

Installing a Water-wise Landscape



Do you know...



Where we get our water?

Where we store our water?

How much water our city uses per year?

What programs we offer?

How much water we have saved over the years?

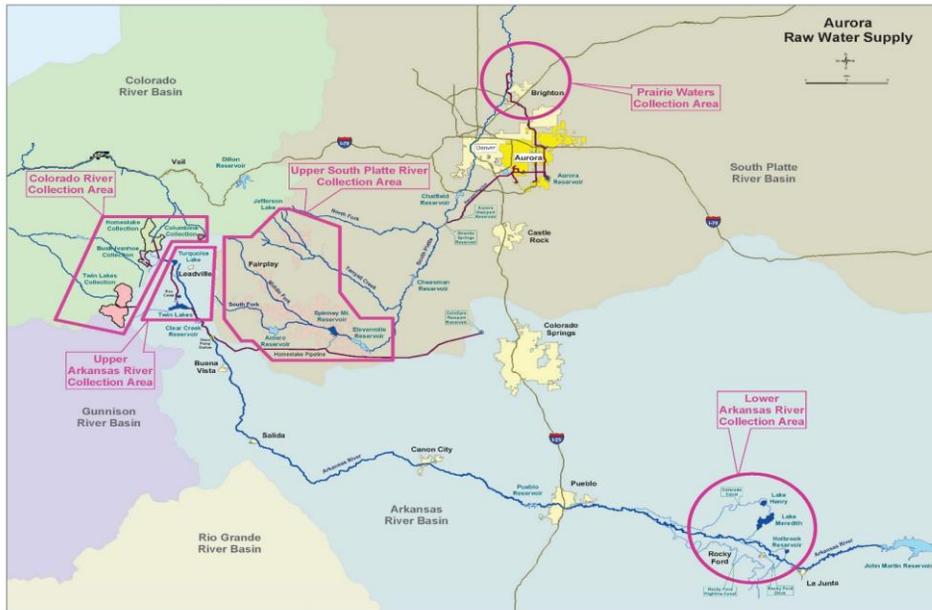
...where we get our water?



Colorado is a headwaters state, with the majority of the state's rivers beginning high in the Rocky Mountains as snowmelt. One of the benefits of living in a state that relies primarily on surface water is that unlike groundwater, surface water is a renewable water source.

One of the drawbacks is that precipitation levels vary greatly from year-to-year making the majority of the state's water supply relatively unpredictable – and highly prone to drought.

... where we store our water?



Aurora's water system starts nearly 180 miles away and includes the use of reservoirs, the natural river system, pipes, tunnels and pumps, all of which help us pull the water we own from our three river basins and deliver it to Aurora.

Aurora receives 25% of its water supply from the Colorado, 25% from the Arkansas and 50% from the South Platte river basins.

- | | |
|------------------|----------|
| Homestake | Rampart |
| Turquoise | Quincy |
| Twin | Pueblo |
| Spinney Mountain | Aurora |
| Jefferson | Meredith |
| Strontia Springs | Henry |

...how much water we use as a city?



16.6 billion gallons



The average annual distribution for the past three years is 16.6 billion gallons annually. About half of that water is used outdoors. Aurora has a semi-arid climate, and our snow and rain levels are about half of the average annual precipitation for the United States, so it's important that we all do our part to help conserve water.

...we offer programs to help you save water and money?

INDOOR PROGRAMS

- Free indoor water assessment
- Ultra-high-efficiency toilet rebate
- Low-income water efficiency program

OUTDOOR PROGRAMS

- Free landscape designs and rebates
- Free automatic sprinkler system assessments and rebates
- Customize your watering schedule
- Water conservation classes
- Gardening and volunteering



...how much water the conservation division has saved?



**448 million
gallons or 7.2
billion cups
of water**



Combined water savings for 2016, 2017, 2018

Class Goals

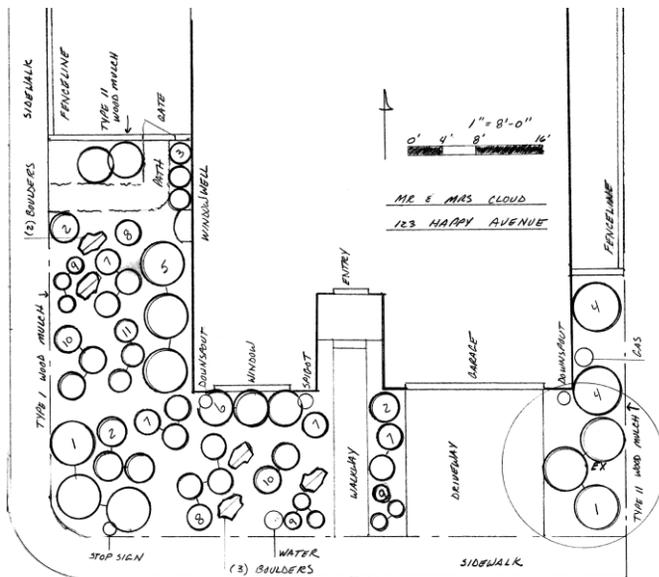


- Present a step-by-step conversion process
- Show cost effective methods
- Cover design, site prep, turf/weed removal, planting, irrigation options and scheduling and maintenance



This class is intended for those who plan on doing all or most of the work themselves. Information is provided on what we feel are best methods. We recommend a quick review of the materials if you plan on hiring a contractor.

Start With A Plan



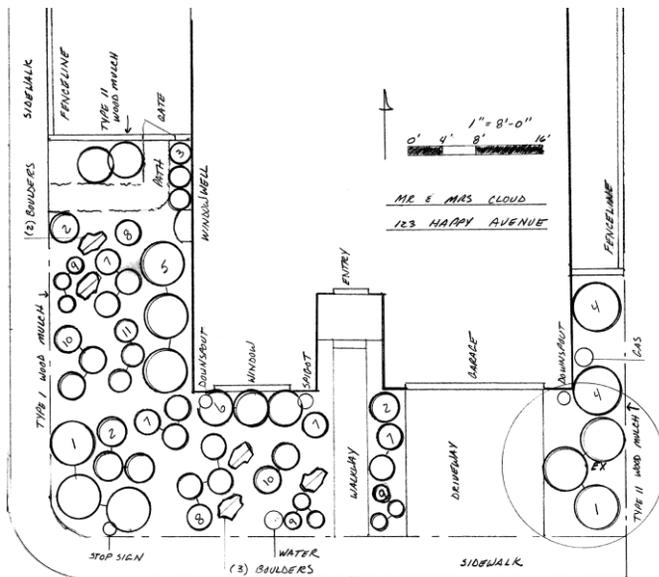
- Lays out the foundation of your new landscape
- May reduce costly mistakes



Educate yourself and then create a plan before starting any project. Think about your goals, budget, timelines (see Phasing Plan), Aurora codes and program requirements, HOA/Community requirements, material types, material availability, methods of installation, and equipment that may be required.

The best way to implement your project is to follow the plan which includes a design. You may create the design yourself, hire out or participate in Aurora Water Conservation's free design consultation program. Any design should be drawn to-scale. This means that all features on the paper are drawn to the right size in relation to one another. The scale relates the dimensions of objects on paper to the objects in real life. For example, a common scale for a residential landscape design is 1:8. This means that 1 inch on the paper refers to 8 feet in real life. The scale is shown on the document and remains in proportion to the design even if the document is enlarged or reduced. Projects implemented piecemeal and without a to-scale design run the risk of costing more, creating long-term maintenance problems and often don't look as good.

Start With A Plan...continued



- Lays out the foundation of your new landscape
- May reduce costly mistakes



A to-scale design is required to participate in the Water-wise Landscape Rebate Program.

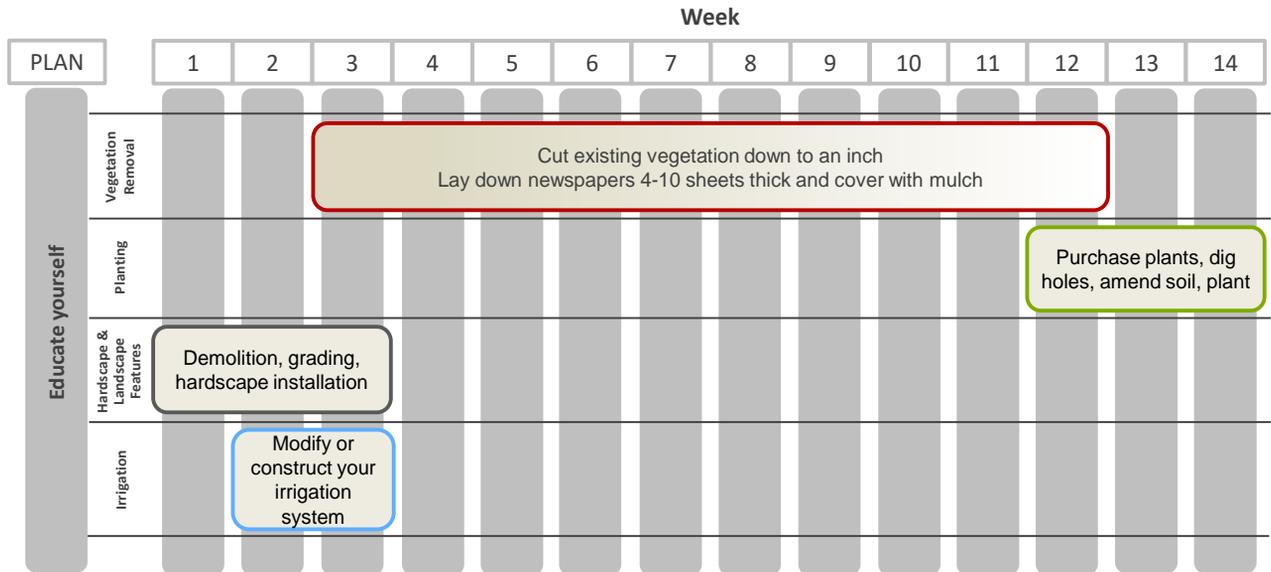
For a free design from Aurora Water:

- Call Aurora Water Conservation , express interest in a water-wise landscape design consultation (303.739.7195)
- You'll be asked a couple of questions about the project area
- We'll prepare a site map packet (homework) and send it to your mailing address, when it arrives follow instructions provided
- Consultations take place at the municipal center and are scheduled only after you've completed the homework

To recap, why is a design important?

- It's a step in any well thought out plan
- Standard for communicating ideas
- Reduces the potential for design mistakes
- Your landscape will look better, more balanced and professional

Phasing Plan



This is the phasing plan for *smother* method of turf removal which will be discussed later. It shows the estimated amount of time specific tasks will take to complete. It may help in setting realistic expectations for the duration of the project. Be sure to take into consideration the actual amount of time you have to work and over-estimate the length of time you expect a project to take.

Plan Implementation

Identify what tasks you'll be completing and what you'll need to contract out

1. Vegetation removal
2. Major demolition
3. Irrigation
4. Hardscape features
5. Planting
6. Irrigation
7. Mulch



Vegetation removal – remove existing, non-desirable plant material

Major demolition – grade changes, removal of trees or large shrubs, installation of landscape features such as walkways, patios or driveways

Irrigation – installation of a backflow, valve boxes, trenching, changes to existing system

Hardscape features – installation of berms, boulders or small rock walls

Landscape features – dry creek beds or flagstone paths

Planting – pick the plants from your favorite local nursery, have them delivered a day or two before planting

Irrigation – if irrigating with a drip system, lay out drip tubing, attach emitters at each plant or fine tune existing system

Mulch – cover area with mulch

Vegetation Removal

1. Mechanical – uses a sod cutter
 - Pros: fastest method (1 day)
 - Cons: labor intensive, sod disposal, can damage tree roots, not always effective
2. Chemical – spray turf with glyphosate (Roundup)
 - Pros: quick (2 weeks) and thorough results
 - Cons: chemicals
3. Smother – uses newspaper and mulch
 - Pros: 'natural'
 - Cons: long process (10 weeks)



There are three main options for removing turf and other ground-plain vegetation. Each have their pro's and con's. It's up to you to select the option that is best for you, your site and your project.

It is critical that caution be used when there are existing trees in or around the project area. Damaging roots can cause irreparable harm to a tree, even to the point of killing it. Options 2 and 3 are the kindest to the tree.

When using a glyphosate product, be sure that the only active ingredient is glyphosate.

Regardless of which option you choose, be sure to continue to water existing desired plant material.

Vegetation Removal Method - Mechanical



- Sod cutter
- Quick
- Labor intensive
- Can damage trees



This popular method uses a machine to cut the grass out by its roots. It is only effective where the grass is healthy. The cut grass which looks like a strip of sod, can then be removed from the yard. It is a relatively quick, though labor intensive process. Adjust the cutting depth before you get started, 1.5" cut depth may be a good starting point. Run the machine a few feet and check the depth. The cut depth should be below the horizontal root later; if it's too shallow, you'll have to repeat the process, if it's especially deep, say two inches, the process will be exceptionally difficult.

Understand that the ground has hills and dips and that there will be sections of grass that you will have to cut out by hand using a sharp flat shovel. Within a week, grass will start growing where the sod cutter didn't get deep enough. We recommend waiting a few days to see if fine blades of grass start appearing in the soil so they can be addressed BEFORE mulch goes down. Do not assume that fabric will stop grass blades from growing.

Vegetation Removal Method – Mechanical



- Sod cutter
- Quickest method
- Labor intensive
- Can damage trees



Major challenges:

Labor

- We mentioned that it's labor intensive. The machine is heavy and more bulky than a lawn mower.
- The machine has an adjustable cutting depth. A deep cutting depth will ensure that all of the grass is cut out, however this will also result in more manual labor and a lot more material to dispose of. If it's not deep enough, grass will start growing again.

Disposal

- Dumpster
- You may be able to incorporate it into your landscape by creating a berm. You'll need to cover the sod with several inches of soil or the grass may start growing again.
- A neighbor may be able to use some of it.
- Flipping it over will not kill the grass

Trees

- Established trees with old roots close to the surface of the soil will make sod removal impossible
- This process has the potential of causing extreme damage to trees, even killing them. If there are established trees in or near the project area, it's best to use another method.

Vegetation Removal Method - Chemical



- Non-selective herbicide
- Relatively quick
- Grass stays in place
- Tree friendly



Glyphosate is a non-selective herbicide, which means it has the ability to kill any living plant it comes in contact with. It is the active ingredient in Roundup. The herbicide must come in direct contact with living tissue for it to be effective. It may be used around trees and other shrubs as long as the foliage or non-barky stems of those plants are not sprayed. Accidentally spraying the trunk (bark) of a mature tree will not harm the tree. Glyphosate will work on grass and most weeds.

There are many products on the market labeled for killing all vegetation. Stick to only those containing glyphosate as the active ingredient. Avoid products with other chemicals that act as soil sterilizers or may have "season-long" benefits. Do some research before making a final decision on which product to purchase.

Glyphosate is most economically purchased as a concentrate and then mixed in a pump-up sprayer. If you're spraying a large area, this may be the best way to go. Consider asking a neighbor if they have any on hand that needs to be used up.

Vegetation Removal Method – Chemical



- Non-selective herbicide
- Relatively quick
- Grass stays in place
- Tree friendly



NOTE: There is a great deal of debate regarding the health impacts of glyphosate use. Educate yourself before you purchase the product. Read the label and the safety data sheet and make sure you understand them. Safety data sheets exist for most every day products we use.

Application notes

- Read the label before use
- Do not deviate from the instructions
- Wear the recommended personal protection equipment.
- Familiarize yourself with the spray equipment before use, including testing spray patterns just using water
- Apply when there is little to no breeze
- Nozzle should emit a spray of larger droplets, not a stream
- The target plant material does not need to be soaked with herbicide
- You may need to respray some areas
- Do not expect glyphosate to permanently kill field bind weed or Canada thistle or unsprouted seeds in the soil

Vegetation Removal Method - Smother



- 'Natural' method
- Newspaper or cardboard
- Use soy-based ink newspapers
- Mulch and do not remove
- Grass stays in place
- Easy on trees



With the smother method, vegetation literally is smothered. The idea is to block light and warmth from reaching the plant, water is also limited. It's an effective method to kill most herbaceous plants, though it has little efficacy with field bind weed and Canada thistle. The biggest drawback to this method is the time that the area must be left undisturbed to ensure plant death, at least eight weeks.

Some tips n tricks

One person can do this, but it may be easier with two. Newspaper printed with soy-based inks is best. Cardboard is better than newspaper in that it is easier to control when there's a little bit of a breeze.

Application:

- Cut the existing vegetation right to the ground
- Excavate soil next to sidewalks and driveways (See slides on mulch)
- Lay down newspaper several sheets thick
- Be sure to overlap material
- Cover with 3 inches of mulch as you go

Once it's time to plant, clear mulch from intended planting location, dig the hole placing soil on a tarp and proceed with planting.

Vegetation Removal Method - Other

Scraping

- Quickest method
- Can damage trees

Rototiller

- Ineffective, do not use



Site Layout

Placement of hardscape and landscape features, and plants according to your design is critical (Follow the design)

Laying it out:

1. Mark location of hardscapes and landscape features
2. Mark the location of plants you have not purchased
3. Physically place all plants before planting



Accurate placement according to design is critical to design integrity, but be reasonable. In most cases it's okay to be off by a few inches.

On the design it may look like plants are touching - they may some day! When you purchase the plants they are much smaller. Take the time to measure the distance (with your scale) between plants' centers and their distance to two points such as the house, sidewalk, driveway, etc.

Laying out your site:

1. Mark layout of landscape features with marking spray paint, chalk, powder or a hose.
2. Put flags or stakes in the ground to mark the location of plants you have not purchased.
3. Physically place plants in their proper locations while still inside plastic tub.
 - Use a measure tape to determine proper location on the ground (see next slide)

Hardscapes & Landscape Features



Hardscape and landscape features add wow to your project.

Approved hardscape features include:

- Berms
- Boulders
- Rock Walls

Examples of landscape features include but are not limited to:

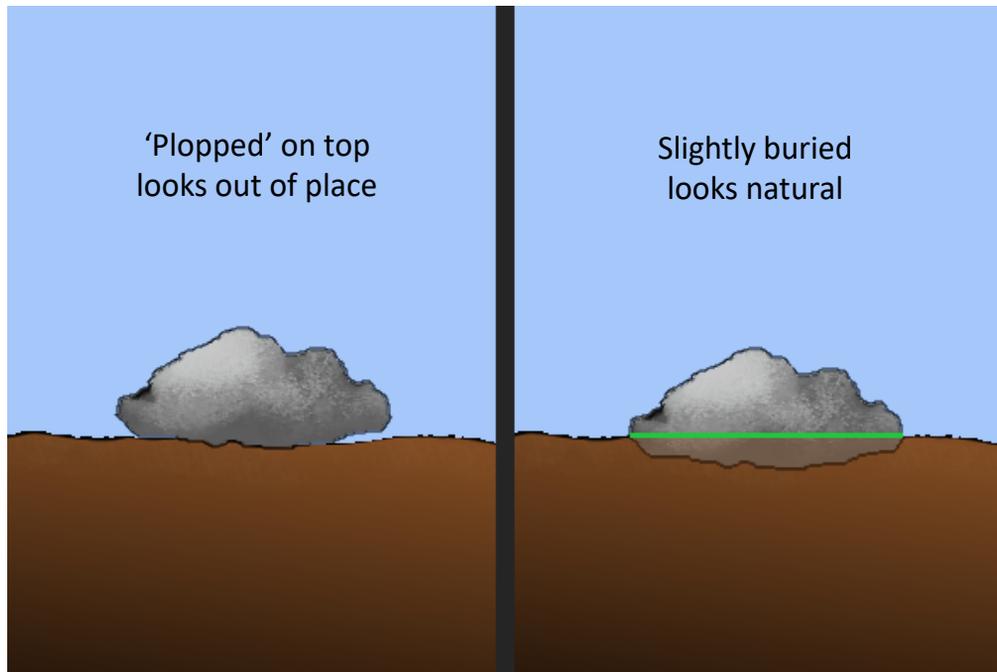
- Dry Creek Bed
- Flagstone Walkway
- Patio



Unlike laying sod, it takes some time for a xeriscape to establish itself. Hardscapes and landscape features give the area structure and the feeling of a more complete landscape. They also provide additional textures and year-round interest. Installation methods vary greatly depending on what you chose to implement.

Hardscapes Features

Boulders



A small depression of three to six inches should be dug into the soil before a boulder is placed. This helps make the boulder look like it is natural and didn't simply fall from the sky. Save the soil to fill in around the edges of the boulder.

Hardscapes Features

Small Rock Wall



A small rock wall can be constructed using retaining wall blocks, strip stone or other rocks. It need not be elaborate.

Edging

- Available in plastic rolls or metal strips
- Minimum height of 4 inches
- Edging should always be used to separate beds from grass
- Leave no more than ½ inch out of the soil



The easiest way to install edging is to dig a narrow trench, place the edging and backfill the sides. Be sure to compact the soil around the edging. Use edging pins to help keep it in place. Edging pins are different than landscape or fabric pins in that they are about 8 inches long and have a small opening that fits snug against the edging. For metal edging, overlap each piece a 6-12 inches and secure using two pins at each overlap and 2-3 in the center of each piece. For edging in rolls, two pins at each overlap and 1 pin every 3 to 5 feet is sufficient.

Edging that meets concrete needs to terminate ½ inch below grade.

Do not use edging to keep mulch off of sidewalk.

Fabric

Myth

- Weeds will grow if I don't use fabric

Fact

- Weeds will grow whether fabric is present or not. Some weeds will even grow through the fabric



A common misconception is that landscape fabric stops weeds. This is false. If the fabric is thick enough, like felt material, it is likely to stop most weeds already in the soil from growing through, however it will not stop weeds that blow in from your neighbor's yard or arrive in bird droppings from germinating on top of the fabric.

We do not recommend the use of fabric around plant material, it creates an unnatural barrier between soil, air, water, and plants. It is especially problematic around plants such as groundcovers that put additional roots into the ground as they spread; fabric will prevent those roots from reaching the soil. Also, as organic mulch decomposes, the resulting product needs to be in contact with the soil, not creating a new soil layer on top of the fabric. Fabric under inorganic mulch helps to keep it clean.

Never use plastic sheeting.

Proper Placement



Proper spacing is critical! Use a measuring tape for accurate spacing. Refer to your design and measure with your scale the distance between plants. The plants shown above are 2 feet apart according to the plan. Notice the measurement is to the center of each plant.

Placing each plant using a ruler can be very time consuming. It's okay if it's off by a few inches for a small perennial or 6-12 inches if it's a large shrub. Place plant material close to where it is supposed to go, then double check placement using a ruler.

Planting



Dig the hole twice as wide as the container and just as deep as the root ball.



Notice the space around the plant. This will facilitate backfilling the hole.



If a plant has been growing in a pot for a long period of time you may see more roots than potting soil. It's also common to see a large accumulation of roots at the bottom of the root ball and even coming out the bottom of the pot.

Perennials and Ornamental Grasses – take a sharp knife and make three vertical cuts down the sides of the root ball. This is damaging roots, but in the long run it is beneficial to the plant. If there is a thick layer of just roots at the bottom of the root ball, cut it off completely.

Shrubs – very carefully loosen some of the roots from the ball.

Trees – take your time. Once the tree is in the hole, remove no less than the upper two-thirds of the wire basket and as much of the burlap sack as possible.

To help reduce transplant shock, remove about 1/3 of the blooms and buds from perennials. This will help the plant get established more quickly.

Check the Hole Depth



This hole is too
SHALLOW

This hole is too
DEEP

**This hole is just
right**



CRITICAL - The hole depth for a tree should be a few inches less than the height of the root ball.

Soil Amendment



Compost- Class I or Class II
Pea gravel

Use up to the size of the plant
container



Mix the amendment with the
soil removed from the hole,
you'll use this to plant



There are two categories of soil amendments, organic and inorganic. For an organic, use only a Class I or Class II compost. Pea gravel or angular sand may be used as inorganic amendments. Careful though, angular sand has larger particle sizes that are angular, playground sand is not an acceptable soil amendment.

One way to select a compost is based on the water needs for the plant. If a plant typically likes a little water, use an organic compost, plants that are ultra low-water typically prefer leaner soils so don't add compost.

Organic amendments "build" the soil that feeds your plants. Clay and sandy soils will both benefit from organic amendment, as it improves texture, creates appropriate pore space, increases water-holding capacity, and adds nutrients. Incorporate amendment thoroughly and deeply; it is helpful to apply during soil tilling.

Do not use any amendment when planting a tree.

Soil Amendment



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Pea gravel

Use up to the size of the plant
container



Mix the amendment with the
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Compost is decomposed organic material. If starting with a new landscape on a blank slate, you can spread 2 to 3 inches of compost across the entire garden area and work it into the soil. Choose fully decomposed material free of insecticides, herbicides and weed seeds. If you have only partially decomposed plant material, add in the fall so it has time to decompose fully; garden debris and fresh grass trimmings are only recommended for fall applications.

Manure is fresh animal waste. It has the potential to “burn” plants may be high in salts and may be contaminated by bacteria (including e. coli). Aged/composted manure is acceptable as a top dressing for grass, but isn't recommended as a soil amendment.

Pea Gravel and Angular Sand (mason's sound) is ideal for heavy clay soils, especially for ultra low-water plants

Replace Soil

Backfill around the plant with the newly mixed soil, layer by layer, using your hands to apply moderate pressure to firm the soil to remove air pockets. Any additional soil should be used to create a ring around the hole



Do **NOT** step on the soil to compact it!

Water



Water shortly after planting. Once you've completed planting for the day, give the plants a second watering. Expect some settling of the soil.



Always water in new plant material.

Allowing water to settle the soil around the plant is ideal.

Mulch

Mulches retain soil moisture, inhibit weeds and reduce erosion potential

Choose from

organic

or

inorganic



Mulch is a surface covering applied to the garden bed. It's benefits include:

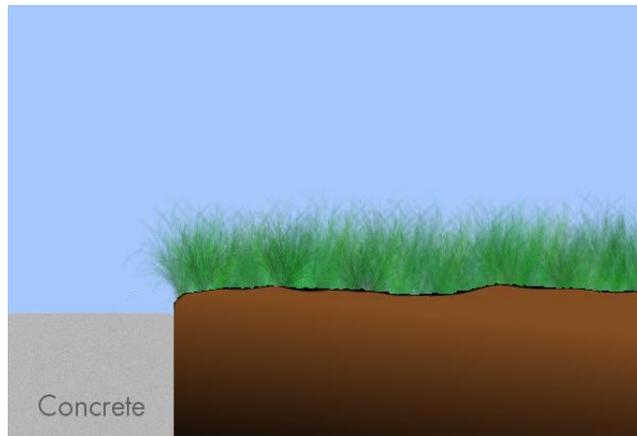
- Retaining moisture
- Creating a tidy look
- Preventing erosion
- Keeping plants clean
- Prevents compaction and weeds

Use of inorganic mulch next to a sidewalk can help reduce maintenance as water tends to collect at sidewalk edges during heavy rainstorms and wash organic mulch away.

Shredded cedar tends to 'stick' together better during wind storms.

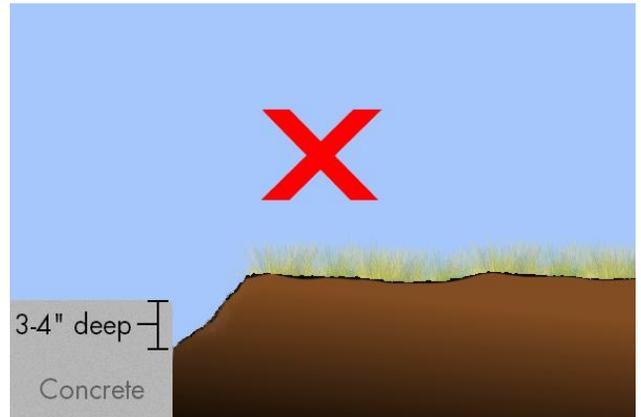
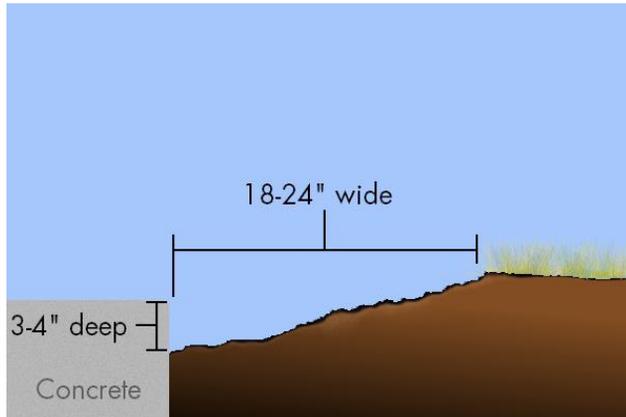
Mulch

Site preparation



For some of us, the level of the grass is higher than the sidewalk or driveway. If mulch is placed directly on top of the exist grade, it will continually be falling onto the sidewalk.

Mulch



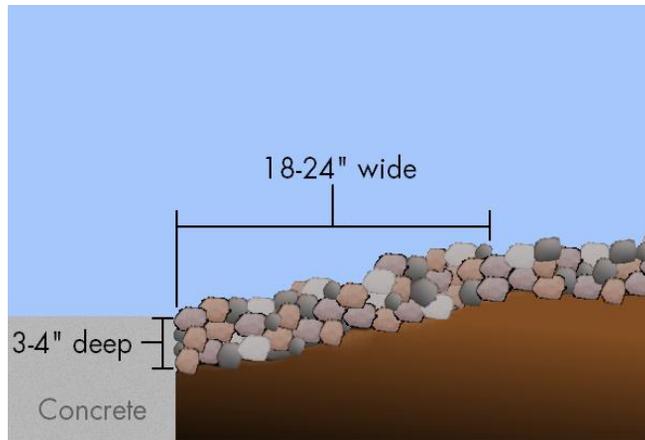
To help remedy this issue remove a section of soil next to any concrete surface area.

We recommend 3-4 inches below the level of the concrete and back 18-24 inches. Do not dig to the bottom of the concrete. If the concrete is only 3 inches thick, dig down 2 inches.

Do not dig back only a couple of inches, or only is there increased likelihood that mulch will still fall onto the sidewalk, but the degree of slope is visually noticeable and you'll have soil showing as well.

Mulch

This shows how the site will look after the mulch is installed.



Irrigation

Hand Watering

- Pro: Great option the first week or two; gives you time with your plants to see how they are doing
- Con: Initially takes more time

Irrigation System (Pop-ups / Rotors)

- Pro: Good way to saturate all of the soil
- Con: Prone to evaporation, wind drift, overspray

Drip Irrigation

- Pro: No evaporation, watering at the roots of the plant, system design flexibility
- Con: Difficult to locate breaks, system needs to be expanded as plants mature



Basics

1. Do not water landscape like it is turf! Plants do not need much water and can be harmed by overwatering. The signs of heat stress are the same as stress from over-watering.
2. Yes, you'll need to water more in the beginning, but it will still be far less water than if you were watering turf. You're watering too much if you see an increase in your water bill after converting healthy turf to a water-wise landscape.
3. After the first year, saturate the soil and then let it dry out
4. Use irrigation zones that are programmed to supply different amounts of water (that align with that zone's plant material) and use the same system components in each zone
5. Perform regular maintenance to verify that your system is working properly

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Drip Irrigation

- Pro: Little evaporation, watering at the roots of the plant, flexible system
- Con: Difficult to locate breaks, system needs to be expanded as plants mature



Frequency

Day of planting – water 2-3 times using a hose

Week one: check plants daily, check moisture in soil, a little water every day to every other day

Weeks two - three: water every two to three days

Weeks four - eight: once a week

Following year: once every couple of weeks to once a month depending on plant material

After a rain, check the soil under the mulch to see how much water it received.

How Much/How Long?

For pop-ups and rotors you're going to need to do some experimenting. These recommendations are for watering a water-wise landscape covered in mulch, not for grass. Leave a pop-up zone on for about 10 minutes. Leave a rotor zone on for 30 minutes. Wait for an hour and note any runoff. Remove mulch in a couple of spots and using a shovel dig into the soil to see how deep the water has traveled. If it's down only an inch, try increasing the runtime by 50% and repeat the steps.

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For drip: when a plant is first installed we mostly just need to keep the root ball moist. This can be achieved by applying 1 quart to 2 gallons of water over the course of an hour. Perennials and ornamental grasses that come in a 4 inch or #1 container probably only need a quart of water per irrigation, large shrubs in #5 containers or larger may need a couple of gallons. You may use 1, 2, or 4 gallon per hour (GPH) emitters, you'll simply adjust the runtime depending on which one. It's easier to use the same emitter for all plants and increase the number of emitters per plant based on its size and water needs. A small plant gets one emitter, a large shrub or a tree gets more. If you're using 1 GPH emitters and need to apply ½ a gallon, run the system for 30 minutes.

Drip

Drip lines have a tendency to push their way through the mulch. Remedy this by staking down the lines every few feet with 4-5 inch landscape pins.

Resources

1. Free turfgrass irrigation assessments through Aurora Water. Call 303.739.7195 to schedule yours.
2. City of Aurora Irrigation classes and rebate. Go to www.aurorawater.org or call 303.739.7195 for more information.

Maintenance



Spring: This is when most of the maintenance will take place. Cut back perennials and most ornamental grasses around mid-March.

Weekly/Monthly: Maintenance includes weeding if needed and “deadheading”, which means removing spent blooms before the plant produces a seed head. This process encourages re-blooming and the spread of unwanted seeds.

Seasonally: Prune shrubs and divide ornamental grasses if needed for optimal plant health. Ornamental grasses require division every three to four years, depending on the species, to remove the deadened middle of the mature clump. Only divide in the spring. Compost the removed material; disease-free grasses are the perfect mulch for a vegetable garden.

Fall / Winter: Wrap newer trees (especially with thin or dark bark), Water in the winter if we have periods of no precipitation and warm temperatures (about 2 weeks), Blow out your irrigation system.

Resources

- Classes (FREE)
- Indoor and Outdoor Assessments (FREE)
- Landscape Design Consultations (FREE)
- Large Property Water Efficiency Program
- Low-Income Fixture Replacement Program
- Rebates – Irrigation, Landscape, Toilet
- Water Smart Readers
- Youth Education Programs



Aurora Water Conservation

https://www.auroragov.org/Residents/Water/water_conservation

Let us know how we're doing

Please take just a few minutes to evaluate this class. We hope you enjoyed it.

<https://www.surveymonkey.com/r/AuroraWater>



Thank You

Water Conservation Office
Hotline 303.739.7195
conservation@auroragov.org



Please visit our website for additional information at www.auroragov.org