LANDSCAPE IRRIGATION EFFICIENCY

IWAC Irrigation Workshop

January 29, 2020

BACKGROUND

- Landscape irrigation is the single largest use of potable water in the U.S.
- Up to 70% of your water use is outdoors.
- As much as 50% of water used for irrigation is wasted due to evaporation, wind, and overwatering caused by inefficient irrigation methods and systems.
- Through education and planning, it is estimated that landscapes can be well maintained using 30 to 50% less water.

8/2011

Athol Elementary

8/2011

Betty Kiefer Elementary

8/2011

Dalton Elementary

8/2011

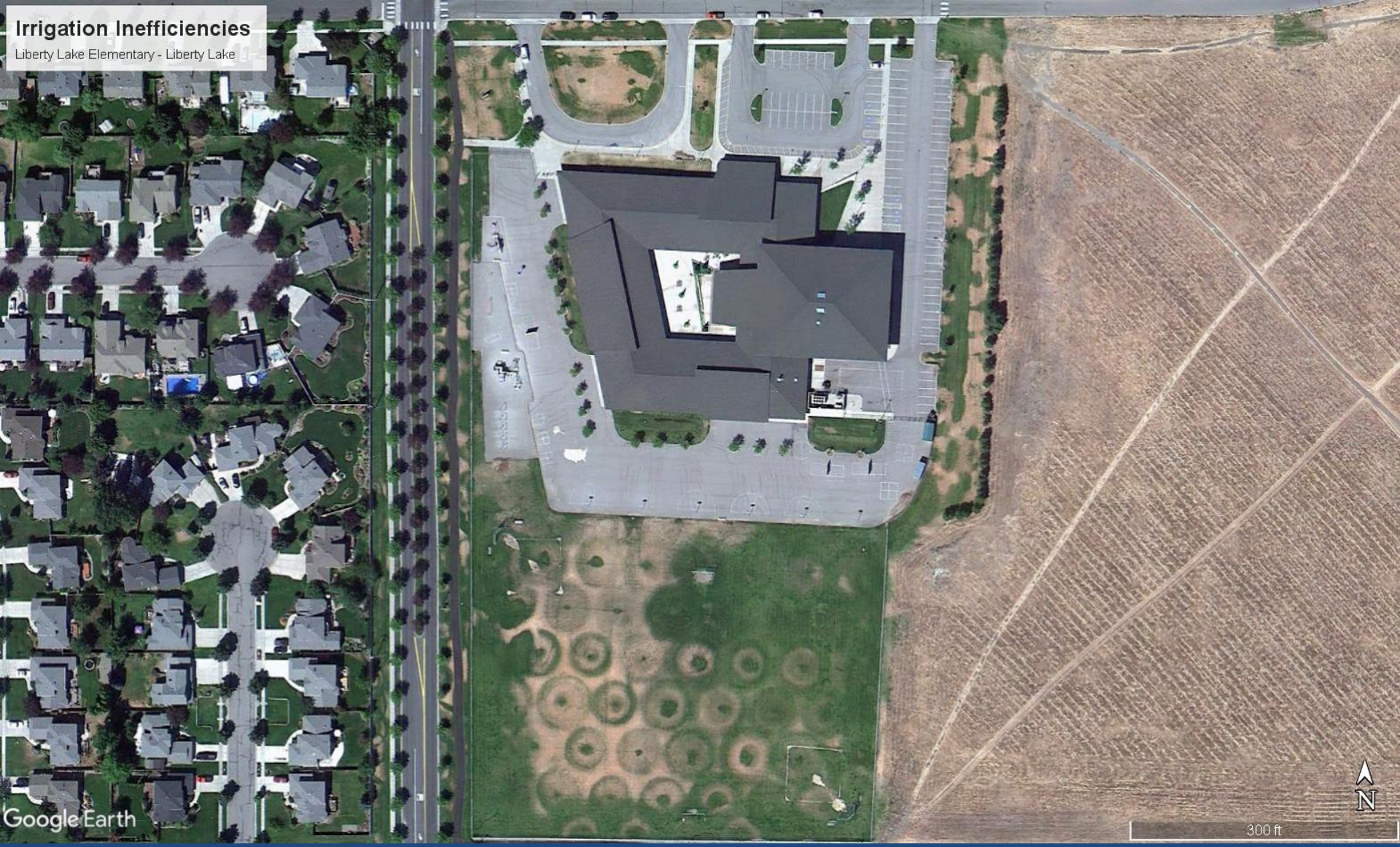
Woodland Middle School

8/2011

Highlands Golf Course

8/2011

Spokane County Sheriff's Training Center



8/2011

Liberty Lake Elementary

8/2011

Valley Christian School

8/2011

Whitman Elementary

DESIGN INEFFICIENCIES

- Proper head spacing (distance) and placement (blockage)
- Proper head height
- Proper head applications (i.e. 15’ head for 6’ space)
- Proper nozzle applications (fine mist, large droplets, breakup)
- Matched precipitation rates
- Mismatched heads
- Zone separation
- System pressure
- Pipe size
- Plant water requirements
- Slope, drainage and landscape contours
- Soil type, compacted soils, root zone depth
- Installation practices (sprinkler/screen plugging)
- Backflow (devices installed on the wrong side of blowout)

MAINTENANCE INEFFICIENCIES

- Misdirected spray
- Broken risers and heads
- Leaking seals
- Plugged nozzles and screens
- Blocked spray
- Tilted heads
- Head height
- Nighttime watering (not checking system regularly)

SYSTEM OPERATION INEFFICIENCIES

- Scheduling
  - Start up/shut down
  - Start times
  - Run times
  - Cycle soak programs
- Root zone depth
- Mow height
- Grass clippings
- New turf settings
- Rain delay
- Sensor technologies


2006

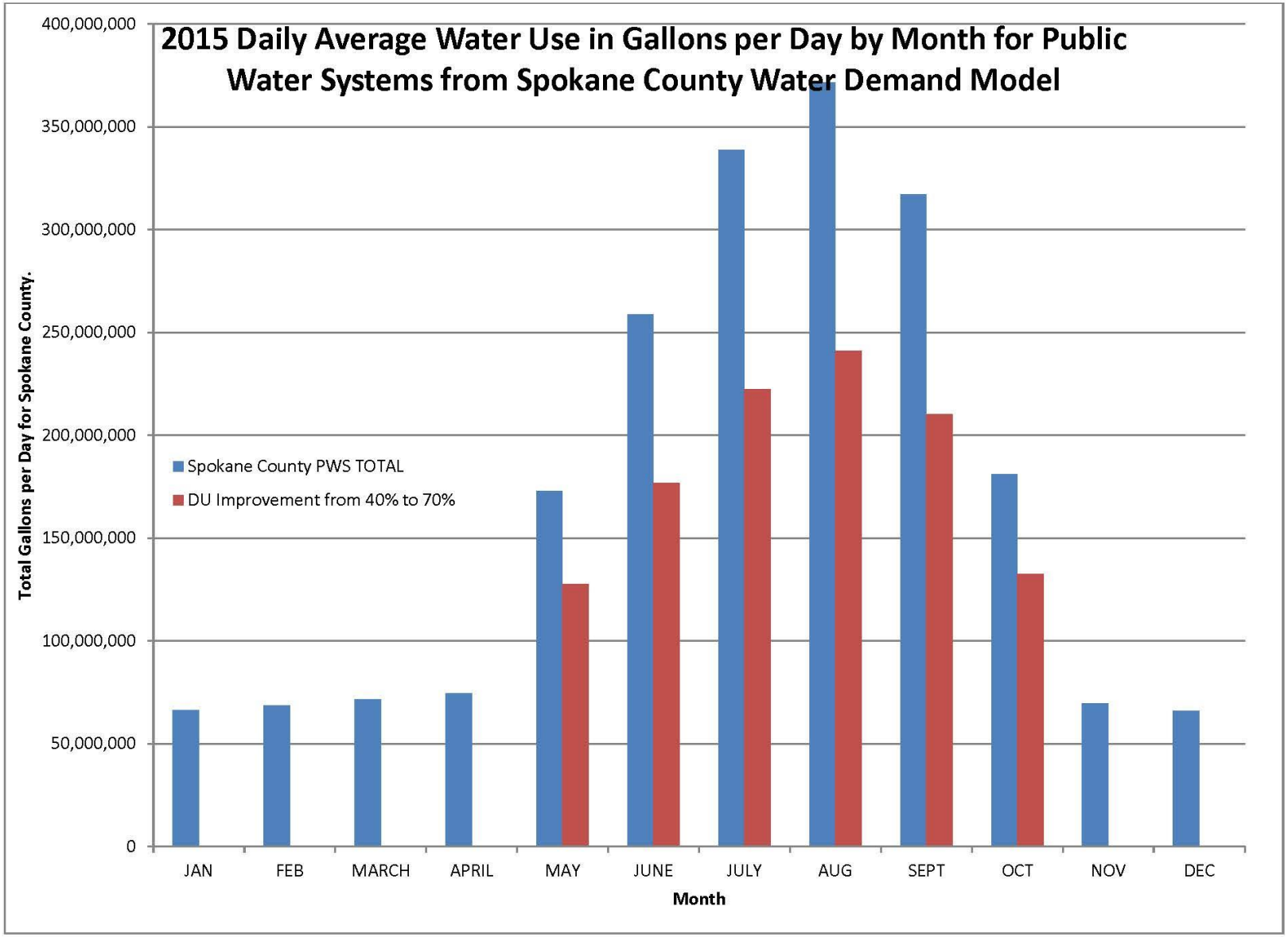

Z71

IMPORTANCE OF DISTRIBUTION UNIFORMITY

DU %	Water the plant needs	÷	DU Decimal	=	Amount of water you need to keep the dry areas green
30%	1 inch	÷	0.3	=	3.33 inches
50%	1 inch	÷	0.5	=	2.00 inches
70%	1 inch	÷	0.7	=	1.42 inches

DU measures how uniformly an irrigation system applies water to the landscape

Excellent (Achievable)	Good (Expected)	Poor (Common)
75%	60%	50%


2015 Daily Average Water Use in Gallons per Day by Month for Public Water Systems from Spokane County Water Demand Model
Total Gallons per Day for Spokane County.
400,000,000
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Spokane County PWS TOTAL
DU Improvement from 40% to 70%
JAN
FEB
MARCH
APRIL
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
Month

EFFICIENCY

- Efficiency of various irrigation methods:
  - Subsurface drip – 90%
  - Surface drip (micro) irrigation – 85%
  - Large rotors – 70%
  - Small rotors – 65%
  - Spray heads – 50%
- Matched Precipitation Rate (MPR)
  - Example: MP Rotator 70%

Traditional Spray Head

Flow (GPM) = 0.1 to 5.52

VS.

Example:
Traditional 1.85 X 20 min = 37 Gal

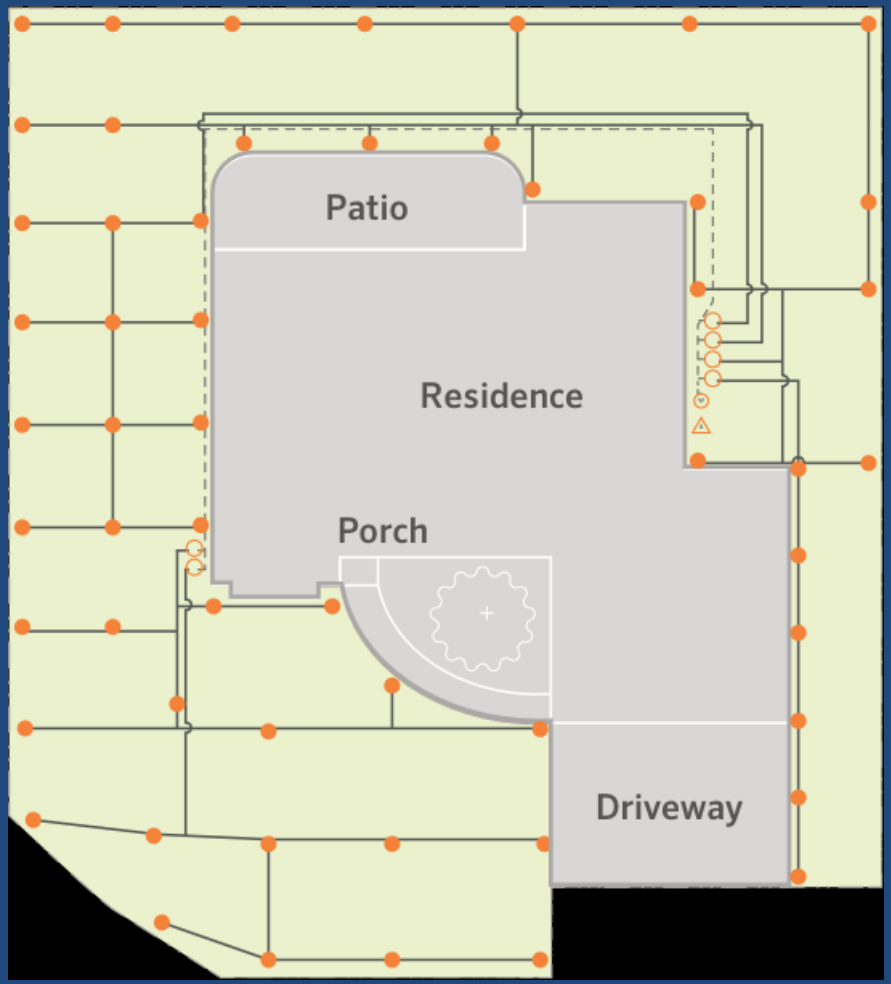
MP Rotator 0.50 X 20 min = 10 Gal

= 73% reduction

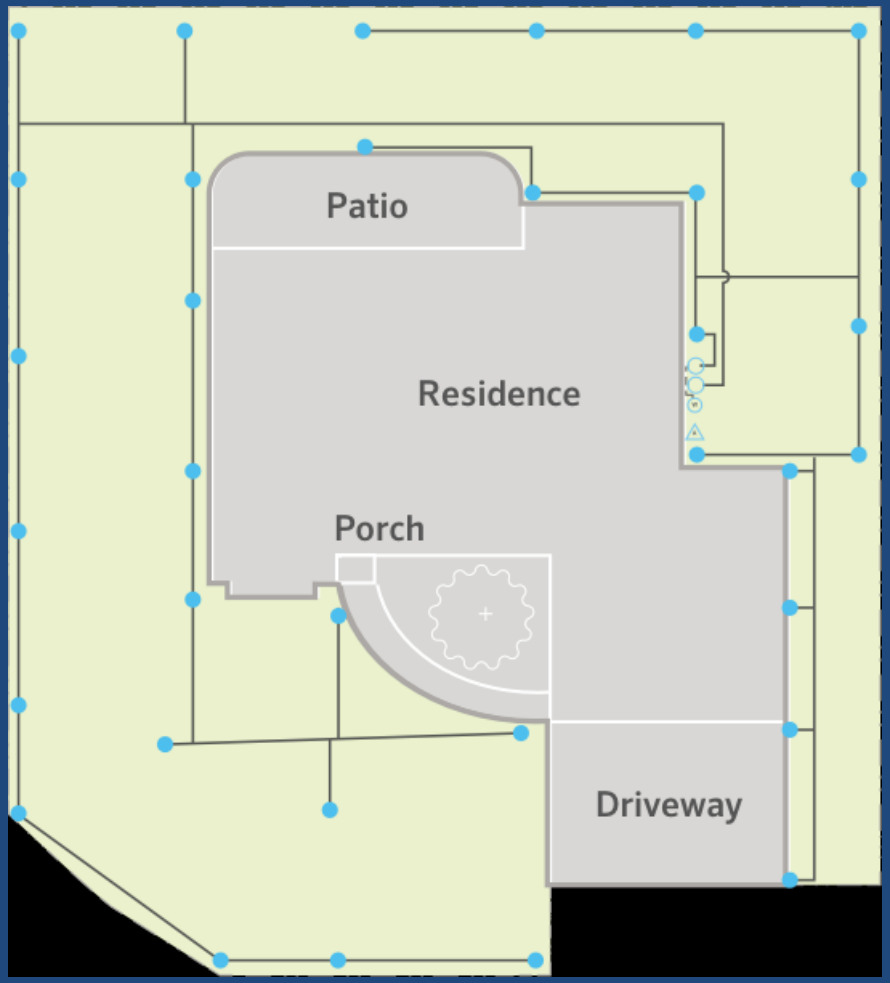
MP Rotator

Flow (GPM) = 0.17 to 1.01

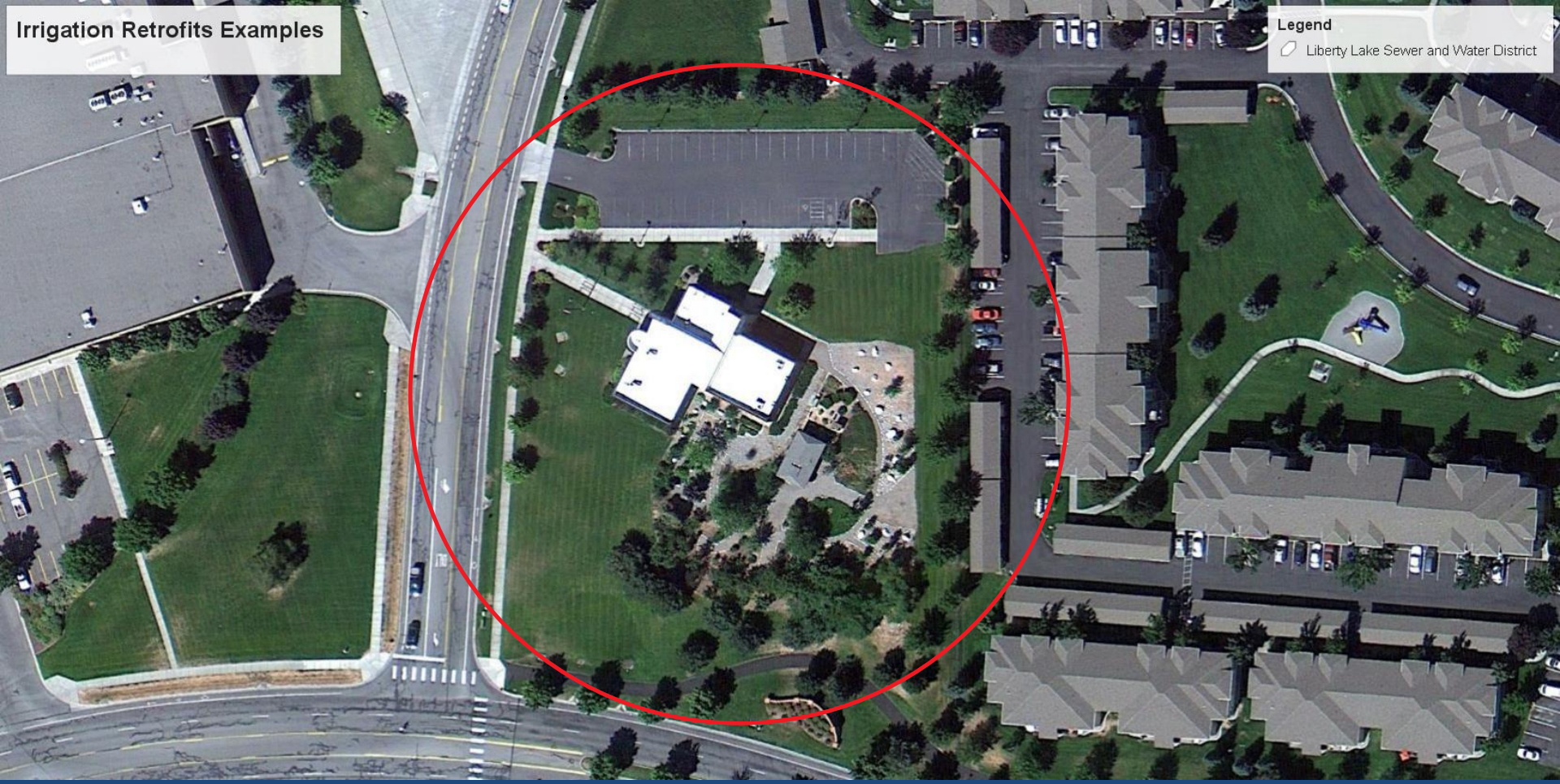
Design Using Traditional Sprays



Design Using MP Rotators



Having a slow precipitation rate across such a large radius range means less pressure loss throughout the zone. This allows more heads to run on one valve and simplifies the design layout (https://www.hunterindustries.com/mp-smarter-faster-better)

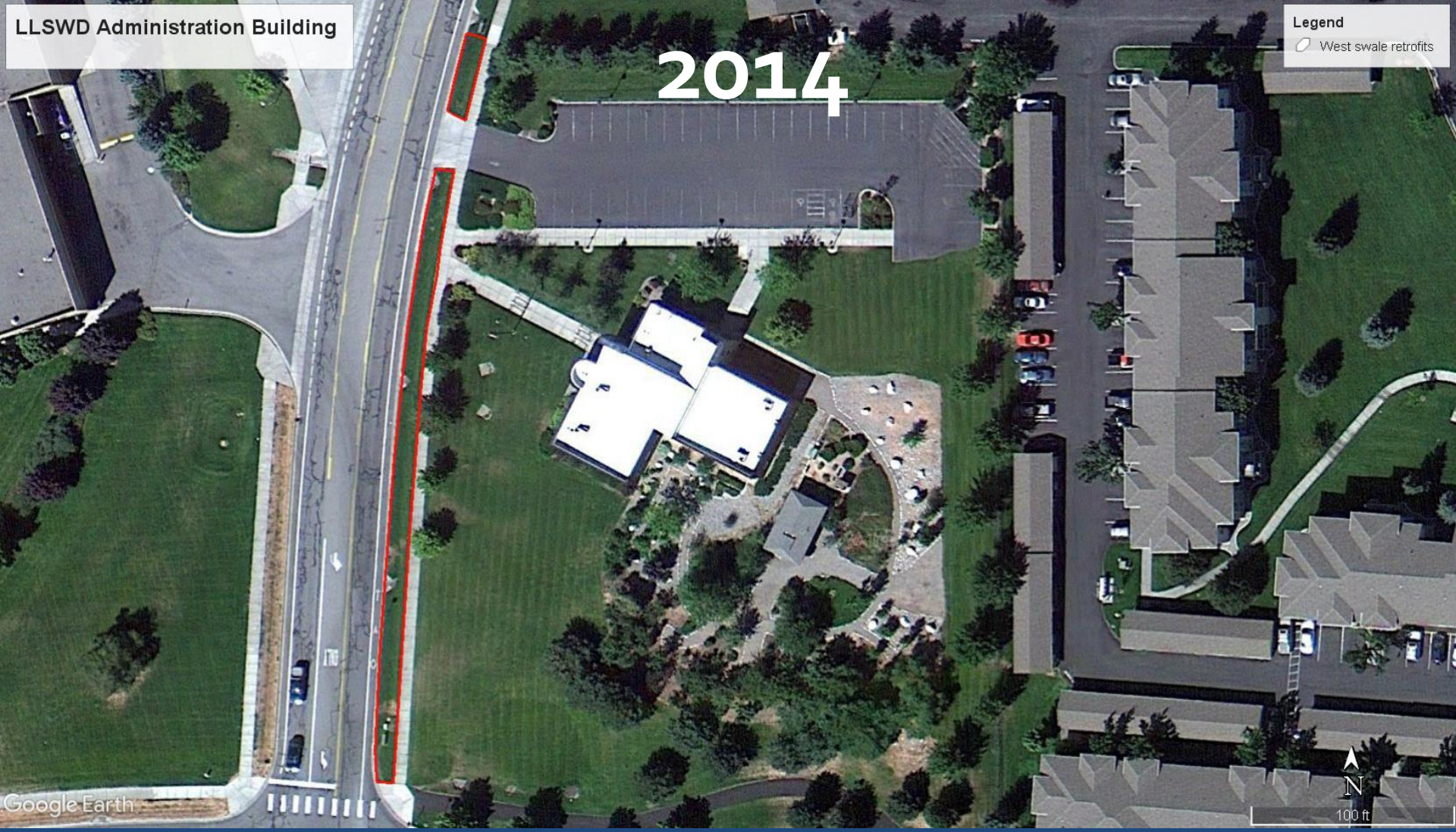


Liberty Lake Sewer and Water District Example

8/2011

- 2.4 acres. Audited in June 2005. System efficiency (DU) was 44%
- Implemented landscape measures (pressure regulation, matched and aligned rotor heads, and installed sensor-based technology)
- Cost under $500 (including soil sensor)
- **Reduced water by 36% the following year and improved DU to 61%**

- Retrofitted 22 spray heads to MP2000 Rotators
- Observed water savings was 2.66 GPM to 0.71 GPM per head
- **Recognized savings = 42.9 gallons per minute the system runs**



- 61 spray heads – 34 were retrofitted to MP1000 Rotators and 27 were eliminated.
- Observed water savings was 1.85 GPM to 0.50 GPM per head
- **Recognized savings = 95.85 gallons per minute the system runs**

QUESTIONS

BiJay Adams

IWAC Vice President

Liberty Lake Sewer and Water District

(509) 922-5443

bijay@libertylake.org