

# Backyard Conservation

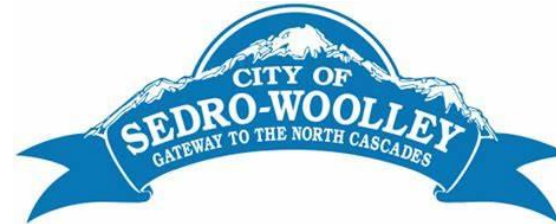
Low Impact Development

&

Effective Landscaping

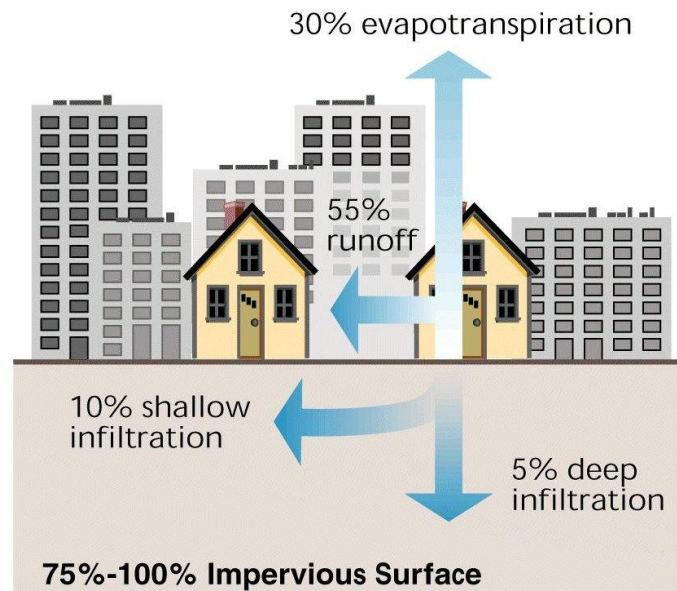
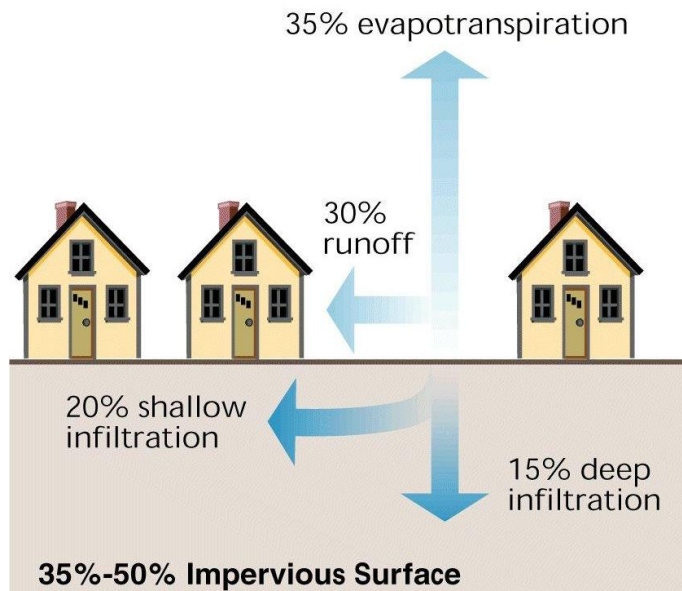
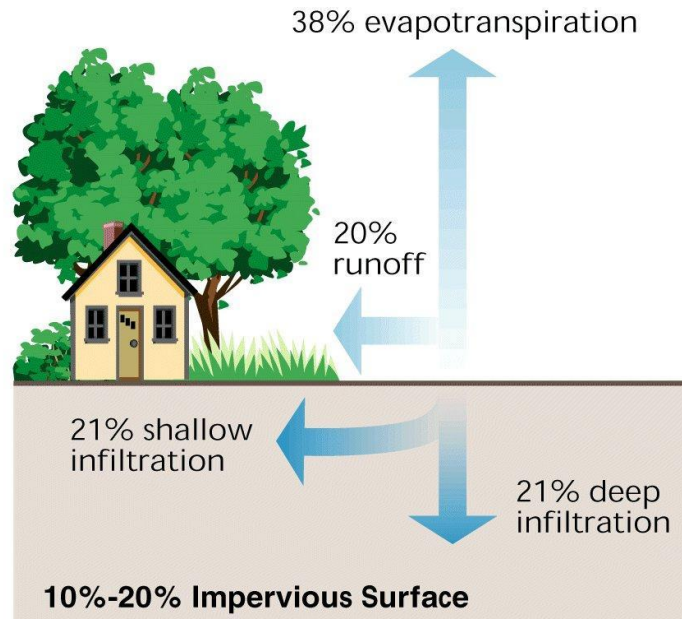
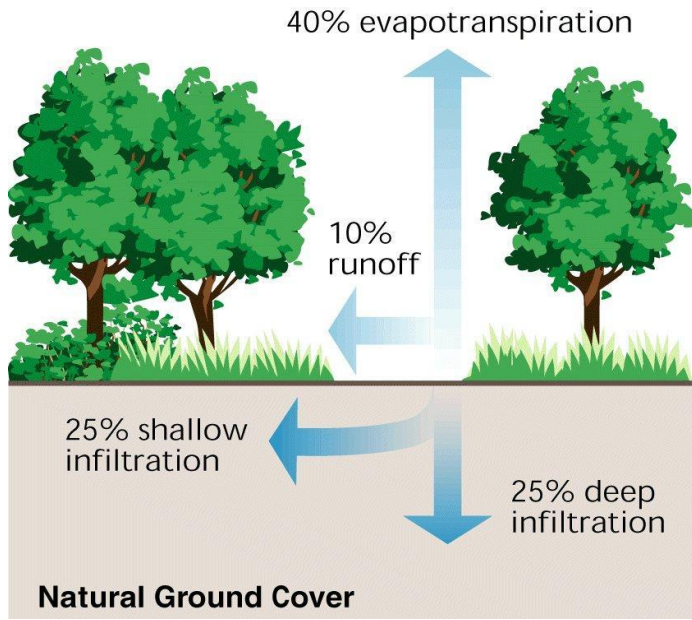
# Sponsored by:

Skagit Conservation District in partnership with the City of Anacortes, City of Burlington, City of Mount Vernon, City of Sedro-Woolley, and Skagit County





WHAT DOES  
GARDENING HAVE TO  
DO WITH  
CONSERVATION?



The amount of area covered by plants affects the amount of water that will infiltrate the soil.

Greater impervious areas result in greater amounts of water runoff.

Plants slow the flow of water and increase the permeability of the soil.

Adding a road here or houses and businesses there, is not necessarily a bad thing, but they do have an effect that needs to be considered.

The amount of impervious surface has steadily increased, but our stormwater system has not kept up and our current stormwater systems are overwhelmed .



Not only that, but when our local Stormwater management system was created, the focus was to channel water away from roads and buildings, as fast as possible, it was not intended to filter runoff.

Stormwater carries trash, bacteria, heavy metals, and other pollutants directly into local waterways. It also moves most of the water far from its origins, to lowland areas where the flows combine, and accumulated water can overwhelm infrastructure and cause erosion and flooding damage.




You don't need to  
start off with big  
expensive changes  
to make a  
difference.

Every little bit  
helps.

Every little thread  
works together in  
the weave of the  
tapestry.

Every thread is  
important in the  
work.



**Start where you are.  
Use what you have.  
Do what you can.**

Arthur Ashe

# What can we do?

Use natural yard care techniques;

Build your soil with compost;

Plant trees, especially natives, to slow and clean rainfall

Don't use pesticides;

Reduce use of fertilizers;

Use porous paving or pavers for walkways, driveways, or patios;

Maintain septic systems;

Fix oil leaks;

Pick up pet waste.



*Small, simple things, that like the threads in a tapestry that work together to become a great thing.*





# Time to make a change.

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Our traditional stormwater  
systems are being  
overwhelmed.



Along with the physical problems with water runoff, there's also the legal problems. Skagit County is required by the EPA to limit the amount of stormwater runoff pollution.



Skagit County is subject to a National Pollutant Discharge Elimination System (NPDES) permit that can result in significant penalties upon the County and property owners if polluted water is discharged to ditches or streams.



Skagit County's Minimum Requirements for managing stormwater depend on

- (1) whether you are inside or outside the NPDES permit area,
- (2) what kind of land use you are building,
- (3) how much hard surface you are creating, and
- (4) how much land disturbing you are doing.

# Basic Rules for Stormwater Management

All projects must follow these rules:

- Runoff may not discharge directly onto the surface of a public road (nor, usually, into a county road ditch).
- Runoff and infiltration must be directed away from septic drain fields.
- Runoff from impervious surfaces, roof drains, and yard drains must be directed so as not to adversely affect adjacent properties.
- Runoff from development may not cause a significant adverse impact to down-gradient properties.
- Stormwater discharges to wetlands are allowed only consistent with the Stormwater Management Manual.



*In other words:*

*Don't let Stormwater run onto the road.*

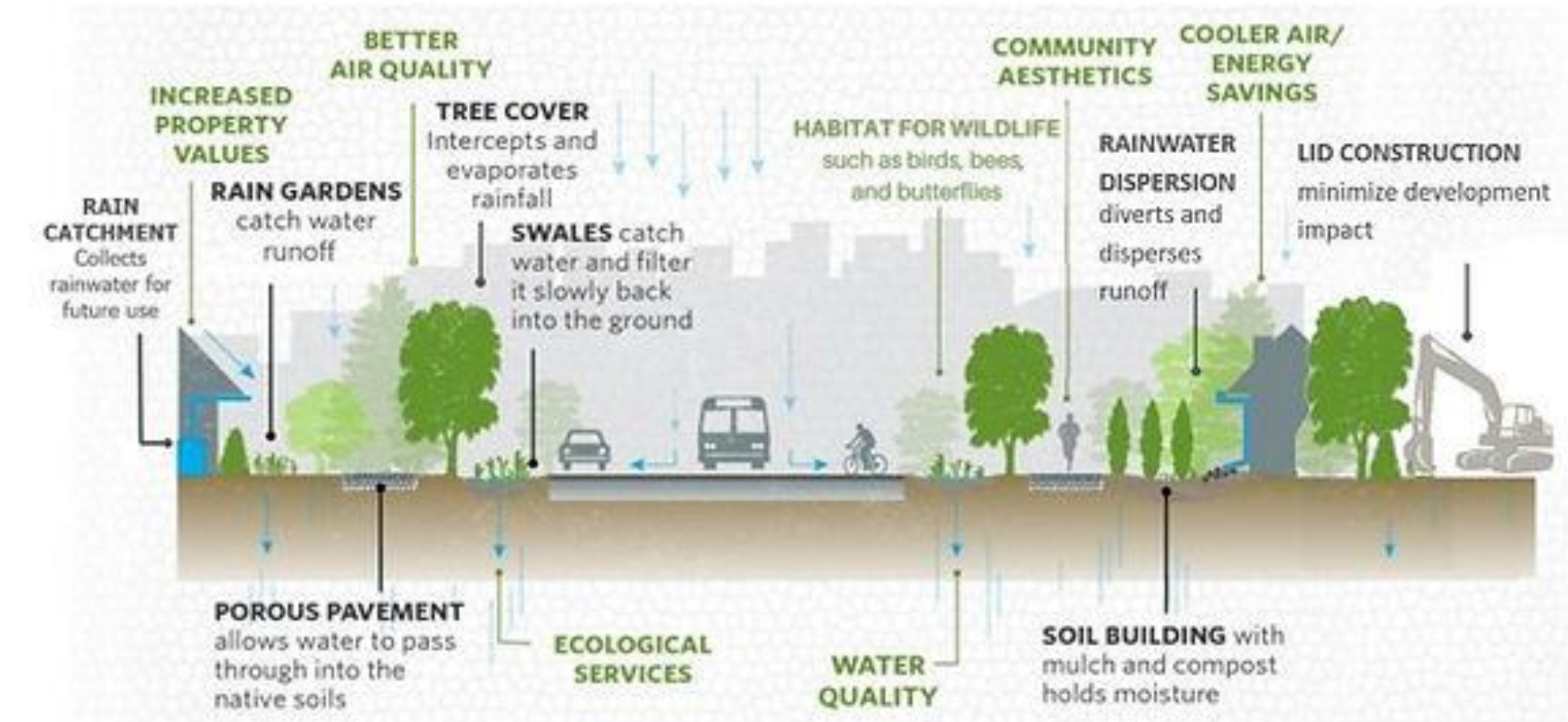
*Don't let it run into the neighbor's property.*

*Don't let it impact anyone down hill.*

*And keep it away from septic tanks, drain fields, underground pipes and wires.*

In order to control and reduce stormwater runoff inside the NPDES Permit Area and the Special Flood Hazard Area, LID techniques are required unless not feasible.

**LID is the preferred approach to stormwater management in Skagit County**



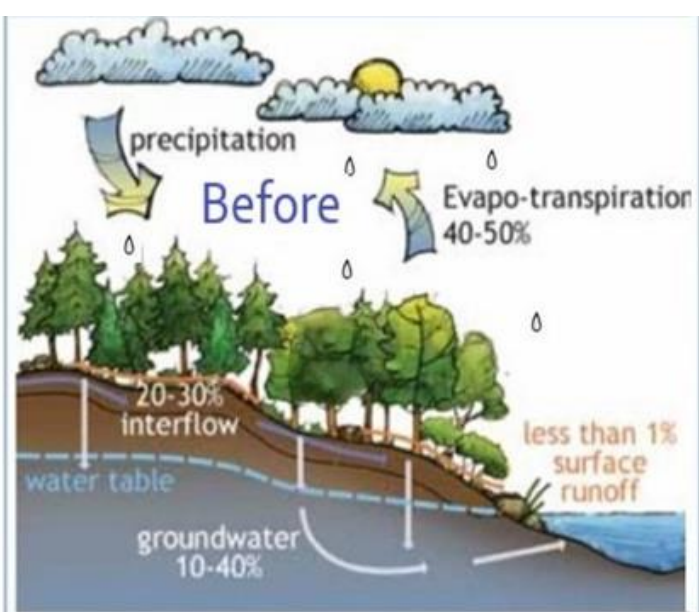
Low Impact Development (LID) is a stormwater management approach that works with nature to manage rainwater as close to where it falls as possible.



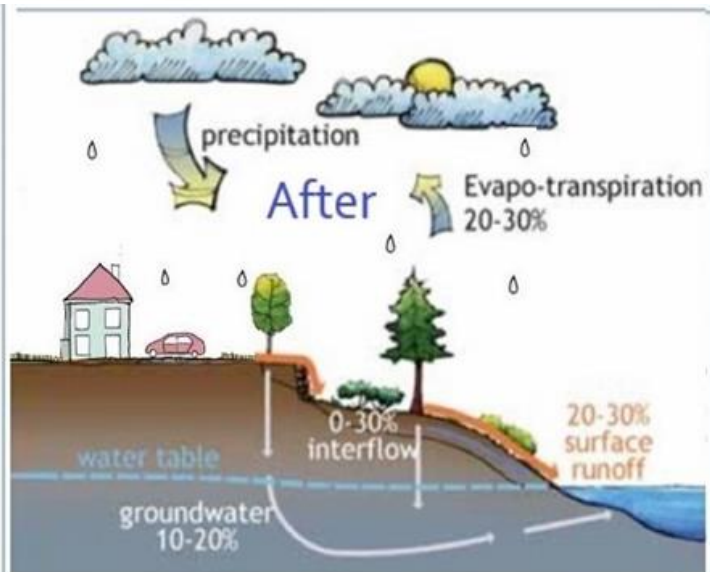
BEFORE



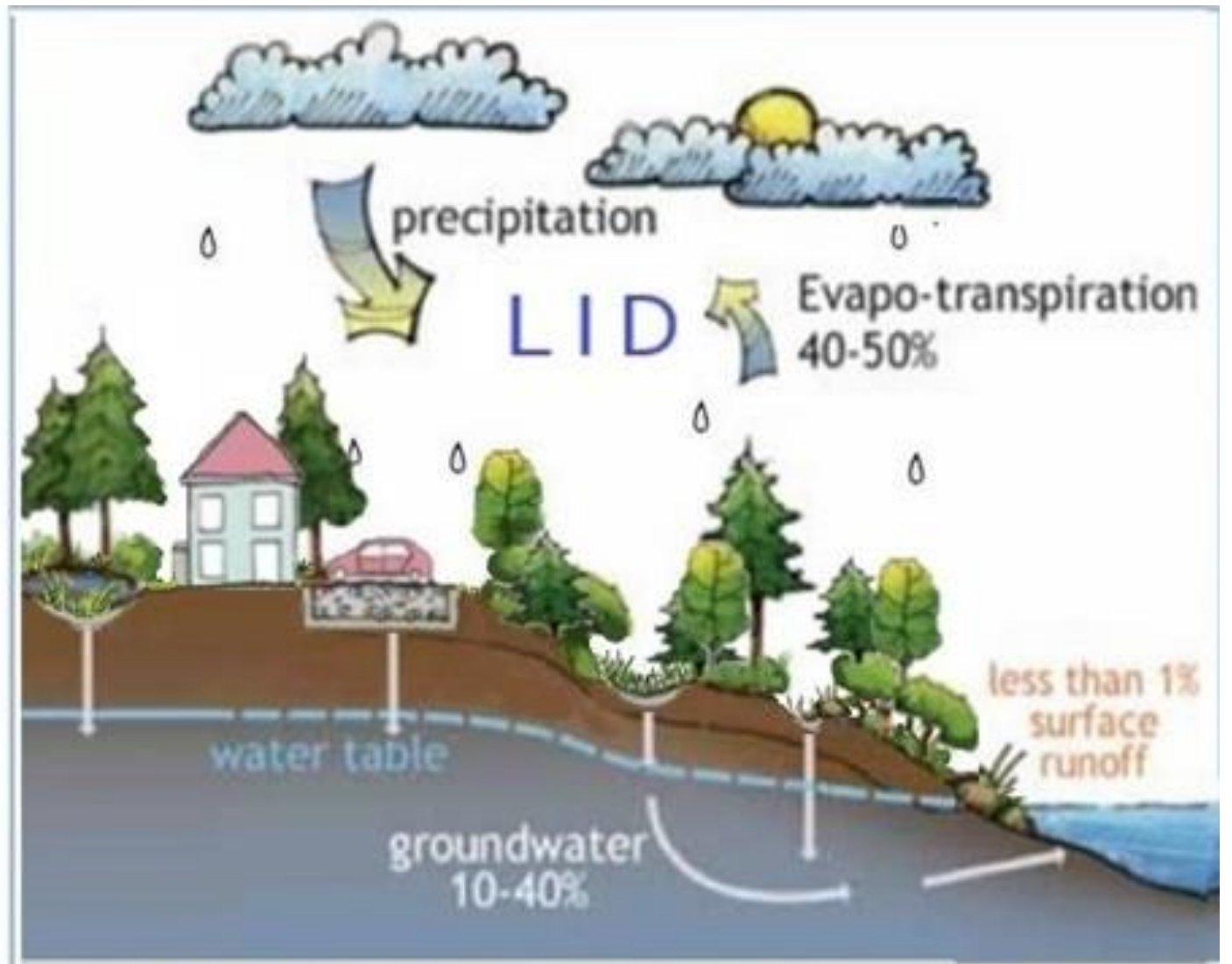
AFTER



Before Development, almost all rainfall is taken up by plants, evaporates, or infiltrates the ground.

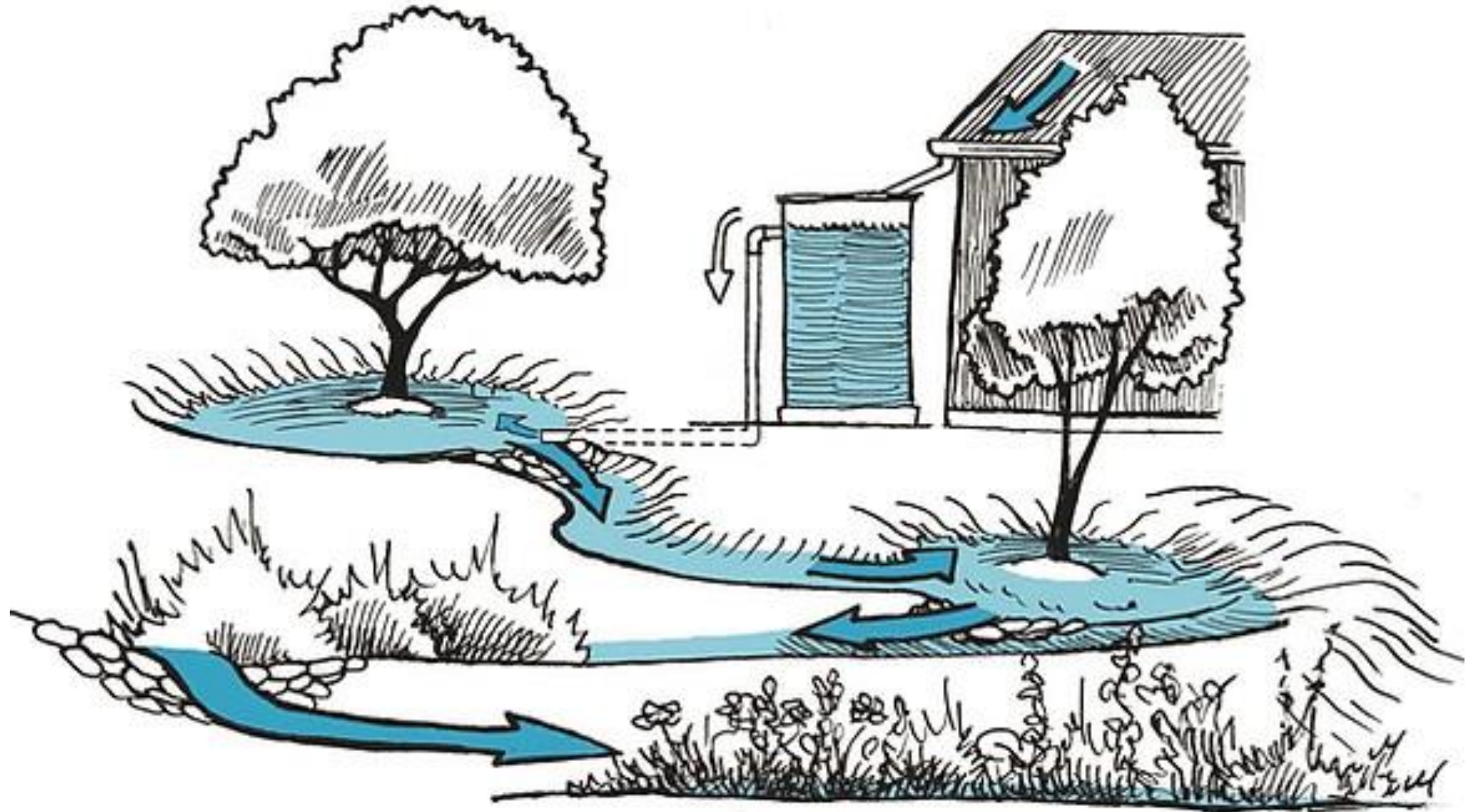


After conventional development, surface runoff increases, while evaporation and infiltration decrease.



Low Impact Development mimics nature to reduce runoff and increase infiltration.

Low Impact Development promotes the view of rainwater as a resource to be preserved and protected, not a nuisance to be eliminated.





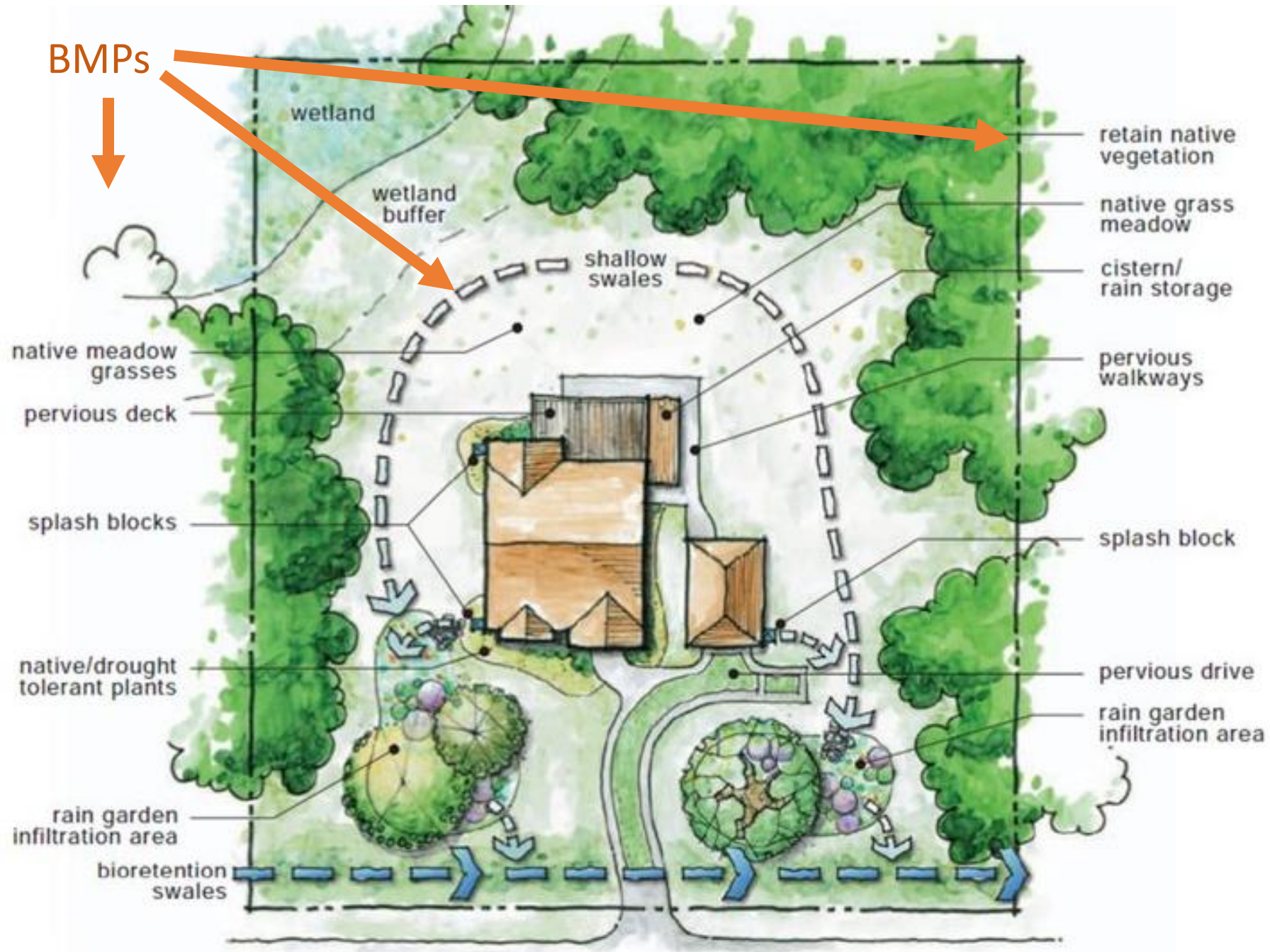
## Benefits of Low Impact Development?

- It can cost less to build and maintain than traditional stormwater systems.
- It reduces local flooding during storms
- It restores water to onsite aquifers.
- It reduces water pollution.
- Conventional approaches to control runoff are not adequate

## The Basics of LID

- **Minimize site disturbance and protect native soils and vegetation**
  - (Don't remove native trees and shrubs unnecessarily. Do not disturb or compact soil unnecessarily.)
- **Use on-site natural features**
  - (Let the site work for you.)
- **Manage stormwater close to the source**
  - (Don't let the water leave the site).
- **Distribute stormwater Best Management Practices (BMPs)**
  - (Use BMPs effectively throughout the site.)

BMPs



Distribute stormwater Best Management Practices (BMPs) to manage stormwater close to the source.

Evaluate how surface water will move on the site.

Determine the most effective BMP(s) to minimize or prevent surface water from leaving the site.

# Minimize site disturbance

Minimize soil disturbance, compaction, and retain native plants.

**#1**  
One of the best and  
easiest ways to  
reduce runoff is to  
minimize site  
disturbance.



**Less damage = Less repair**

# Best Management Practices

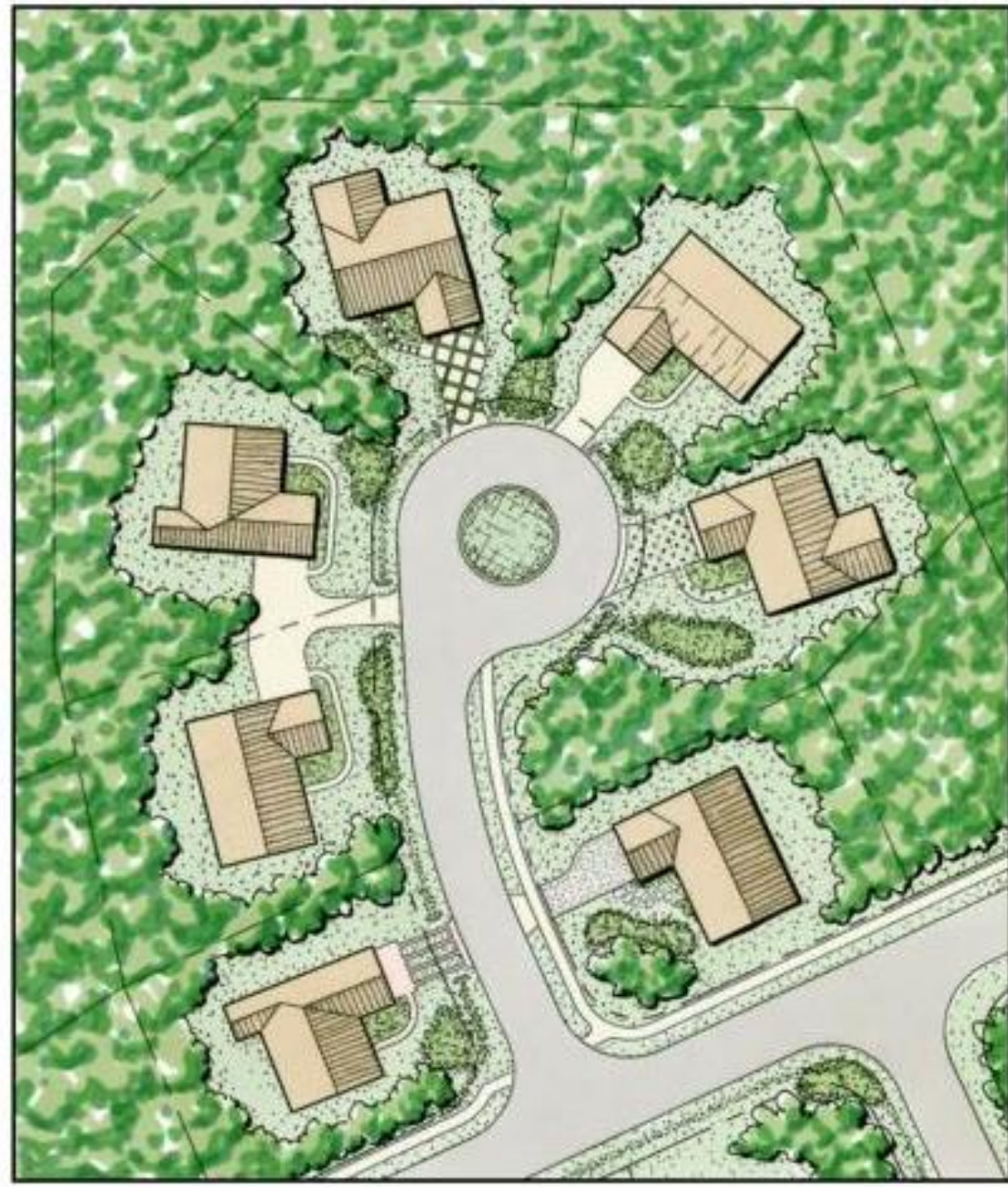
## New Construction

- Retain and protect native topsoil and vegetation (especially trees)
- Store and reuse topsoil from site
- Retain buffer vegetation along waterways
- Restore disturbed soils by adding mulch and/or compost

## Existing Landscapes

- Mulch beds with organic mulches (leaves, wood chips, compost), and top-dress turf with compost
- Minimal turf and well-planted areas that include native plants
- Avoid overuse of chemicals, which may damage soil life

Clear only what needs to be cleared for the project.



# Rainwater Harvesting

Another method (BMP) of limiting rainwater runoff is rainwater harvesting, also known as rainwater catchment or rainwater collection. It is the simple act of collecting the rainwater that runs off the hardscapes on your site for beneficial use.



## Rainwater collection is legal in the State of Washington

Residents of Washington state may harvest rainwater without a permit as long as:

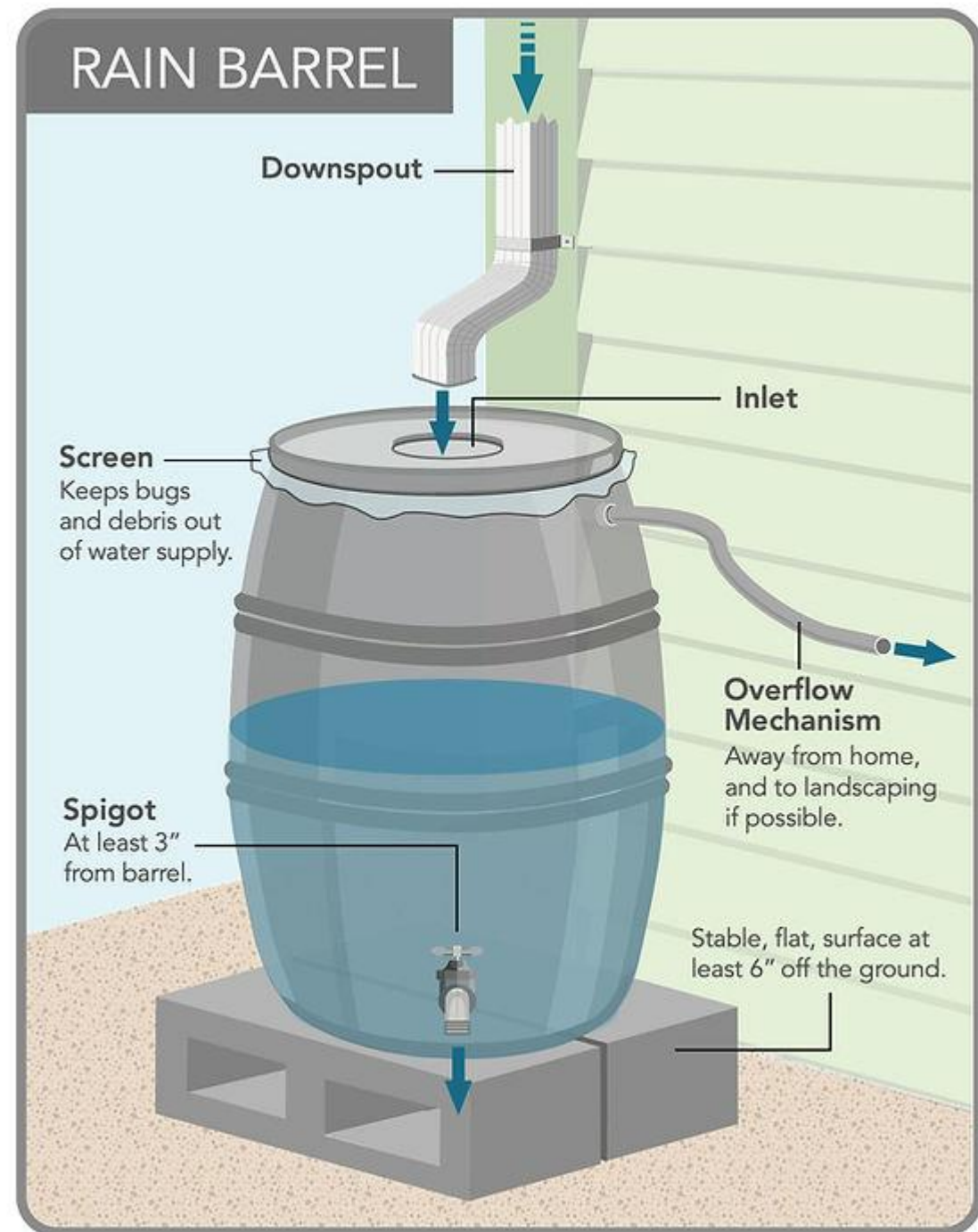
- it's used on the property from which it was collected
- it's collected on an existing rooftop

Washington state law even authorizes counties to reduce rates for stormwater control facilities that utilize rainwater harvesting. Wash. Rev. Code §36.89.080.

WA Dept of Ecology  
Interpretive Policy  
Statement

Collecting rain during the wet season to use during the dry season can potentially help homeowners lower water bills on lawn maintenance among other things.

- Only use food-grade barrels.
- Avoid collecting rainwater from roofs that have been treated with chemicals (ie. moss killers, zinc strips, etc.).
- Never use your rain barrel water for drinking or washing.
- Mosquito control is important
- Be sure to place your rain barrel on a strong, sturdy, and flat base.
- Check your rain barrel on a regular basis.



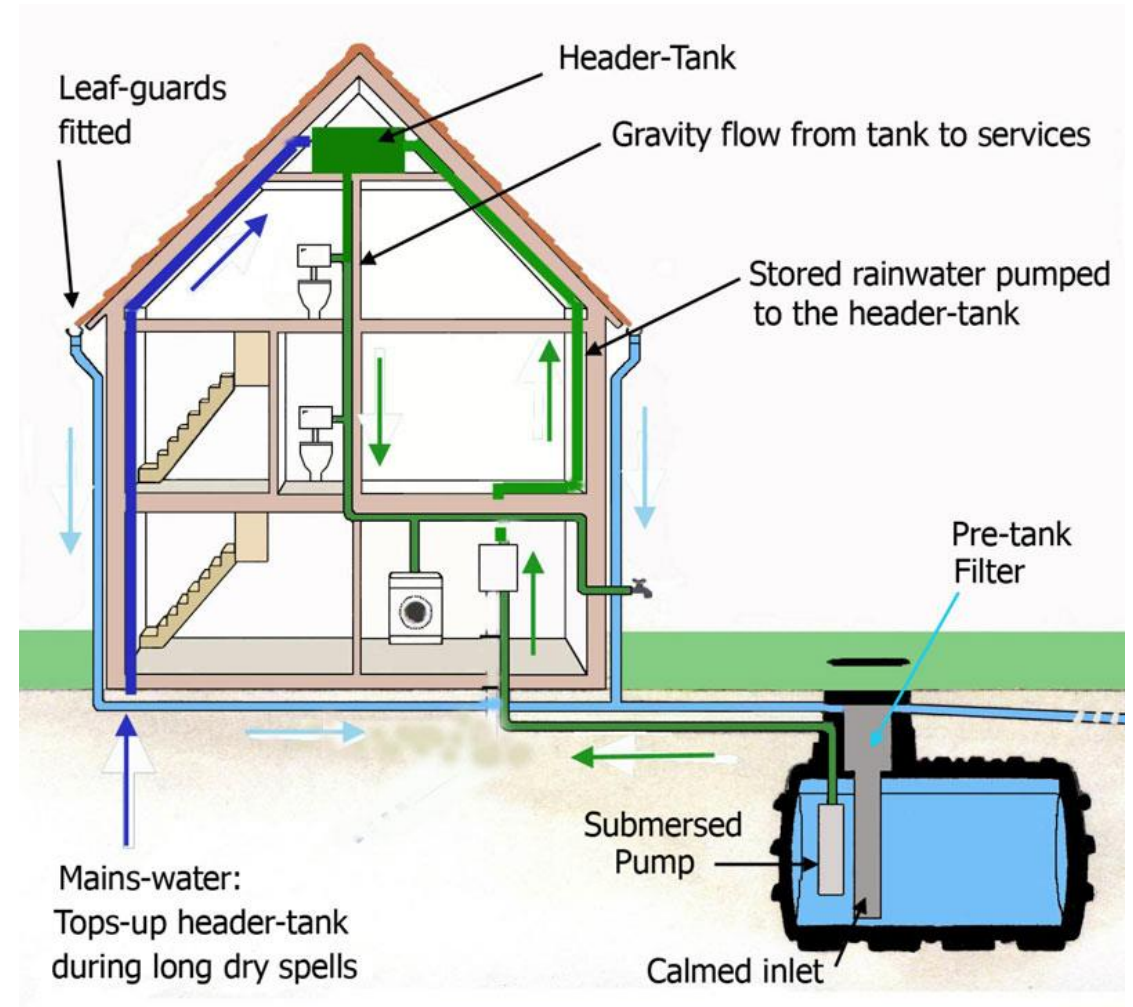


## Pros:

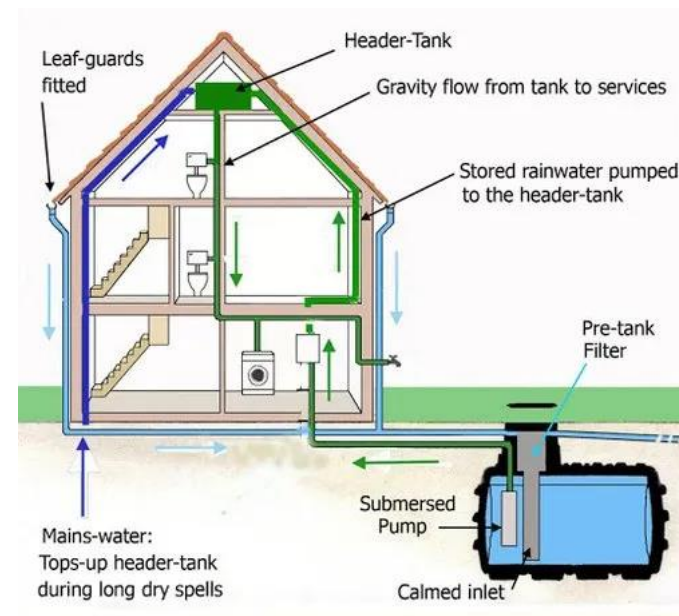
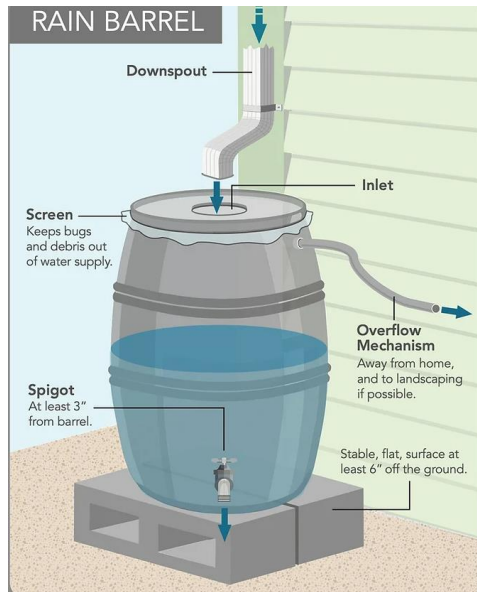
- Stored rainwater can be used for domestic tasks and landscape irrigation;
- systems are easily assembled with little professional help;
- systems can be as simple as storing runoff water in a drum at the end of your rain gutter;
- systems can be inexpensive;
- systems are easily reconfigured, expanded, and relocate if needed;

## Cons:

- The mains pressure is often higher than what a pump can produce and the mains pressure can stop the tank water from coming through the pipes.
- There are strict government regulations concerning the connection of mains water and tank water systems. The intention is to prevent tank water systems possibly contaminating the mains system. A licensed plumber must install this type of connection. These regulations don't apply if the systems are plumbed separately.



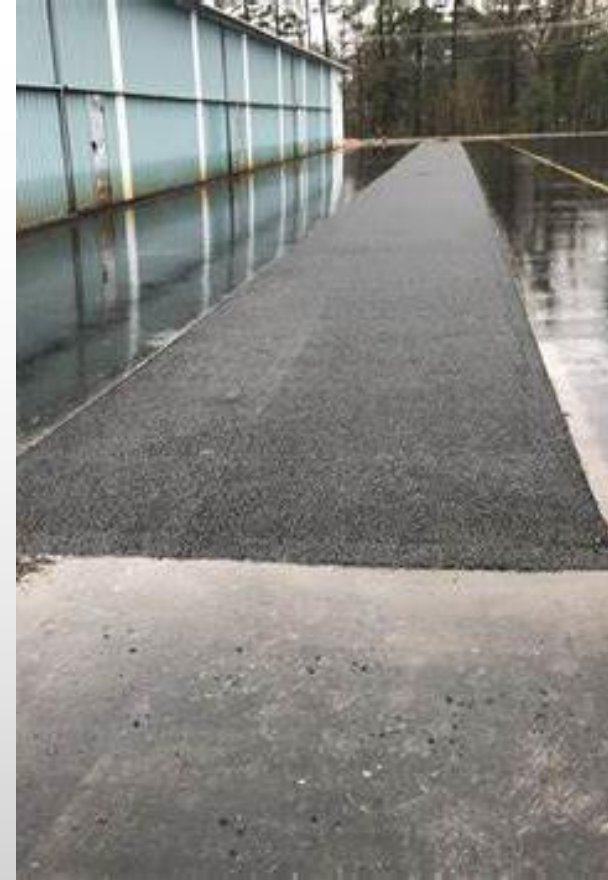
# Rainwater harvesting comes in all sizes. Pick the one that's right for you.



## LID BMP -Reduce paved area

Minimize impermeable surfaces by making narrower driveways, using pavement with grass strips at edges or middle, or using permeable concrete, permeable asphalt, or Porous pavers.





## LID BMP -Pervious Pavements

Permeable pavement is a term given to several types of pavement with a porous surfaces which allow the water to infiltrate to the soil below or is drained via a drain tile. The stone or gravel in or underneath the tiles acts as a natural filter and clears the water of pollutants. All pervious pavements require a base preparation that is different from traditional pavements and needs to be designed for infiltration. Proper installation is critical to long term function.

It is important to note that one size does not fit all - there are pros and cons for use of each type of permeable pavements



## Pervious Pavements in general

### Pros

- Do not produce a 'heat island'
- Can be made using recycled materials
- Manages excessive runoff
- Reduces erosion
- Filters pollutants
- Better for nearby plants and trees
- Standing water does not accumulate

### Cons

- Can be more expensive to install
- Needs regular cleaning to maintain permeability
- Not as strong as traditional pavements
- Potentially poor performance on sloped land
- Potentially Less suitable for frigid climates
- Not suitable for high volumes and extreme loads
- Not appropriate for hazardous material areas

**Pervious Concrete** is like conventional concrete but with less fine aggregate content, leaving open spaces for water to pass through.

- The only permeable pavement that is rigid
- Works well for parking lots, bike lanes, driveways, and sidewalks

Pervious Concrete is an expensive option and typically not well-suited for large commercial applications. For smaller areas, however, and where vehicle use is limited, it is an option that encourages water absorption into the soil below. Its primary disadvantage is the relatively high cost and the need for routine upkeep and repairs.



**Porous Asphalt** is like conventional asphalt but with less fine aggregate content, leaving open spaces for water to pass through.

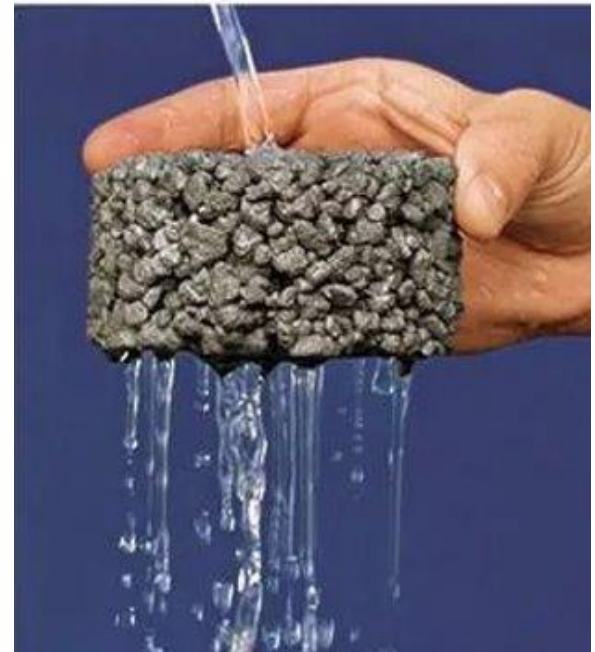
- Flexible

### **Pros**

- Can be installed with regular asphalt machinery
- Can be very durable

### **Cons**

- Porous asphalt requires more maintenance
- Has a shorter lifespan (Porous asphalt up to 20 years, regular asphalt up to 30 years).
- Lower load-bearing capacity than conventional pavement.
- May be difficult to find source (especially for small projects)



## Aggregate Pavers (Pervious Pavers)

Pervious pavers, like pervious concrete, allow stormwater to percolate through the surface of the pavers into a system of aggregate layers beneath the surface that accepts the stormwater prior to the water percolating into the sub-grade or being piped away. Pervious pavers let the ground below breathe and allow tree roots and their supporting microbes to interact.

- Flexible
- Capable of high vehicle loads. Used for lower speeds

### Pros

- Variety
- Durable
- Easy To Repair
- Less Finishing Time

### Cons

- More expensive
- Not as strong as traditional or asphalt pavements





## Special Maintenance Considerations for Pervious Concrete, Porous Asphalt, and Pervious Pavers

Prevent Clogging of Pavement Surface with Sediment

Vacuum pavement twice per year

Maintain planted areas adjacent to pavement

Immediately clean any soil deposited on pavement

Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement  
surface

Clean inlets draining to the subsurface bed twice per year



## Permeable pavers

Permeable pavers are different from pervious and porous pavers in that they are composed of concrete or fired clay brick. The pavers are separated by joints filled with crushed aggregate. The water flows *around* the paver into a system of aggregate layers beneath the surface that accepts the stormwater

- Flexible
- Capable of high vehicle loads. Used for lower speeds

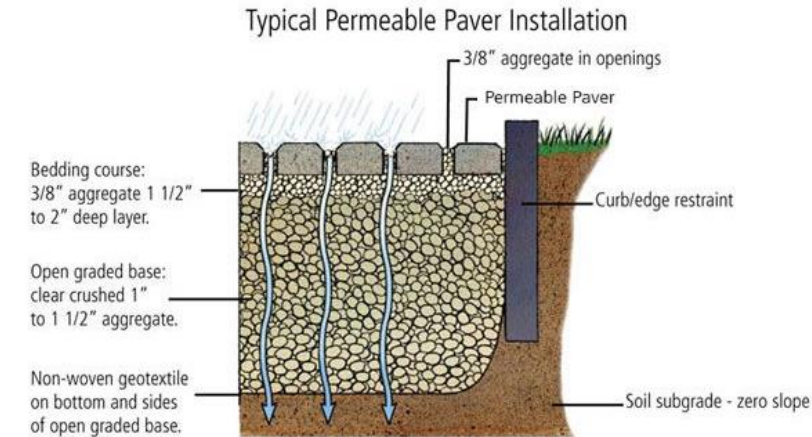
The cost of installation can be high. It is not a good option for parking areas but can be very attractive for garden pathways or patios even in commercial settings.

### Pros

- Fairly easy to install
- Easy to replace/repair small sections
- Longer life than asphalt
- Cooler surfaces

### Cons

- Not as Durable as Traditional Pavers. It is more brittle than conventional concrete.
- Can be more expensive to install than traditional pavers.



**Turf block pavers** or grow-through pavers—are an alternative to asphalt, concrete, and traditional pavers. They're made of concrete or recycled plastic with open cells that allow grass to grow through them. They're a porous, eco-friendly option for driveways and parking areas.

### **Pros**

Grass block pavers have the highest permeability of any of the pervious pavement. They reduce stormwater runoff, filter pollutants, and recharge groundwater. They keep your driveway cooler, thanks to transpiration from that grass.

### **Cons**

Grass block pavers have grass, so they come with the same drawbacks as a turf lawn. (They need to be watered. They need to be mowed. They get weeds, etc.) They can cost twice as much as asphalt. They last half as long as concrete and asphalt, which need to be replaced in 20 to 30 years, Grass block pavers will need to be replaced every 10 to 15 years in a residential driveway. They'll last only five years in a commercial driveway.



**Concrete Turf block pavers** or grow-through pavers have open cells that allow grass to grow through them.

### **Pros**

- Not as prone to clogging as other permeable pavers
- Increase curb appeal.
- More sturdy than plastic pavers

### **Cons**

- Extra Care Requirements (Weeds in grass pavers are a significant issue and it is important to keep the area watered and maintained by mowing.)
- May have high installation costs and difficulty installing in certain soil types.
- Break down more quickly than traditional concrete patios.



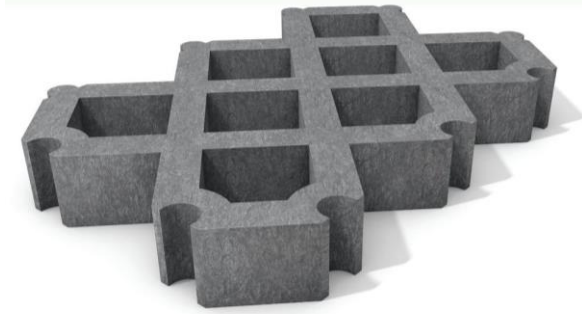
**Heavy Duty Plastic Turf block pavers** or grow-through pavers have open cells that allow grass to grow through them.

### **Pros**

- Not as prone to clogging as other permeable pavers
- Made with extra strength patented recycled plastic.
- Lighter than concrete
- Not susceptible to free-thaw damage
- Easy for one person to install
- Non-porous so does not absorb moisture from the soil

### **Cons**

- Extra Care Requirements (Weeds in grass pavers are a significant issue and it is important to keep the area watered and maintained by mowing.)
- May have high installation costs and difficulty installing in certain soil types.
- May not last as long as traditional concrete patios.



## Plastic Grid Pavers in General

Plastic grid pavers are a type of open-cell unit paver. They can be filled with gravel or soil and turf planted in the cells. Water drains through the pavers into a system of aggregate layers beneath the surface that accepts the stormwater prior to the water percolating into the sub-grade or being piped away.

- Flexible
- Largest amount of void space for permeable pavement wearing course layer
- Grids are appropriate for trails, paths, maintenance access roads in parks, and parking lots
- Capable of high vehicle loads
- Best suited for low speeds and infrequent vehicular traffic

### Pros

- They're easy to install
- Less expensive than other pavements
- Not as prone to clogging as other permeable pavers

### Cons

- They Break Down Faster than traditional pavers
- Not as level surface as traditional pavers
- Not as easy to repair
- Grass maintenance and watering
- Weeding



**Rolled plastic paving** — For increased flexibility, plastic paving systems can be rolled for easy storage and shipping. For grass- or gravel-filled applications, these are used primarily for foot traffic and light load applications.

**Pros**

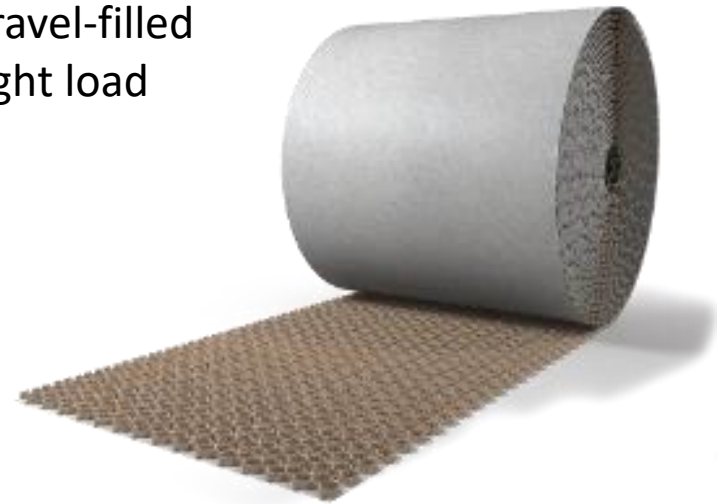
- Typically made from 100% recycled plastic
- Less expensive than other pavements

**Cons**

- Lower Strength: The cell walls in rolled pavers are thinner than other plastic paving systems
- Stake Installation Required
- Clogging: Some rolled plastic pavers have a fabric attached to the bottom of the paver to add strength

**Not Recommended for:**

- Traffic on slopes exceeding a 10% grade
- To support tread driven vehicles
- Frequent use traffic, since grass will not have time to recover



**Geocell Pavers** are a load support and erosion control product, made of geotextile fabric, used to provide strength, stability, and erosion control to base layers of soil, sand, gravel and rock.

### Pros

- Less expensive than other pavements
- When filled with a suitable aggregate, it has lateral strength and retention that prevents the material from shifting sideways
- Helps spread out applied weight and reduces erosion.

### Cons

- Little Compressive or Tensile Strength
- Challenging Installation and stakes required
- May not last as long as other pavers

Improper application or installation and/or differential settlement is the primary cause of problems with this system.





**Rigid plastic pavers** —Rigidity results in good compression strength in product lab tests, but the lack of designed-in flexibility can cause issues in real world applications that aren't completely flat or that have commercial traffic or heavy loads. These are generally used only for grass-filled applications. Suitable for light-duty grass applications:

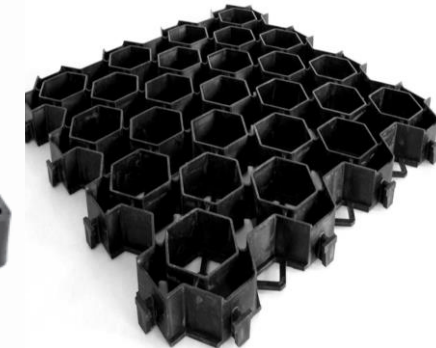
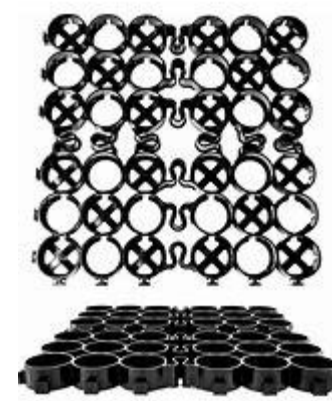
**Pros**

- Less expensive than many other pavers
- More durable than Rolled plastic paving and Geocell Pavers

**Cons**

- Low Flexibility
- Lower torsional strength
- Susceptible to Cracking

Improper application or installation and/or differential settlement is the primary cause of problems with this system.



## **Commercial and industrial strength semi-flexible, cellular plastic grids**

Semi-flexible plastic grid that is available for heavy commercial and industrial use has cells of varying size that are designed to be filled with gravel or grass.

- This material moves to some extent with vehicle traffic, but it does not crack,
- More durable than other plastic grids



## Special Maintenance Considerations for Permeable pavers and Turf block pavers

Prevent Clogging of Pavement Surface with Sediment

Maintain gravel or turf fill at the appropriate level

Prevent weeds and maintain health of turf fill

Do not allow construction staging, soil/mulch storage, etc. on unprotected  
pavement surface



## Summary of Permeable Pavement Design Requirements

Site and design requirements can help you decide if permeable pavement might be appropriate for your project.

- Permeable pavement is allowed on surfaces with slopes no greater than 5 percent.
- Underlying soils should have a minimum infiltration rate of 2 inches per hour.
- There are no setback requirements for permeable pavement.
- There must be 5 feet between the high groundwater level and the excavated bottom.
- The subgrade next to structures should slope away from the structures.
- Use a minimum of 6 inches of washed, crushed 2- to  $\frac{3}{4}$ -inch or No. 57 rock under concrete or asphalt.
- Consult the Stormwater Management Manual regarding required edge restraints.

For best results, keep in mind the following construction considerations:

- Protect the subgrade from over-compaction during excavation.
- Do not excavate or compact the native subgrade in wet conditions.
- Plan the sequence of construction to protect the subgrade from traffic.
- Protect the paving from construction traffic and sediment after installation.

## LID BMP -Minimal Excavation Foundations

are defined as those foundation technologies that engage intact existing soil strength with minimal or no excavation, and do not disturb, or significantly compact the natural soil profile within the footprint of the structure when installed. This preserves most of the hydrologic properties of the native soil.

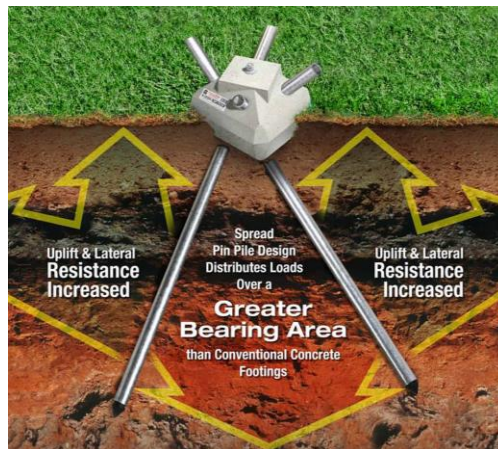
Minimal excavation foundations can be used to partially or completely achieve the LID Performance Standard associated with MR #5: On-site Stormwater Management, and the flow control standard associated with MR #7: Flow Control (Table II-5.16).



*Less land disturbance means fewer MR stormwater controls will be needed.*

Pin pile, screw pile, and cluster pile foundations are examples of minimal excavation foundations, as well as post and beam, grade beam or fin wall structures. Selection of an appropriate foundation system is dependent upon soil and groundwater conditions, slope, type of structure

On minimal excavation foundations, structural loads are transferred from a beam through a pin, pile, or post system to a supportive layer of earth underneath the desired permeable layer, which preserves the natural drainage patterns of the soil beneath the structure.



## Pin Foundation

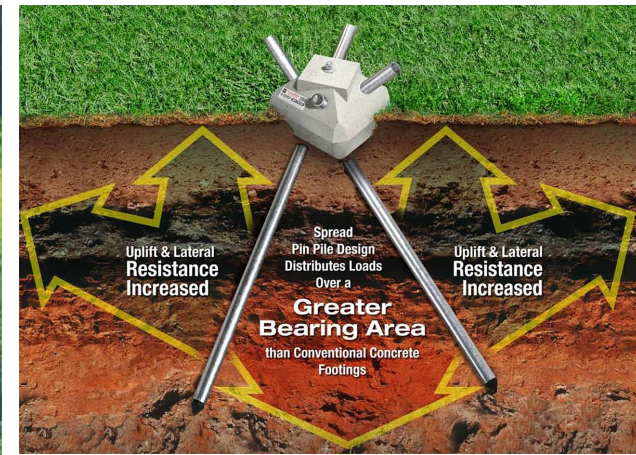
Pin Foundations can use a steel-reinforced perimeter grade beam, poured in reusable concrete forms resting on a gravel bedding or pre-cast in concrete. Soil and site characteristics must be determined since pin foundations are pre-engineered systems.

Since existing vegetation remains in place during the entire construction process, soil continues to absorb and process rain water as it always has.

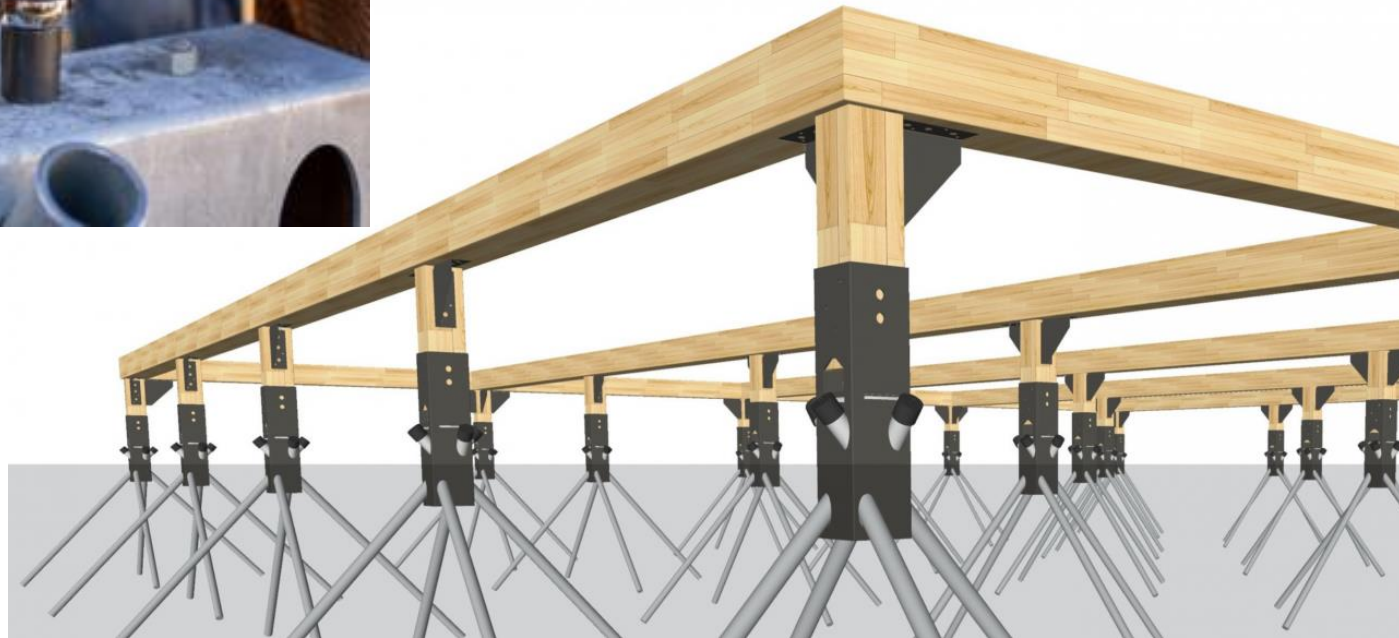
Once the beams are in place, a jackhammer drives heavy steel pins through angled channels to depths of 5 to 9 feet, depending on soil conditions. The pins criss-cross from opposite sides of the beams to provide a stable foundation. The number of pins is determined by the weight of the building and the soil profile.

A mud sill is generally bolted to the grade beam.

Once the foundation is pinned down, construction of the structure proceeds as it would on any conventional building site.



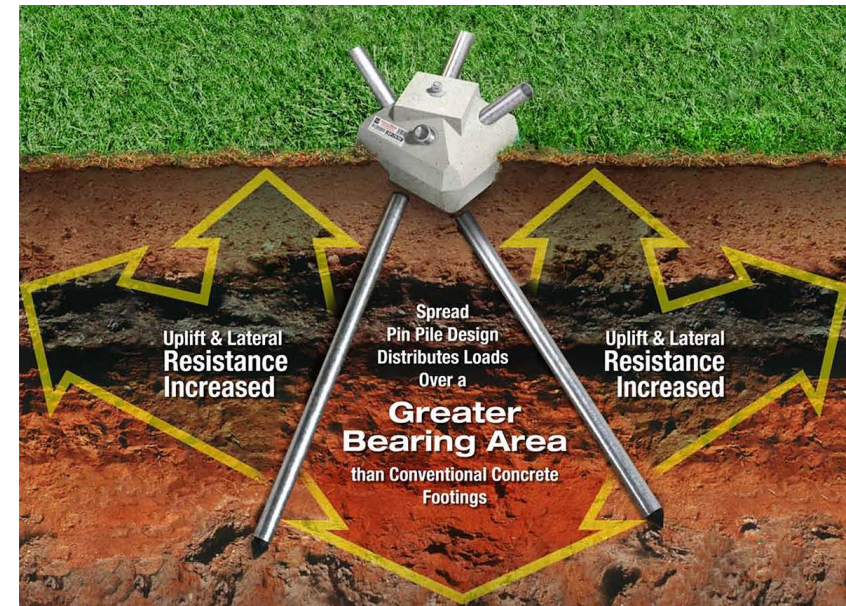
# Ground Frame Pin Foundation system





## Diamond Pier Foundation

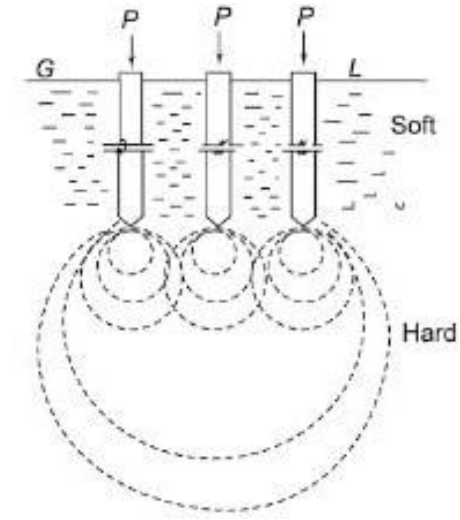
Diamond Pier foundation uses the strength of a precast concrete head to lock in four weight-bearing, galvanized steel pins that transfer the load to a larger area of undisturbed soil



# Pile Foundations

Pile foundations are deep foundations, formed by long, slender, columnar elements typically made from steel or reinforced concrete (or sometimes timber). A foundation is described as 'piled' when its depth is more than three times its breadth.

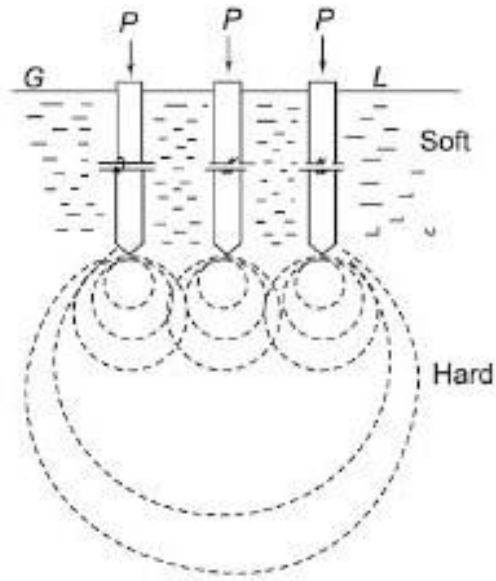
The main purpose of a pile foundation in Low Impact Development is to maintain the uncompacted permeability of the soil by passing through it, ending the pile foundation into strata that has adequate bearing capacity.



# Pin Pile Foundations

Pin Pile Foundations keep topsoil and natural drainage intact, so the home's entire footprint is considered to be pervious. Normal excavation and soil disturbance permits are not needed as Pin Pier foundations sit on the topsoil, eliminating all excavation and soil compaction.

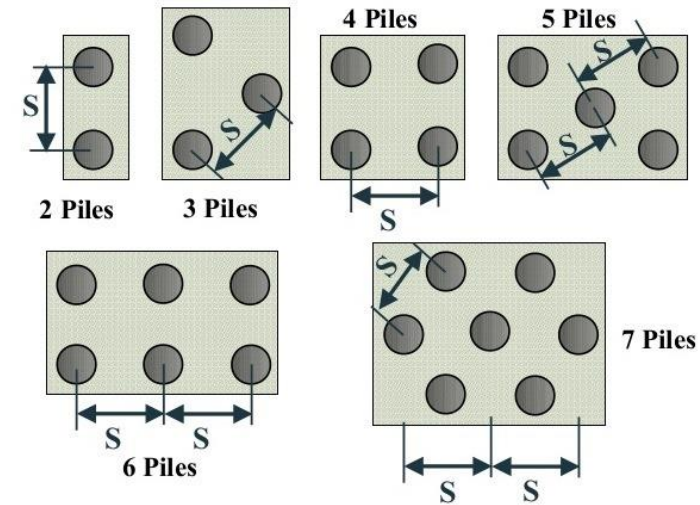
A Washington state-certified engineer's stamp of approval is needed on loading and design. After the concrete footings and steel pipes are installed, an inspector checks depths and bracket orientation with the engineered plan before construction begins.



Depending upon the condition, a **cluster of piles** can be inserted to improve the bearing capacity. Pile foundation spacing and skin friction in a pile group decides the design of pile foundation, its efficiency and capacity in any construction.

Piles that transfer the load to or through an underlying stratum by means of friction is called the **friction pile**. Here one of the embedded surfaces is the pile surface. **End bearing piles** are piles that transfer the load to the lower stratum. Specially designed piles will transmit the load by both the means.

This type of foundation generally adopted whenever hard strata are available at great depth and bedding is uneven or the topsoil has a poor bearing capacity or there are large fluctuations in subsoil water level, or the topsoil is of expansive nature. Pile foundation transfers the load through friction as well as bearing



The piles must be arranged so that the force exerted by one of the piles on the other is least because the soil surrounding the piles are in a stressed condition. This force exertion will affect the frictional resisting capacity of the neighboring piles.

Helical Piles (also called helical anchors or Screw piles) The helix can run down the entire length of the shaft or only cover the tip. The material, size, thickness, configuration, etc. depends on the unique requirements of each construction project. Helical piles can rotate and can bore into the ground. The installation requires special rotary attachments or high torque drivers at a slow speed. The torque driver is mounted on a mini-excavator or a skid steer loader which allows them to be driven to the specified depth necessary to achieve desired strength and capacity. The depth is determined by monitoring the machine's hydraulic pressure and installation torque.



To minimize soil compaction, heavy equipment, including pile driving equipment that would degrade the natural soil profile's ability to retain, drain and/or filter stormwater cannot be used within or immediately surrounding the building. Tracked equipment weighing 650 psf or less is acceptable. BMP T5.19

Construction is done by Grading the site by blading or surface terracing using light tracked equipment. Piles are driven using a machine mounted, frame mounted, or hand-held automatic hammer. Connection component (pre-cast or poured-in-place) is installed, and plastic vapor barrier installed in the crawlspace

**You must hire a licensed geotechnical engineer to design and implement pin, pile, and post foundations.**

### **Challenges**

- Building code barriers
- Architectural fees and structural engineering costs may be prohibitive
- Contractors experienced in Minimal Excavation foundations may be difficult to find

## LID BMP -Green roofs

Also known as an ecoroof, vegetated roof, or living roof, is a special roof system that allows for plants to grow on top of the roof's surface.



### Pros:

Temperature moderating effects.

Improved Air Quality.

Noise attenuation.

Filters Rainwater runoff.

Benefits Birds, bees, butterflies.

### Cons:

Cost.

Not easy to build or maintain.

Structural Limitations.



### Types of green roof systems:

Extensive, Semi-Intensive, Intensive

Each type of roof has their specific applications and drawbacks.

## Green Roof Considerations

**Increased structural load.** The structural engineer must factor in the weight of completely saturated soil since the plantings and the soil will hold a significant amount of water.

**Type and lifetime of the roof membrane** that will be used. Green roofs tend to improve the life of the roof membrane because it is completely covered by plantings and isn't exposed to the sun's harsh UV rays. However, the membrane may be exposed to plant roots, animals and insects, and fertilizer chemicals. It is important that a protective barrier be used over the waterproofing membrane.

**Maintenance** is also important to consider when designing a green roof. The owner should understand that a green roof requires routine landscape maintenance, which can vary from occasional to regular.







EXTENSIVE GREEN ROOF	SEMI-INTENSIVE GREEN ROOF	INTENSIVE GREEN ROOF
<b>Height:</b> 6- 20 cm	<b>Height :</b> 12 - 25 cm	<b>Height :</b> 15 cm > 1m
<b>Weight:</b> 60 - 150 kg/m <sup>2</sup>	<b>Weight :</b> 120 - 200 kg/m <sup>2</sup>	<b>Weight :</b> 180 - 500 kg/m <sup>2</sup>
<b>Vegetation:</b> mosses, sedums, herbs and grasses	<b>Vegetation :</b> grasses, herbs and shrubs	<b>Vegetation :</b> lawn, perennials, shrubs and small trees
<b>Cost:</b> low	<b>Cost:</b> middle	<b>Cost:</b> high
<b>Maintenance:</b> low	<b>Maintenance :</b> periodically	<b>Maintenance :</b> regularly

## Extensive

Extensive green roofs are the most common type of green roof, with a shallow soil depth of 4 to 6 inches, suitable for growing varieties of grasses and sedum. They are the least expensive to install and generally cover all or large portions of a roof. The plants, if chosen correctly for the climate, need very little maintenance and rarely need water so an irrigation system is not required.

	EXTENSIVE
<b>Plant Options</b>	sedum, moss, grass
<b>Soil Depth</b>	2" to 5" Deep
<b>Dry Weight</b>	10 to 25 pounds dry weight
<b>System Types</b>	Tray, Built-Up
<b>Maintenance</b>	Minimal
<b>First Cost</b>	Low



## Semi-Intensive

Semi-intensive green roofs have a slightly deeper soil depth, between 6 to 12 inches. In addition to the mosses, grasses, and sedum of extensive roofs, semi-intensive plantings include herbs, flowering plants, taller grasses, and small shrubs. They are typically constructed in layers, but can also be installed using a tray system. May require a bit more maintenance, but generally no more than would be expected for sidewalk planters.

	SEMI-INTENSIVE
<b>Plant Options</b>	sedum, moss, grass, herbs, flowers, shrubs
<b>Soil Depth</b>	5" to 8" Deep
<b>Dry Weight</b>	25 to 40 pounds dry weight
<b>System Types</b>	Tray, Built-Up
<b>Maintenance</b>	Occasional / Routine
<b>First Cost</b>	



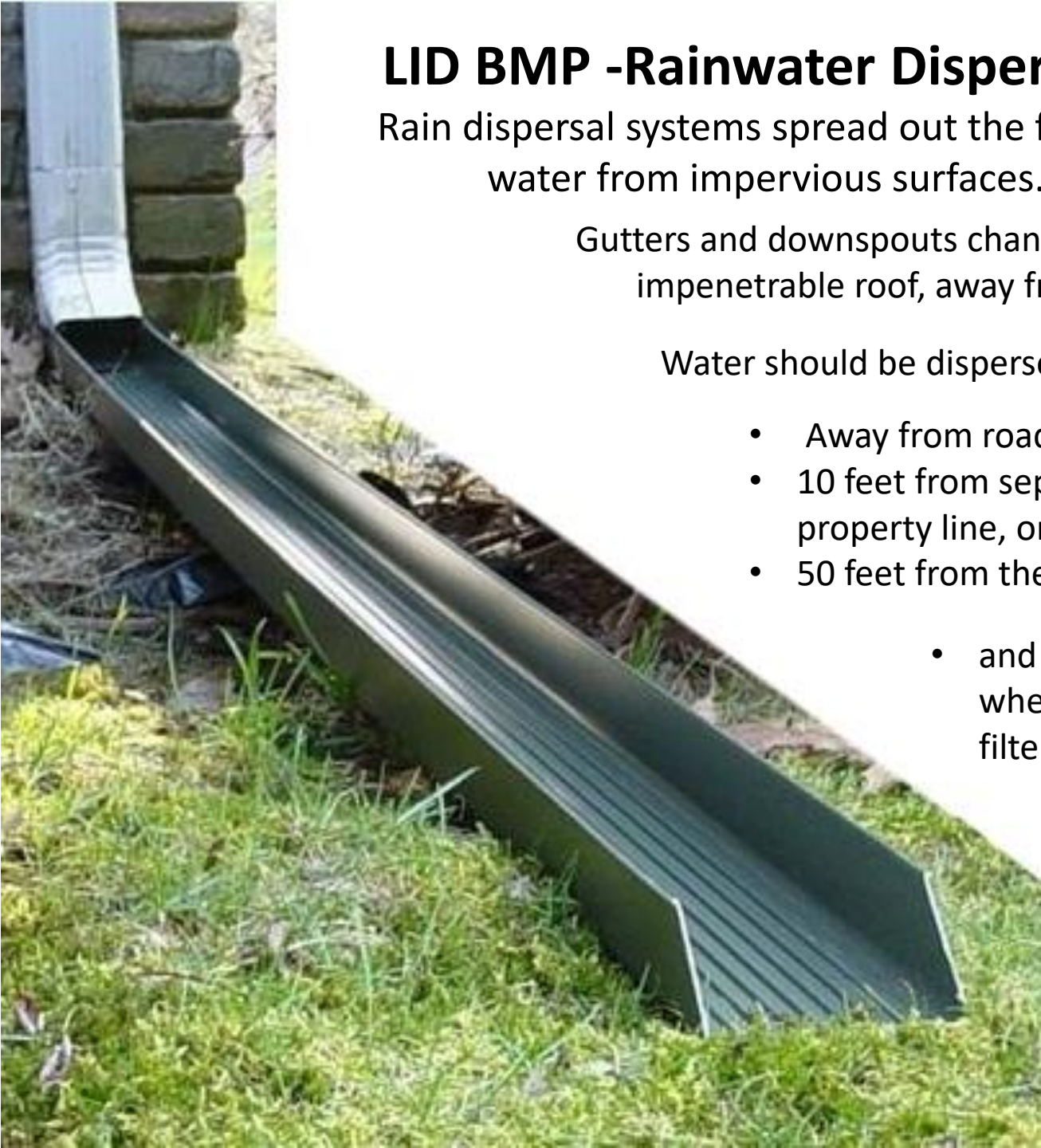
## Intensive

Intensive green roofs require the deepest soil and have the greatest impact on the structural design, but they also accommodate all types of plantings including large shrubs and trees. Intensive systems allow the designer to create a park-like setting so they are the best option for roof gardens that will be occupied.

Maintaining an intensive roof can be quite involved and special attention needs to be paid to walkways and other occupied zones so that visitor safety is maintained.

	INTENSIVE
<b>Plant Options</b>	sedum, moss, grass, large shrubs, trees
<b>Soil Depth</b>	8" to 30"+ Deep
<b>Dry Weight</b>	40 to 100+ pounds dry weight
<b>System Types</b>	Built-up
<b>Maintenance</b>	Routine
<b>First Cost</b>	





## LID BMP -Rainwater Dispersion

Rain dispersal systems spread out the flow of water from impervious surfaces.

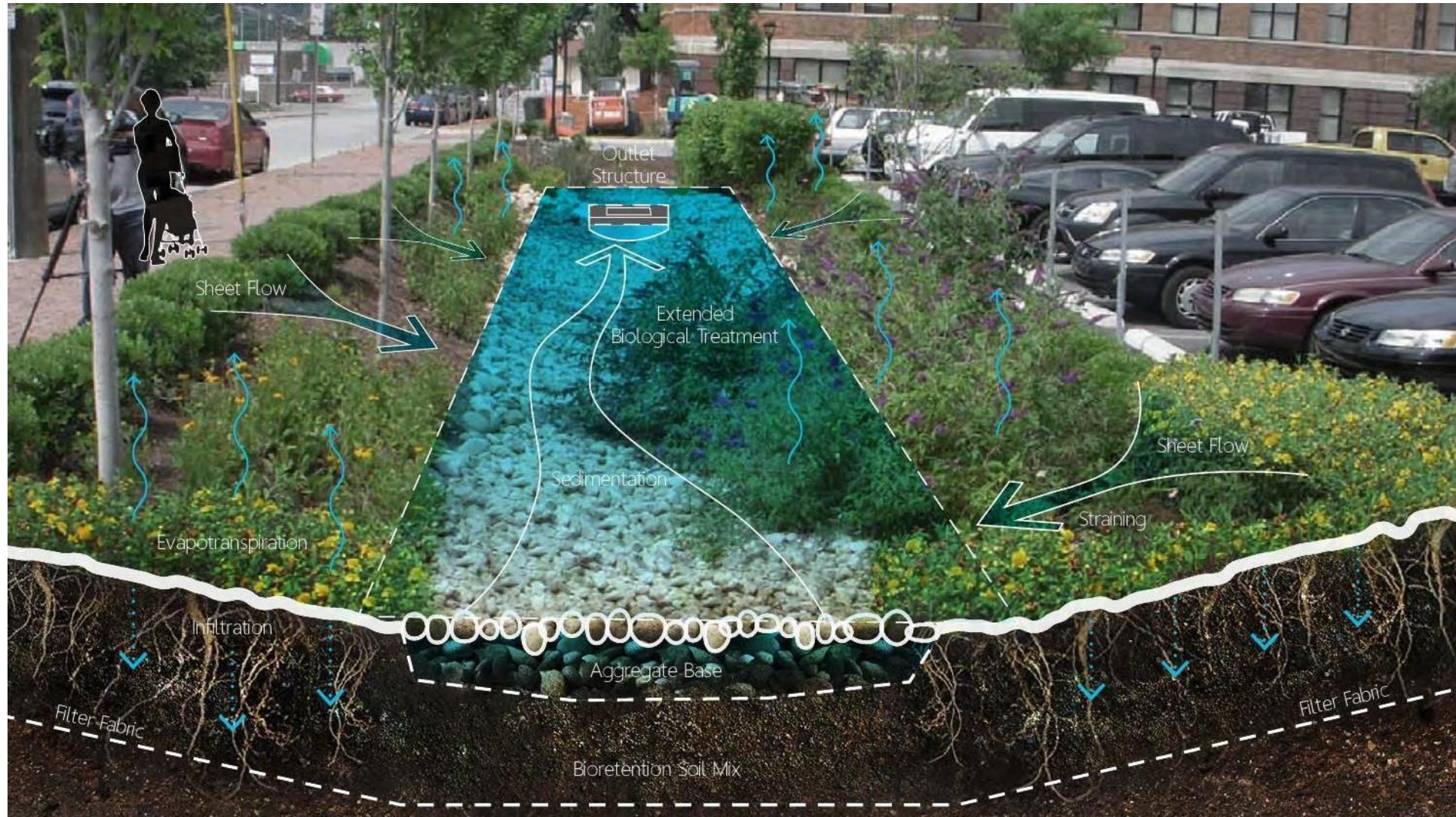
Gutters and downspouts channel water from the impenetrable roof, away from the house.

Water should be dispersed:

- Away from roads,
- 10 feet from septic systems, structures, property line, or sensitive areas,
- 50 feet from the top of any slope over 15%,
  - and into a planted area(s) where the water will be able to filter into the soil.

**Check Infeasibility  
Criteria**

**Sheet dispersion** is where broad impervious surfaces like Sidewalks, driveways, and roads are sloped so water runoff flows in broad slow sheets toward lawns or planted areas. Spreading out the flow of water reduces the force hitting the soil, allowing it to slow down and be absorbed into the soil. If more holding capacity is needed, structures with amended soils can be added.



## LID BMP - Rain garden

A rain garden is an LID structure including a depressed area in the landscape that collects rainwater from a roof, driveway or street and allows it to soak into the ground. Rain gardens are designed with amended soil to increase the amount of water that can be handled.

### Rain gardens

- Remove pollutants from water before it enters surface waters.
- Prevent erosion by holding soil in place with its deep roots.
- Attract birds and butterflies.
- Require very little watering and maintenance once established.



Planted with grasses and flowering perennials, rain gardens can be a cost effective and beautiful way to reduce runoff from your property.

# residential rain garden

(keep 10 feet away from most structures)

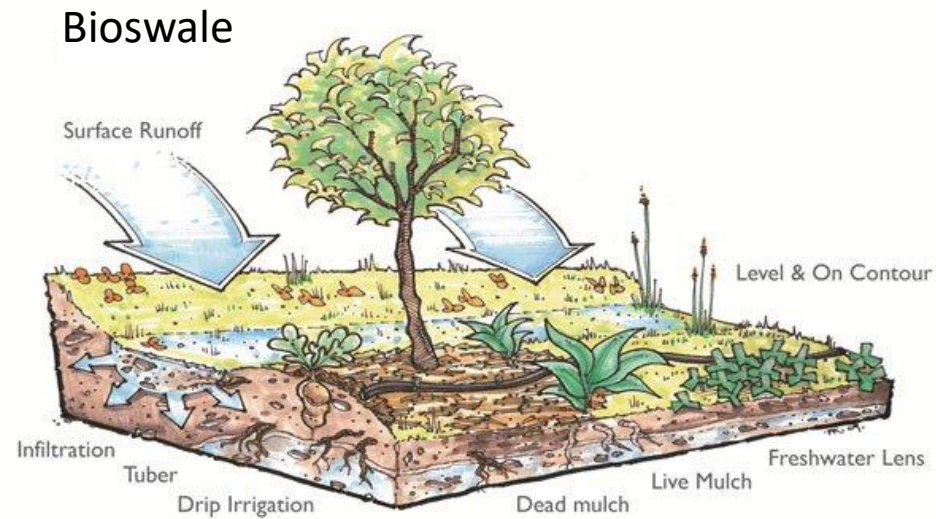
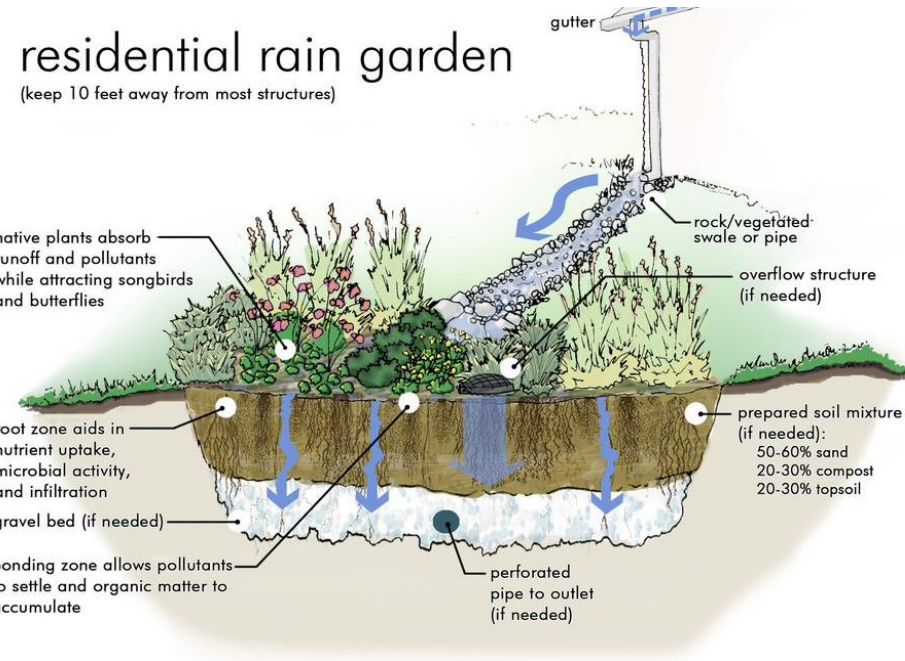


A rain garden's design is based on the type of soil and the amount of water runoff that needs to be controlled.

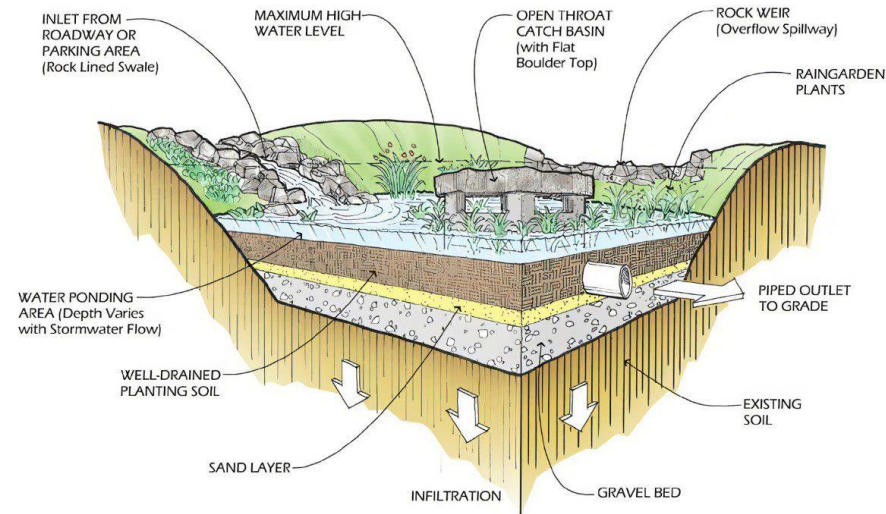
The specially designed soil is used to increase the rain garden's ability to handle the runoff.



Bioretention Cells, Bioswales, and some Hedgerows are sometimes referred to as "Rain Gardens", because they all sort of do the same thing. For example, a "Bioswale" is basically a rain garden channel where water is slowed and some is filtered, but much of the water is directed to another location for infiltration. Bioretention is a more complex design of rain garden with more complicated drainage systems and amended soils.



### Bioretention



## This is a type of Raingarden called a "curb cut"

It is a revision of the traditional stormwater system which was designed to channel water off site. Instead, the curb cut diverts water from the road and into a raingarden or Bioswale.

These prevent water from leaving the area and allow water to be absorbed into the soil, which benefits nearby plants, the soil, and restores water to on-site aquifers.

Raingardens require very little maintenance once established, even during the summer when it's dry.



I'm not sure if  
this is a  
raingarden,  
bioswale, or just  
cute landscaping,  
but it is a nice  
example.





This is an example of a Bioswale. It is a Low Impact Development technique where surface water runoff is allowed to run into a planted channel where some water can infiltrate, and the rest will be directed to a place where it can infiltrate.

## Rain Garden considerations

Rain gardens function only as well as they are designed. Planning is needed as well as knowledge of soil and local weather conditions. Take the time to plan effectively.

### **Don't put a rain garden**

- within 10 feet of a building foundation,
- near the edge of a steep slope or bluff,
- in low spots that do not drain well,
- where groundwater is within one foot of the bottom of the finished rain garden,
- over a septic drain field or tank, over shallow utilities (call before you dig),
- in areas that would require disturbing healthy native soils and vegetation.

# Effective Landscaping

Work Smarter, not Harder

Simple

Maintainable

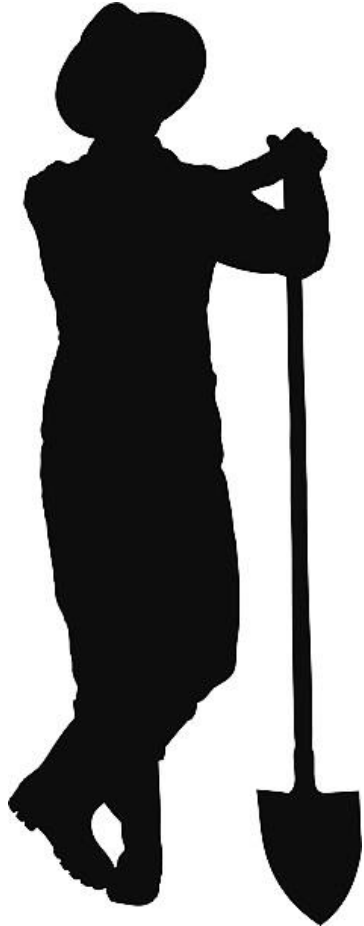
Adaptable

Resilient

Timesaving

Economical

Resourceful



Effective landscaping starts with conserving natural areas wherever possible and minimizing the impacts on the health of the soil.

## Effective Landscape Principles

- Let nature do more of the work
- Use resources wisely
- Healthy soil, Healthy Plants
- Right plant, Right Place, Right Purpose

Like LID, an Effective landscape maximizes all the benefits of the landscape in an efficient and sustainable way.





Trees and plants provide rainwater flow control by interception, transpiration, and increased infiltration. The degree of flow control provided by a tree depends on the tree type, canopy area, and whether or not the tree canopy overhangs impervious surfaces. The more coverage there is, the less runoff there will be, and fewer maintenance requirements.

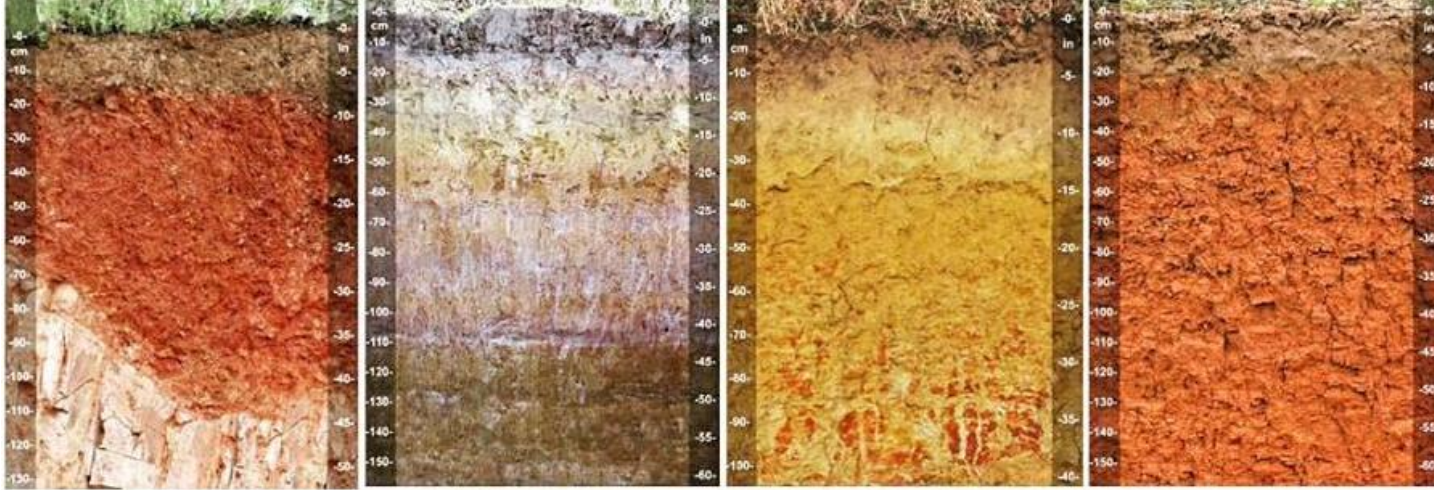


Plant coverage of soil also creates an environment where weeds are less likely to sprout and prosper.



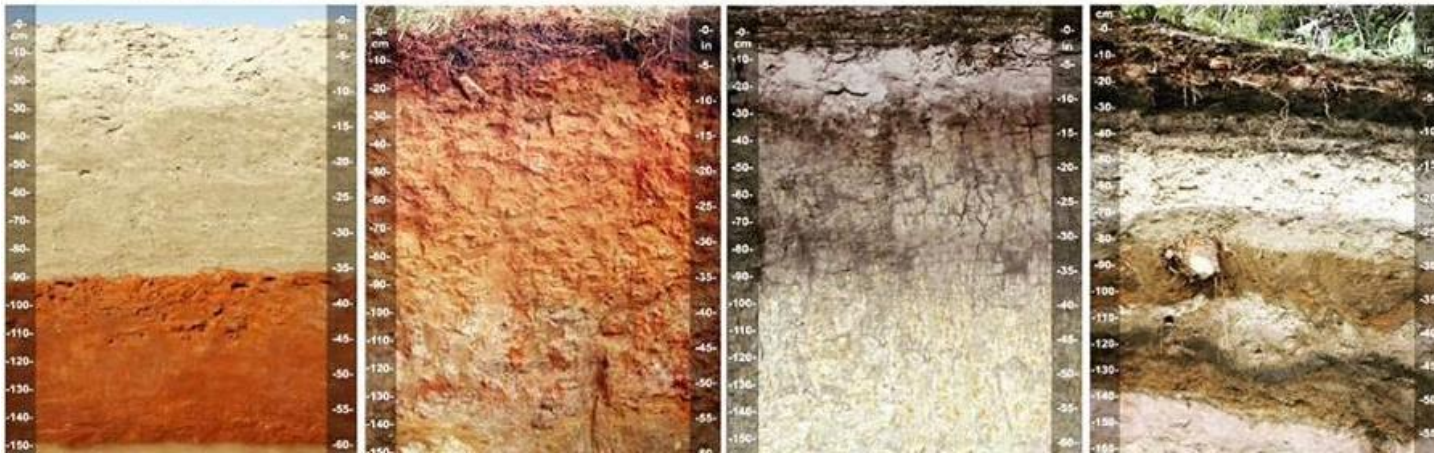
Native, mature landscaping is a desired component of LID and Effective Landscaping: Trees and other vegetation have a 3-5 year establishment period during which they may require additional watering. Maintaining native vegetation reduces the time, effort, and expense of tending to newly planted vegetation.





"each soil has had its own history. like a river, mountain, forest, or any natural thing, its present condition is due to the influences of many things and events of the past."

- Charles Kellogg

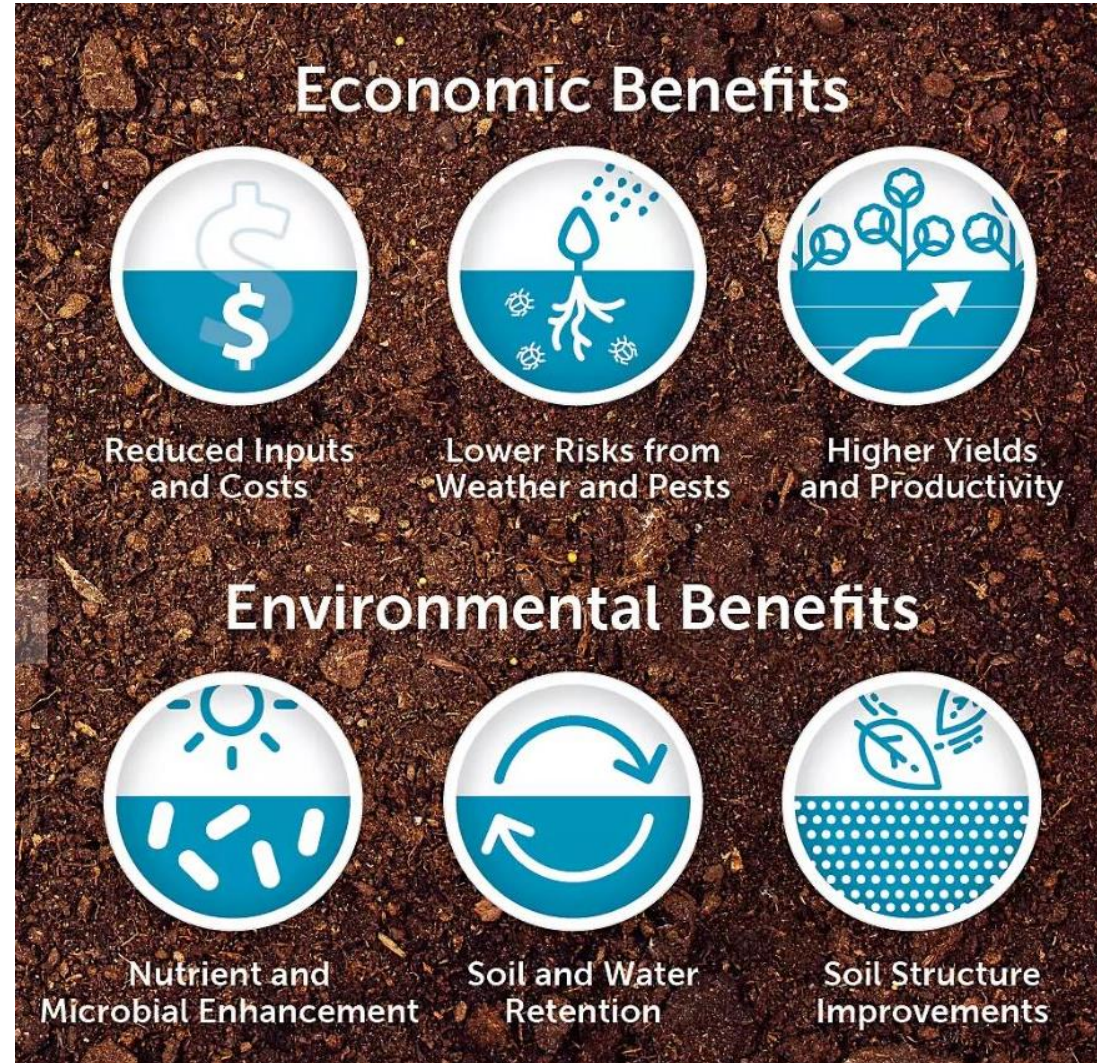


The soil is the foundation of any planting. If you have done any significant digging, you know that all soil is not created equal. The soil in the fertile valley is much different than the rocky soil on the hill. Soil that is constantly waterlogged is much different than soil that is frequently dry. Soil that is covered by plants is much different than soil that is exposed to the elements.



Unless the onsite soil has already been damaged by construction, erosion, or chemicals, it is alive with great potential. Scraping off the top layers and replacing them with imported soil sets back the health of the site's landscape that can take years to recover. It is Smarter to use the soil that is there, top coated with mulch or topsoil as needed.

## Healthy Soil Benefits





# Benefits of Healthy Soil

- Healthier plants
- Reduced watering
- Reduced/eliminates need for fertilizer
- Reduced insect pest problems
- Lower maintenance
- Erosion Control
- Cleaner water – absorbs more & holds more water
- Reduces runoff

As the soil's history has shaped its current condition, its current condition effects its health and future condition. The things we do today (even small things) will have an effect.

Things that effect the soil, effects plant life, which effects animal life, etc...

Adding a topcoat of mulch made of plant material or compost is a great way to improve the soil. A layer of mulch three to four inches deep discourages weed growth and it's easier to pull the weeds from the loose material.

Mulch protects the soil around your plants. A mulch layer of even an inch or two will keep the soil cooler in the summer and warmer in the winter, so plant roots have less chance of incurring damage as the weather changes.

As the mulch breaks down it adds nutrients to the soil. Mulch also retains moisture, so the soil in your garden dries out slower than non-mulched or thinly-mulched areas.

Apply mulch wisely. Generally, about 4 inches is sufficient. Do not mound a "volcano" around the trunk of trees, think donut.





PLAN

AHEAD



The first step in making effective change is to evaluate what you have to work with.

What are the characteristics of the area you are working with.

Is it flat? Is it Steep?  
Is it Wet or Dry?  
Sunny or Shady?

The physical aspects that are there, will direct how you can or should proceed.







Power lines

Mountains

Mountain

Volcano

Hills

Desert

River

Lake

Forest

Iceberg

Ocean

Well

Ravine

House

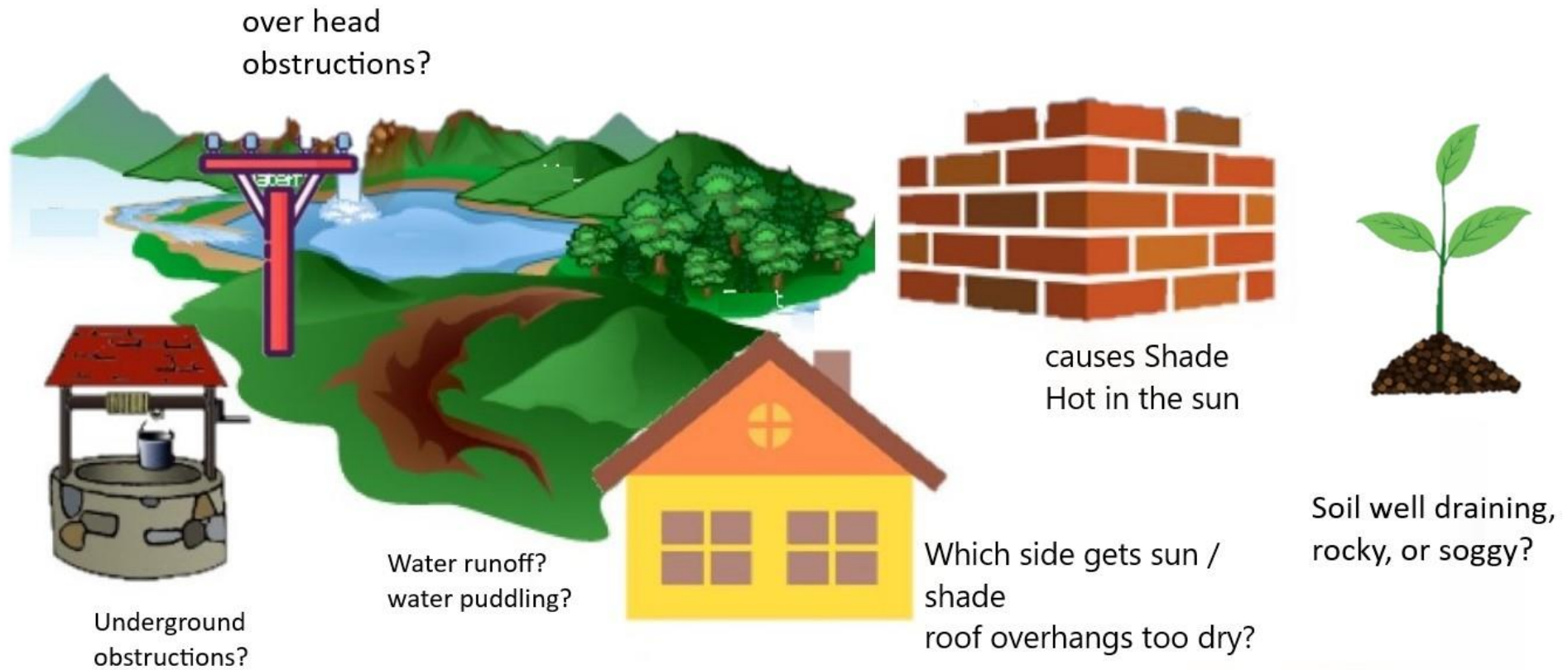
Wall

The pieces of the landscape



**Know what's below.  
Call before you dig.**

Planning and understanding the pieces of the landscape can prevent a lot of future problems and can be used to make your landscape easier to maintain.



Think about how the pieces of the landscape function. Will the brick wall prevent water movement? Will it cause your plants to be too warm in the sun or too shaded or too dry? Are there overhead wires, etc. that will limit the growth of the plants? What kind of soil do you have? Sand, silt, or clay? Rich or poor? Does the soil dry out fast or remain soggy? Is there a slope which will cause runoff or puddling?



Don't forget to consider how the changing seasons will affect the pieces of the landscape. Will that field be a lake in the winter? Will it be too dry in the summer? Will leaves or fruit falling from a tree be a problem for the plants or items underneath?



## The Value of pieces of the landscape.



What is the value of the pieces. That could mean time, effort, sentimentality, accessibility, etc. Sitting in the shade of a tree on a warm day can be priceless. Is there a view that needs to remain unobstructed? Is Great grandpa's special rose bush worth the extra time and effort it will take to care for it? Maybe yes, maybe no. What is important to you?

## Jobs that plants can do:

- Mud reduction
- Dust barriers
- Visual screens & buffers between neighbors
- Summer shade & winter sun
- Summer cooling of buildings
- Minimize Water runoff and Erosion
- Provide food for wildlife and people



Plants can be effective partners. Beautiful and effective, Form and function. Let plants work for you; Mud reduction, Dust barriers, Visual screens & buffers between neighbors, Summer cooling of buildings, wind block, Minimize Water runoff and Erosion, they can Provide food for wildlife and people, and more...

## Wants & Needs:

- Small lawn for recreation such as badminton, croquet, etc
- Protected area for outdoor living for Barbecuing, sitting, etc
- Vegetable & herb garden, fruits & berries
- Attract birds, pollinators, wildlife
- Visual barrier
- Low Maintenance
- Waterwise
- Child safe



Think about what you want and need and how that can fit in your landscape.

If you have big ideas, don't let the size of your project overwhelm you.

In most cases, it doesn't need to be done all at once, it can be done in stages over months or even years.

**Right plant,  
Right Place,  
Right Purpose  
is the key**





# Plants need these things in order to grow:



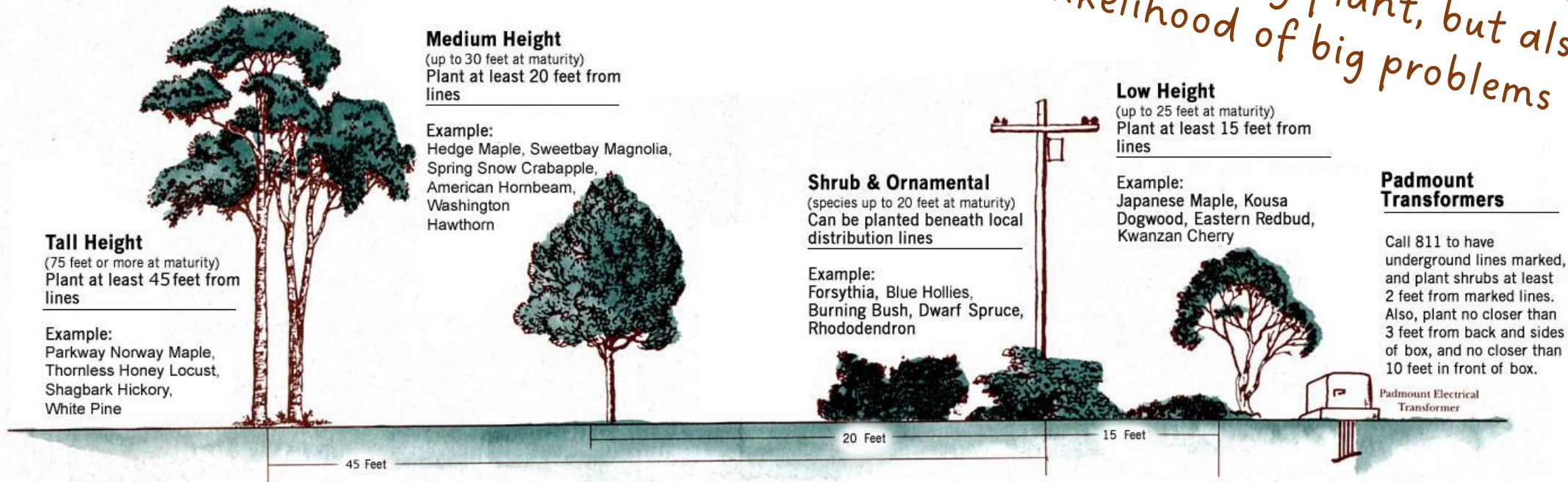
All plants need air, light, water, and nutrients, but they don't all need the same amount.

Some plants need more sun, some need more shade.

Some plants need a lot of water, some need very little, and then everything in between...

# Plan your Planting

Putting the right plant in the right place, not only increases the likelihood of a happier healthy plant, but also reduces the likelihood of big problems later



**Tall Height**  
(75 feet or more at maturity)  
Plant at least 45 feet from lines

Example:  
Parkway Norway Maple,  
Thornless Honey Locust,  
Shagbark Hickory,  
White Pine

**Medium Height**  
(up to 30 feet at maturity)  
Plant at least 20 feet from lines

Example:  
Hedge Maple, Sweetbay Magnolia,  
Spring Snow Crabapple,  
American Hornbeam,  
Washington Hawthorn

**Shrub & Ornamental**  
(species up to 20 feet at maturity)  
Can be planted beneath local distribution lines

Example:  
Forsythia, Blue Hollies,  
Burning Bush, Dwarf Spruce,  
Rhododendron

**Low Height**  
(up to 25 feet at maturity)  
Plant at least 15 feet from lines

Example:  
Japanese Maple, Kousa  
Dogwood, Eastern Redbud,  
Kwanzan Cherry

**Padmount Transformers**

Call 811 to have underground lines marked, and plant shrubs at least 2 feet from marked lines. Also, plant no closer than 3 feet from back and sides of box, and no closer than 10 feet in front of box.

Padmount Electrical Transformer

**Tall Trees**

75 feet or more at maturity  
Don't plant within 45 feet of overhead lines.

- Best for:
- Shading large areas
  - Park and open space settings
  - Background and framing of multi-story buildings

**Medium Trees**

Up to 30 feet at maturity  
Avoid locations under or within 20 feet of overhead lines

- Best for:
- Shade
  - Windbreak
  - Streetside, park and business district locations
  - Background and framing of onestory buildings

**Low Trees**

Under 25 feet at maturity  
May be planted 15 feet or more from lines if adequate space is allowed for future growth.

- Best for:
- Visual screen
  - Windbreak
  - Noise abatement
  - Wildlife benefits
  - Streetside, park and business district locations

**Shrubs & Ornamental Trees**

20 feet or less at maturity  
May be planted under utility lines.

- Best for:
- Visual screen and privacy barriers
  - Windbreak
  - Noise abatement
  - Wildlife benefits

**DO NOT PLANT OVER UNDERGROUND UTILITIES**  
electricity / gas / water / communications



**Know what's below.  
Call before you dig.**



Plants in the wrong place Damage infrastructure, roadways, buildings, and utilities.

They shorten the life span of plants, require excessive maintenance such as trimming, mowing, or shaping.

They require excessive irrigation, fertilization, weed and pest control.



Right plant, Right place =  
healthier happier plants

Ignoring the plants' growing requirements and the soil quality can lead to sickly plants. Do your homework before you plant! Pay close attention to the light and soil requirements of your plants as well as the plant's mature height and width.



Picture your planting area totally filled in with the plants. Use stakes or other markers to help you visualize.

Always consider the mature size of the plants and be sure to give them enough space!

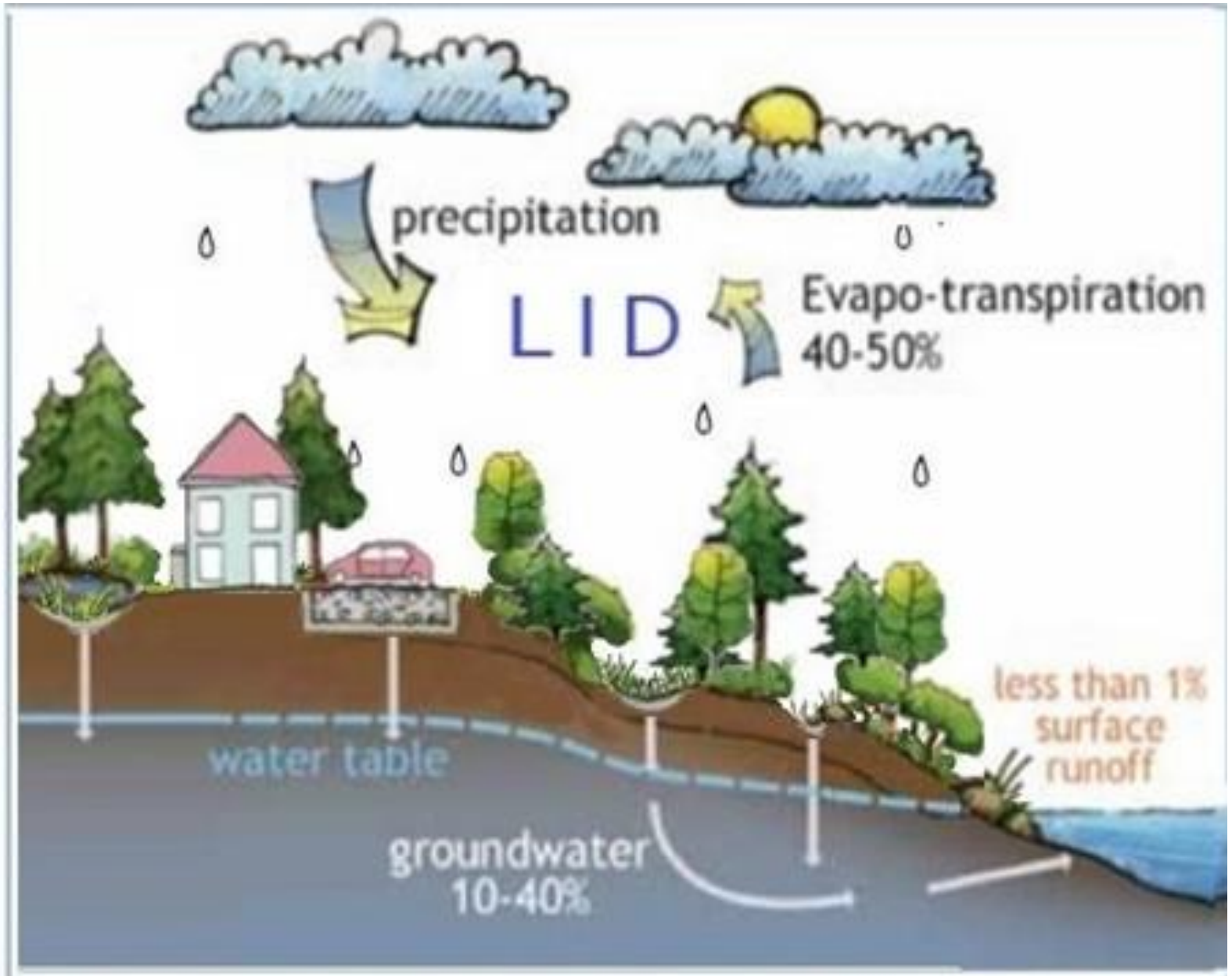


Plants need room to grow

Size matters.



Look at the places on the site where water is able to leave the site. Can plants be added to that spot to slow runoff and restore onsite aquifers? Can the land be shaped to direct water to a planted area that could use the water, lessening the need to supplement the watering? Select plants for each area of the landscape based on the needs of the plant as well as the job the plant can do. Need a privacy screen in a wet area? There are moisture loving plants that would love to do that. There are plants to suit almost any area.



When the rainwater is absorbed at the site, it maintains the health and function of the soil, restores onsite aquifers, and reduces the need for additional landscape maintenance watering.

As a bonus, there are many trees and shrubs that work in the landscape that also provide food. For people. For wildlife. And for bees and other pollinators.





## Avoid Invasive Species

Most invasive plants are habitat generalists and can survive in a wide range of conditions. Many of them are still being sold for garden use despite their documented ability to degrade natural areas.

Predicting invasiveness isn't easy, so caution is in order.

Avoid non-native species bearing fleshy fruits that can be dispersed by birds. It's also good to avoid planting any species that has escaped into vacant lots or roadsides in the area, even if they are not on an official invasive species list.

The most prudent prevention measure is to select regionally native plants when possible.



A lot of our current ideal of landscaping and maintenance is not very effective.



"That's right . . . egg it on!"

Time to make  
a change.

---



Excessive lawns are not effective landscaping, because lawns are little better than pavement for slowing stormwater runoff and they are a lot of work.

Generally, mowing is needed 2- 4 times/month in the summer, which requires time, money, and energy.

Lawns also require more chemicals, fertilizers, and water than other landscaping.



Officially

Grass lawns are not required by Skagit County or the cities of Anacortes, Burlington, Mount Vernon or Sedro-Woolley, however, there are a few Planned Unit Developments (PUDs) where the developer wanted to create an extremely restrictive landscape plan that would be a requirement of homeowners.

In those few PUDs there is a requirement to maintain a lawn. Even in those cases the city Development Services Department would work with the Homeowner to make landscaping as flexible as possible.

Because

“Grass is acceptable as groundcover in landscaped areas, but generally not preferred for water conservation and maintenance purposes (lawn areas designed as play areas are an exception).”

# Reduce the size of your lawn.



If you have excessive lawns, consider reducing the size of it.

Changes can be made gradually over several seasons.

Areas already established with shrubs and trees can be expanded in width.

Include ground covers, xeriscape plantings, perennial flower beds, and/or tiered shrub plantings that are low maintenance and water wise.

# Honey, I shrunk the lawn

- Hedge the edge
- Erase the center
- Cut Corners
- Widen existing beds



Choose least functional lawn areas to replace. -Look for areas of lawn which are least used, and those which are hardest to mow such as the corners of the yard, beneath trees with low branches, etc.





*Before*

*Making our world a better place,  
One backyard at a time.*



*After*





Putting the  
ART  
in your  
gARTden



Color can make a big difference in art. You can combine subtle hues with splashes of color, use a lot of bright colors, or coordinate hues of a single color palette in your landscape.





The gardener's paint palette is made of plants, such as these shrubs and small trees.

Elderberry, viburnum, hebe, fruiting shrubs, etc. show color in their leaves, their flowers, their fruit, even their bark. There are many varieties and colors of plants suited to the different landscape environments.

Pay attention to the needs of the plants, but don't be afraid to try new plants. Remember variety is beautiful and decreases the likelihood of many problems.

Here is a palette of low growing plants; groundcovers, flowers and ornamental grasses. Try planting early spring bulbs that will peek up through the other groundcover plants. Mix plants that will bloom at different times of the year.

Beauty for you and pollen for the bees. There are so many options that are low maintenance, beautiful and able to work hard in your landscape



# Structural diversity

## Vertical layering



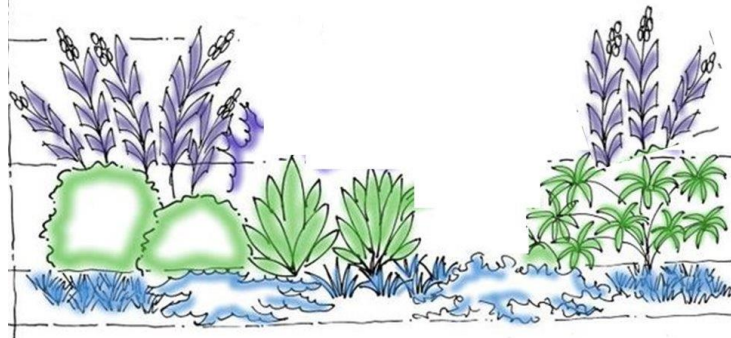
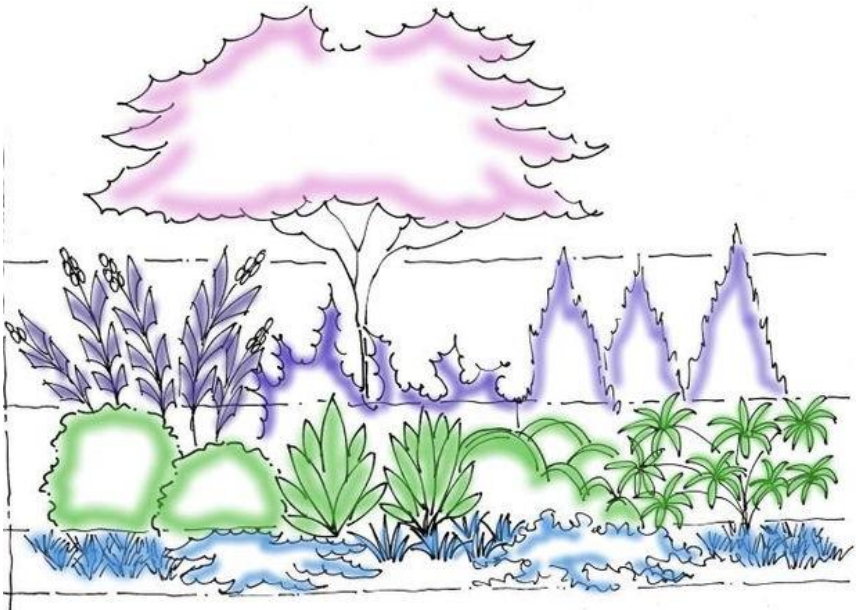
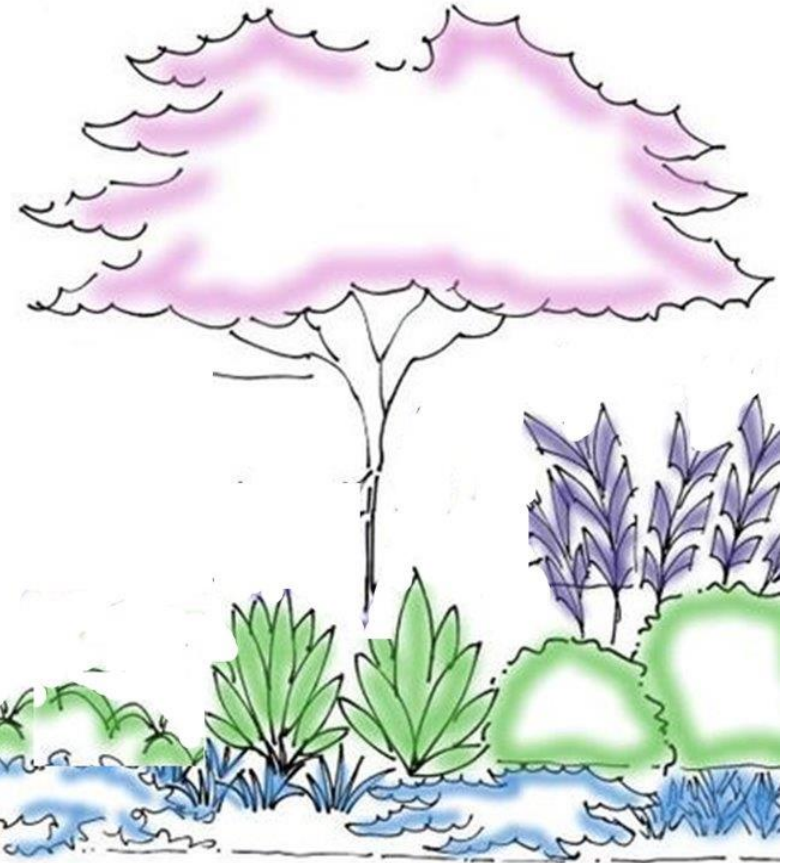
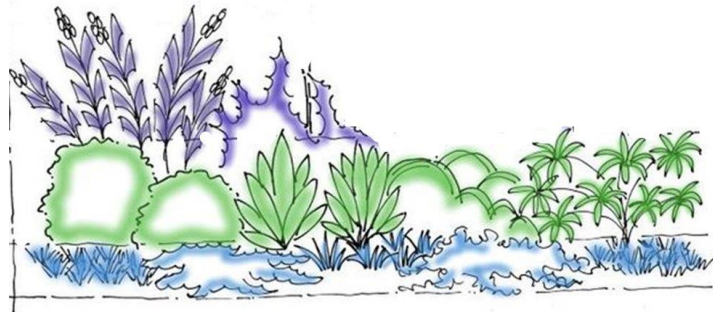
Vertical layering is a technique using multiple layers or mixed borders, such as a tree with varying heights of shrubs and/or ground covers underneath.

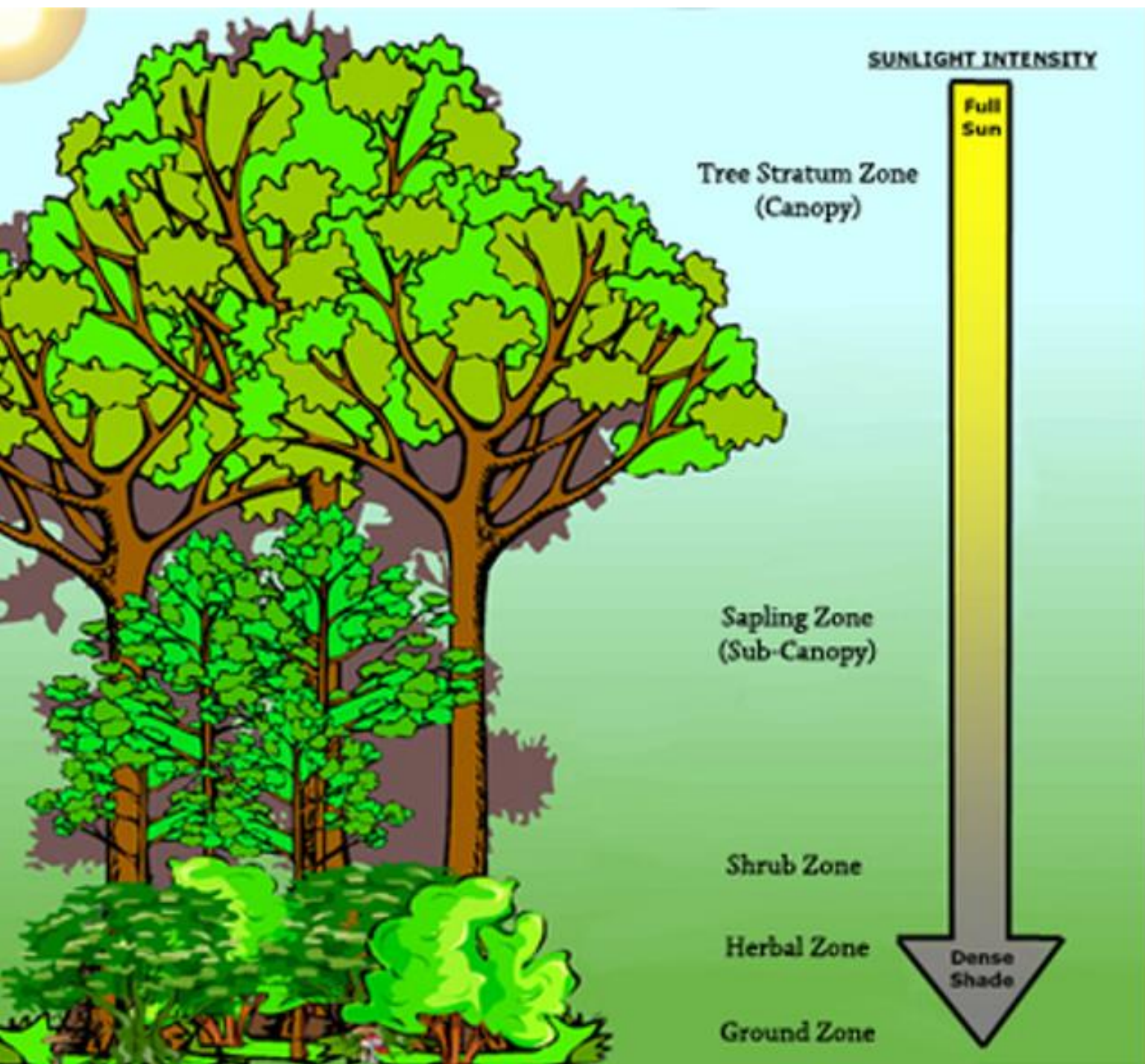
Vertical layering increases the variety of plants in an area. That is not only beautiful, but can provide more food for pollinators, wildlife and people and more habitat for beneficial wildlife. It also reduces the amount of maintenance needed for the landscaping.

The more bare ground in your garden, the more you will be fighting invasions of weeds.

Keep the soil covered by plants or adding mulch. It will greatly reduce the amount of water transpiration, soil erosion, and weeds that will germinate in your garden.

Use the shape of the land and the availability of light and water to shape your design.





Trees, shrubs and flowers planted in layers successively shade each other, so the plants require less water and shade out many of the weeds so the seeds can't sprout.

# Textural Diversity



Textural contrast is another artistic technique. In the landscape, combine plants with contrasting leaf types like Hostas, heucheras, and ferns. Something with broad leaves, something thin and vertical, and something sprawling or with delicate leaflets. Etc. Combine evergreen plants with deciduous plants.



When selecting plants, consider their seasonal appearance.

Do the plants have characteristics that make them attractive during certain seasons? For example,

interesting or colorful bark or evergreen leaves that is seen during the winter.

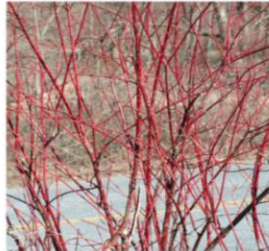
Interesting or colorful leaves in the spring or fall? Flowers, berries, seeds, or cones?





# Seasonal Palette

This slide shows 3 seasons of coral bark Japanese maple, evergreen huckleberry, low Oregon grape, Red Osier dogwood, and American cranberry viburnum.





# Habitat at Home

Supporting wildlife habitat where you live, work, and play



Washington Department of FISH & WILDLIFE

## What is wildlife habitat?

Wildlife habitat provides four essential elements for local wildlife to thrive:

- Food
- Shelter
- Water
- Space

## Who can create wildlife habitat?

Anyone can provide elements of food, water, shelter, and space for wildlife by choosing what plants they grow. Native plants have evolved with wildlife and thus provide all these elements for species in our area. For instance, adding structure to your garden with diverse plants or physical features like logs can create places where water can collect temporarily.

Providing habitat for wildlife no matter the size of your space can make a huge difference. Renters and homeowners of residential homes with yards can help

## Why is creating wildlife habitat on private lands important?

As human development continues, private property becomes especially important as it can connect or fragment wildlife habitat. By creating habitat at home for wildlife, you are helping to offset the acres of habitat that are lost to housing and urban development each year. A simple container garden can help decrease habitat fragmentation for small species like insects and terrestrial mollusks, especially in highly urbanized areas.

Wildlife habitat benefits more than wildlife, it can benefit you, too. Native plants are adapted to the natural rainfall in your area, and thus require less maintenance. Native plants also help reduce stormwater runoff pollution and can decrease the heat island effect in your community.

THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION

## Bring Back the Pollinators

To bring back the pollinators, I will:

- Protect and provide bee nests.
- Grow a variety of pollinator-friendly flowers which bloom from spring through fall.
- Avoid using pesticides, especially insecticides.
- Talk to my neighbors about the importance of pollinators and their habitat!

# Pollinator Habitat

This area has been planted with pollinator-friendly flowers and is protected from pesticides to provide valuable habitat for bees and other pollinators.

To learn how you can help to bring back the pollinators, please visit [www.xerces.org](http://www.xerces.org).



Plants are not just beautiful, they are also important to wildlife.

## Bloom Times for Bees



**Indian Plum**  
(*Oemleria cerasiformis*)  
February to March



**Pacific Crabapple**  
(*Malus fusca*)  
April to June



**Mock Orange**  
(*Philadelphus lewisii*)  
June to July



**Red Flowering Currant**  
(*Ribes sanguineum*)  
February to March



**Bitter Cherry**  
(*Prunus emarginata*)  
April to June



**Oceanspray**  
(*Holodiscus discolor*)  
June to August



**Salmonberry**  
(*Rubus spectabilis*)  
March to May



**Elderberries**  
(*Sambucus spp.*)  
April to June



**Snowberry**  
(*Symphoricarpos albus*)  
June to August



**Serviceberry**  
(*Amelanchier alnifolia*)  
March to June



**Willows**  
(*Salix spp.*)  
April to May



**Douglas Spirea**  
(*Spiraea douglasii*)  
June to August



**Oregon Grape**  
(*Mahonia spp.*)  
March to May



**Golden Currant**  
(*Ribes aureum*)  
April to June



**Roses**  
(*Rosa spp.*)  
June to August



**Maples**  
(*Acer spp.*)  
March to June



**Pacific Ninebark**  
(*Physocarpus capitatus*)  
May to June



**Twinberry**  
(*Lonicera involucrata*)  
June to August

Different plants bloom at different times, so planting a variety of plants can have plants blooming all through the spring, summer, and fall, which is not only beautiful, but also helpful to our pollinators.

(All of the plants shown here are native to our area)

Native plants are an important addition to an effective landscape because wildlife depends on them.

For example, many butterflies depend on native plants as their larval food. If there's no food for the butterfly larva, the butterfly will die out.

Additionally, native plants are less maintenance because they are adapted to this environment.

They don't need extra fertilizers or water.



# Why go native?

- Native plants help control erosion and reduce runoff
- Appropriate species for local wildlife
- Non-invasive
- Adapted to local soils and climate:
  1. Less likely to need pesticides
  2. Needs less water
  3. Needs less fertilizer

Not living, but still working...

- **Snags and brush piles host**

- **Birds** (chickadees, dark-eyed juncos, song sparrows, quail, wrens, towhees, grouse, etc.)
- **Mammals** (chipmunks, cottontail rabbits, fox, mice, rabbits, skunks, voles, weasels, etc.)
- **Reptiles** (salamanders, snakes, toads, turtles, etc.)
- **Beneficial Insects** (Bumble bees, ground beetles, etc.)



Consider the idea of allowing a little bit of nature in your yard. Do you have an area where a "naturescape" could go?

Natural areas provide food and shelter to many birds, reptiles, and beneficial insects.

With a little creativity brush piles and old snags can be a beautiful addition to your landscape.

# LEAVES ARE NOT LITTER

THEY 'RE FOOD AND SHELTER FOR  
BUTTERFLIES, BEETLES, BEES, MOTHS, AND MORE.  
TELL FRIENDS AND NEIGHBORS TO JUST

## #LEAVETHELEAVES

Leaves on the ground suppress weed seeds and add to the moisture retaining ability of the soil.

They add nutrients to the soil when they break down.

Just sweep them from the paths and driveway to under the landscape plants where they can benefit the plants, soil, and all the little beneficial wildlife and insects.





Leaves protect  
our little  
garden  
neighbors like  
Salamanders  
that eat  
worms,  
tadpoles,  
snails, slugs,  
and a wide  
variety of  
insects.





Birds and their food sources benefit from a yard that hasn't been stripped of branches, leaves, and seedheads. The fallen leaves, dried seed pods, sticks and dead stems produced during the spring and summer provide necessary shelter and food for native bees, beneficial insects, birds and others during the winter.

# INTEGRATED PEST MANAGEMENT (IPM)

## KEY COMPONENTS OF AN IPM STRATEGY



**PREVENT**  
the build-up  
of pests



**MONITOR**  
crops for pests  
and natural control  
mechanisms

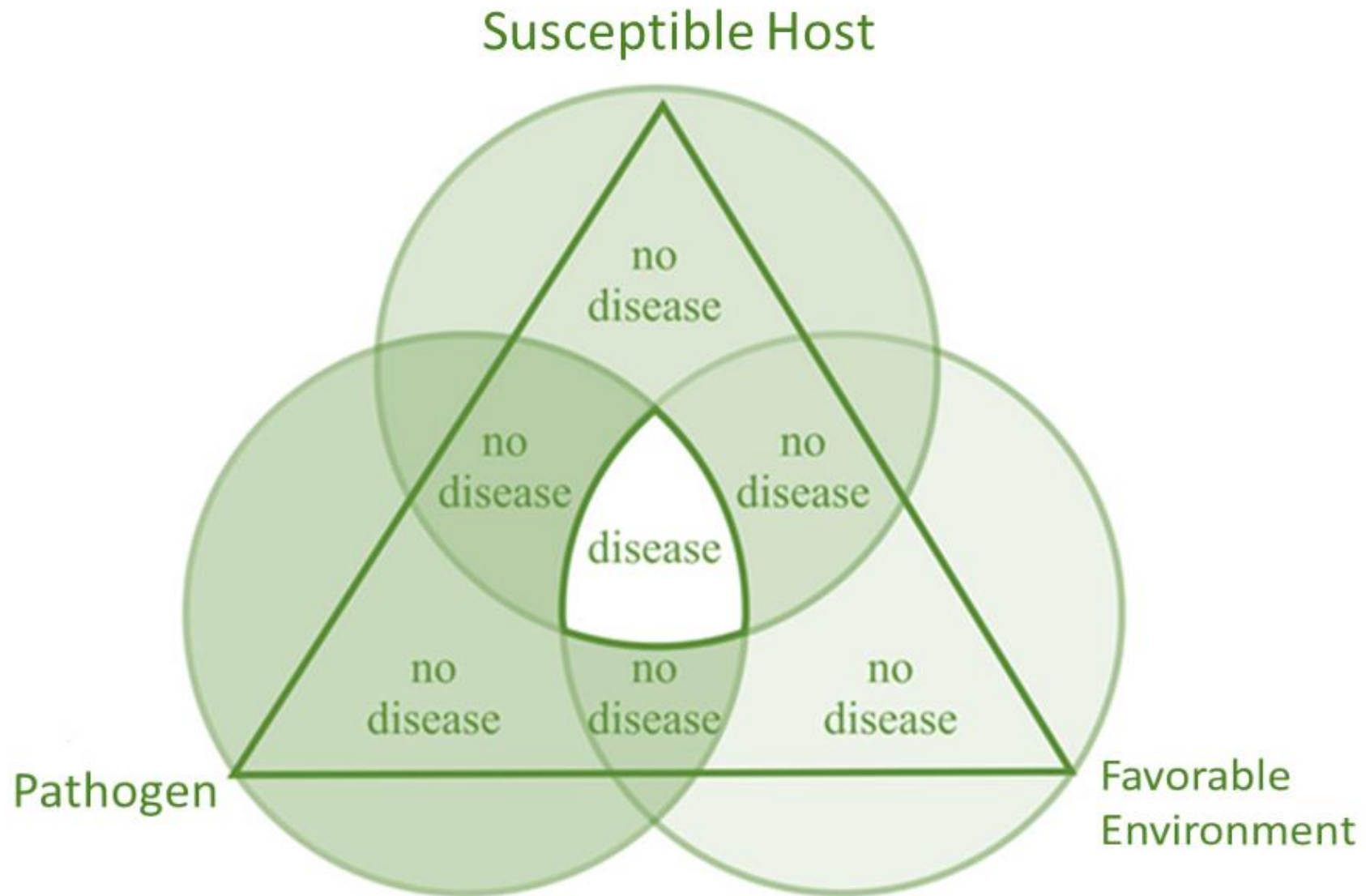


**INTERVENE**  
when control  
measures are  
needed

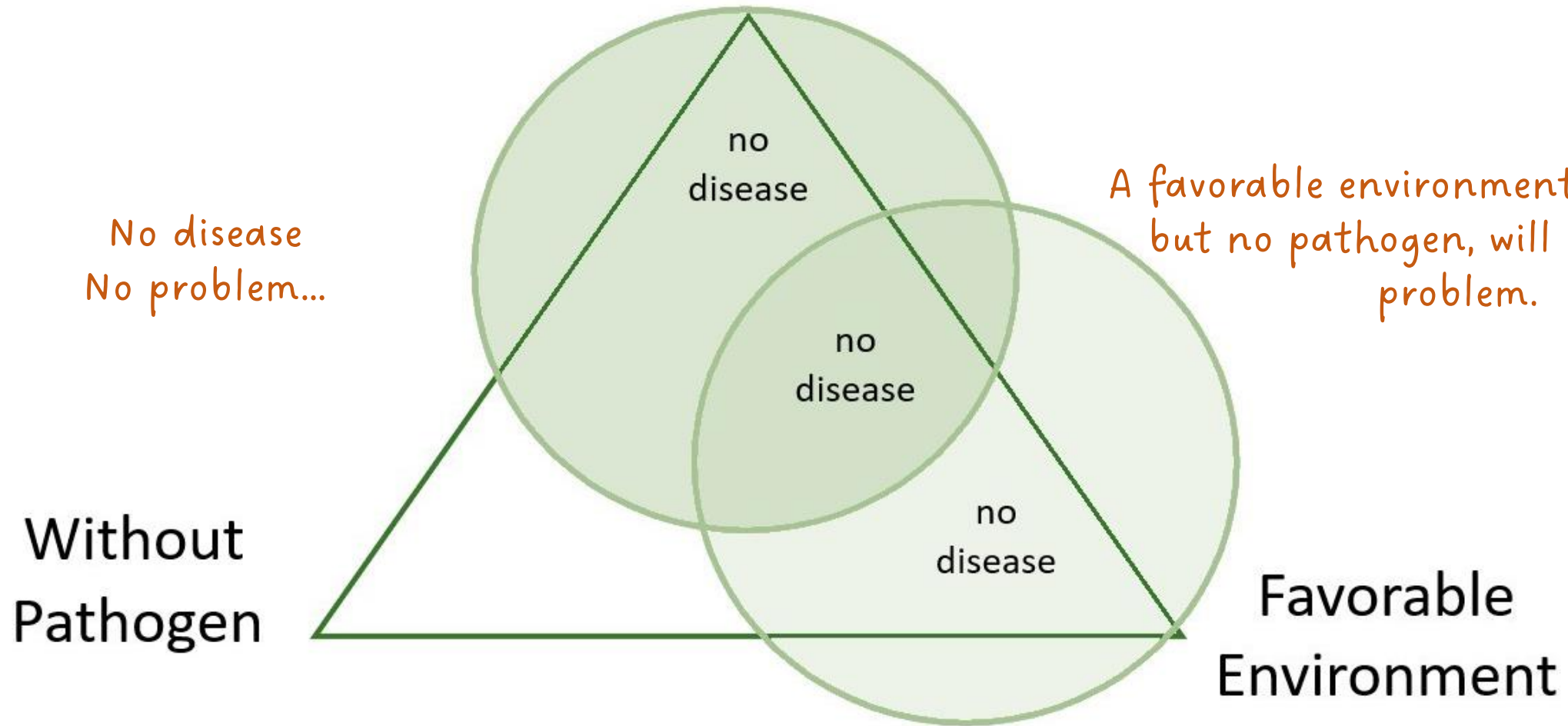
- Determine the most appropriate intervention to control pests; one that is cost-effective and environmentally sound
- Interventions can be physical, cultural, biological or chemical
- If crop protection products are required, use them responsibly

Integrated Pest Management is a comprehensive, systems-based approach to pest management with the goal of providing the safest, most effective, most economical, and sustained remedy to pest infestations. IPM reduces the risk from pests while also reducing the risk from the overuse or inappropriate use of hazardous chemical pest-control products.

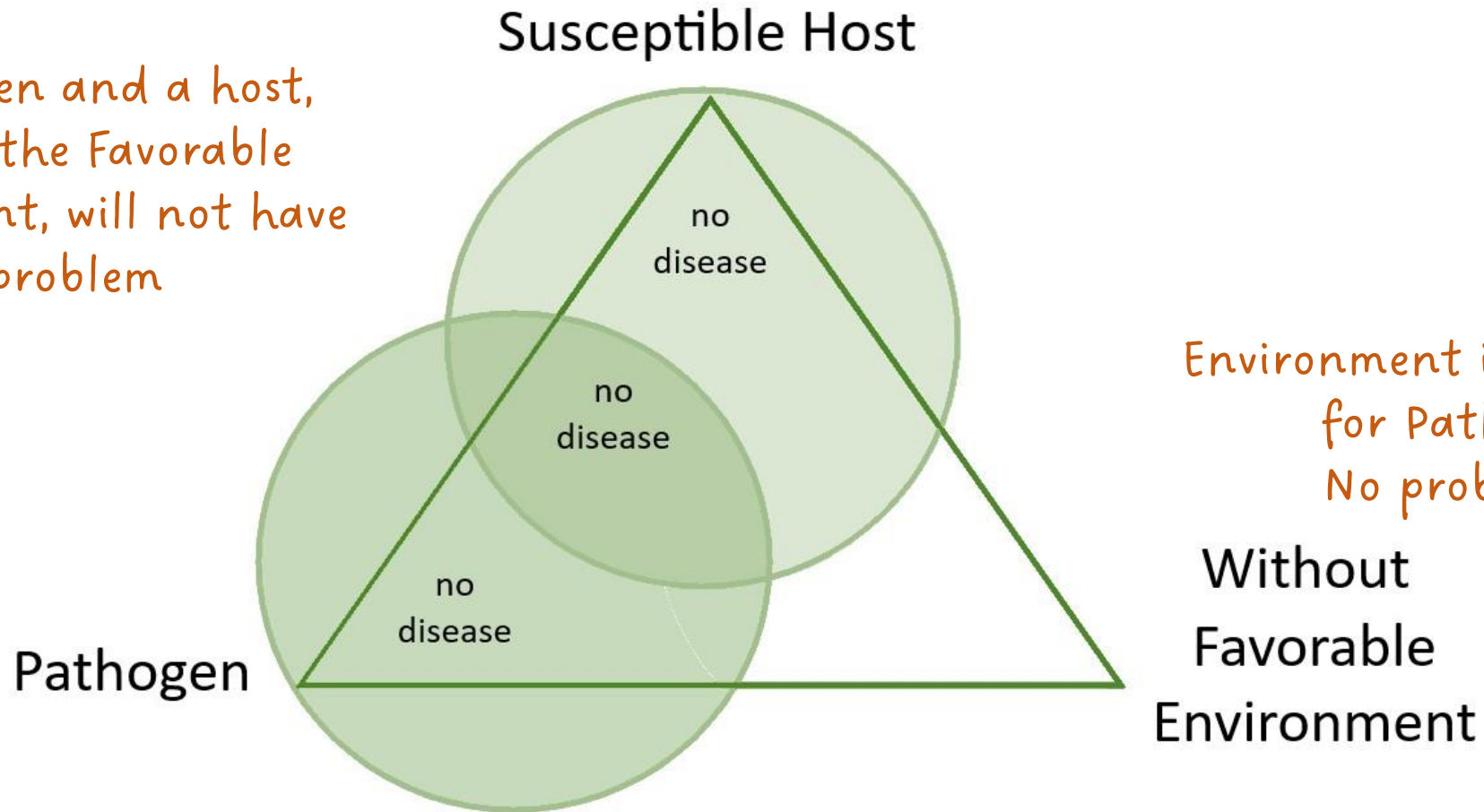
Diseases and pests require 3 things to become a problem:



# Susceptible Host

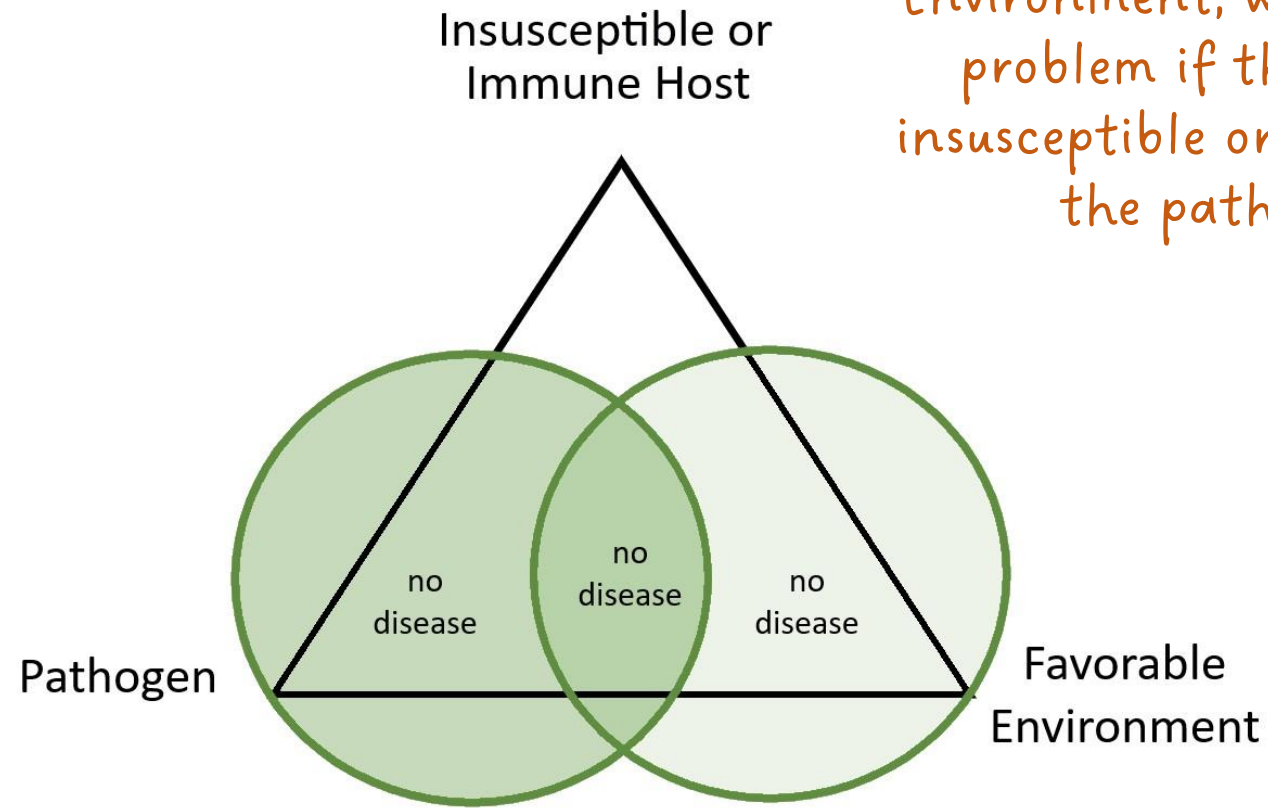


A pathogen and a host,  
without the Favorable  
Environment, will not have  
a problem



Environment inhospitable  
for Pathogen  
No problem...

For example, many fungal problems can be reduced or eliminated by planting and/ or pruning for more air circulation. Air circulation makes the environment less favorable for fungi.



A pathogen in a Favorable Environment, will not be a problem if the host is insusceptible or immune to the pathogen

Selecting varieties that are immune or resistant to the common diseases in your area can prevent a lot of problems.

## Pest Management

Mature plants will not be seriously harmed by a few pests. Determine how much damage is allowable and select non-chemical management options as your first choice.





Be aware that many herbicides and pesticides will cause harm to more than just the targeted pests.

Run off from Chemical sprays are a problem and hawks and owls are eating rodents that have eaten poison, causing the unintended death of many non-targeted species.

Be effective. Treat only when necessary and use the least toxic tool.



## Integrated Pest Management

Treat only when necessary and use the least toxic method.

Honey bees, native bees, and other pollinators play an essential role in pollinating fruits, vegetables, flowers, and agricultural crops. According to the USDA, in recent decades, news about bee poisonings, colony collapse disorder (CCD), and native bee species population decline has been on the rise. Although the definitive reason behind most of these mass bee deaths has not been determined, pesticides are one of many contributing factors. Pesticides, such as neonicotinoids, pose a threat to bee health and have been linked to mass bee deaths. Homeowners can reduce negative health impacts on bees by using alternative pest control methods, reading pesticide labels, and avoiding applying pesticides to plants in bloom.



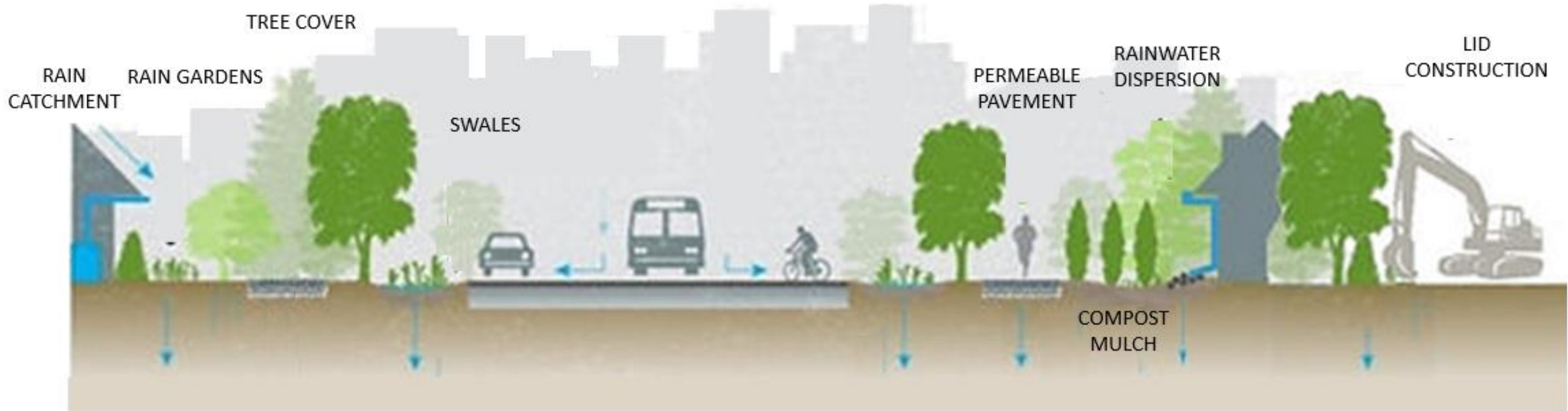
## **ALTERNATIVE PEST CONTROL**

Many effective pest control methods do not involve the application of pesticides. These alternative methods can prevent or reduce pests without harming bee and pollinator health. Preventative measures include planting pest repellent plants or plants that attract beneficial insects, which can keep pest populations low. Many pest species are attracted to overly fertilized plants due to the increased nitrogen content. This can be avoided by using organic compost which releases nitrogen slowly. Make sure to monitor your pest infestations and determine an appropriate level to take action. Low-level infestations can be controlled using mechanical or non-chemical methods.

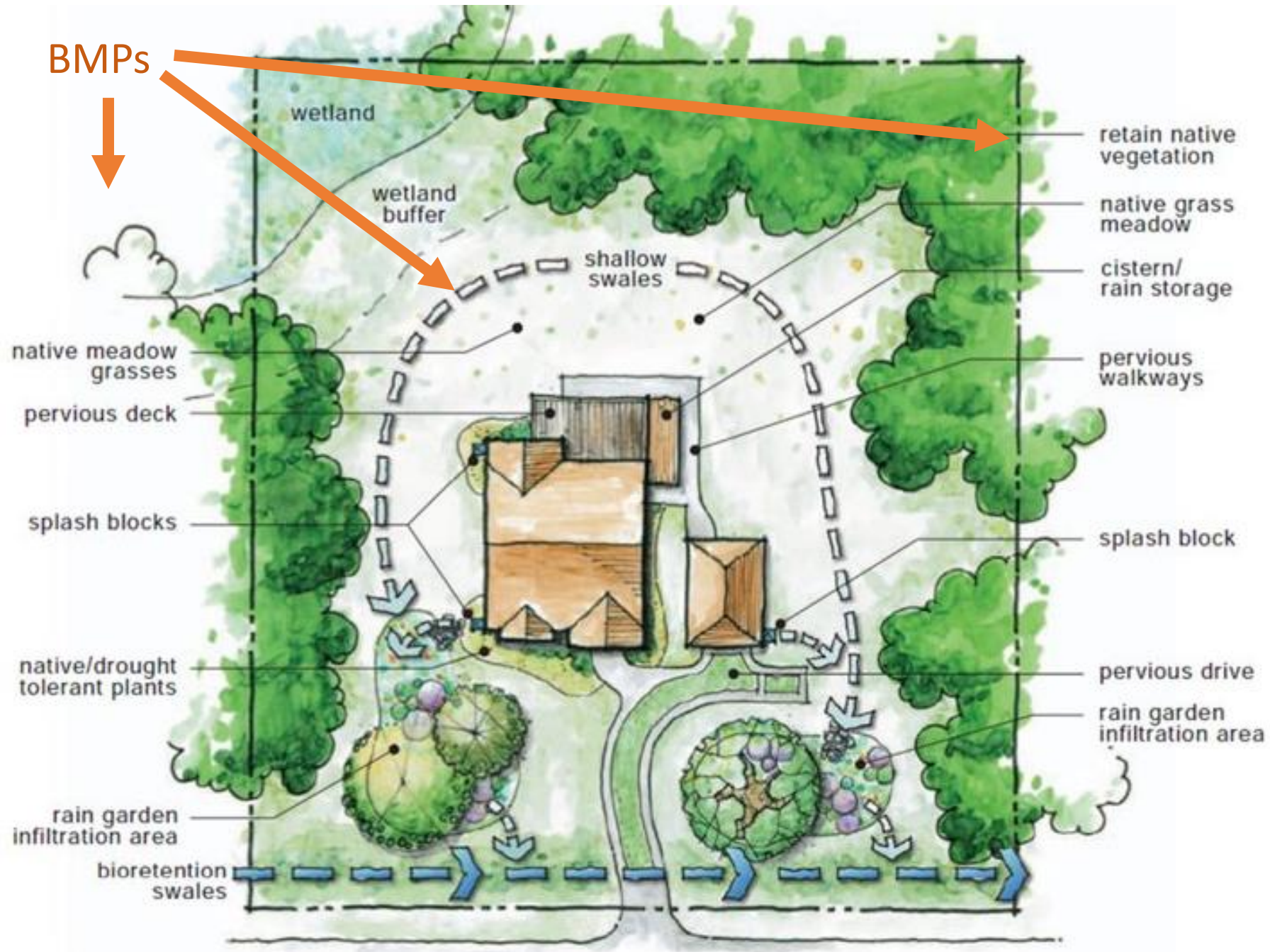
[388-HowToProtectBees-WEB.pdf \(wa.gov\)](#)

In summary..

## LID is the preferred approach to stormwater management in Skagit County



BMPs



Distribute stormwater Best Management Practices (BMPs) to manage stormwater close to the source.

Evaluate how surface water will move on the site.

Determine the most effective BMP(s) to minimize or prevent surface water from leaving the site.

# Effective Landscaping

Work Smarter, not Harder

Simple

Maintainable

Adaptable

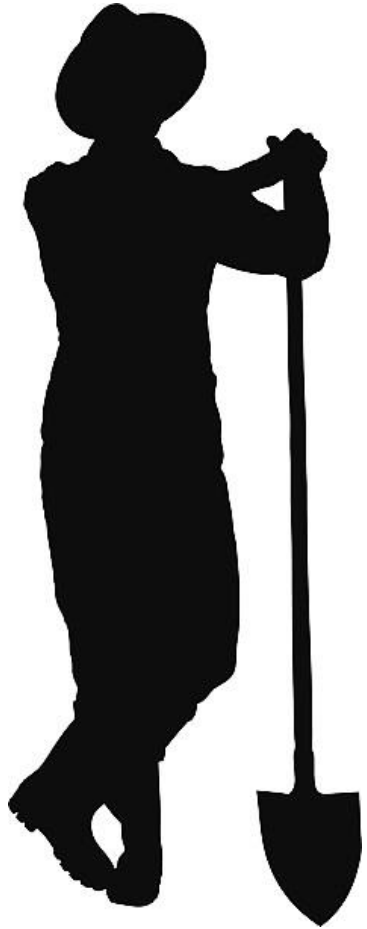
Resilient

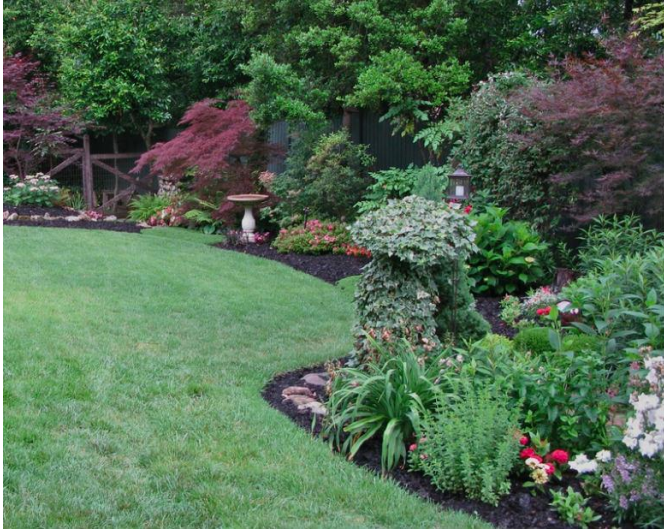
Timesaving

Economical

Resourceful

- Let nature do more of the work
- Use resources wisely
- Healthy soil, Healthy Plants
- Right plant, Right Place, Right Purpose





Choose least functional lawn areas to replace. -Look for areas of lawn which are least used, and those which are hardest to mow such as the corners of the yard, beneath trees with low branches, etc.



# What can we do?

Use natural yard care techniques;

Build your soil with compost;

Plant trees, especially natives, to slow and clean rainfall

Don't use pesticides;

Reduce use of fertilizers;

Use porous paving or pavers for walkways, driveways, or patios;

Maintain septic systems;


Fix oil leaks;

Pick up pet waste.



*Small, simple things, that like the threads in a tapestry that work together to become a great thing.*





**Start where you are.  
Use what you have.  
Do what you can.**

Arthur Ashe

Every little thread  
works together in  
the weave of the  
tapestry.  
Every thread is  
important in the  
work.



**Thank you!**

Any Questions???