Housekeeping:

- Breaks: mid-class, after lab
- Restrooms (please respect closed-off areas)
- Please silence your cell phones
- If you can’t attend, contact us!

WaterSmart Series Contacts:

Michelle Landis, Project Manager
Leticia Perez Isaac, Project Coordinator
Rania Theodosi, Project Coordinator
Studio West Landscape Architecture + Planning
Email: landscapemakeover@sdcwa.org
WaterSmart Landscape Makeover Series Survey

• To continue to improve these classes, we need your input.
• Take a few minutes to complete the survey. Please turn it in at the end of Class 4.

Publicity: use of class materials and photographs

• During the application process you agreed to allow us to use items related to this program.
• NO names or addresses will be made public.
• In the event you need to opt out of this agreement, please notify the WaterSmart Landscape Makeover team in writing.
Prepare for Your Coaching Session

Sign up for your appointment today!

✓ Plan on arriving 15 minutes early to check in

✓ Bring the following:
  • L-1, L-2, L-3 and L-4 base plans
  • Photos (yard & irrigation)
  • Highlighted design questionnaire
  • Bubble diagrams
  • Hardscape plan
  • Plant list
  • Evaluation sheet from notebook

✓ After your coaching appointment:
  • Have your low impact development, planting & irrigation plans scanned BEFORE YOU LEAVE!
  • Turn in your completed survey form.
Want to Learn More?

Landscape design and horticulture programs at local community colleges:

- Cuyamaca Community College
- MiraCosta Community College
- Southwestern Community College
WaterSmart Landscape MAKEOVER SERIES

Let's Get Started
Watersheds, Plot Plan, Scale, Soil, Watersheds & Site Evaluation

Shaping Spaces
Landscape Design Fundamentals, Plant Selection & Functional Design

Make it Happen
Irrigation Design, Turf Removal, Implementation & Maintenance

Design Coaching
Planting, Irrigation and LID Plans
Class 3 Objectives

Homework Review

Step 4
Irrigation
Anatomy of an Irrigation System
Water Efficient System
Performance
Retrofit Options
Management and Scheduling
Demonstration

Step 5
Implementation
Turf Removal
Sheet Mulching
Installation

Step 6
Care for Your WaterSmart Landscape
Maintenance
Troubleshooting

Prepare for Class 4
WaterSmart Landscape
MAKEOVER SERIES

SAN DIEGO COUNTY WATER AUTHORITY

Make It Happen!
Did you complete your

- Landscape design questionnaire?
- Plant list?
- Bubble diagram?
- Hardscape plan?

Did you start your

- Planting plan?

Hopefully you read

- *A Homeowner’s Guide to a WaterSmart Landscape* steps 4-6
- The resource info in your notebook

And had a chance to watch

- *Videos On Demand* episodes 9 through 17 at landscapemakeover.watersmartsd.org

Did you…

- Photograph your irrigation system?
- Identify your Sunset climate zone?
- Collect a turf sample – one for each type of lawn you have?
What is Efficient Irrigation?

Efficient Water Delivery – System Performance

- Correct Pressure
- Good Distribution Uniformity

Intelligent Water Management and Scheduling
Water Needs vs. Water Use

Water Waste!
Irrigation Design

Preventing Water Waste

• What is waste?
  • Runoff
  • Watering past root zone
  • Watering more than plants require

• How to prevent waste:
  • Improve uniformity
  • Improve infiltration
  • reduce compaction
  • mulch
  • increase soil organic matter content
  • Split cycles, cycle and soak
STEP FOUR
DESIGN YOUR WATER SMART LANDSCAPE

Anatomy of an Irrigation System

[Diagram of irrigation system components]
Water Management

You Can’t Manage What You Can’t Measure

• Locate your water meter
• Know your water history
• Consider adding a flow sensor
Irrigation Controllers

- Multiple types and manufacturers available
- Multiple start times
- Look at calendar length
- Look for ability to program individual stations
- Web based capability
- Sensor data capability
Weather Based Controllers

- Type
  - Historical
  - Weather station
- Web-Based Control
- Sensor Data Input – solar sync
- Flow meters
STEP FOUR  
DESIGN YOUR WATER SMART LANDSCAPE

Water Efficient Control Equipment

Use your water meter to track weekly/monthly water use

- Smart Controllers
- Rain and ETo Sensors
- Moisture Sensors
Backflow Prevention
Check your base plan - your backflow device should be identified!

A Reduced Pressure Zone Device (RPZ) protects against:
• Back Siphon
• Back Pressure

An anti-siphon valve (ASV) protects against:
• Back Siphon
Pressure

Static pressure at the point of connection (POC)- this may not always be a reliable location to measure irrigation pressure

Dynamic pressure at the irrigation heads
Pressure

Pressure Test

- This was recorded during your field visit and shown on your plan
- Dynamic range should be between 25 psi and 40 psi
Pressure Regulation

- At the Point of Connection (POC)
- At the valve
- At the head
- Very high pressure may require more than one item to reduce pressure
Pressure

Sprays: Adequate Pressure
Pressure
Sprays: High Pressure

Misting
**Pressure**

**Rotors: Adequate Pressure**

Rotor stream should fan out and disperse evenly from beginning to end.
Pressure

Rotors: Low Pressure

Rotor emits one noticeable stream
Pressure

Rotors: Low Pressure

Donuts formed by poor coverage
Distribution Uniformity (DU)

- How evenly irrigation water is applied
- Wet area vs. dry area in the same zone
- Good uniformity conserves water through efficient run times
Distribution Uniformity (DU)

Factors Effecting DU

- Sprinkler spacing
- Mixed nozzles and equipment
- Plant interference
- Incorrect water pressure
- Tilted sprinkler heads
- Head arc adjustment
- Radius adjustment
- Low head drainage
- Broken equipment
Head Damage

- Especially adjacent to driveways
- High pressure can also cause breaks and system damage
Control Valves

Standard valves

Low flow zone kit – valve, filter and pressure regulator
Overhead System Types

- Spray heads
- Rotors
- Low precipitation rotors or spray (water efficient)
Overhead Spray

Advantages of Efficient Overhead Spray

✓ Simple to retrofit existing spray hardware
✓ Some choices can nearly match the precipitation rate of drip
✓ Simpler to troubleshoot than drip
✓ Provides good distribution uniformity for groundcover establishment
Overhead Spray

Don’t Mix Overhead Spray Types
Drip Irrigation

Surface or Subsurface Drip Irrigation Types

- In-line drip irrigation
- Sub-surface in-line drip
- Point Source Drip
- Bubblers
Drip Irrigation

**Advantages**

- Drip is the most efficient irrigation delivery type
- Reduces weed growth by targeted water application
- Prevents runoff and erosion
- Low precipitation rate
- No trenching means less digging
Drip Irrigation

Filters

At the valve

At the head
Drip Retrofit Equipment

**Drip Retrofit Systems**

- Replace existing pop-ups with a head retrofit such as Rainbird RETRO-1800 – refer to step by step guide
- Compatible with in-line tubing or point source 1/4” “spaghetti” tubing
- Cover with mulch for easy access
Drip Retrofit

Easy to install

Shown with the Rainbird RETRO-1800
In-line Drip Irrigation

Advantages of In-Line Drip Tubing

- Provides consistent flow throughout line
- Less prone to clogging and damage than point source “spaghetti” tubing
- Easy to install
- Distributes water to entire root zone when installed correctly
- Blank tubing can be spliced in where no irrigation is desired
In-line Drip Irrigation

In-line Drip Installed on the Surface and covered with mulch
Irrigation Design

**Equipment Choice Affected by:**

- Plant material
- Soil texture
- Slopes
- Existing system
- Available pressure
- Available flow
- Budget
- Maintenance requirements
Irrigation Design

Irrigation Plan

- Create an irrigation plan based on your completed planting plan and hydrozones
- Select a category of irrigation (rotor, drip, etc.)
- Work with the Design Coach to prepare a materials list and fill in spaces on your legend (quantity and components)
Irrigation Design

Advantages of Efficient Overhead Spray

- Simple to retrofit existing spray hardware
- Some choices can match precipitation rate of drip
- Simpler to troubleshoot than drip
- May provide better coverage for groundcover

Use an Overhead Spray Retrofit when:

- The existing system has good coverage
- Replacing turf with a “turf-like” substitute
- For small plugs of planting that will spread out
Irrigation Design

Specifying Spray Conversion

- Valves
Irrigation Design

Specifying Spray Conversion

- Valves

*NOTE*

Anti-siphon valves should be installed 6-12" above the highest sprinkler head within the zone, or, according to local code.

PGV-ASV VALVE

Scale: 1.5" = 1'-0" Hunter Irrigation Detail
Irrigation Design

Specifying Spray Conversion

• Heads
**Step Four**  
**Design Your Watersmart Landscape**

**Irrigation Design**

**Specifying Spray Conversion**

- Nozzles

---

### Nozzle Chart

<table>
<thead>
<tr>
<th>Arc</th>
<th>Pressure</th>
<th>Radius</th>
<th>Flow</th>
<th>Flow</th>
<th>Precip</th>
<th>In/hr</th>
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<td>90°</td>
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<td>5</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
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<tr>
<td>180°</td>
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<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
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<td>210°</td>
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<td>5</td>
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<td></td>
<td>5</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
</tbody>
</table>

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*For PR540 information see page 48*

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Visit hunterindustries.com

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Irrigation Design

Specifying Spray Conversion

- Pipe

Use Sch. 40 pipe (only) for all mainlines (up to 1.5"")
Drip Irrigation

Advantages

✓ Drip is the most efficient irrigation delivery type
✓ Reduces weed growth by targeted water application
✓ Prevents runoff and erosion
✓ Low precipitation rate
✓ No trenching means less digging

Use a Drip Retrofit when:

✓ There is a mix of plant material sizes and types
✓ Lots of hardscape or walkways have been added
✓ When combining plants with different water needs, especially existing plants with new, low water varieties
Irrigation Design

Specifying Drip Conversion

- Low flow zone valve
Irrigation Design

Specifying Drip Conversion

Most residential properties use ASV valves
Irrigation Design

Specifying Drip Conversion

- Low flow zone valve
Irrigation Design

Specifying Drip Conversion

• Head Conversion
Irrigation Design

Specifying Drip Conversion

- Fittings
Irrigation Design

Specifying Drip Conversion

• In-line tubing
STEP FOUR  DESIGN YOUR WATERSMART LANDSCAPE

Medusa Outdoor Demonstration

and a break
Now it’s time to...make it happen!

Before

After
Turf Removal & Sheet Mulching

1) Prepare the site
2) Edging, mounding & contouring
3) Ensure irrigation of trees and plants
4) Plant large plants
5) Apply weed barrier
6) Layer compost and mulch
Protecting Trees

- Protect mature trees, the root zones can be shallow & extensive
- The critical root area is in a radius 10x the diameter of the trunk
- Use care when removing sod in this zone

(http://www.extension.umn.edu/)
Protecting Trees

Most trees have their roots in the upper 6” of soil

- Don’t change the existing grade of the soil around trees, especially in the drip line
- Never mound soil around the trunk
- Minimize adding new planting in the critical root zone, mulch instead
- Include a separate irrigation zone for the existing trees
Irrigating Existing Trees

• Add supplemental water by a soaker hose or hand water until the final irrigation is installed
• Install irrigation away from the tree trunk!
• Ensure the entire the critical root zone area is irrigated, at a minimum
Turf Removal & Sheet Mulching

Preparing the site - hardscape

✓ Call 811 to locate utilities at the street

✓ Layout areas which will become paths and patios.

✓ These areas will NOT require sheet mulching but will need to be excavated.

✓ Lay irrigation lines beneath areas before completing hardscape.
Implementation - Hardscape

Hardscape and Sheet Mulching

- Don’t sheet mulch future hardscape areas
- Hardscape requires soil compaction beneath
Turf Removal vs. Sheet Mulching

- May be more effective for warm season turf
- Faster

- Improves soil
- Reduces landfill
- Costs less
- Less labor
# Turf Removal & Sheet Mulching

Know your turf type to remove effectively

<table>
<thead>
<tr>
<th>Turf Type</th>
<th>Dormant Season</th>
<th>Active Season</th>
<th>Growth form</th>
<th>Seeds</th>
<th>Common Types</th>
<th>Kill Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool Season</td>
<td>Winter</td>
<td>Summer</td>
<td>Small tuffs</td>
<td>Dwarf Tall Fescue (common locally), Perennial Ryegrass, Annual Ryegrass, Blue Grass</td>
<td>Sheet Mulch</td>
<td></td>
</tr>
<tr>
<td>Warm Season</td>
<td>Winter</td>
<td>Summer</td>
<td>Creeping Stolons</td>
<td>Bermuda grass, Zoysia grass, St. Augustine Grass, Kikuyu grass</td>
<td>Solarization or Chemical Followed by Sheet Mulching</td>
<td></td>
</tr>
</tbody>
</table>
Turf Removal & Sheet Mulching

Warm Season Turf Issues:
- Very resilient
- May break through: watch for regrowth and remove
- Requires **additional pre-treatment**
  - Removal
  - Multiple treatments
Turf Removal & Sheet Mulching

Pre-Treat Warm Season Turf:

Complete Sod Removal
- or-
Solarization
- or-
Non-toxic herbicides

✓ Follow all with mulching
Turf Removal & Sheet Mulching

Warm Season Turf Treatment Methods:

- Complete sod removal
- Sod goes to landfill, cannot be recycled
Turf Removal & Sheet Mulching

Warm Season Turf Treatment Methods

Solarization

- Use clear plastic, not black
- Must be done in warm season
- Takes 8-12 weeks
- Doesn’t work in shade
- **Caution!** This action also tends to kill the beneficial microbiological life in soil
- You may also need to amend with mature compost after utilizing this technique

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74145.html
Turf Removal & Sheet Mulching

Warm Season Turf Treatment Methods

- Herbicides
  - *Warm season turf cannot be killed with chemicals when dormant*
  - Spray herbicides when actively growing
  - Always follow manufacturer’s instructions
  - Repeat application!

- Non-toxic herbicide products are also an option
Turf Removal & Sheet Mulching

Preparing the site

• Remove woody or invasive plants
• Remove or Pre-treat warm season turf
• Flag sprinkler heads or install irrigation if there is not a system in place to retrofit.
• Soak the area with water
Turf Removal & Sheet Mulching

Preparing the site

• Edge, mound and contour
• Make room for the mulch - cut lawn to 3” below concrete level, 12 inches away from concrete
Turf Removal & Sheet Mulching

Edging, Mounding & Contouring

- Make room for the mulch: Cut lawn 12 inches away from concrete to 3” below concrete level.
Turf Removal & Sheet Mulching

Soil Lasagna Sheet Mulching Layers

Water between each layer

Water

Mulch

Compost (1-2”)

Water

Cardboard

Water

Newspaper

Cardboard

- Costco, Best Buy
- Regular "B" flute corrugated paper rolls
  http://www.papemart.com/regular-b-flute-corrugated-paper-rolls/id=4609#4609

Rule of thumb for mulch coverage:
- 1¼ cu. yd. covers 100 SF @ 4” depth
IMPLEMENT YOUR PLAN

Turf Removal & Sheet Mulching

Sheet Mulching in Action

- Notify your neighbors first!
- Contour edges
- **Water**
- Newspaper
- **Water**
- Cardboard
- **Water**
- Compost layer
- **Water**
- Mulch layer
- **Water**

water smart
SAN DIEGO COUNTY WATER AUTHORITY
Turf Removal & Sheet Mulching

Sheet Mulching in Action

- Use 3” of soil building mulch, not wood chips!
- Takes 4 to 7 months depending on temperatures
Turf Removal & Sheet Mulching

Sheet Mulching in Action

- Water when layers beneath are dry
- Ensure that trees and existing plants receive water during process
Turf Removal & Sheet Mulching

Fast-Finish Methods: Plant Before Sheet Mulching

Steps:
1. Install hardscape
2. Contour landscape for stormwater detention
3. Place rocks
4. Install irrigation
5. Plant
6. Sheet mulch between and around plants or sheet mulch entire area, pull back mulch, cut hole in cardboard, plant and replace mulch
Planting

Hole
• As deep as pot, twice as wide as pot
• Rough sides
• Fill with water before planting

Plant crown above soil level
• Loosen roots

Amend Back Fill Soil
• Add 30% compost to soil removed from hole (3 scoops compost : 7 scoops soil)
• Natives: If soil is disturbed, add 15% compost to soil removed from hole.
• Use mixture to backfill hole.
Planting

**Groundcovers that spread by rooting:**

- Remove turf completely, work in compost
- Plant groundcover with 1” deep mulch around it
- Plants require contact with soil, not just mulch
Irrigation of Trees and Large Plants

Add bubblers or drip irrigation if needed

In-line drip irrigation
Irrigation Scheduling

*How much water does your landscape need?*

…it depends.
Irrigation Scheduling Factors

Climate

Soil Texture
• Infiltration rate – how fast soil takes water in
• Water holding capacity
  • How long it stays there
  • “Plant gas tank”

Irrigation Equipment Precipitation Rate
• How fast water is applied
• “Light rain vs. heavy rain”

Plant Demand
Irrigation Scheduling

Know root zone depth =
Know how much water to apply

Deep, less frequent watering is best for plant health
What is a Controller Program?

- A set of instructions stored in the controller
- Different irrigation schedules
  - Irrigation days – how often?
  - Start times – at what time?
  - Water times – how long?
STEP FIVE  IMPLEMENT YOUR PLAN

Irrigation Scheduling Help on the Internet

webwaterwise.com Irrigation Scheduling Help on the Internet

webwaterwise.com

Watering Schedule

Check with your local water provider to find out the watering days and times allowed in your area.

1. Use your watering schedule as a guide. Program your automatic timer according to the numbers below or your local watering restrictions.
2. Water your plants for stress, increasing or decreasing watering times accordingly. Do not exceed the maximum allowed minutes per day, per your local water restrictions.
3. Skip watering days when it rains or when the soil is already wet.
4. Re-program your timer each month using your Sprinkler Schedule as a guide. Do not exceed the maximum allowed minutes per day, per your local water restrictions.
5. If your timer allows you to adjust watering times by a percentage, you can set your timer for the highest month and adjust the percentage by using the Sprinkler Index published on our website. This index is scientifically calculated to allow even more efficient watering schedules based on estimated water needs for the week. Please note that this option may not be suitable if local watering restrictions are in force.

Property Zip Code: 92123
This is as of 2/25/2019 11:13:17 PM

Groundcover

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<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
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<th>Oct</th>
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<tr>
<td>Maximum Min</td>
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<td>18</td>
<td>12</td>
<td>12</td>
<td>12</td>
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</tbody>
</table>

Watering Index

Watering Index

Watering Calculator

The calculator tool estimates the correct amount of water to give your landscape or garden weekly during normal supply conditions.

webwaterwise.com
Irrigation Scheduling

Remember...

• The best technology is only as smart as the person operating it.
• Nothing replaces human knowledge and attention!
Implementation - Resources

Irrigation Information:

- Manufacturer product catalogs
- Your homeowner’s guide
- Bewaterwise.com
- Local irrigation vendor workshops
- YouTube
Implementation - Sequence

Do It Yourself or Professional Contractor

- What is right for you?
- Tradeoff: cost vs. labor & time
- Option: be the general contractor yourself

Installation or Repair:

- California Landscape Contractors Association (CLCA) http://www.clcasandiego.org
- Certified Irrigation Professional www.irrigation.org
- Contractors State License Board (CSLB) http://www.cslb.ca.gov/consumers/
- YouTube instructional videos
Plant Maintenance

- Amend soil with compost and mulch regularly
- Add additional organic amendments, as needed
- Remove weeds
- Monitor and treat pests
- Monitor plant health
Plant Maintenance

Use Integrated Pest Management (IPM)

✓ Minimize use of non-organic chemicals for pest control

- Inspection and identification of pests is the first step
- Start with a hard spray of water
- Use insecticidal soap or other non-toxic pest killers
Plant Maintenance

Use Integrated Pest Management (IPM)

✓ Use chemical control as a last resort

- Consider replacing pest prone plants with another species
- When using chemical control, follow all manufacturer directions
- Wear protective gloves, clothing, glasses, mask, etc...
- Only apply when weather permits
- Do not use higher concentrations than recommended
Irrigation Maintenance

- **Adjust run time for season, 3 schedules per year:**
  - Winter
  - Fall & Spring
  - Summer

- **Check for leaks and fix leaks promptly**

- **Flush drip systems and check filters to reduce clogging**

- **Adjust spray heads to prevent overspray on hardscape**
Irrigation Maintenance

Tools for Maintenance

- Small flathead screw driver
- Rotary nozzle sprinkler adjustment tool
- Small channel locks
**Irrigation Maintenance**

**Overhead Sprinklers, Look for:**

- Broken or leaning sprinkler heads
- Overspray
- Misting instead of spraying
- Uneven coverage
- Spray patterns blocked by plant material
- Broken or clogged nozzles and drip emitters

**Subsurface Problems, Look for:**

- Excessively wet areas
- Unusual mounding in turf areas
- Water flowing or seeping from turf/sidewalk edges
Irrigation Maintenance

**Drip Irrigation:**

- Drip systems, remove surface debris to clearly see piping and emitters
- Look for unwanted bubbling or spraying
- Replace missing or broken drip emitters (point source drip)
- Separations at pipe fittings for drip lines
Irrigation Troubleshooting

To Clear Clogged a Clogged System

✓ Turn the system off
✓ Remove nozzles from sprinklers at end of each line or remove end caps from drip lines
✓ Run system a few minutes until clean, solid stream of water flows from sprinkler heads or ends of drip lines
✓ Turn system off
✓ Check nozzle filters and flush; Rinse drip line filters (located in RETRO 1800 and valve zones)
✓ Reassemble system
✓ Run system and check for proper operation
WaterSmart Landscape MAKEOVER SERIES

Please keep in touch, write and send pictures of your progress

Please reply to our completion surveys to track your success

Get Ready! For your Design Coaching Appointment at class 4
Homework for Class 4

Prepare
- Research and think to develop your
  - Plant palette
  - Planting plan

Complete
- Your design questionnaire with important aspects highlighted
- Your irrigation assessment
- Hardscape plan

Arrive
- Arrive 15 minutes prior to your appointment

Meet
- With your design coach

Then…
- Finish your planting plan
- Have your planting, irrigation and LID plans scanned
- Turn in your class survey
Class 4 – Design Coaching

Bring all needed materials:

- **Base Plans:**
  - L-1 with notes for reference
  - L-2 with Drainage notes
  - L-3 with your existing Planting Plan work
  - L-4 with your existing Irrigation notes
- **Photos**
- **Highlighted Design Questionnaire**
- **Bubble Diagrams**
- **Hardscape Plan**
- **Plant List**
- **Evaluation survey from workbook**
QUESTIONS?