

# WaterSmart Landscape MAKEOVER SERIES



CLASS **3** MAKE IT HAPPEN



## 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:

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## 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.

## 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



## Make it Happen

Irrigation Design,  
Turf Removal,  
Implementation &  
Maintenance

## Shaping Spaces

Landscape Design  
Fundamentals,  
Plant Selection &  
Functional Design

## Design Coaching

Planting, Irrigation  
and LID Plans

# WaterSmart Landscape MAKEOVER SERIES

CLASS

3

## 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

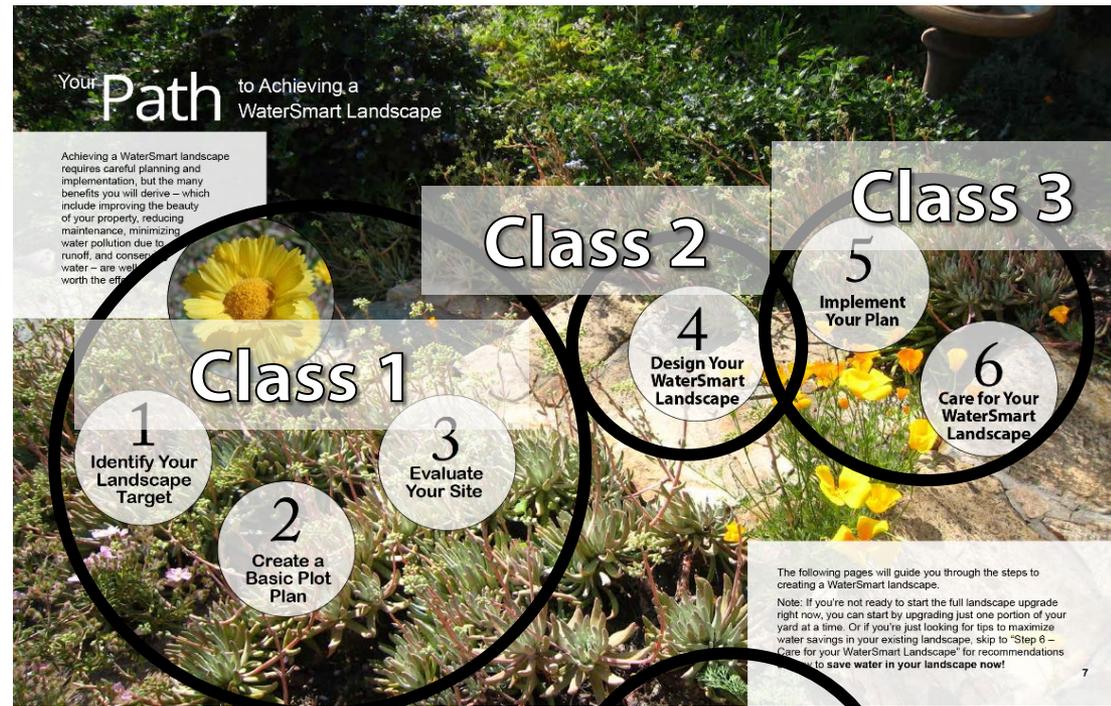
Turf Removal  
Sheet Mulching  
Installation

#### Step 6

##### Care for Your WaterSmart Landscape

Maintenance  
Troubleshooting

#### Prepare for Class 4



Class 4

Design  
Coaching

# WaterSmart Landscape MAKEOVER SERIES

CLASS

3



## 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](http://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?

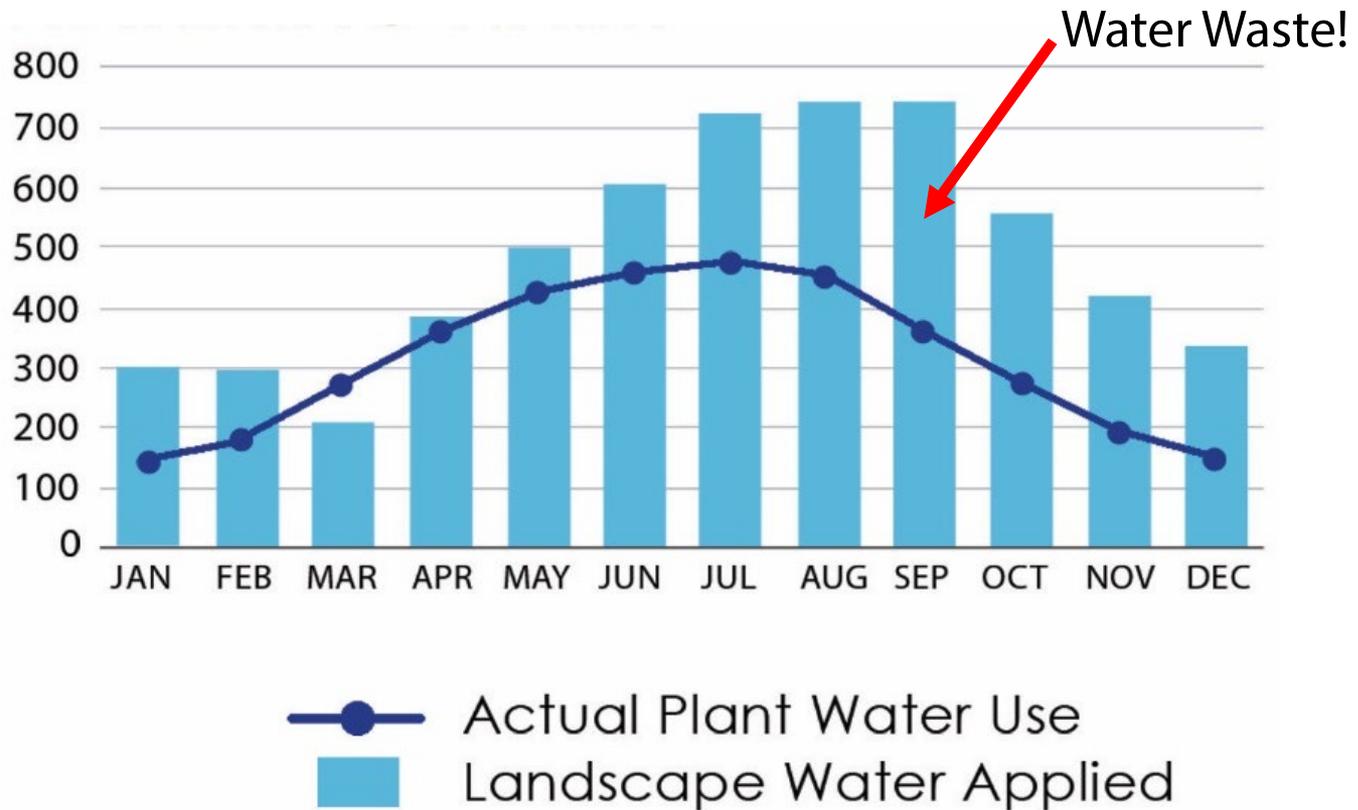
## What is Efficient Irrigation?

### Efficient Water Delivery – System Performance

- Correct Pressure
- Good Distribution Uniformity

### Intelligent Water Management and Scheduling

# Water Needs vs. Water Use

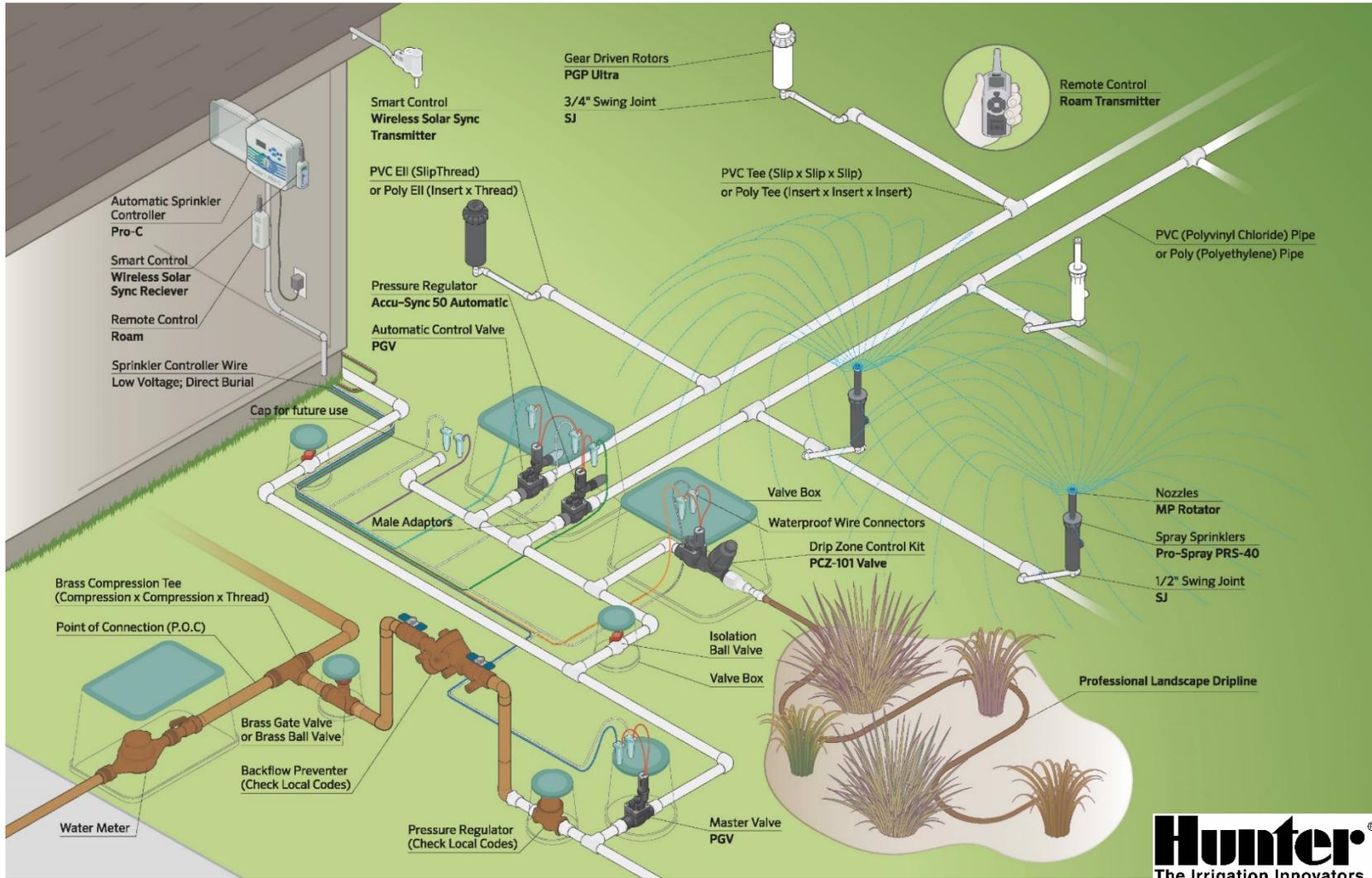


# Irrigation Design

## 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

# Anatomy of an Irrigation System



## 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



**Hunter**<sup>®</sup>  
The Irrigation Innovators



**RAIN BIRD**



**TORO**<sup>®</sup>

## Weather Based Controllers

- Type
  - Historical
  - Weather station
- Web-Based Control
- Sensor Data Input – solar sync
- Flow meters



# Water Efficient Control Equipment

Use your water meter to track weekly/monthly water use



Rain and ETo Sensors



Smart Controllers



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:

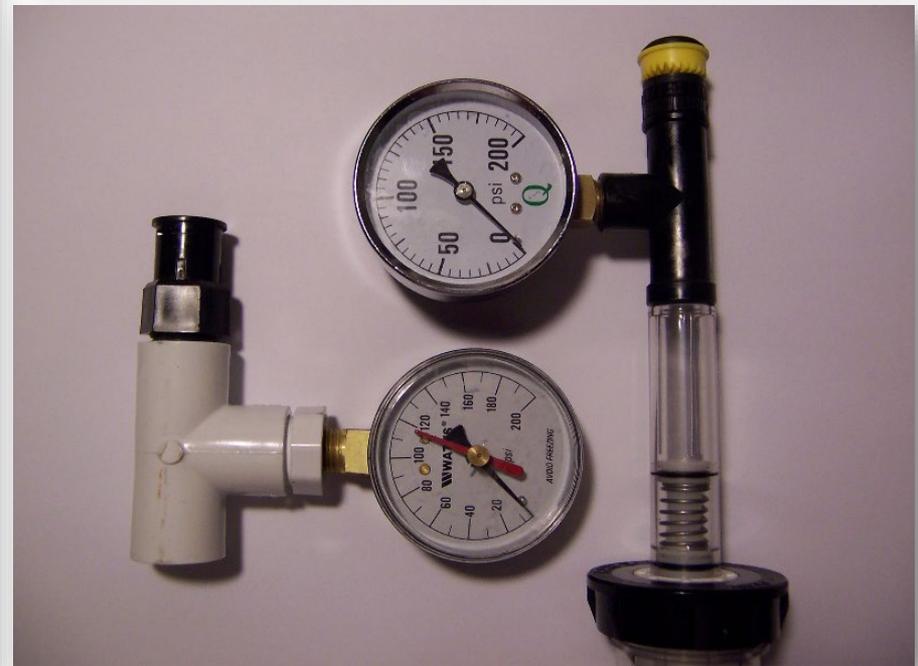
- Back Siphon

## Pressure

### 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



**At the valve**



**At the point of connection (POC)**



**At the head**

# 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

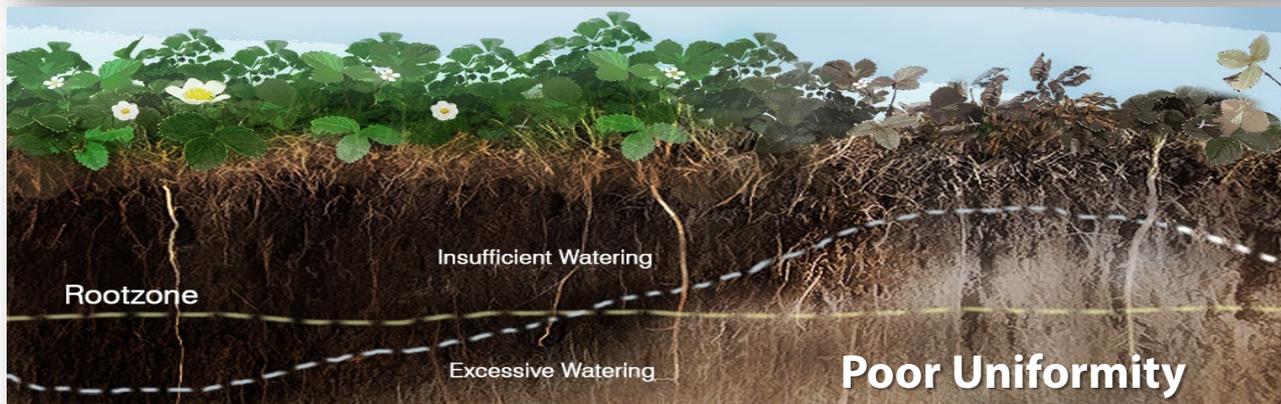
## Rotors: Low Pressure



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**



**Rotor**

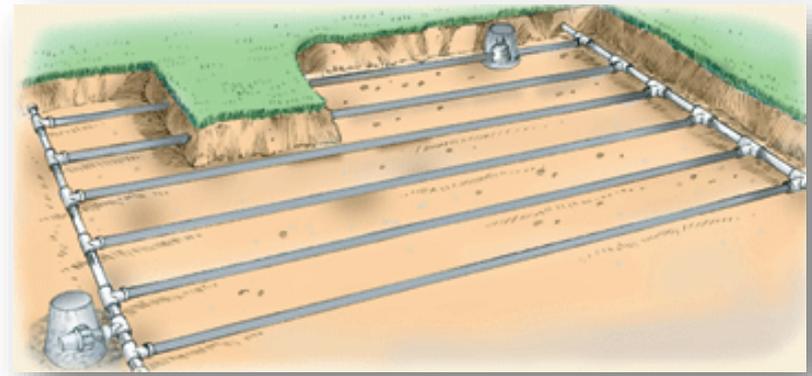
**Spray head**

# 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



#### Spray-to-Drip Retrofit Kits

##### Convert Any Spray Zone to a Drip Zone!

The easiest and fastest way to convert a conventional spray zone to a low-volume irrigation zone.

##### 1800-RETRO

1800 Series Spray Body that contains a filter, pressure regulator, 1/2" male threaded outlet, and low profile fittings



##### Installation

- Simply remove the top of any 1800 and remove the internal assembly (On the 1806 and 1812 leave the spring in the body)
- Remove the internal assembly of the retro kit and drop into the existing body
- Tighten the cap
- Use included Elbow or Tee Fittings to connect to drip tubing or connect other 1/2" FPT devices

##### Features

- Can be installed above or below grade
- Provides 30 psi (2.1 bar) pressure regulation and 200-mesh (75 micron) screen
- Flow rate 0.50 to 6.00 GPM (1.9 to 22.71 l/m)



#### RBY Pressure-Regulating Filter

Unique, compact unit that combines filtration and pressure regulation in one compact piece for protection of downstream components



##### Installation

- Simply connect the RBY Pressure-Regulating Filter into the water line
- Use Easy Fit Fittings or a female adapter to connect to drip tubing
- Install a valve or emitter box over the filter for easy access during cleaning

##### Features

- Comes in 3/4" MPT (model PRF-075-RBY, not shown) or 1" versions (model PRF-100-RBY)
- 3/4" MPT (PRF-075-RBY) regulates pressure at 30 psi (2.1 bar) and flows 0.20 to 5.0 GPM (0.8 to 18.9 l/m)
- 1" MPT (PRF-100-RBY) regulates pressure at 40 psi (2.8 bar) and flows 3.0 to 15.0 GPM (11.4 to 56.8 l/m)
- Can be installed above or below grade
- Robust body and cap are made of glass-filled polypropylene and provide 150 psi (10.3 bar) pressure rating
- 200 mesh stainless steel filter (75 micron)



# 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

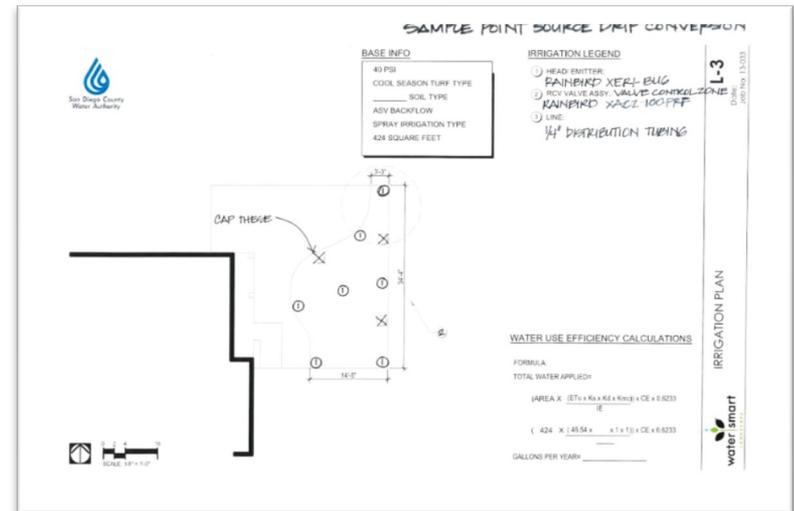
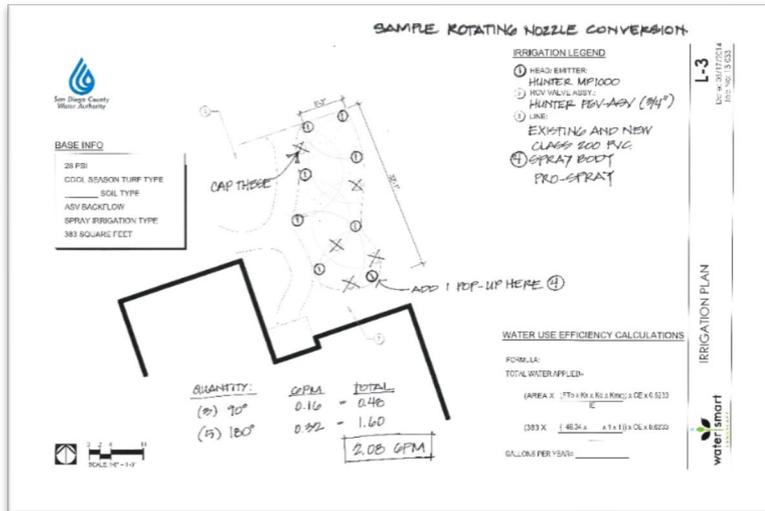
### Equipment Choice Affected by:

- 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:

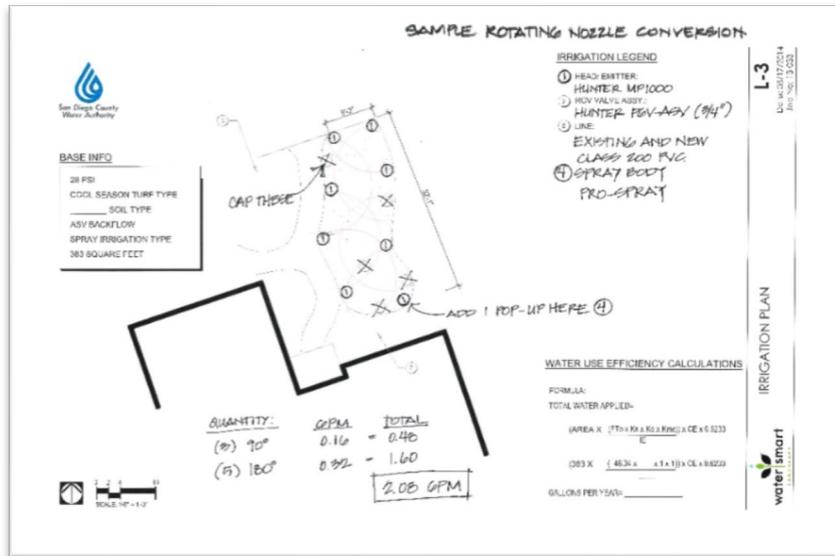
- ✓ The existing system has good coverage
- ✓ Replacing turf with a “turf-like” substitute
- ✓ For small plugs of planting that will spread out



## Irrigation Design

### Specifying Spray Conversion

- Valves



PGV-ASV 1" PGV & PGV JAR TOP PGV ICV IBV ACCU-SYNCTM QUICK COUPLERS

### PGV-ASV

Size: 3/4", 1"  
Flow: 0.2 to 40 GPM

#### FEATURES

- External and internal manual bleed allows quick and easy "at the valve" activation
- Durable six-bolt bonnet design for maximum strength
- Removable anti-siphon cap for simple servicing
- Double-beaded diaphragm seal design assures leak free performance
- Optional DC latching solenoids enable Hunter's battery-powered controllers
- Captive bonnet bolts provide hassle-free valve maintenance
- Low flow capability allows use of Hunter's micro irrigation products
- Encapsulated 24 VAC solenoid with captive plunger for hassle-free service
- Temperature rating: 150° F
- Warranty period: 2 years
- Flow control
- Optional reclaimed water ID handle
- Accu-Sync™ pressure regulation



PGV-075-ASV  
Inlet Diameter: 3/4"  
Height: 5 1/2"  
Length: 5 1/4"  
Width: 2 1/2"



PGV-101-ASV  
Inlet Diameter: 1"  
Height: 5 1/2"  
Length: 5 1/4"  
Width: 2 1/2"

#### OPERATING SPECIFICATIONS

- Flow: 0.2 to 40 GPM
- Recommended pressure range: 20 to 150 PSI

#### SOLENOID SPECIFICATIONS

- 24 VAC solenoid
- 350 mA inrush, 190 mA holding, 60 Hz
- 370 mA inrush, 210 mA holding, 50 Hz

► Advanced Feature descriptions on page 63

#### PGV-ASV - SPECIFICATION BUILDER: ORDER 1 + 2 + 3 + 4

1 Model	2 Inlet/Outlet	3 Options (Factory Installed)	4 Options (User Installed)
PGV-075 = 3/4" Anti-siphon valves with flow control	ASV = Female NPT ASV-S = Slip x slip	LS = Valve without solenoid	(blank) = No option R = Reclaimed water ID handle CC = Solenoid conduit cover DC = DC latching solenoid AS-ADJ = Accu-Sync™ adjustable pressure regulator AS-xx* = Accu-Sync pressure regulator 20 * = 20 PSI, 30 * = 30 PSI 40 * = 40 PSI, 50 * = 50 PSI 70 * = 70 PSI
PGV-101 = 1" Anti-siphon valves with flow control			

#### PGV-ASV PRESSURE LOSS IN PSI

Flow (GPM)	3/4" Globe	1" Globe
1	1	1
5	2	2
10	2	2
15	3	3
20	6	6
25	6	6
30	9	9
35	16	16
40	20	20

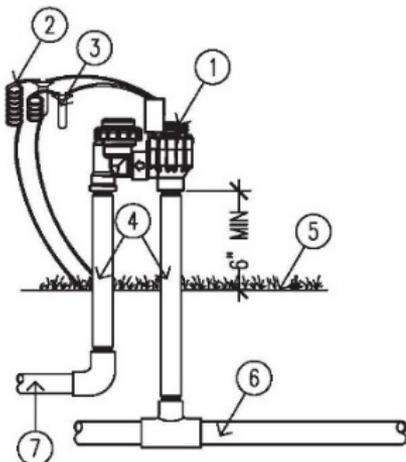
#### Examples:

- PGV-075 - ASV = 3/4" Anti-siphon valve with flow control, and female NPT
- PGV-101 - ASV - S - DC = 1" Anti-siphon valve with flow control, slip x slip, and DC latching solenoid
- PGV-101 - ASV - R = 1" Anti-siphon valve with flow control, female NPT, and reclaimed water ID handle

## Irrigation Design

### Specifying Spray Conversion

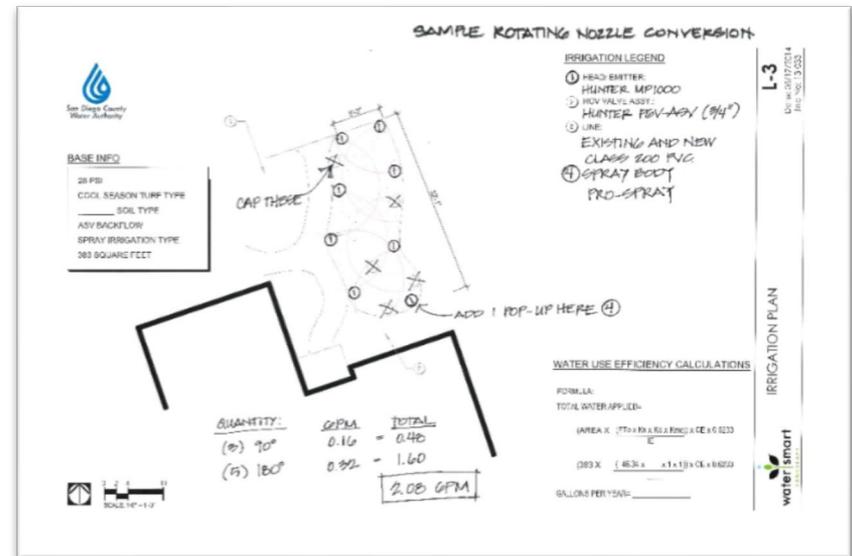
- Valves



- ① MODEL PGV-XXX-ASV
- ② 18-24" COILED WIRE
- ③ WATERPROOF CONNECTORS (2)
- ④ SCH 80 NIPPLES
- ⑤ FINISH GRADE
- ⑥ MAIN LINE PIPE & FITTINGS
- ⑦ LATERAL PIPE & FITTINGS

**\*NOTE\***

ANTI-SIPHON VALVES SHOULD BE INSTALLED 6-12" ABOVE THE HIGHEST SPRINKLER HEAD WITHIN THE ZONE, OR, ACCORDING TO LOCAL CODE.

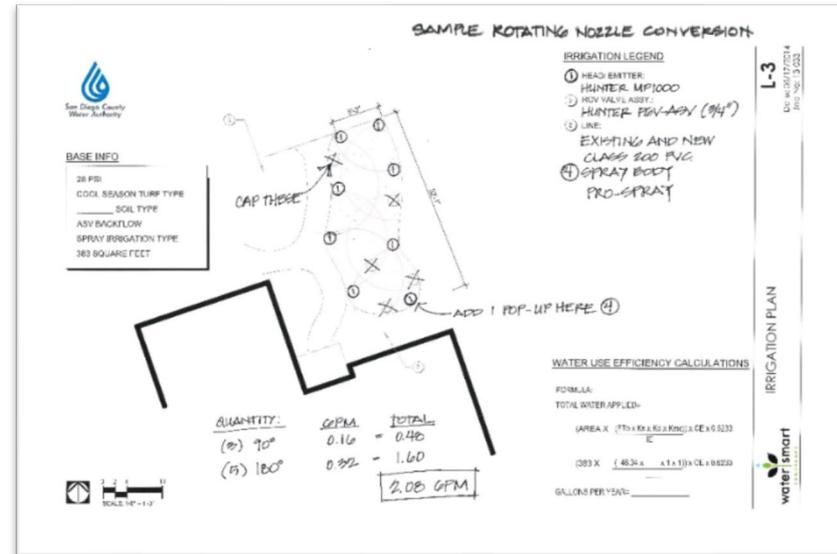
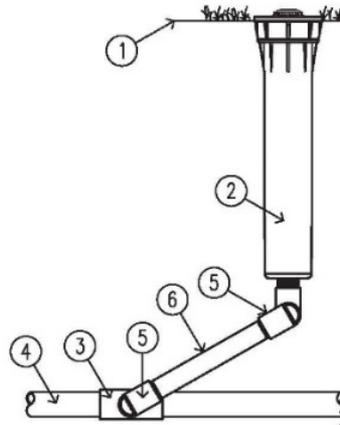


## Irrigation Design

### Specifying Spray Conversion

- Heads

- ① FINISH GRADE
- ② MODEL PROS-06-PRS40-CV
- ③ LATERAL TEE OR ELL
- ④ LATERAL PIPE
- ⑤ 1/2" PVC STREET ELLS (3)
- ⑥ SCH 80 NIPPLE

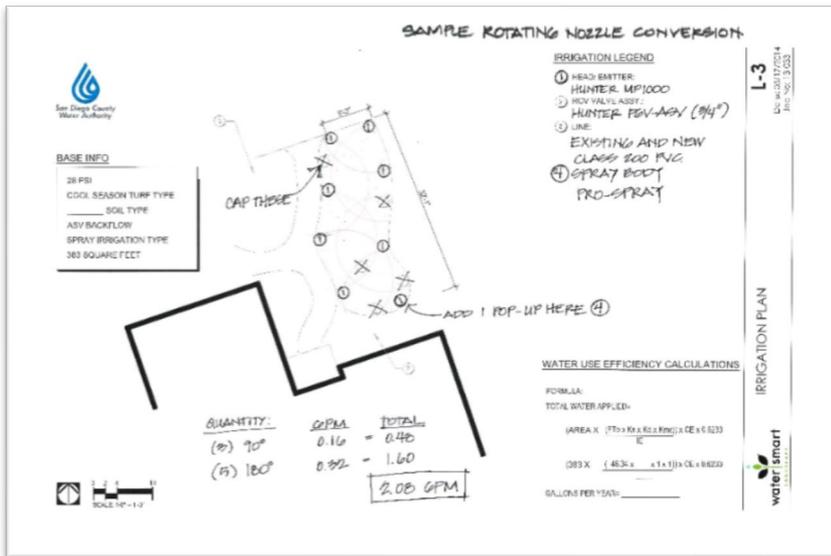


XX **PROS-06-PRS40-CV**  
**MP ROTATOR SPRINKLER**  
 SCALE: 3" = 1'-0" Hunter® IRRIGATION DETAIL

## Irrigation Design

### Specifying Spray Conversion

- Nozzles



### MP ROTATOR®

#### MP ROTATOR PERFORMANCE DATA

Arc	Pressure PSI	MP1000 Radius: 8' to 15' Adjustable Arc and Full-Circle					MP2000 Radius: 13' to 21' Adjustable Arc and Full-Circle					MP3000 Radius: 22' to 30' Adjustable Arc and Full-Circle				
		Radius ft.	Flow GPM	Flow GPH	Precip in/hr	Precip in/hr	Radius ft.	Flow GPM	Flow GPH	Precip in/hr	Precip in/hr	Radius ft.	Flow GPM	Flow GPH	Precip in/hr	Precip in/hr
90°	25	--	--	--	--	--	17	0.31	18.6	0.41	0.48	25	0.69	41.4	0.43	0.49
	30	12	0.16	9.60	0.43	0.50	18	0.33	19.8	0.39	0.45	27	0.74	44.4	0.39	0.45
	35	13	0.18	10.8	0.40	0.46	19	0.37	22.2	0.39	0.46	28	0.80	48.0	0.39	0.45
	40	14	0.19	11.4	0.39	0.45	20	0.40	24.0	0.39	0.44	30	0.86	51.6	0.37	0.43
	45	14	0.20	12.0	0.39	0.45	21	0.42	25.2	0.37	0.42	30	0.91	54.6	0.39	0.45
180°	25	--	--	--	--	--	16	0.58	34.8	0.44	0.50	25	1.44	86.4	0.44	0.51
	30	12	0.32	19.2	0.43	0.50	17	0.63	37.8	0.42	0.49	27	1.58	94.8	0.42	0.48
	35	13	0.35	21.0	0.40	0.46	18	0.69	41.4	0.41	0.47	28	1.70	102	0.42	0.48
	40	14	0.37	22.2	0.39	0.45	19	0.74	44.4	0.39	0.45	30	1.82	109.2	0.39	0.45
	45	14	0.40	24.0	0.39	0.45	20	0.78	46.8	0.38	0.43	30	1.93	115.8	0.41	0.48
210°	25	--	--	--	--	--	16	0.68	40.8	0.44	0.50	25	1.68	100.8	0.44	0.51
	30	12	0.37	22.2	0.43	0.50	17	0.74	44.4	0.42	0.49	27	1.84	110.4	0.42	0.48
	35	13	0.41	24.6	0.40	0.46	18	0.80	48.0	0.41	0.47	28	1.99	119.4	0.42	0.48
	40	14	0.43	25.8	0.39	0.45	19	0.86	51.6	0.39	0.45	30	2.12	127.2	0.39	0.45
	45	14	0.46	27.6	0.39	0.45	20	0.91	55.2	0.38	0.43	30	2.25	135.0	0.41	0.48
270°	25	--	--	--	--	--	16	0.97	58.2	0.36	0.41	30	2.37	142.2	0.43	0.50
	30	12	0.48	29.0	0.43	0.50	17	1.01	60.6	0.37	0.43	30	2.49	149.4	0.46	0.53
	35	13	0.54	32.0	0.40	0.46	18	1.03	61.8	0.41	0.47	25	2.19	131.4	0.45	0.52
	40	14	0.57	34.0	0.39	0.45	19	1.10	66.0	0.39	0.45	30	2.53	153.0	0.42	0.48
	45	14	0.60	36.0	0.39	0.45	20	1.17	70.2	0.38	0.43	30	2.89	173.4	0.41	0.48
360°	25	--	--	--	--	--	21	1.23	73.8	0.36	0.41	30	3.06	183.6	0.44	0.50
	30	12	0.65	39.0	0.43	0.50	21	1.30	78.0	0.37	0.43	30	3.22	193.2	0.46	0.53
	35	13	0.71	42.6	0.40	0.47	16	1.16	69.6	0.44	0.50	25	2.88	172.8	0.44	0.51
	40	14	0.75	45.0	0.39	0.46	17	1.27	76.2	0.42	0.49	27	3.15	189.0	0.42	0.48
	45	14	0.80	48.0	0.39	0.45	18	1.37	82.2	0.41	0.47	28	3.40	204.0	0.42	0.48

**Bold = Recommended Pressure.**  
This can easily be achieved by using the MP Rotator with the Hunter PRS40 Spray Body, pressure regulated at 40 PSI.

#### Works best with PRS40

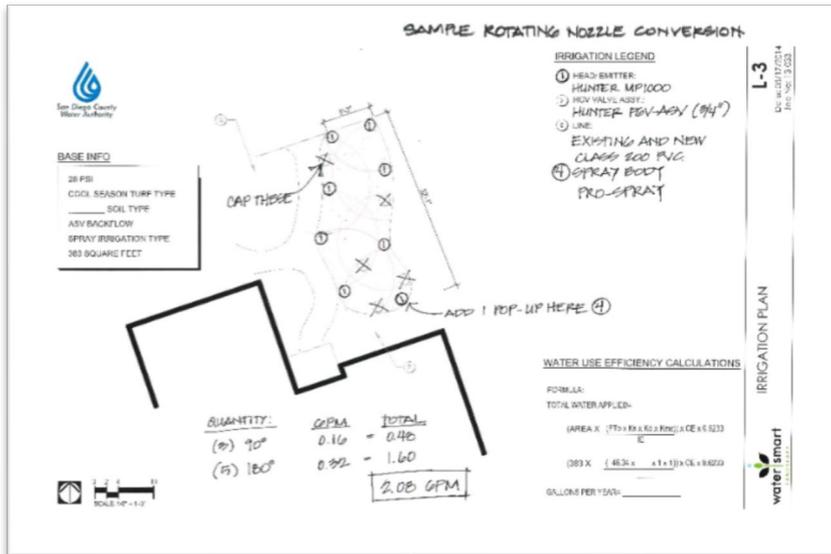


For PRS40 information see page 48

## Irrigation Design

### Specifying Spray Conversion

- Pipe



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

## 0700

## PVC/IRRIGATION PIPE



### PVC PRESSURE RATED PIPE

PVC (polyvinylchloride) pipe has been installed in industrial applications such as chemical treatment processing, plating, cold water distribution, drainage and irrigation systems for over 30 years. PVC pipe is a strong, easy-to-handle material light enough that the average person can lift and carry a 20 foot section of 8" pipe.

Since PVC is made of a nearly inert material, it is not effected by electrolytic or galvanic corrosion. Its high strength-to-weight ratio and its flexible nature means PVC pipe will resist cracking or rupture.

PVC pipe is manufactured in a strict accordance to ASTM specifications (ASTM D-1784) and is available in a wide range of sizes and pressure ratings. The PVC used in plastic pipe is Type 1, Grade 1 PVC Cell Classification 12454-B.

PVC has the highest long term hydrostatic strength of any major thermoplastic used for piping.

Class 200 - SDR 21			Schedule 40 Pipe			Schedule 80 Pipe		
Conforms to ASTM D-2241, D-1784 Cell Class 12454 A, B.			Conforms to ASTM D-1745, D-1785 Cell Class 12454 A, B.			Conforms to ASTM D-1745, D-1784 Cell Class 12454 A, B.		
ITEM	CARTON	DESCRIPTION	ITEM	CARTON	DESCRIPTION	ITEM	CARTON	DESCRIPTION
07001190	1500	3/4 CL 200 PVC BE PIPE	07000410	1000	1/2 SCH 40 PVC BE PIPE	07000610	1000	1/2 SCH 80 PVC BE PIPE
07000180	1000	1 CL 200 PVC BE PIPE	07000420	1000	3/4 SCH 40 PVC BE PIPE	07000520	8100	3/4 SCH 80 PVC BE PIPE
07000240	1000	1-1/4 CL 200 PVC BE PIPE	07000430	1000	1 SCH 40 PVC BE PIPE	07000530	6300	1 SCH 80 PVC BE PIPE
07000260	1000	1-1/2 CL 200 PVC BE PIPE	07000440	1000	1-1/4 SCH 40 PVC BE PIPE	07000540	3970	1-1/4 SCH 80 PVC BE PIPE
07000280	1000	2 CL 200 PVC BE PIPE	07000450	1000	1-1/2 SCH 40 PVC BE PIPE	07000550	3020	1-1/2 SCH 80 PVC BE PIPE
07000270	1450	2-1/2 CL 200 PVC BE PIPE	07000460	1000	2 SCH 40 PVC BE PIPE	07000560	2100	2 SCH 80 PVC BE PIPE
07000280	1500	3 CL 200 PVC BE PIPE	07000470	1450	2-1/2 SCH 40 PVC BE PIPE	07000570	1450	2-1/2 SCH 80 PVC BE PIPE
07000290	950	4 CL 200 PVC BE PIPE	07000480	1500	3 SCH 40 PVC BE PIPE	07000580	1500	3 SCH 80 PVC BE PIPE
07000300	650	6 CL 200 PVC BE PIPE	07000490	950	4 SCH 40 PVC BE PIPE	07000590	950	4 SCH 80 PVC BE PIPE
<b>Class 315 - SDR 13.5</b>			<b>Schedule 40 PVC Pipe</b>			<b>Schedule 80 PVC Pipe</b>		
Conforms to ASTM D-2241, D-1784 Cell Class 12454 A, B.			Conforms to ASTM D-1785, Type 1 (normal impact), Grade 1, (high chemical resistance). This pipe also conforms to U.S. Product Standard PS 21-70 (supersedes U.S. Commercial Standard CS 207-60) as having the same O.D. dimensions as iron pipe. The National Sanitation Foundation (NSF) has approved pipe sizes 1/4" through 12" for use in potable water service. <b>Schedule 40 pipe should NOT be threaded.</b>			Conforms to ASTM D-1785, Type 1 (normal impact), Grade 1, (high chemical resistance). This pipe also conforms to U.S. Product Standard PS 21-70 (supersedes U.S. Commercial Standard CS 207-60) as having the same O.D. dimensions as iron pipe. The National Sanitation Foundation (NSF) has approved pipe sizes 1/4" through 12" for use in potable water service. <b>Schedule 80 pipe should NOT be threaded.</b>		
ITEM	CARTON	DESCRIPTION	ITEM	CARTON	DESCRIPTION	ITEM	CARTON	DESCRIPTION
07001110	1000	1/2 CL 315 PVC BE PIPE	07000500	350	5 SCH 40 PVC BE PIPE	07000600	350	5 SCH 80 PVC BE PIPE
07000350	2100	2 CL 315 PVC BE PIPE	07000510	350	6 SCH 40 PVC BE PIPE	07000610	350	6 SCH 80 PVC BE PIPE
07000370	1450	2-1/2 CL 315 PVC BE PIPE	07000520	350	8 SCH 40 PVC BE PIPE	07000620	350	8 SCH 80 PVC BE PIPE
07000380	1600	3 CL 315 PVC BE PIPE	07000530	350	10 SCH 40 PVC BE PIPE			
07000390	950	4 CL 315 PVC BE PIPE	07000540	150	12 SCH 40 PVC BE PIPE			

### 100 Foot Head

Conforms to ASTM S-376.1, ASTM D-1784 Cell Class 12454 A, B. **Regional distribution.**

ITEM	CARTON	DESCRIPTION
07001008	280	8 100 FT HEAD PVC PIPE
07001010	220	10 100 FT HEAD PVC PIPE
07001012	160	12 100 FT HEAD PVC PIPE
07001015	160	15 100 FT HEAD PVC PIPE
07001018	100	18 100 FT HEAD PVC PIPE
07001020	80	20 100 FT HEAD PVC PIPE

### Class 100 SDR 41

Conforms to ASAE S-371.1, SCS 430DD, ASTM D-1784 Cell Class 12454-A, B. **Regional distribution.**

ITEM	CARTON	DESCRIPTION
07001812	120	12 CL 100 PSI PVC PIPE B E PPS
07001815	120	15 CL 100 PSI PVC PIPE B E PIP
07001818	200	18 CL 100 PSI PVC PIPE B E PIP

Note: For Pipe specifications, see page 36. For PVC Pipe Friction Loss Charts, refer to pages 296-298.

## 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:

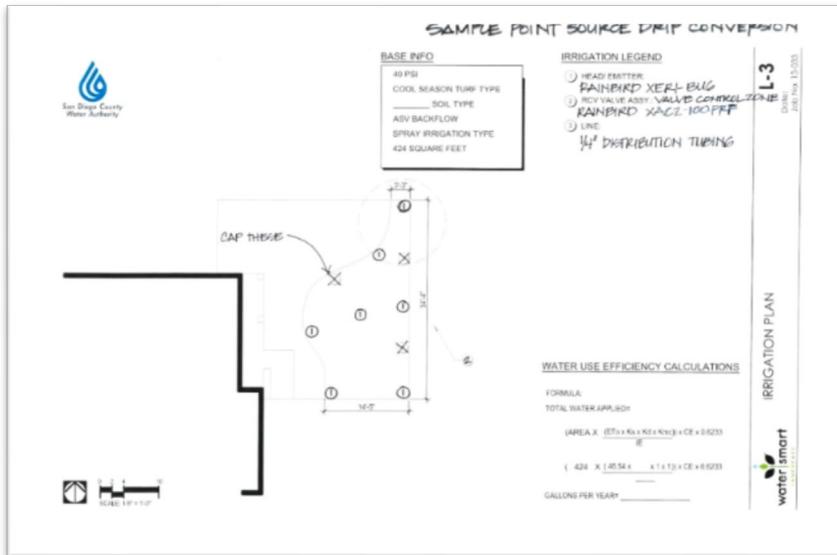
- ✓ There is a mix of plant material sizes and types
- ✓ Lots of hardscape or walkways have been added
- ✓ When combining plants with different water needs, especially existing plants with new, low water varieties

## Irrigation Design

### Specifying Drip Conversion

- Low flow zone valve

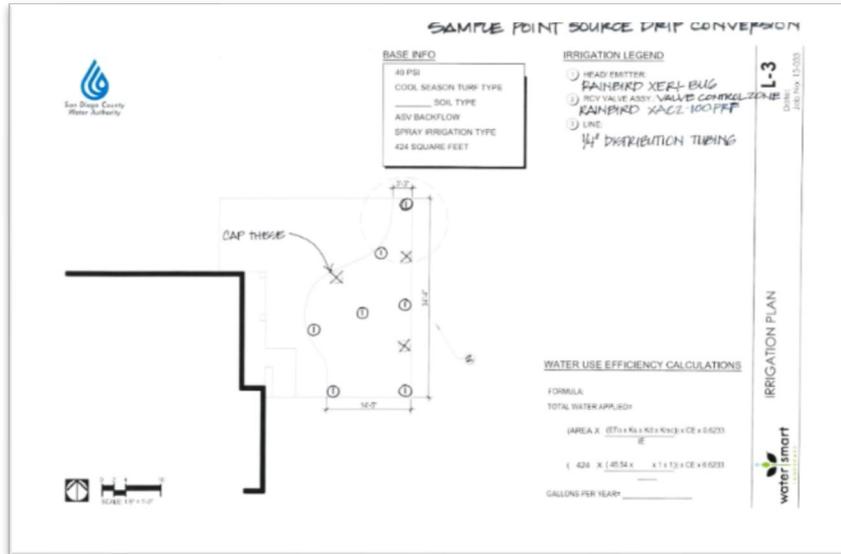
That's intelligent.



## Irrigation Design

### Specifying Drip Conversion

**Most residential properties use ASV valves**



Control Zone Kit Selection Chart

Flow Range	0.2 GPM to 5.0 GPM		3.0 GPM to 15.0 GPM
Filter Type	Pressure Regulating Manual Flush		Pressure Regulating Manual Flush
Model #	XCZ-075-PRF	XCZ-LF-100-PRF	XCZ-100-PRF
Valve	Low Flow or Anti-Siphon	Low Flow	LF or Anti-Siphon
Inlet x Outlet Size	3/4" FPT x 3/4" MPT	1" FPT x 3/4" MPT	1" FPT x 1" MPT
Inlet Pressure	20 to 120 PSI		20 to 120 PSI
Regulating Pressure	30 PSI		
Filter	200 Mesh Stainless Steel		200 Mesh Stainless Steel
Replacement Filter	RBY2005SMX		RBY2005SMX



**Low Flow Valves**  
The only valve on the market that can handle low flows (below 3 gpm) without weeping



**Shorter Kits**  
With only two components (valve plus pressure regulating filter) you can fit more Control Zone Kits in a valve box, saving time and money



**Anti-Siphon Valve**  
Field proven low flow anti-siphon valve that has an atmospheric vacuum breaker for backflow prevention and an IAPMO rating

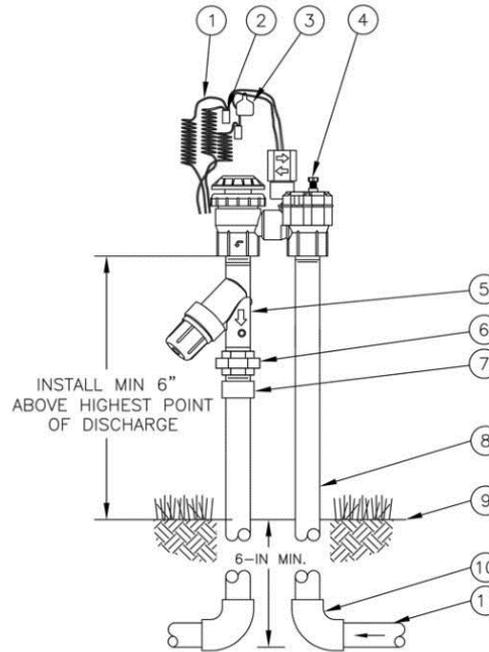


**PR Filter Kits**  
All of these kits provide on/off control, filtration, and pressure regulation with fewer components; so there is less chance of leakage at the connections, both at installation and over the life of the system

## Irrigation Design

### Specifying Drip Conversion

- Low flow zone valve



- ① 30-INCH LINEAR LENGTH OF WIRE, COILED
- ② WATERPROOF CONNECTION:  
RAIN BIRD DB SERIES (1 OF 2)
- ③ ID TAG
- ④ LOW FLOW ANTI-SIPHON VALVE:  
RAIN BIRD ASV-LF-075 VALVE  
(INCLUDED IN XACZ-075-PRF KIT)
- ⑤ PRESSURE REGULATING FILTER:  
RAIN BIRD PRF-075-RBY  
(INCLUDED IN XACZ-075-PRF KIT)
- ⑥ PVC SCH 80 UNION
- ⑦ PVC SCH 40 MALE ADAPTER
- ⑧ UV RADIATION RESISTANT PVC SCH 40 PIPE  
(1 OF 2)
- ⑨ FINISH GRADE/TOP OF MULCH
- ⑩ PVC SCH 40 ELL (1 OF 2)
- ⑪ PVC LATERAL PIPE (1 OF 2)

XACZ-075-PRF 3/4" LOW FLOW  
CONTROL ZONE KIT



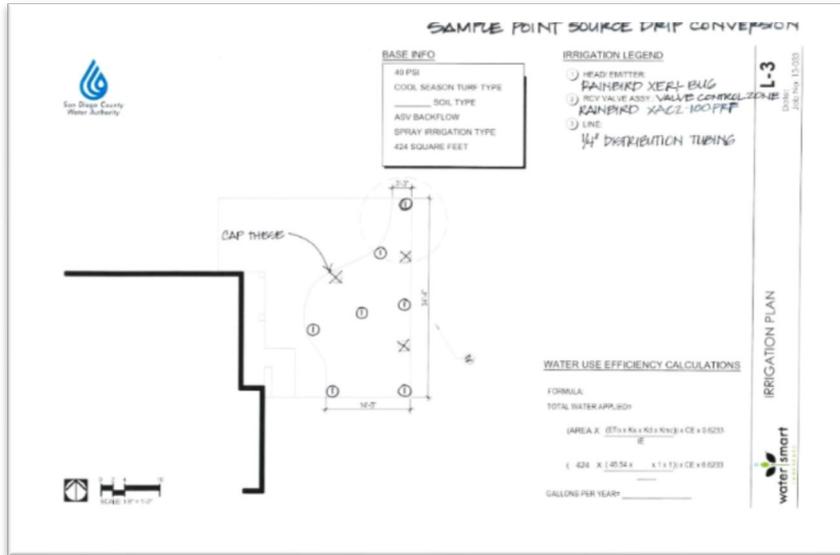
N.T.S. OPTION 1

1-25-10

## Irrigation Design

### Specifying Drip Conversion

- Head Conversion



### Spray-to-Drip Retrofit Kit

Simple kit that easily converts a conventional spray zone to a low-volume irrigation zone

#### Features

- 1800 Series Spray Body that contains a filter, pressure regulator, and 1/2" male threaded outlet
- Permits convenient conversion to drip tubing when used with Easy Fit Fitting and female adapter
  - Can be installed above or below grade
- Internal assembly can be removed and easily dropped into any 1804, 1806 or 1812 Spray Head Body to easily retrofit existing system to Xerigation products
- Provides 30 psi (2.1 bar) pressure regulation and 200-mesh (75-micron) screen
- If retrofit flow is less than 3 gpm, replace electronic valve with a Rain Bird Low Flow Valve

#### Operating Range

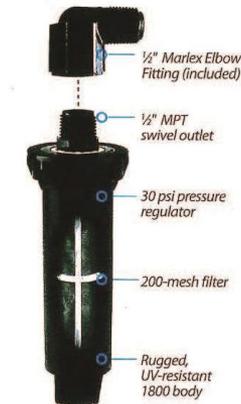
- Flow: 0.50 to 4.00 gpm (1.9 to 15.1 l/m)
- Inlet pressure: 15 to 70 psi (1.0 to 4.8 bar)
- Regulated pressure: 30 psi (2.1 bar)
- Filtration: 200 mesh (75 micron)

#### Model

- RETRO-1800

#### Dimensions

- 1/2" female-threaded inlet
- 1/2" male-threaded swivel outlet
- Height: 7" (17.8 cm)
- Width: 2" (5.1 cm)



Designed specifically for areas with water restrictions, our Spray-to-Drip Retrofit Kit allows use of existing 1800 Series Spray Bodies as drip irrigation connection points.

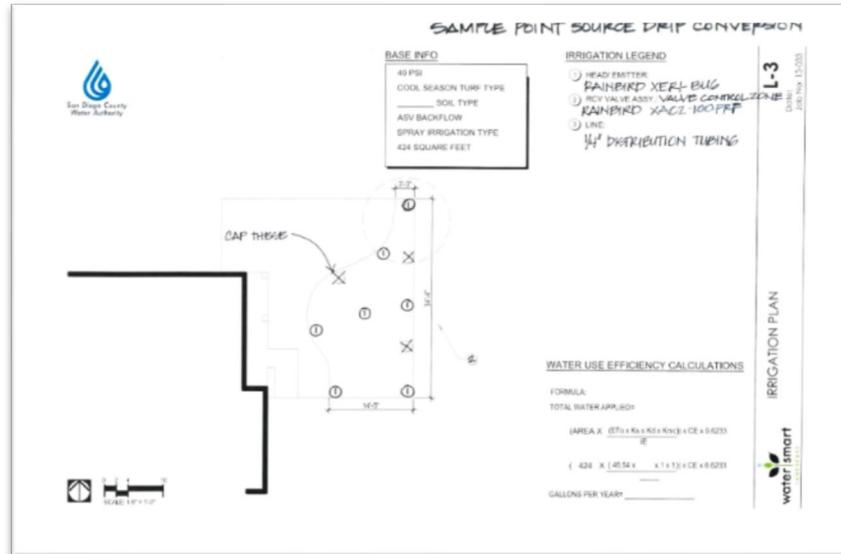
The Intelligent Use of Water.™



## Irrigation Design

### Specifying Drip Conversion

- In-line tubing



Xerigation® / Landscape Drip  
 XFCV Dripline with Heavy-Duty Check Valve

[www.rainbird.com/drip](http://www.rainbird.com/drip)

#### Operating Range

- Opening Pressure: 14.5 psi
- Pressure: 20 to 60 psi (1.38 to 4.14 bar)
- Flow rates: 0.6 and 0.9 gph (2.3 l/hr and 3.5 l/hr)
- Temperature:
  - Water: Up to 100°F (37.8°C)
  - Ambient: Up to 125°F (51.7°C)
- Required Filtration: 120 mesh

#### Specifications

- Dimensions:
  - OD: 0.634" (16mm)
  - ID: 0.536" (13.6mm)
  - Thickness: 0.049" (1.2mm)
- 12" & 18" (30.5 cm, 45.7 cm) spacing
- Available in 100' and 500' (30.5 m and 152.4 m) coils
- Coil Color: Brown
- Use with XF Dripline Insert Fittings (see page 160), Rain Bird Easy Fit Compression Fittings (see page 161) and 17mm Insert Fittings

#### XFCV Dripline Models

Model	Flow gph	Spacing in.	Coil Length ft.
XFCV-06-12-100	0.60	12	100
XFCV-06-12-500	0.60	12	500
XFCV-06-18-100	0.60	18	100
XFCV-06-18-500	0.60	18	500
XFCV-09-12-100	0.90	12	100
XFCV-09-12-500	0.90	12	500
XFCV-09-18-100	0.90	18	100
XFCV-09-18-500	0.90	18	500

#### XFCV Dripline Models

METRIC

Model	Flow l/h	Spacing cm	Coil Length m
XFCV-06-12-100	2.30	30.5	30.5
XFCV-06-12-500	2.30	30.5	152.4
XFCV-06-18-100	2.30	45.7	30.5
XFCV-06-18-500	2.30	45.7	152.4
XFCV-09-12-100	3.50	30.5	30.5
XFCV-09-12-500	3.50	30.5	152.4
XFCV-09-18-100	3.50	45.7	30.5
XFCV-09-18-500	3.50	45.7	152.4

#### XFCV Dripline Maximum Lateral Lengths (Feet)

Inlet Pressure psi	Maximum Lateral Length (feet)			
	12" Spacing		18" Spacing	
	Nominal Flow (gph): 0.6	Nominal Flow (gph): 0.9	Nominal Flow (gph): 0.6	Nominal Flow (gph): 0.9
20	276	180	306	255
30	336	215	385	326
40	377	269	444	383
50	411	293	509	405
60	450	320	583	445

#### XFCV Dripline Maximum Lateral Lengths (Meters)

METRIC

Inlet Pressure bar	Maximum Lateral Length (Meters)			
	30.5 cm		45.7 cm	
	Nominal Flow (l/h): 2.3	Nominal Flow (l/h): 3.5	Nominal Flow (l/h): 2.3	Nominal Flow (l/h): 3.5
1.38	84	45	93	78
2.07	102	65	117	99
2.76	115	74	135	117
3.45	125	84	155	123
4.14	137	86	178	136

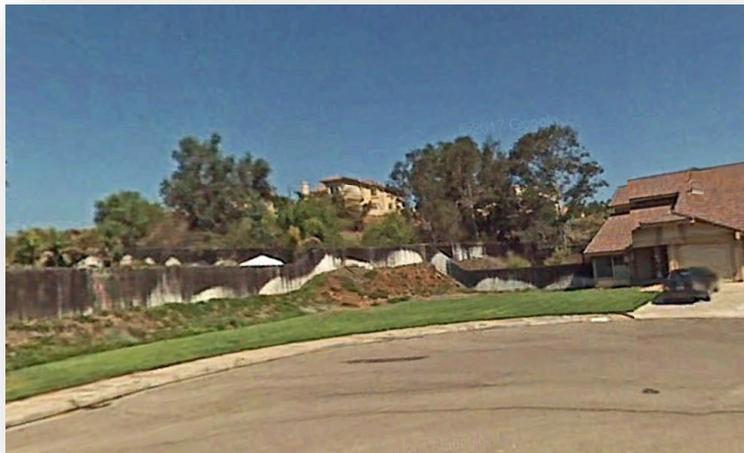
Landscape Drip

# Medusa Outdoor Demonstration and a break



# Now it's time to...make it happen!

Before



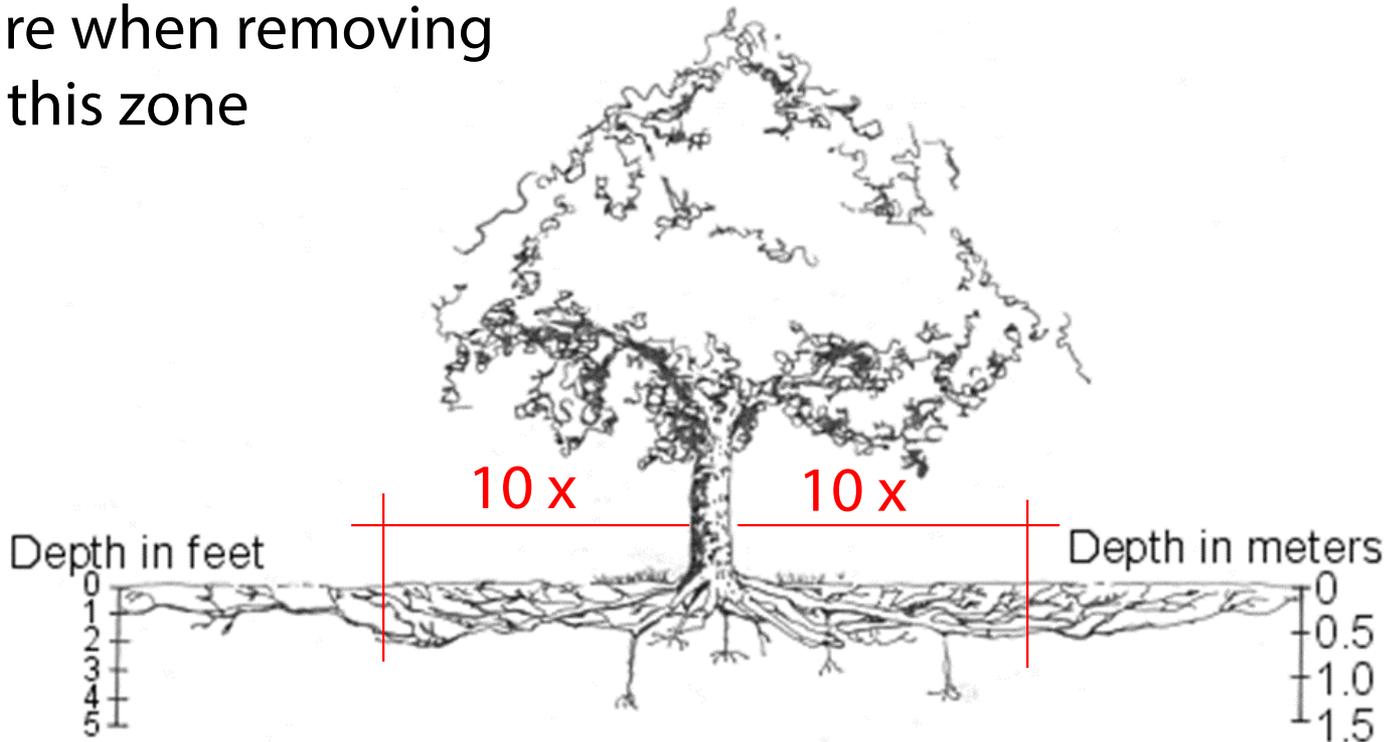
After

## 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.



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



## Implementation - Hardscape

### Hardscape and Sheet Mulching

- Don't sheet mulch future hardscape areas
- Hardscape requires soil compaction beneath



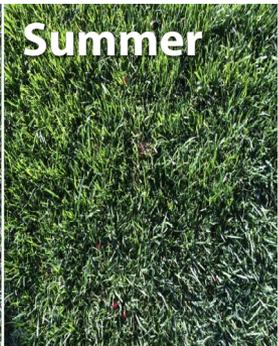
## Turf Removal vs. Sheet Mulching

- 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

Turf Type	Dormant Season	Active Season	Growth form	Seeds	Common Types	Kill Method
<b>Cool Season</b>	 <b>Winter</b>	 <b>Summer</b>	 <b>Small tufts</b>	 <small>CC-BY-SA-3.0</small>	Dwarf Tall Fescue (common locally), Perennial Ryegrass, Annual Ryegrass, Blue Grass	Sheet Mulch
<b>Warm Season</b>	 <b>Winter</b>	 <b>Summer</b>	 <b>Creeping Stolons</b>		Bermuda grass, Zoysia grass, St. Augustine Grass, Kikuyu grass	Solarization or Chemical Followed by Sheet Mulching

## 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



Manual "Grubbing"



Sod Cutter





# Turf Removal & Sheet Mulching



## Soil Lasagna Sheet Mulching Layers

### Cardboard

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

### Rule of thumb for mulch coverage:

- 1¼ cu. yd. covers 100 SF @ 4" depth

## 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**



## 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

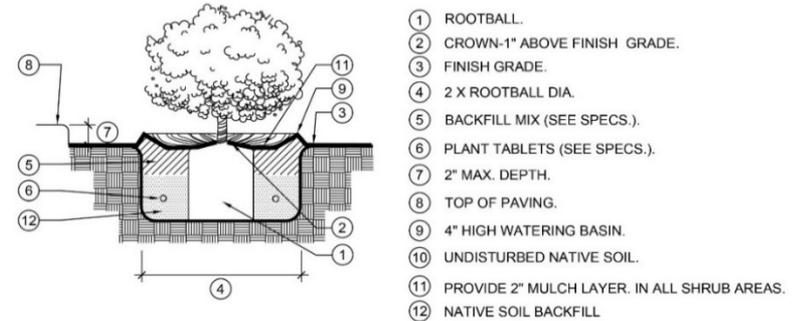
- As deep as pot, twice as wide as pot
- Rough sides
- Fill with water before planting

### Plant crown above soil level

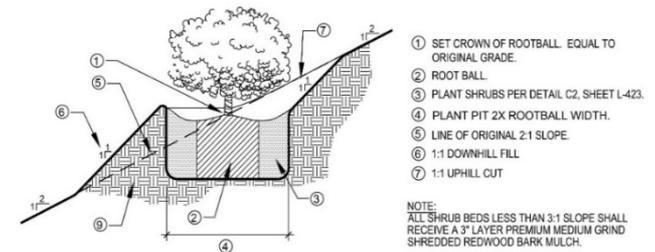
- Loosen roots

### 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.



**D** SHRUB PLANTING DETAIL  
NO SCALE



**G** SLOPE SHRUB PLANTING DETAIL  
NO SCALE

## 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**

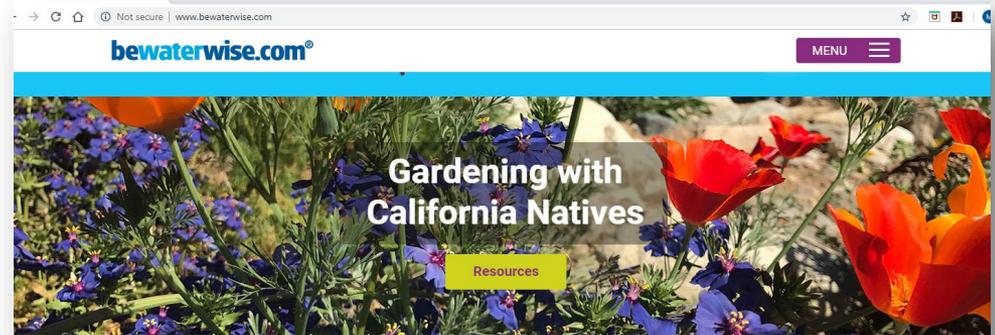


## What is a Controller Program?

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

## Irrigation Scheduling Help on the Internet

bewaterwise.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. Watch 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 2/23/2019 1:15:17 PM

Month	Groundcover											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Minutes per start time	16	16	16	16	16	16	16	16	16	16	16	16
Start times per week*	2	3	4	6	6	7	7	7	6	4	3	2
Total minutes per week	32	48	64	96	96	112	112	112	96	64	48	32

\*Start times per week may not equal days per week. Multiple start times per day may be needed to avoid runoff.

### Watering Index



#### Watering Calculator

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

## 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



### RESOURCES

#### Irrigation Information:

- Manufacturer Catalogs and Websites
- Local irrigation supplier workshops
- You Tube videos
- The Homeowner's Guide to a WaterSmart Landscape
- The San Diego County Water Authority WaterSmart website: <http://www.watersmartd.org/>
- The San Diego County Water Authority E-Guide to a WaterSmart Lifestyle: <http://www.e-digitaleditions.com/178218>
- The Metropolitan Water District website for the Be Waterwise program and irrigation scheduler: <http://www.be-waterwise.com/>

#### Landscape Installation or Irrigation Repair:

- California Landscape Contractors Association (CLCA), San Diego chapter referral list and information: <http://www.clcasandiego.org/>
- California Department of Consumer Affairs Contractor State License Board license status check: <https://www2.cslb.ca.gov/OnlineServices/CheckLicense/checklicense.aspx>
- Better Business Bureau San Diego referral list: <http://www.bbb.org/sandiego/>
- Local community college horticulture program students. Schools with horticulture programs include: Cuyamaca College, Southwestern College, and Mira Costa College.  
*Note: State regulations require a licensed C-27 landscape contractor for installation work in excess of \$500.*
- Youtube instructional videos

#### Design Services:

- American Society of Landscape Architects, San Diego chapter referral list: <http://www.asla-sandiego.org/>
- Association of Professional Landscape Designers, San Diego district referral list: <http://www.apldca.org/ContactSanDiego.aspx>

## 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](http://www.irrigation.org)
- Contractors State License Board (CSLB)  
<http://www.cslb.ca.gov/consumers/>
- YouTube instructional videos

## Plant Maintenance

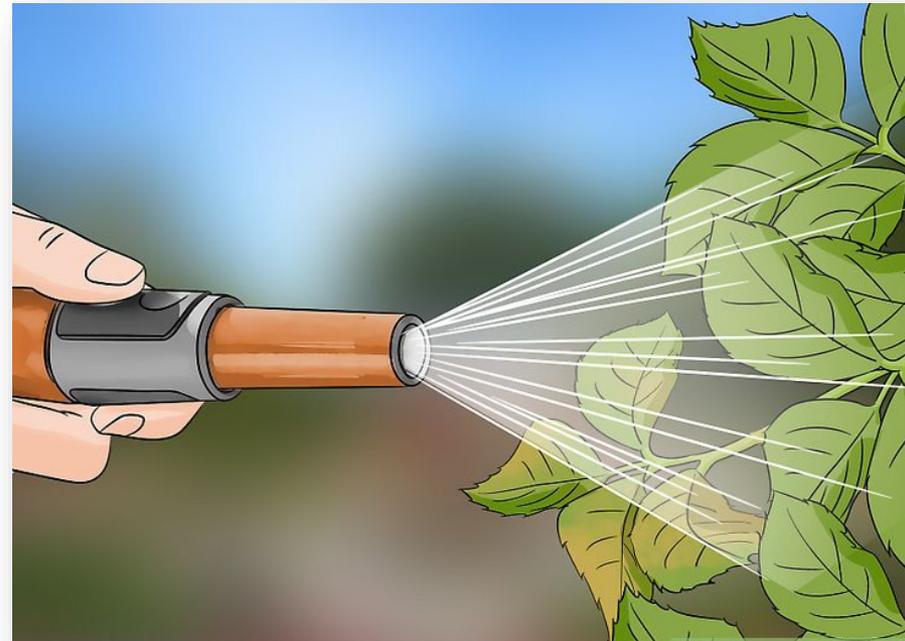
- ✓ Amend soil with compost and mulch regularly
- ✓ Add additional organic amendments, as needed
- ✓ Remove weeds
- ✓ Monitor and treat pests
- ✓ Monitor plant health



## 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

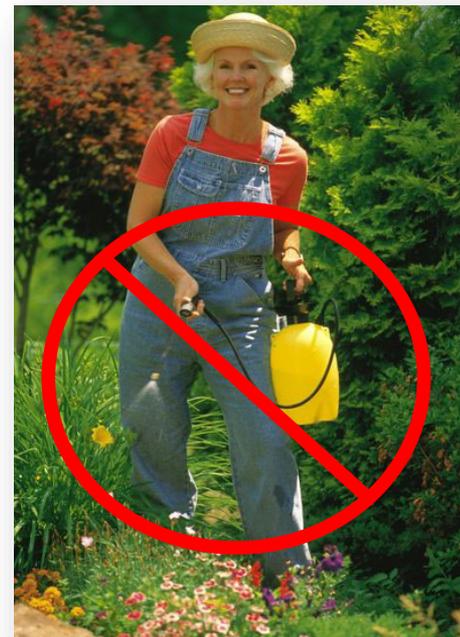


## Plant Maintenance

### 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



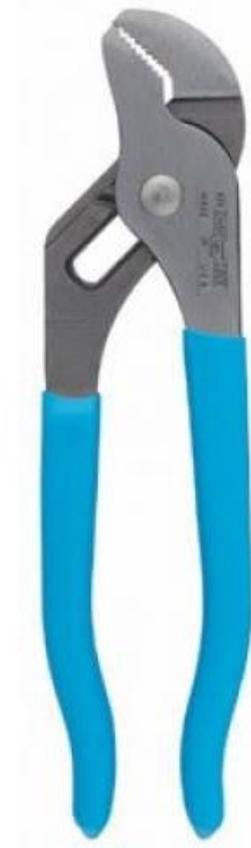
## Irrigation Maintenance

- ✓ **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**



## 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

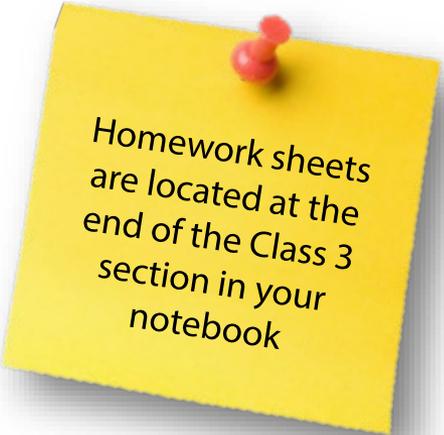
- Arrive 15 minutes prior to your appointment

## Meet

- With your design coach

## Then...

- Finish your planting plan
- Have your planting, irrigation and LID plans scanned
- Turn in your class survey



Homework sheets  
are located at the  
end of the Class 3  
section in your  
notebook

## 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**

# WaterSmart Landscape MAKEOVER SERIES



**QUESTIONS?**