Water Efficiency for Irrigation Systems

July 8, 2010
1:00 – 3:00 EST
Water Efficiency for Irrigation Systems

Buddy Murrow, Shepherds Landscape Supply

Brent Mecham, IA Industry Development Director

Andy Smith, IA External Affairs Director

Tom Barrett, Green Water Infrastructure
Agenda

- Smart Irrigation Month-Staying Green with Less Water
- Precision Application
- Water Budgeting and Measurement
- Control Technology
- Alternative Sources
- Questions
Water Efficiency
For Landscape Irrigation
SMART IRRIGATION MONTH
Buddy Murrow, Vice President, North Carolina Green Industry Council
What is Smart Irrigation Month?

- Established in 2006
- A public relations campaign promoting efficient irrigation practices
- Advanced water-saving products
- Raising public awareness of water conservation
State of North Carolina

SPECIAL IRRIGATION MONTH

2018

BY THE GOVERNOR OF THE STATE OF NORTH CAROLINA

A PROCLAMATION

WHEREAS, North Carolina recognizes that water is one of man’s most basic and precious natural resources; and
WHEREAS, water is fundamental to the preservation and protection of the environment, the health and safety of our people, and the promotion of the economy of our state; and
WHEREAS, it is in the public interest to promote water use efficiency; and
WHEREAS, incorporating smart and water management practices and new technologies that promote water use efficiency will achieve the goal of protecting and expanding our water supply, and
WHEREAS, North Carolina values well-maintained green spaces as important to the health and well-being of all citizens, and
WHEREAS, summer months can be a peak time for outdoor water use; now, therefore, I, BEVERLY FAVES PERDUE, Governor of the State of North Carolina, do hereby proclaim July 2018 as “SMART IRRIGATION MONTH” in North Carolina and urge our citizens to commit to its observance.

BEVERLY FAVES PERDUE

IN WITNESS WHEREOF, I have caused the seal of the State of North Carolina to be affixed by the Secretary at my request.

BEVERLY FAVES PERDUE
Why Smart Irrigation Month?

IA Alignment

- **Mission**: Promote efficient irrigation
- **Unifying Statement**: Ensure water is available for Irrigation for future generations

*Important to convey and demonstrate irrigation isn’t a bad thing*
Why Smart Irrigation Month?

- Ag & Urban interests often use irrigation water inefficiently:
  - In some cases, as much as 50% of irrigation water used is estimated as wasted

- Efficiencies of 90% or more are possible with smart irrigation:
  - Design
  - Installation
  - Operation
  - Maintenance

- SIM promotes the adoption of new technologies such that:
  - Ag irrigation maintains the ability to efficiently produce crops
  - Landscape irrigation continues to enhance property values and quality of life
Why July?

- Summer season across all parts of the country
- July is most frequently the month in which water use peaks
- People think about irrigation in summer
- Member demonstration of environmental stewardship
Where to Go

www.smartirrigationmonth.org
Show Off Your Smarts

- Smart Marketing Contest
  - Messaging
  - Quality
  - Creativity
- All participants recognized
- Winner recognition
  - Turf/landscape, ag, small company
- Complete entry form, submit samples
  - Entries due Sept. 15, 2010

www.smartirrigationmonth.org
Precision Application

Andy Smith, Irrigation Association
All the water that will ever be, is right now.

National Geographic, October 1993
Perspective

The landscape industry has traditionally placed a high priority on appearance.
Confronting the Brutal Facts

- Landscape irrigation uses more than 7 billion gallons per day nationwide. U.S. EPA, 2007
- Some suggest as much as half the water applied to the landscape is wasted
- Much of this water is treated drinking water
- Landscape water use is often deemed an unessential use
- Irrigation is often looked at as a nuisance rather than an opportunity by builders and many landscapers
- In “green building”, the solution is often to eliminate irrigation from the project
Beyond Appearance

- bio remediation
- dust abatement
- noise abatement
- oxygen production
- sequester carbon
- heat reduction
- prevent erosion and sedimentation
- vegetative fuel management
- recreation
- wildlife habitat
- hydrologic cycle enhancement
- improve water quality
Efficiency Begins with Uniformity

• Landscape irrigation is most often managed through the interpretation of visual symptoms
• Irrigation systems are programmed to water weak areas of coverage
• Compensating for poor design/uniformity becomes a long-term management challenge
Identifying Problems

- Check irrigation systems regularly for obvious problems
- Performing an irrigation audit at regular intervals can help identify opportunities for improvement
Check Valves

- Check valves
  - Prevent lateral pipes from draining between cycles through the sprinklers
  - Prevent erosion of sloped or newly seeded areas by “low head drainage”
  - A typical residential irrigation system holds about 60 gallons of water
Drip Irrigation

- Flexible output
- Pressure compensating
- Direct applied
- Efficient application
- Low volume
- Broader water window
- Limited contact with water
Nozzle Performance

- Nozzle performance
  - Enhancing matched precipitation
  - Improved distribution uniformity
  - Patterns for irregular shaped areas
Pressure Regulation

- Ensures proper downstream pressure will not exceed setting
- Enhances uniformity
- Prevents misting/atomization
Understanding the Site

- Every irrigation system represents a unique systems integration process
- Every site has varying soils, slopes and exposure
- Plant water needs vary
- Some “inherited” problems are difficult to resolve
- There is no substitute for regular site visits and skilled “hands-on” management
- Customer input is critical to understanding the desired outcome
Technology is Not a Substitute

- Prudent planning
- Proper spacing and application
- Correct pipe sizing
- Proper Hydrozoning
- Proper installation
Water Budgeting & Measurement
Brent Mecham, Irrigation Association
Overview
EPA WaterSense Single Family New Home Specification
www.epa.gov/watersense
EPA released its Final Specification for Single-Family New Homes (PDF) (15 pp, 120K, About PDF) on December 10, 2009. This specification establishes the criteria for new homes labeled under the WaterSense program and is applicable to newly constructed single-family homes and townhomes of three stories or less.

The following information and resources provide builders and other industry professionals with the resources they need to design, build, inspect and earn the WaterSense label for a new home. To learn more, see the WaterSense Labeled New Homes fact sheet.

Building a WaterSense Labeled New Home

- Become a Builder Partner
- Final Specification for Single-Family New Homes (PDF) (15pp, 120K, About PDF)
- Using the water Budget Approach for Landscape Design (Option 1 in section 4.1.1 of the specification for new homes)
- Water Budget Approach (PDF) (14pp, 255K, About PDF) – information on how to use the...
Building a WaterSense Labeled New Home

- **Become a Builder Partner**

- **Final Specification for Single-Family New Homes (PDF)** (15pp, 120K, About PDF)


- Using the water Budget Approach for Landscape Design (Option 1 in section 4.1.1 of the specification for new homes)
  
  - **Water Budget Approach (PDF)** (14pp, 255K, About PDF) – information on how to use the water budget and how the tool was developed.
  
  - **WaterSense Landscape Water Budget Tool** (xls)
  
  - **Water Budget Data Finder**


- Information about having your home inspected and certifying to the specification.

- Find a licensed certification provider to have your home inspected.
4.1 Landscapes

• Option 1  Water budget tool
• Option 2  Turfgrass not too exceed 40%

The tool allows for variety and creativity in the plant materials used and appearance of the landscape
4.1 Landscape guidelines

- Landscapes less than 1000 square feet are exempt.
- Slopes greater than 4:1 must be vegetated.
- Exposed soil shall be mulched.
- Pools/spas shall have a cover.
- Water features must recirculate water and have beneficial use.
Water Budget Calculator

- Part 1
  - Determine landscape water allowance (LWA)
- Part 2
  - Calculate landscape water requirement (LWR)
- Part 3
  - Results compare LWR to LWA

http://www.epa.gov/watersense/excel/Waterbudget_tool_112509_Final.xls

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1.1 of the specification. Please refer to the WaterSense Water Budget Approach for additional information.

<table>
<thead>
<tr>
<th>A</th>
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</tbody>
</table>

**Your Name:**

Brent Macham

**Builder Name:**

Quality Builder USA

**Lot Number/Street Address:**

123 Example Street

**City, State, Zip Code:**

RALEIGH NC

**Peak Watering Month:**

June

Obtain from Water Budget Data Finder at [www.epa.gov/watersense/nhspecs/wb_data_finder.html](http://www.epa.gov/watersense/nhspecs/wb_data_finder.html)

**Is an irrigation system being installed on this site?**

Yes

---

### This worksheet determines the baseline and the landscape water allowance (LWA) for a site based on its peak watering month.

The baseline is the amount of water required by the site during the peak watering month if watered at 100 percent of reference evapotranspiration ($ET_o$). The following formula is used to calculate the baseline:

$$ Baseline = ET_o \times A \times C_u $$

Where:

- $ET_o$ = Local reference evapotranspiration (inches/month)
- $A$ = Landscaped area (square feet)
- $C_u$ = Conversion factor (0.6233 for results in gallons/month)
Water Budget Data Finder

Irrigation professionals using the WaterSense Landscape Water Budget Tool may use the Water Budget Data Finder to determine peak watering month and the appropriate evapotranspiration and rainfall values for a specific United States zip code.

Information presented in the Data Finder comes from the World Water and Climate Atlas, a project of the International Water Management Institute (IWMI). EPA would like to thank IWMI for the use of this data.

Enter Zip Code: 22042  Go

Peak Month: Jun
ETo Value: 6.39 inches/month
Rainfall: 2.91 inches/month

For more information about the Water Budget Data Finder, visit How the Water Budget Data Finder Works.
Peak Watering Month

- Month with the largest need for supplemental irrigation (ET – rainfall)
- Automatically determined by data finder
- Just enter zip code
Data finder results

Raleigh NC

- Enter Zip Code: 27601
- Peak Month: Jun
- ETo Value: 6.03 inches/month
- Rainfall: 3.53 inches/month

Asheville NC

- Enter Zip Code: 27215
- Peak Month: Jun
- ETo Value: 5.99 inches/month
- Rainfall: 3.67 inches/month

Wilmington NC

- Enter Zip Code: 28403
- Peak Month: Apr
- ETo Value: 5.18 inches/month
- Rainfall: 2.50 inches/month
The LWA is the water allotment for the site. The following formula is used to calculate the LWA:

\[ LWA = 0.70 \times \text{Baseline} \]

Where:
- \( LWA \) = Landscape water allowance (gallons/month)
- \( \text{Baseline} \) = \( ET_0 \times \text{landscaped area} \times 0.6233 \)

To calculate the Baseline and LWA for a site, enter the designed landscaped area and average monthly reference evapotranspiration for the site's peak watering month. (Enter data in white cells only.)

**STEP 1A - ENTER THE LANDSCAPED AREA (A)**

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**Landscaped area = lot area less house footprint, permanent hardscape (driveways, patios, walks), septic drainage fields and public right-of-ways.**
Landscape Water Allowance

The LWA is the water allotment for the site. The following formula is used to calculate the LWA:

\[ LWA = 0.70 \times \text{Baseline} \]

Where:
- \( LWA \) = Landscape water allowance (gallons/month)
- \( \text{Baseline} = ET_0 \times \text{landscaped area} \times 0.6233 \)

To calculate the Baseline and LWA for a site, enter the designed landscaped area and average monthly reference evapotranspiration for the site’s peak watering month. (Enter data in white cells only.)

**STEP 1A - ENTER THE LANDSCAPED AREA (A)**
- Area of the designed landscape (square feet)  
  - 7,830

**STEP 1B - ENTER THE AVERAGE MONTHLY REFERENCE EVAPOTRANSPIRATION (ET)_0**
- Average monthly reference ET (inches/month) for the site’s peak watering month  
  - 6.03

Obtain from Water Budget Data Finder at [www.epa.gov/watersense/nhspecs/wb_data_finder.html](http://www.epa.gov/watersense/nhspecs/wb_data_finder.html)

Enter \( ET_0 \) from EPA data finder for the zip code of property
LWA = 20,601 gallons

The LWA is the water allotment for the site. The following formula is used to calculate the LWA:

\[
LWA = 0.70 \times Baseline
\]

Where:
LWA = Landscape water allowance (gallons/month)
Baseline = ET₀ × landscaped area × 0.6233

To calculate the Baseline and LWA for a site, enter the designed landscaped area and average monthly reference evapotranspiration for the site's peak watering month. (Enter data in white cells only.)

**STEP 1A - ENTER THE LANDSCAPED AREA (A)**

<table>
<thead>
<tr>
<th>Area of the designed landscape (square feet)</th>
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</thead>
<tbody>
<tr>
<td>7,830</td>
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</tbody>
</table>

**STEP 1B - ENTER THE AVERAGE MONTHLY REFERENCE EVAPOTRANSPIRATION (ET₀)**

<table>
<thead>
<tr>
<th>Average monthly reference ET (inches/month) for the site's peak watering month</th>
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</thead>
<tbody>
<tr>
<td>6.03</td>
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</tbody>
</table>

Obtain from Water Budget Data Finder at [www.epa.gov/watersense/nhspecs/wb_data_finder.html](http://www.epa.gov/watersense/nhspecs/wb_data_finder.html)

**OUTPUT - BASELINE FOR THE SITE**

<table>
<thead>
<tr>
<th>Monthly baseline (gallons/month) based on the site's peak watering month</th>
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<tbody>
<tr>
<td>29,431</td>
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</table>

**OUTPUT - WATER ALLOWANCE FOR THE SITE**

<table>
<thead>
<tr>
<th>Monthly landscape water allowance (gallons/month) based on the site's peak watering month</th>
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<tbody>
<tr>
<td>20,601</td>
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</tbody>
</table>

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1.1 of the specification. Please refer to the WaterSense Water Budget Approach for additional information.

Your Name: Brent Macham

Builder Name: Quality Builder USA

Lot Number/Street Address: 123 Example Street

City, State, Zip Code: RALEIGH NC

Peak Watering Month: June

Is an irrigation system being installed on this site? Yes

---

This worksheet determines the monthly landscape water requirement (LWR) for a site based on its peak watering month.

The monthly LWR is the water requirement specific to the designed landscape. The sum of the LWRs for each hydrozone equals the site LWR.

The following formula is used to calculate the LWR for each hydrozone:

\[
LWR_H = \frac{1}{DU_{LQ}} \times [(ET_o \times K_L) - R_A] \times A \times C_o
\]

Where:

- \( LWR_H \): Landscape water requirement for the hydrozone (gallons/month)
- \( DU_{LQ} \): Lower quarter distribution uniformity
- \( ET_o \): Local reference evapotranspiration (inches/month)
- \( K_L \): Landscape coefficient for the type of plant in that hydrozone (dimensionless)
- \( R_A \): Allowable rainfall, designated by WaterSense as 25% of average peak monthly rainfall (inches)
- \( A \): Area of the hydrozone (square feet)
- \( C_o \): Conversion factor (0.6233 for results in gallons/month)

To calculate the LWR for the site, enter the information requested below for the site's peak watering month. (Enter data in white cells only.)
### Table 2. Plant Type or Landscape Feature and Associated Landscape Coefficient

<table>
<thead>
<tr>
<th>Plant Type or Landscape Feature</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
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<tbody>
<tr>
<td>Trees</td>
<td>0.2</td>
<td>0.6</td>
<td>0.9</td>
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<tr>
<td>Shrubs</td>
<td>0.2</td>
<td>0.5</td>
<td>0.7</td>
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<tr>
<td>Groundcover</td>
<td>0.2</td>
<td>0.6</td>
<td>0.7</td>
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<tr>
<td>Turfgrass</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
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<tr>
<td>Pool, Spa, or Water Feature</td>
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<td>0.8</td>
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<tr>
<td>Permeable Hardscape</td>
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<tr>
<td>Nonvegetated Softscape</td>
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Source: Based on LEED for Homes Rating System 2008.

### Table 3. Distribution Uniformity

<table>
<thead>
<tr>
<th>Irrigation Type</th>
<th>DU\textsubscript{LQI} or EU*</th>
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<tbody>
<tr>
<td>Drip - Standard</td>
<td>70%</td>
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<tr>
<td>Drip - Press Comp</td>
<td>90%</td>
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<tr>
<td>Fixed Spray</td>
<td>65%</td>
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<td>Micro Spray</td>
<td>70%</td>
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<tr>
<td>Rotor</td>
<td>70%</td>
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<tr>
<td>No Irrigation</td>
<td>NA</td>
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</tbody>
</table>

*Lower quarter distribution uniformity (DU\textsubscript{LQI}) applies to sprinkler zones and emission uniformity (EU) applies to drip/microirrigation zones.


### Table 4. Appropriate Irrigation Types - Landscaped Areas with Irrigation Systems

<table>
<thead>
<tr>
<th>IF THE PLANT TYPE IS:</th>
<th>THEN THE IRRIGATION TYPE CAN BE:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drip - Standard</td>
</tr>
<tr>
<td>Trees</td>
<td>x</td>
</tr>
<tr>
<td>Shrubs</td>
<td>x</td>
</tr>
<tr>
<td>Groundcover</td>
<td>x</td>
</tr>
<tr>
<td>Turfgrass</td>
<td>x</td>
</tr>
</tbody>
</table>
Rainfall uses 25% as effective.

**STEP 2A** - ENTER THE AVERAGE MONTHLY RAINFALL (R) AT THE SITE FOR THE PEAK WATERING MONTH IDENTIFIED.
- **Average monthly rainfall** (inches/month) for the site’s peak watering month
- **Obtain from Water Budget Data Finder** [www.epa.gov/watersense/nhspecs/wb_data_finder.html](http://www.epa.gov/watersense/nhspecs/wb_data_finder.html)

**STEP 2B** - COMPLETE TABLE 1 BELOW (enter data in white cells only)
- Enter the area of the hydrozone (square feet). The total area must equal the landscaped area entered in Step 1A.
- Choose the plant type from the dropdown list (source data is displayed in Table 2).
- Choose the irrigation type from the dropdown list (source data is displayed in Table 3; guidance is displayed in Table 4 and Table 5).

<table>
<thead>
<tr>
<th>Zone</th>
<th>Hydrozone/Landscape Feature Area (sq. ft.)</th>
<th>Plant Type or Landscape Feature</th>
<th>Landscape Coefficient ($K_L$)</th>
<th>Irrigation Type</th>
<th>Distribution Uniformity ($DU_{LO}$)</th>
<th>LWR$_{H}$ (gal/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,800</td>
<td>Turfgrass - Low water requirement</td>
<td>0.6</td>
<td>Fixed Spray</td>
<td>65%</td>
<td>4,722</td>
</tr>
<tr>
<td>2</td>
<td>3,790</td>
<td>Turfgrass - High water requirement</td>
<td>0.8</td>
<td>Rotor</td>
<td>70%</td>
<td>13,302</td>
</tr>
<tr>
<td>3</td>
<td>950</td>
<td>Shrubs - Medium water requirement</td>
<td>0.5</td>
<td>Drip - Press Comp</td>
<td>90%</td>
<td>1,403</td>
</tr>
<tr>
<td>4</td>
<td>600</td>
<td>Groundcover - Medium water requirement</td>
<td>0.5</td>
<td>Micro Spray</td>
<td>70%</td>
<td>1,139</td>
</tr>
<tr>
<td>5</td>
<td>690</td>
<td>Nonvegetated Softscape</td>
<td></td>
<td>No Irrigation</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
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<td>10</td>
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<td>11</td>
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<tr>
<td>12</td>
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<td>13</td>
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<td>14</td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Area</strong></td>
<td><strong>7,830</strong></td>
<td>Landscape Water Requirement for the Site (gal/month)</td>
<td><strong>20,567</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LWR = 20,567 gallons
Part 3  Results

This worksheet determines if the designed landscape meets the water budget.

If the landscape water requirement is LESS than the landscape water allowance, then the water budget criterion is met.
If the landscape water requirement is GREATER than the landscape water allowance, then the landscape and/or irrigation system needs to be redesigned to use less water.

**STEP 3A - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2**

<table>
<thead>
<tr>
<th>LWA</th>
<th>20,601 (gallons/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWR</td>
<td>20,567 (gallons/month)</td>
</tr>
</tbody>
</table>

**STEP 3B - REVIEW THE TOTAL AREA OF TURFGRASS* IN THE DESIGNED LANDSCAPE FROM STEP 2B**

The designed landscape contains **5,590** square feet of turfgrass.* This is **71%** of the landscaped area.

*This includes the area of any pools, spas, and/or water features, designated by WaterSense to be counted as turfgrass.

**OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?**

**YES**

If YES, then the water budget criterion is met.
If NO, then the landscape and/or irrigation system needs to be redesigned to use less water.

The designed landscape water requirement is a **30%** reduction in water use from the baseline calculated in Part 1.
Part 3  Results

LWR is less than LWA so the designed landscape is acceptable.

Builder has to provide copies of the water budget to the inspector for verification.

Inspector will measure turf footprint but not exempt areas
## Change landscape design

### Table 1. Landscape Water Requirement

<table>
<thead>
<tr>
<th>Zone</th>
<th>Hydrozone/Landscape Feature</th>
<th>Plant Type or Landscape Feature</th>
<th>Landscape Coefficient ($K_L$)</th>
<th>Irrigation Type</th>
<th>Distribution Uniformity ($DU_{LQ}$)</th>
<th>$LWR_H$ (gal/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Turfgrass - High water requirement</td>
<td>0.8</td>
<td>Fixed Spray</td>
<td>65%</td>
<td>14,363</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Shrubs - Low water requirement</td>
<td>0.2</td>
<td>Drip - Press Comp</td>
<td>90%</td>
<td>358</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Shrubs - Medium water requirement</td>
<td>0.5</td>
<td>Drip - Press Comp</td>
<td>90%</td>
<td>1,255</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Groundcover - Medium water requirement</td>
<td>0.5</td>
<td>Micro Spray</td>
<td>70%</td>
<td>1,139</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Permeable Hardscape</td>
<td>0.5</td>
<td>No Irrigation</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Pool, Spa, or Water Feature</td>
<td>0.8</td>
<td>Fixed Spray</td>
<td>65%</td>
<td>1,134</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>8</td>
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<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Total Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18,250</td>
</tr>
</tbody>
</table>
## Results of new landscape

### Step 3A - Review the LWA and LWR from Part 1 and Part 2
- **LWA**: 20,601 gallons/month
- **LWR**: 18,250 gallons/month

### Step 3B - Review the Total Area of Turfgrass*
- The designed landscape contains 4,100 square feet of turfgrass.* This is 52% of the landscaped area.

*This includes the area of any pools, spa, and/or water features, designated by WaterSense to be counted as turfgrass.

### Output - Does the Designed Landscape Meet the Water Budget?

**YES**

If YES, then the water budget criterion is met.

If NO, then the landscape and/or irrigation system needs to be redesigned to use less water.

The designed landscape water requirement is a 38% reduction in water use from the baseline calculated in Part 1.
Summary

• Water budget tool helps define the landscape design and appearance.
• Based on peak irrigation month.
• On day of inspection, hydrozone areas must match water budget tool.
• Plant water requirements are based on local determination for various plant types.
Appropriate Irrigation

• Even if no irrigation system will be installed, plants still need to be irrigated, so irrigation default values are to be used. See table 5
### Table 4. Appropriate Irrigation Types - Landscaped Areas with Irrigation Systems

<table>
<thead>
<tr>
<th>IF THE PLANT TYPE IS:</th>
<th>THEN THE IRRIGATION TYPE CAN BE:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drip - Standard</td>
</tr>
<tr>
<td>Trees</td>
<td>x</td>
</tr>
<tr>
<td>Shrubs</td>
<td>x</td>
</tr>
<tr>
<td>Groundcover</td>
<td>x</td>
</tr>
<tr>
<td>Turfgrass</td>
<td>x</td>
</tr>
</tbody>
</table>

*Micro spray may only be used on vegetation other than turfgrass if it meets the definition of microirrigation system, which according to the 2008 WaterSense Single-Family New Home Specification is: "The fine, gentle water drops from the soil surface as drops, tiny streams or miniature spray through emitters or applicators placed along a water delivery line. Microirrigation encompasses a number of methods or concepts, such as bubbler, drip, and sprinkler systems. For purposes of this specification, microirrigation includes emission devices that have flow rates less than 30 gallons per hour."

### Table 5. Appropriate Irrigation Types - Landscaped Areas without Irrigation Systems

<table>
<thead>
<tr>
<th>IF THE PLANT TYPE OR LANDSCAPE FEATURE IS:</th>
<th>THEN THE IRRIGATION TYPE SHALL BE:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drip - Standard</td>
</tr>
<tr>
<td>Trees, Shrubs, or Groundcover with Low Water Requirements ($K_L &lt; 0.2$)</td>
<td>x</td>
</tr>
<tr>
<td>Trees, Shrubs, or Groundcover with Medium or High Water Requirements ($K_L &gt; 0.2$)</td>
<td>x</td>
</tr>
<tr>
<td>Turfgrass with Low, Medium, or High Water Requirements ($K_L &gt; 0.2$)</td>
<td>x</td>
</tr>
<tr>
<td>Pool, Spa, or Water Feature</td>
<td>x</td>
</tr>
<tr>
<td>Permeable Hardscape</td>
<td>x</td>
</tr>
<tr>
<td>Nonvegetated Softscape</td>
<td>x</td>
</tr>
</tbody>
</table>

*Please see additional information in the WaterSense Water Budget Approach for landscapes installed without irrigation systems.*
4.2 Irrigation System

- No overhead irrigation on areas less than 4 feet wide.
- No overhead irrigation on slopes greater than 4:1
- No runoff or direct overspray during minimum operation run time.
- DU_{LQ} of 0.65 or greater in largest area
- Must include operational rain shut off device
4.2 Irrigation System

- Designed or installed by a WS partner
- All system to be audited by WS partner
- Minimum $DU_{LQ}$ is 0.65—largest area
- Rain shut off device
- Good quality controller
- Posted irrigation schedule by controller
  - Grow-in schedule
  - Maintenance schedule
4.2 Irrigation System

• NO
  – Leaks
  – Runoff/direct overspray
  – Sprinkler irrigation on slopes > 4:1
  – Sprinkler irrigation on areas < 4 feet wide
Water Budget Tool

- Determines the style of landscape that will potentially use less water
- Builder needs help to understand the ramifications of the tool
- Landscape designers will need help to understand how to use the tool
- Local sources of information are used to determine the relative water usage of plants
- Will need a superior quality irrigation system to perform at the expected level
New Home Specification

• Preference to use the water budget tool
• Preference to use WS partners
  – Design/install
  – Audit irrigation performance
• New business opportunity if you understand how to use the tool
Control Technology
Andy Smith, Irrigation Association
Irrigation Control

• Is not just a device that hangs on the wall in the garage
• Represents the integration of individual components to actuate the application of supplemental irrigation as deemed appropriate by the operator
• Is often the source of high level opportunity for savings
• Can be the source of significant waste
• Needs to gravitate toward fulfilling landscape need rather than simply performing date and time function
Pump Stations

- Pre-manufactured
- Skid mount
- Customized per application
- For main supply or booster
- VFD and Conventional
- Integrated Communication
Valve Advancements

- Pressure regulation
- Battery actuation
- Wireless control
- Decoder Actuation
Sensors

- Rain
- Wind
- Moisture
- Temperature
- Flow
- Comprehensive weather
Smart Irrigation Controllers

- Adapt programmed irrigation cycles to meet site specific demand
- Require no daily intervention by homeowner or contractor, once calibrated
- Utilize a variety of inputs to tailor application
Question

- Will smart irrigation controllers save water in every application?
EPA and WBIC’s

- EPA issued a draft specification for weather-based irrigation controllers in November 2009
- Interested parties provided comments on the draft specification for weather-based irrigation controllers until January 18, 2010
- A second draft is expected in the fall of 2010
- For more information: http://www.epa.gov/watersense/partners/controltech.html
Technology is Not a Substitute

- Prudent planning
- Proper spacing and application
- Correct pipe sizing
- Proper Hydrozoning
- Proper installation
Alternative Sources
Tom Barrett, Green Water Infrastructure, Inc.
Cisterns

Above Ground
Residential Condensation

- 8 to 15 gallons of water per day.
- 60 to 100 gallons per week.
- 250 to 450 gallons per month.
Commercial Condensation

- 15 gallons of water per hour.
- 360 gallons of water per day.
- 2,520 gallons of water per week.
- 10,000 gallons of water a month.
Putting It Together
Stormwater Mitigation

Stormwater Mitigation

Stormwater Mitigation

Stormwater Mitigation

Stormwater Mitigation
Untapped Reservoir
Untapped Reservoir
Untapped Reservoir
Untapped Reservoir
Untapped Reservoir
Questions?

- Green Water Infrastructure
  - Strategic Planning
    - Marketing
    - Coaching
    - Training

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