WOOD ARCHITECTURE
DESIGN.CONSULTING.MANAGEMENT

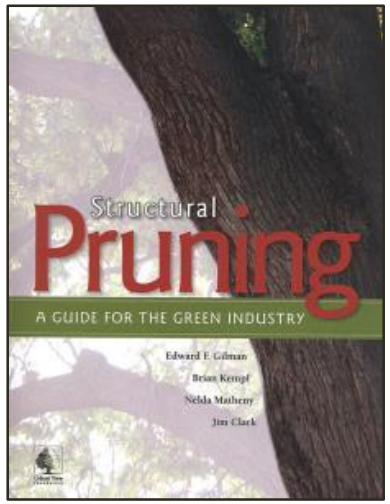
Irrigation & Innovations

Outline

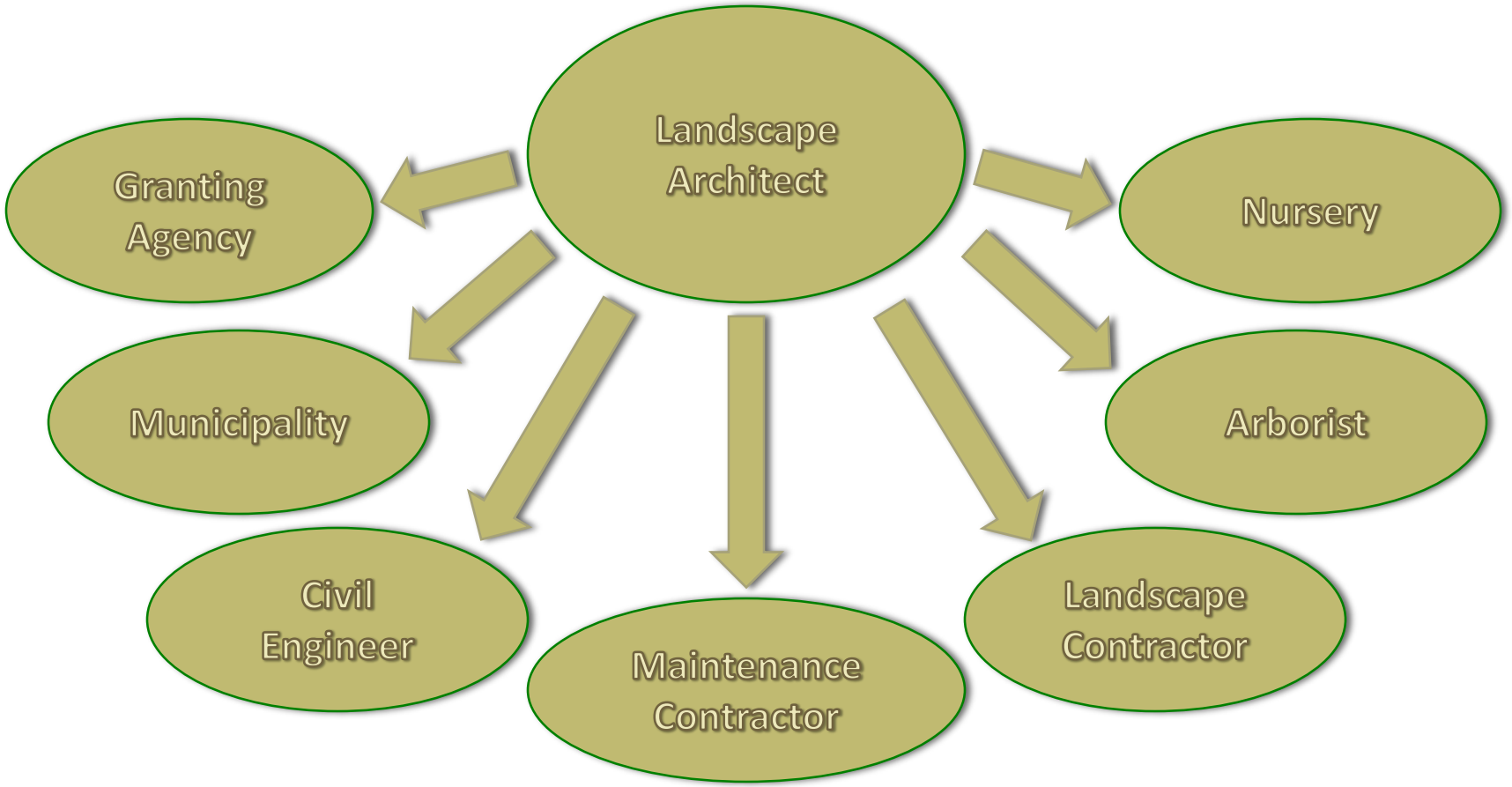
- Background
- Personal Work History
- Grant project process
- Evolution of irrigation beliefs/practices/standards
- Watering with Soil Moisture
- Sensors

Personal History

- Graduated from Cal Poly in 2005.
- Worked on Central Coast for 3 years for a LA firm specializing in Commercial, Institutional & Residential Work.
- Joined Urban Tree Foundation in 09 after crash.
- Wrote more than $23 million dollars in design build grants.
- Began working for Apple in 2016.



Grant/Project Process



Grant/Project Process.

Grant/Project Process.

S-1

Schematic Plan
Packwood Creek

Date: 07.07.16
Scale: 1"=300'
Project: EEMP

Urban Tree Foundation
1512 W. Mineral King
Visalia, Ca 93291
559-713-0631
www.urbantree.org

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Groundcover Legend

SYMBOL	DESCRIPTION	QTY
	BARK MULCH 6" thick layer of RECYCLED LANDSCAPE MULCH available from West Coast Sand & Gravel. Contact is Kevin Oliver at 559. 801. 1150 for further information. See specifications for mulch.	130,700 sf

Schematic Plant Legend

TREES	BOTANICAL NAME	COMMON NAME	SIZE	TYPE	CA NATIVE	WATER USAGE
	Cercis occidentalis	Western Redbud Multi-trunk	15 gal	Yes	Deciduous	Very Low
	Platanus racemosa	California Sycamore Multi-Trunk	15 gal	Yes	Deciduous	Medium
	Quercus lobata	Valley Oak	15 gal	Yes	Deciduous	Low

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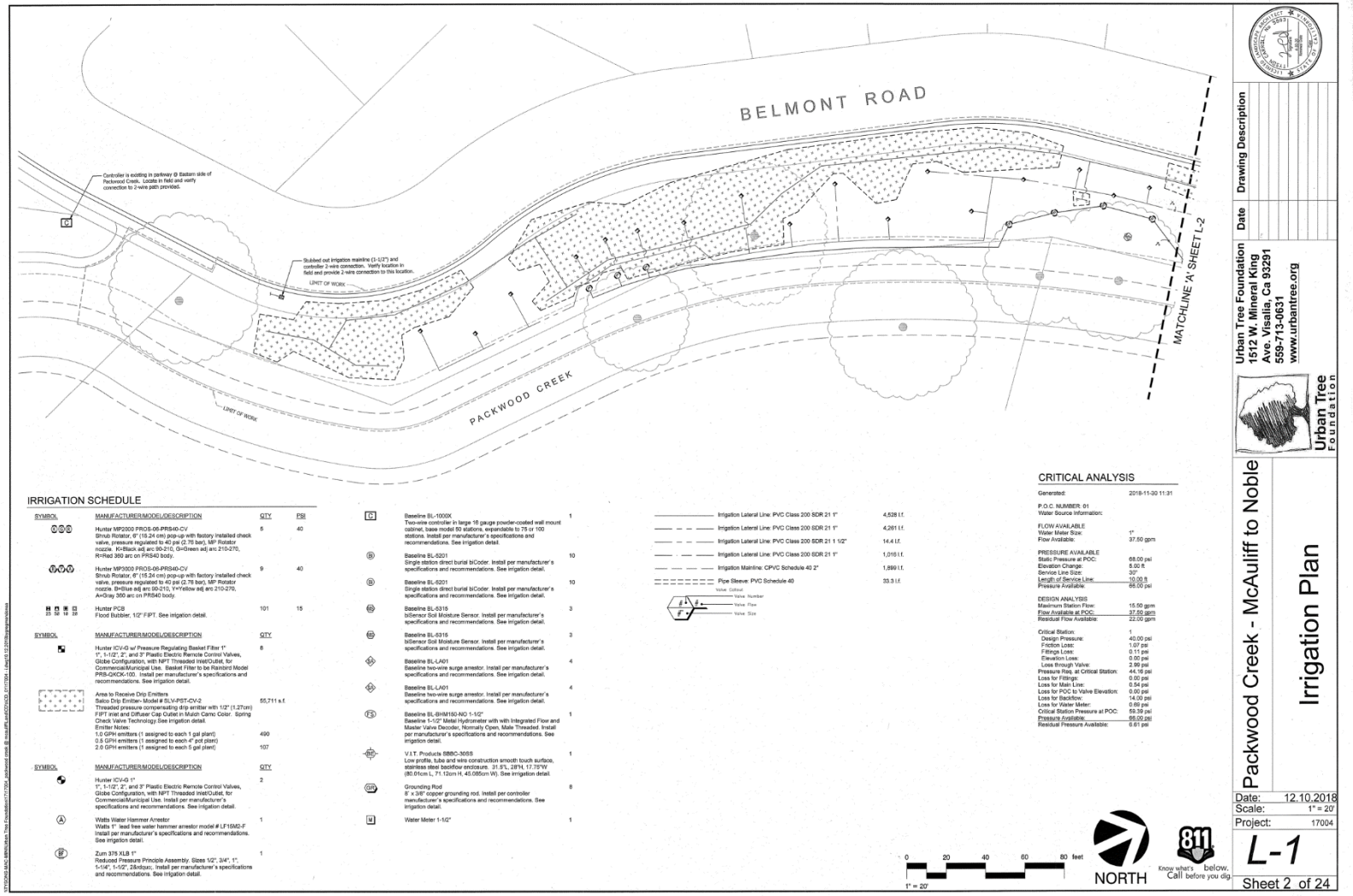
Grant/Project Process.

PROJECT ELEMENTS: Packwood Creek Tulare to Noble Ave.	Unit Price	Units	Quantity	Total Amount	EEMP Grant	Applicant Match	Other Funding Source	Estimated Schedule for Completion
Direct Project Management & Administrationm(not to exceed 25% of grant)								
Staff Time	$0.00		1	$0.00				
Incidental Charges	$0.00		1	$0.00				
Consultants:								
UTF	$8,400.00	LS	1	$8,400.00				
Subtotal 1	$8,400.00			$8,400.00				
Planning, Design, & Permitting								
Staff Time	$500.00		1	$500.00				
Landscape Construction Plans	$5,600.00	LS	1	$5,600.00				
Electrical Plans	$4,500.00	LS	1	$4,500.00				
Permitting	$520.00		1	$520.00				
Subotal 2	$11,120.00			$11,120.00				
CEQA Compliance (if applicable)								
Staff Time	$0.00		1	$0.00				
Consultants	$0.00		1	$0.00				
Subtotal 3	$0.00			$0.00				
Implementation/Construction								
Water Meter Services	$6,000.00	per meter	1	$6,000.00		$6,000.00		
Electrical Panel/Meter	$13,000.00	per bore	1	$13,000.00				
Site prepration & trenching	$6,500.00	per week	3	$19,500.00				
Landscape Irrigation	$6,500.00	per week	3	$19,500.00				
Backfilling & settling	$6,500.00	per week	2	$13,000.00				
Tree Planting w/ Staking	$6,500.00	per week	1	$6,500.00				
Shrub Installation	$6,500.00	per week	2	$13,000.00				
Mulch Installation	$6,500.00	per week	4	$26,000.00				
Final clean up	$6,500.00	lump sum	1	$6,500.00				
Porta-Potty Rental:	$90.00	per month	4	$360.00				
Subtotal 4				$123,360.00	$0.00			
Implementation/Applicant								
Irrigation Materials	$0.19	sq. ft.	130700	$24,833.00				
Backflow Prevention Devices	$3,000.00	lump sum	1	$3,000.00				
Controller (City Required)	$12,000.00	lump sum	1	$12,000.00				
Trees w/ Stakes	$65.00	per tree	101	$6,565.00				
Shrubs	$7.00	per shrub	600	$4,200.00				
Mulch	$13.00	cu. yd.	2424	$31,512.00		$6,490		
Grant signage:	$600.00	LS	1	$600.00				
C-Train:	$300.00	per month	4	$1,200.00				
Green Waste Recycling:	$300.00	per load	1	$300.00				
Subtotal 5				$84,210.00	$0.00			
Subtotal	$19,520.00			$227,090.00				
(not to exceed 10% of the grant)								
Contingency	$1,952.00			$22,709.00				
Grand Total	$21,472.00			$249,799.00	$237,309	$12,490		

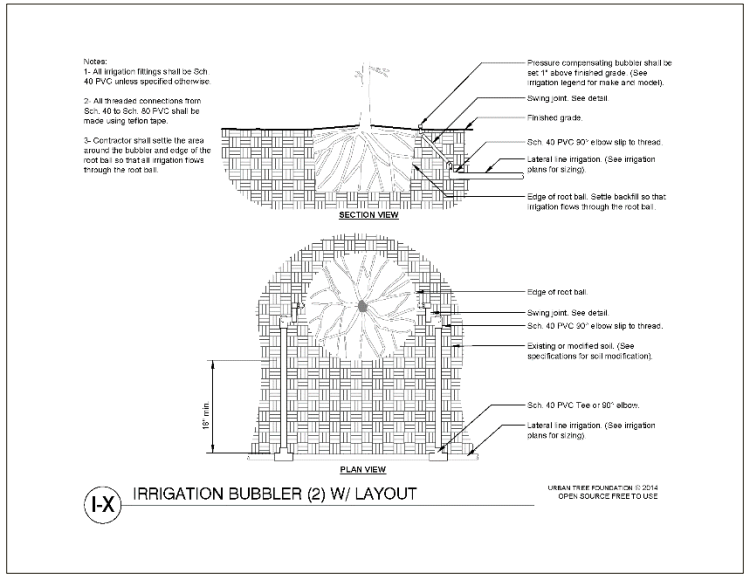
Grant/Project Process.



Grant/Project Process.

Lessons Learned

Irrigating with Soil Moisture Sensors



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Moisture Sensors vs. ET

Soil Moisture Sensors

- Pros
  - Provides information in the soil profile at the plants root zone.
  - Provides data that can be used to adjust irrigation scheduling.
  - Incorporates irrigation emitter type, soil type, weather and mulch into readings.
- Cons
  - Placement is critical.
  - Takes time to calibrate.
  - Can provide false data.

ET

- Pros
  - Easy to incorporate into irrigation scheduling.
  - Can be accessed through onsite or local weather stations.
  - Adjusts irrigation based on historic data.
- Cons
  - Applies irrigation schedule adjustments across the board.
  - Information based on crop coefficient for turf grass.
  - Does not incorporate onsite conditions.

Personal Experience

- In 2011 our local agency was looking to make a change.
- Met with multiple irrigation controller manufacturer's and tested multiple controllers.
- Needed a test site to try out a new system…..

Test Site

Packwood Creek at Diamond Creek

- Low profile location.
- Hybrid system with conventional and 2-wire.
- 3 soil moisture sensors one for trees, one for shrubs and one for existing trees.

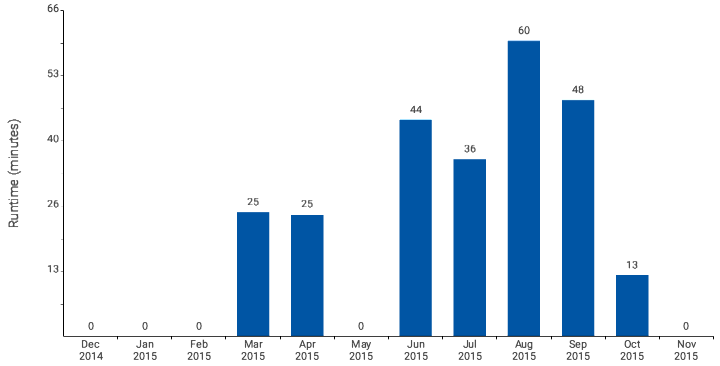
Results

- 1 year trial.
- Active management.
- Enabled the system to allow watering seven days a week with sensors.
- Email and Text Alerts.
- Longest stretch without water was 139 days for trees 181 for shrubs.

Zone Runtimes Report - Packwood Creek Trail

Site: Packwood Creek Trail
Controller: Packwood Creek Trail
Zone 14: Zone 14 Trees
Total Runtime: 4:10:31

Date: December 2014 - November 2015



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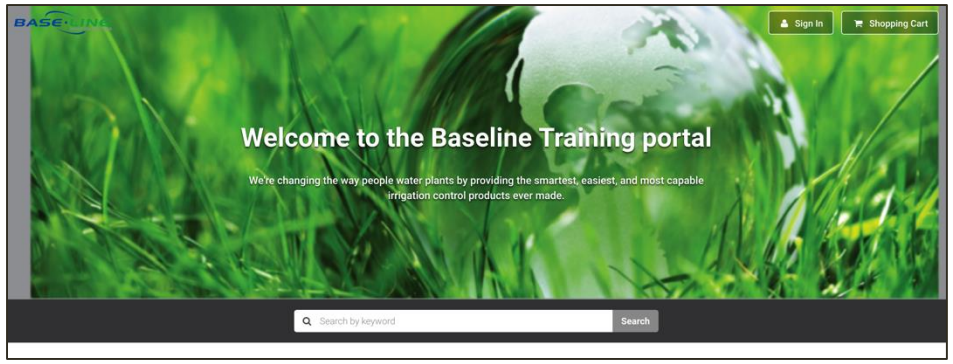
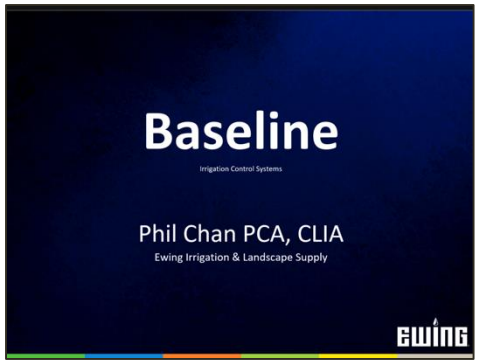
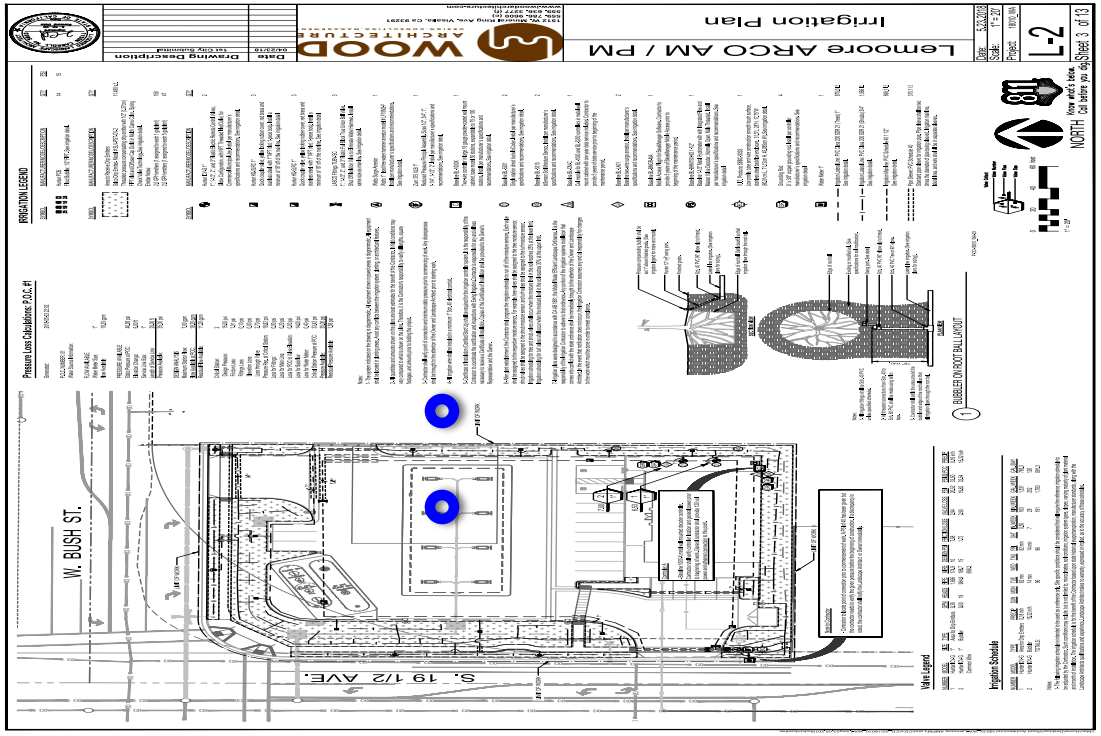
Implementation (aka my screw ups)







- Early meetings with Client/Contractors.
- Begin on smaller jobs.
- Don't overcomplicate sensor placement.
- Know more than the Contractor.
- Design irrigation for maintenance programming.
- Keep it simple.

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Questions....