface swale, core-drilled curb or other discharge point. Stacking additional bundles to the seasonal high groundwater level in the soil below the main receiving bundles will maximize groundwater recharge and limit peak outflows.

PRODUCT

In general, **EZ-Drain** bundles should be selected with a pipe diameter equal to or greater than the size of the downspout.



EXAMPLE CONFIGURATIONS



MINIMUM SOIL COVER IN VERTICAL STACK ROOF RUNOFF APPLICATIONS

No. of 7″ or 8″ Bundles	Minimum Soil Cover
1 or 2	6″
3	8″
4	10″
5	12″

INSTALLATION INSTRUCTIONS

The steps below offer typical installation practices for roof runoff drains and will vary based on site conditions. Refer to page 5 for minimum cover and maximum bundle chart to prevent flotation for a filled drainage area.

1. Identify downspout locations for connection to the proposed roof runoff system. Mark off areas for connection piping and for the **EZ-Drain** bundles, considering system discharge limitations.

2. Excavate locations for catch basins, pipe runs and bundles. The trench for the **EZ-Drain** bundles should match the bundle width and can be excavated to the seasonal high groundwater level for maximum groundwater recharge.

3. Install additional **EZ-Drain** bundles along the bottom of the deep trench as needed for maximum groundwater recharge, and the top bundle with pipe at the appropriate depth to ensure a minimum 6 inches of soil cover above the system.

4. Install an NDS or equivalent catch basin to directly receive downspout discharge and run a minimum 4-foot length of solid (unperforated) pipe away from the building foundation before connecting to the **EZ-Drain** pipe. More than one downspout can be connected prior to entering the system with properly-sloped solid piping and connections. Catch basins are recommended for ease of maintenance. Clean-outs must be installed if direct downspout to drainage system connections are made.

5. Following the **EZ-Drain** bundle assembly, install a solid pipe run to a pop-up emitter, surface swale, core-drilled curb or other drainage point. Fully insert the proper couplings at all system connections.

6. Cover the trench and other exposed excavation areas with sod or topsoil and seed to finish the installation.

Basement/Crawlspace Dewatering

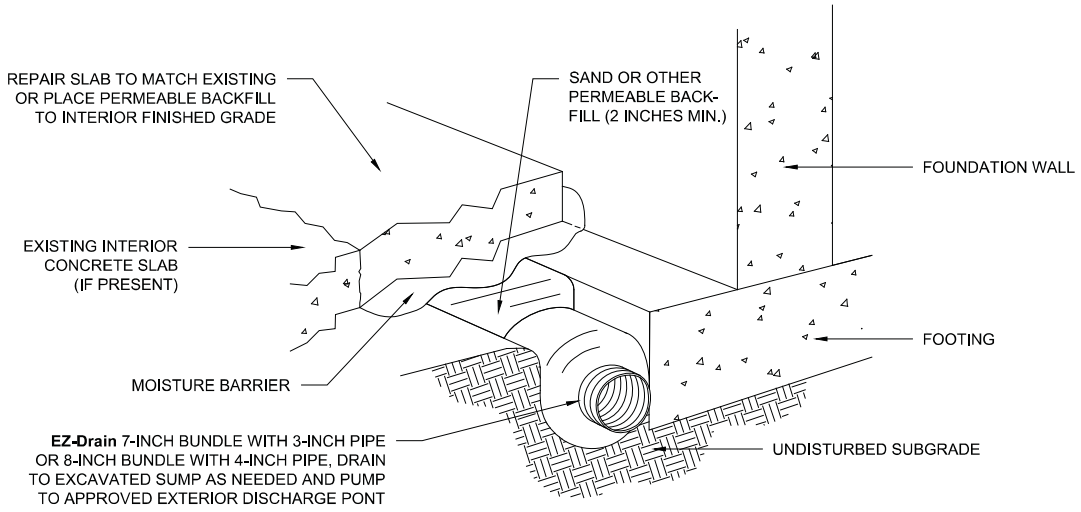
In many cases older homes were constructed without foundation and footing perimeter drains. A basement area or crawlspace can become inundated when groundwater levels rise with seasonal cycles or following heavy rains. Retrofitting a footing drain on an existing home can be impractical considering paved areas, steps, decks and patios, site access, utility connections and mature landscaping. A better solution may be to install an interior basement or crawlspace drain system that conveys collected water to a discharge point or sump for removal from basement or crawlspace by pump.

PLACEMENT

For **EZ-Drain** basement and crawlspace dewatering systems it is recommended that a 10- to 12-inch-wide trench be excavated along the interior foundation wall a minimum of 9 inches deep below the floor surface elevation for a soil floor or 9 inches below the bottom of floor slab elevation for a concrete floor. The trench must slope towards and discharge into an excavated sump. Installation should be avoided during flooded conditions or when no other outlet exists.

PRODUCT

7-inch or 8-inch **EZ-Drain** bundles with 3-inch or 4-inch pipe are installed along the bottom of the trench with appropriate fittings at trench bends. A minimum 2-inch layer of permeable backfill is placed above the bundle to support poured concrete in slab repair situations or brought to finished grade where the concrete slab exists.



INSTALLATION INSTRUCTIONS[1]

The steps below offer typical installation practices for basement/crawlspace dewatering drains and will vary based on site conditions.

1. Excavate a trench along the inside perimeter of the foundation wall being careful to not damage or interfere with existing utilities. The trench should be a minimum of 9 inches deep and should be sloped evenly towards an excavated sump or discharge point.

2. Connect the **EZ-Drain** bundle with pipe to the excavated sump outfall and connect additional bundles to run the entire length of the trench. Use an end cap at any system high point and fully insert the proper couplings at all system connections.

3. Place a minimum 2-inch layer of clean, coarse sand or washed pea gravel above the bundle to support poured concrete in slab repair situations, or place the sand/gravel to finished grade where no concrete slab exists.

1 Consult local building codes to assure compliance.

NDS EZFLOW™ WARRANTY

STANDARD LIMITED WARRANTY

(a) The structural integrity of each EZFlow expanded polystyrene drainage system manufactured by EZFlow LP and distributed by National Diversified Sales, Inc. ("NDS"), when installed and operated in a drainage system in accordance with its instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date installation of the drainage system commences. To exercise its warranty rights, Holder must notify NDS in writing at its Corporate Headquarters, 21820 Burbank Blvd., Suite 200, Woodland Hills, CA 91367 within fifteen (15) days of the alleged defect. EZFlow LP will supply replacement Units for Units determined by EZFlow LP to be covered by this Limited Warranty. The liability of EZFlow LP and NDS specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE

(c) The Limited Warranty does not extend to incidental, consequential, special or indirect damages. EZFlow LP and NDS shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; failure of the Units due to improper sitting or improper sizing; or any other event not caused by EZFlow LP or NDS, This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty. Further, in no event shall EZFlow LP or NDS be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party.

(d) No representative of EZFlow LP or NDS has the authority to change or extend this Limited Warranty. No warranty applies to any party other than the original Holder.

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