Sprinkler Head Water Saving Reports

INTRODUCTION & BACKGROUND

The 3 attached reports record significant and immediate water-saving results from simple, low cost change-outs of just 2 spray sprinkler parts: the pop-up riser stem and the nozzle. The pop-up stem contains an In-Stem Flow Regulator (IFR) and the nozzles are high-efficiency (H/E). All items used to generate the reductions shown below are on MWD's rebate list. In contrast to turf removal, which can take 2-3 months to deliver water savings and usually requires hazardous weed killers to avoid leaving grass-weed problems behind, the attached reports show that significant flow reductions and concurrent water savings can be achieved immediately. With the drought emergency upon us, it is incumbent upon us to reduce outdoor water use now, not when the summer is over.

Immediately below is a summary of the water savings at an LAX facility in Van Nuys – the FlyAway Bus Terminal. In deference to the various inquiries that may arise related to the information presented, the averages are expressed with 5 different analyses – A through E. The pages that follow provide the details and calculations of this first report.

AVERAGE WATER SAVINGS CALCULATIONS AT THE FLYAWAY BUS TERMINAL

A. Average Water Savings of all 26 retrofitted zones: **47.82%**

B. Average Water Savings of 22 retrofitted zones; excluding the 4 * zones in which some heads were substantially reduced or shut off as appropriate: **45.21%**

C. Average Water Savings of the 9 "T" (turf) retrofitted zones: **43.37%**

D. Average Water Savings of 17 "S" (shrub) retrofitted zones: **52.16%**

E. Average Water Savings of 13 "S" (shrub) retrofitted zones; excluding the 4" zones in which some heads were substantially reduced or shut off as appropriate: **49.08%**

IFR Technology & Function

IFRs are available in pop-up riser stem replacements for all major manufacturers in 4", 6" and 12" sprinklers as well as in ½" and ¾" couplings (fipt x fipt) and riser extenders (fipt x mipt) and shrub adapters. IFRs provide:

1. on/off control at each sprinkler;
2. ability to precisely adjust the distance of the water throw;
3. higher uniformity of the water application due to the water entering into the nozzle with less turbulence;
4. ability to eliminate water-wasting misting and fogging as IFRs override all high pressure;
5. elimination of excessive flow rates caused by high-pressure; and
6. quick servicing, flushing and change-outs of nozzles by one person as all IFR parts can shut down the water to a single sprinkler without affecting the others on the same line - with pop-up stems not retracting until the water to the system is shut off. Presently, all In-Stem Flow Regulators are manufactured by Valvette Systems, located in the Los Angeles area and commonly known as "LittleValve".

Preferred High Efficiency Nozzles

H/E nozzles preferred by the writer of this report, a CA licensed landscape contractor, who also oversaw the change-out work, are Toro® Precision™ Series Rotating Nozzles (PRN) for all 'Radius' applications because of the great flexibility the PRNs offer: (1) an Arc range of 45° to 270° with its 'Adjustable' model, the other model being a fixed full circle pattern; (2) availability in both Male and Female styles allowing use on all plastic sprinklers; (3) very low trajectory, which undercuts even high wind conditions; and (4) when paired with an IFR has a distance range of 18 inches, regardless of pressure all the way up to 26 – 28 feet, depending on pressure. For long, narrow planter areas, most pros will use side strip nozzles. When using side strips in the same valve system with rotating nozzles, flow rates and precipitation rates must be respected. The writer prefers Toro's Precision Spray Nozzle (PSN) model nos. 4 X 30 SST and 4 X 18 SST. The PSN line also comes in male and female styles. When the nozzle calls for a side strip to cover a left/right area of less than 8 – 9 feet, Hunter's SS530 is the side strip of choice.

Benefits of Combining Distinct Technologies

Because of all the advantages of the two parts described above, the water savings noted in the reports can be considered an annual reduction in total water use because the recommendation is to leave the station run times unchanged or even reduced. This is possible because the water passing through the new pop up stems and high efficiency nozzles is applied more slowly – reducing or eliminating runoff – and more efficiently – because the water is being applied more evenly and without the overspray and misting that previously characterized the operation of the sprinkler system. For those reasons, dramatic flow reductions are being experienced. And those flow reductions translate into direct water savings – immediately upon completion of a retrofit.

Three Change-outs

Lest the reader think that the dramatic flow reductions documented above be unique or out of the ordinary, two additional retrofit sites are noted below. All 3 of the listed Change-outs are located in Van Nuys, California. All 3 had been watered with typical 'Spray' type sprinklers. All 3 sites have the irrigation water separately metered. The reads were notated down to 1/10 of a cubic foot of water. The reads were taken over 3 or 4-minute periods. All 3 are under the umbrella of the City of Los Angeles but the FlyAway Terminal is an LAX facility, whereas the other two sites are Van Nuys Airport facilities. Note that the detailed information on the Van Nuys Airport change-outs is provided as two separate attachments.

The FlyAway Terminal

The change-out discussed in these 3 pages is the LAX FlyAway Bus Terminal, summarized above on page 1. It is a large site comprising over 2,500 sprinklers, operated by 2 controllers. 26 of the 57 valves systems that were changed out were included in this study of which 17 valves watered only shrub areas and 9 valves watered only turf areas.

The NOTES and Legend for the FlyAway change-out are as follows:

NOTE #1: The water savings shown on page 3 and their averages shown on page 1 can be relied upon 4 seasons of the year for all the S (shrub) valves. It is anticipated that the T (turf) valves will have their savings reduced or perhaps even halved in the summer season.

NOTE #2: No sprinklers were moved or added. Only the pop-up stems and nozzles in every existing sprinkler in each valve system were changed out. The Project was completed on April 21, 2015.

NOTE #3: Wherever sprinklers are watering just dirt, mulch, or gravel, we most often take advantage of the easy on/off adjustment control In-Stem Flow Regulators **(IFRs)** provide by substantially reducing the watering distances in order to save even more water. In the first 4 valve systems (of this Report) some sprinklers were partially closed down or closed off completely. An asterisk (*) is shown beside each of those valves.

NOTE #4: Each valve waters either Shrubs or Turf as shown in the 2nd column.

Legend: POP1210 = LittleValve 12" Rain Bird Replacement stem
POP610 = LittleValve 6" Rain Bird Replacement stem
POP410 = LittleValve 4" Rain Bird Replacement stem
PRN = Precision Rotating Nozzle by The Toro Company
PSN = Precision Spray Nozzle – 4 x 30 **&** 4 X 18 Side Strip models by The Toro Company

Legend Note: A few sprinklers were very difficult to access, specifically under very thick Bougainvillea bushes, hence 8' full circle PSNs were used in those few spots.

The next page 3 provides all the computations and information for the 26 valve systems of the FlyAway Terminal of which reads were conducted.

Change-Out of Every Sprinkler in 57 Valve Systems with
In-Stem Flow Regulators **(IFR**s**)** and High-Efficiency Nozzles

Location: LAX FlyAway Bus Terminal, 7610 Woodley Avenue, Van Nuys, CA

Of the 57 valve systems changed-out, 'Before & After' water usage/time studies were made on 26
[See Notes and Legend on Page 2)

Valve No.	Shrubs or Turf	Exact no. of Sprinklers	(Approx no.) IFRs used	Exact no. of Nozzles Used	Water Savings
A7 *	S	48	18 POP1210; 14 POP610; 16 POP410	12 PRNs; 36 PSNs	**42.7%**
A13 *	S	52	30 POP1210; 22 POP610	1 PRN; 51 PSNs	**67.6%**
A17 *	S	42	39 POP1210; 3 POP610	42 PRNs	**55.1%**
A20 *	S	16	16 POP1210	16 PRNs	**83.4%**
A21	T	19	19 POP610	19 PRNs	**28.0%**
A22	T	41	41 POP610	26 PRNs; 15 PSNs	**33.6%**
A24	S	70	65 POP1210; 5 POP610	35 PRNs; 35 PSNs	**46.0%**
A25	T	60	60 POP610	15 PRNs; 45 PSNs	**40.6%**
A26	S	67	45 POP1210; 22 POP610	33 PRNs; 34 PSNs	**52.6%**
A27	T	64	64 POP610	20 PRNs; 40 PSNs	**48.9%**
A28	S	49	40 POP1210; 9 POP610	34 PRNs; 15 PSNs	**48.3%**
A30	S	57	42 POP-1210; 17 POP610	27 PRNs; 30 PSNs	**55.1%**
A31	T	67	67 POP610	22 PRNs; 45 PSNs	**50.4%**
A32	S	68	48 POP1210; 20 POP610	35 PRNs; 33 PSNs	**50.0%**
A33	T	69	69 POP610	19 PRNs; 50 PSNs	**40.4%**
A34	S	61	44 POP1210; 17 POP610	35 PRNs, 26 PSNs	**54.1%**
A35	S	50	44 POP1210; 6 POP610	50 PRNs	**58.7%**
A36	T	62	62 POP610	45 PRNs; 17 PSNs	**31.7%**
A37	S	49	41 POP1210; 8 POP610	49 PRNs	**49.7%**
B1	T	16	16 POP610	16 PRNs	**48.4%**
B3	T	16	16 POP610	16 PRNs	**34.6%**
B7	S	15	15 POP1210	13 PRNs; 2 PSNs	**56.9%**
B8	S	32	31 POP1210; 1 POP610	30 PRNs; 2 PSNs	**45.5%**
B20	S	47	47 POP1210	47 PRNs	**44.0%**
B21	S	28	28 POP1210	28 PRNs	**31.3%**
B22	S	68	60 POP1210; 8 POP610	61 PRNs; 7 PSNs	**45.8%**