
SNVIA
SOUTHERN NEVADA
IRRIGATION ASSOCIATION
SiteOne
LANDSCAPE SUPPLY

Basic Irrigation 101

SNVIA Class I Irrigation Technician Exam Preparation

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President – Desert Green Foundation

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CLASSIFICATION PROGRAMS

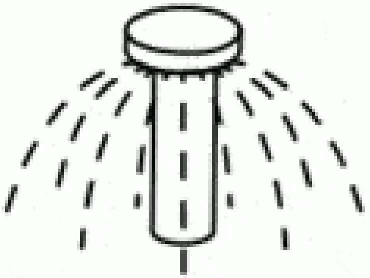
SNVIA Class I Irrigation Technician (Coverage)

A SNVIA Class I Irrigation Technician displays a complete understanding of common materials, equipment and processes used in the landscape irrigation industry including: polyvinyl chloride (PVC) pipe, polyethylene (PE) pipe/tubing (blank/inline), emitters (micro line/inline/point-source/drip), fittings, valves (remote control /gate/ball), sprinkler heads (rotor and spray), nozzles, PVC primer, PVC solvent cement, PVC thread seal tape/sealant, precipitation rate and distribution uniformity.

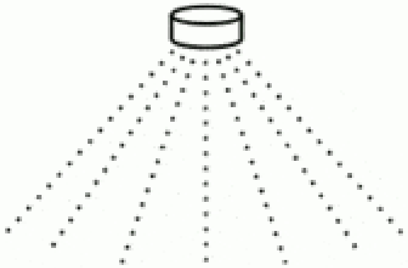
Required Training & Certifications:

- Basic Irrigation – 101
- PVC primer, solvent cement, thread seal tape/sealant
- precipitation rate and distribution uniformity
- pressure and friction loss charts
- work orders and documents

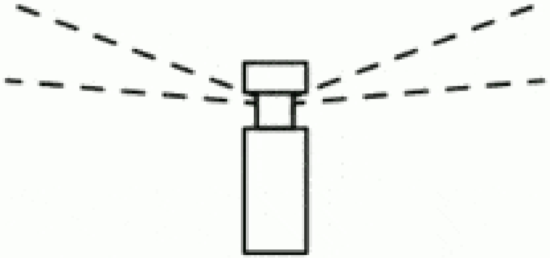
Sprinkler Types



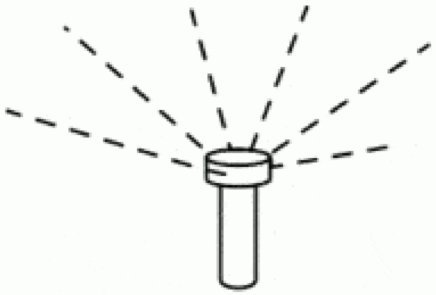
Bubbler



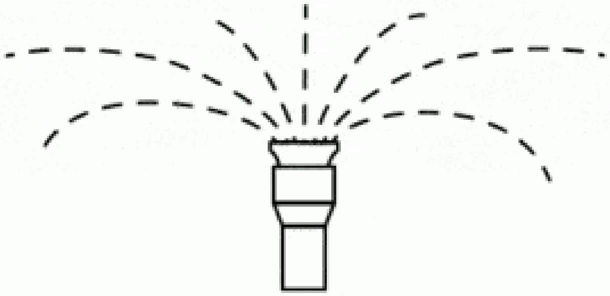
Misting / micro



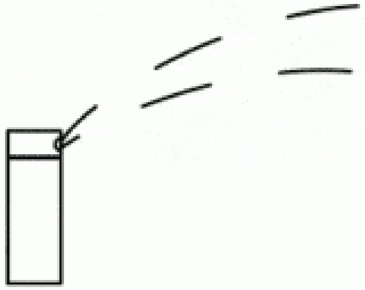
Pop-up



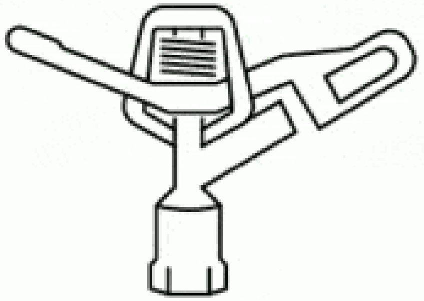
Rotary nozzle



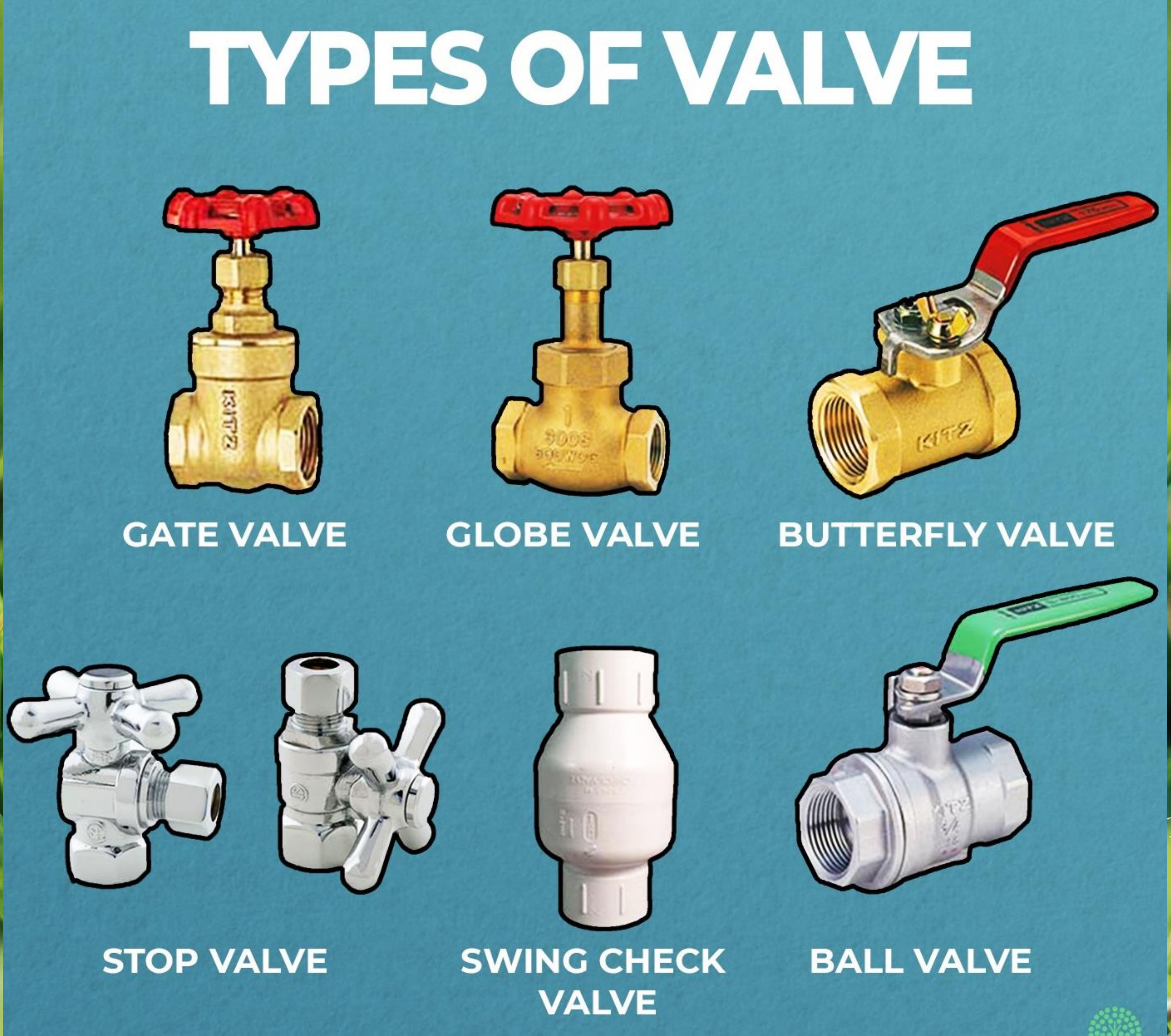
Fixed



Gear-driven rotor

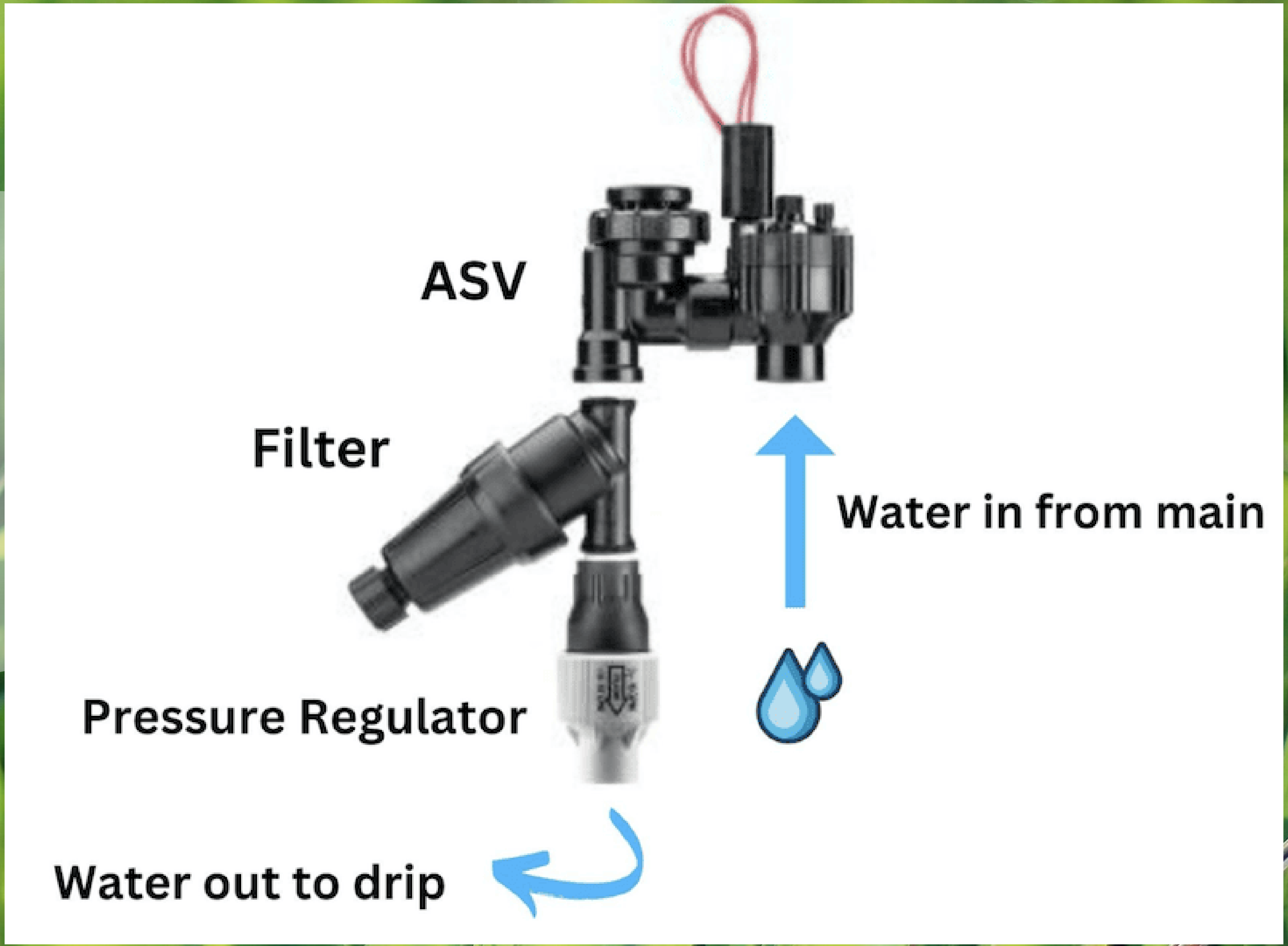


Impact rotor


TYPES OF VALVE
GATE VALVE
GLOBE VALVE
BUTTERFLY VALVE
STOP VALVE
SWING CHECK VALVE
BALL VALVE

Drip Assembly

(Electric or Remote Valve)



hydrozoning

Definition

is the practice of clustering together plants with similar water requirements in an effort to conserve water.[.

only turfgrass on a sprinkler system

similar shrubs, trees, and plants on a sprinkler system

plant material with similar root zone depths on a sprinkler system

Polyvinyl Chloride (PVC)

https://youtu.be/lmPrYi-kFeM

Solvent Weld Joints

1) Apply primer to: socket, pipe, socket again
2) Apply cement to pipe, fitting, pipe again
3) Assemble the pipe with a quarter turn while the pipe is still wet
4) Hold assembly for <u>at least 30 seconds</u>, allow appropriate time to set and cure, wipe excess glue

Threaded Joints

Teflon Tape, wrap Clockwise
2-3 wraps
Until hand tight

ALWAYS INSPECT the Pipe & Fittings & Check Expiration Dates FIRST!!!!

Potable

Non-Potable

Sewer

The C factor, also known as the *Hazen-Williams roughness coefficient*, is a value that measures the relative **smoothness/roughness** of a pipe's **interior**.

The C factor is used in the Hazen-Williams equation to account for the effect of pipe material on flow resistance when designing water pipe systems

A higher C factor indicates a smoother pipe, which can lead to greater carrying capacity and lower friction or energy losses.

Keep Velocity UNDER 5 feet/second

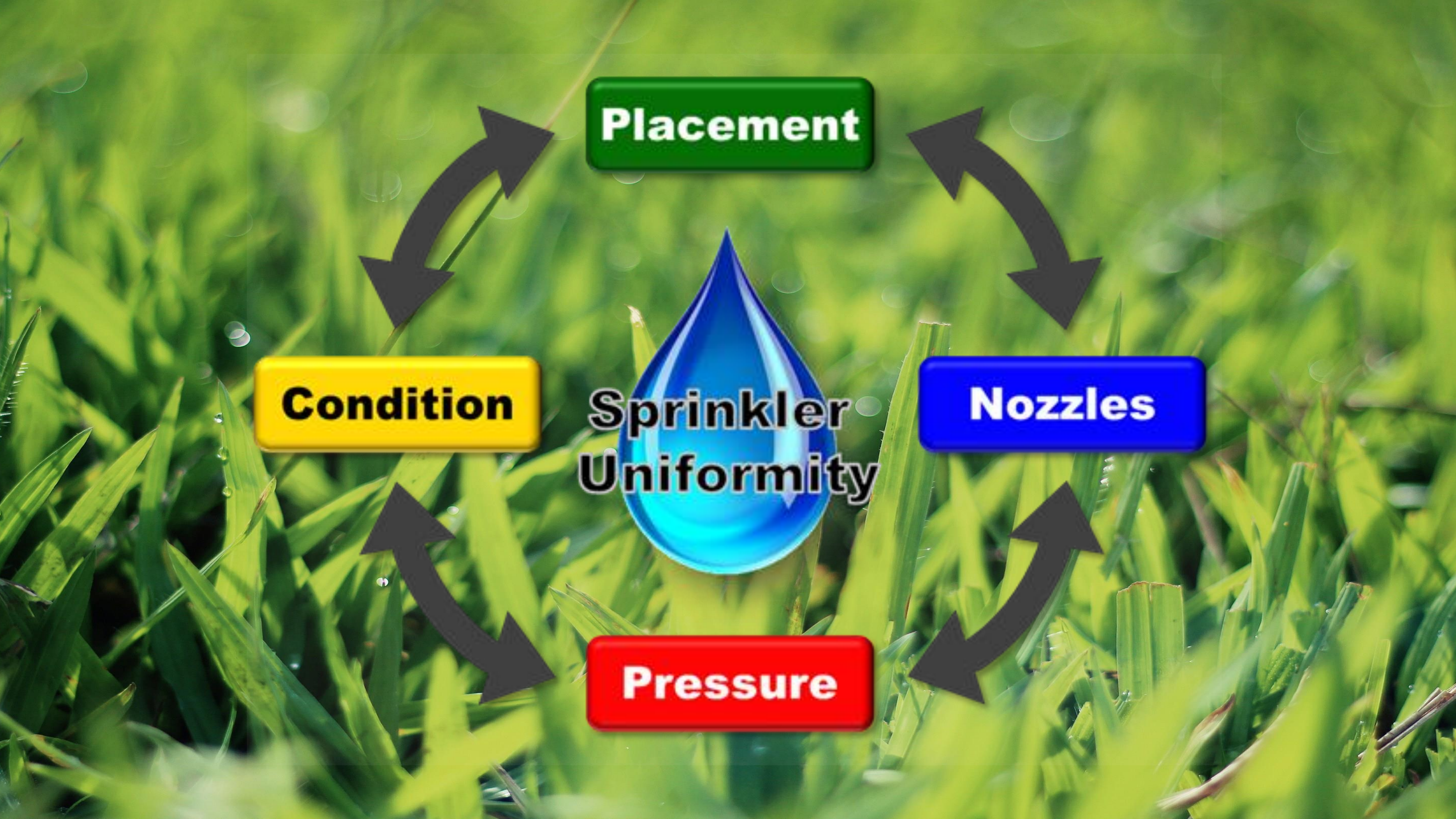
Irrigation Association Friction Loss Chart 2008

Class 200 PVC IPS Plastic Pipe

ANSI/ASAE S376.2 ASTM D2241 SDR 21 C=150

psi loss per 100 feet of pipe

Nominal size	Shown for convenience Class 315 1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"		3"		4"		6"	
Avg. ID	0.696		0.910		1.169		1.482		1.700		2.129		2.581		3.146		4.046		5.955	
Pipe OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. wall	0.072		0.070		0.073		0.089		0.100		0.123		0.147		0.177		0.227		0.335	
Min. wall	0.062		0.060		0.063		0.079		0.090		0.113		0.137		0.167		0.214		0.316	
Flow {gpm}	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss	Velocity {ft/s}	psi loss
1	0.84	0.25	0.49	0.07	0.30	0.02	0.19	0.01	0.14	0.00										
2	1.68	0.90	0.99	0.24	0.60	0.07	0.37	0.02	0.28	0.01	0.18	0.00								
3	2.53	1.90	1.48	0.52	0.90	0.15	0.56	0.05	0.42	0.02	0.27	0.01								
4	3.37	3.24	1.97	0.88	1.19	0.26	0.74	0.08	0.56	0.04	0.36	0.01	0.24	0.01						
5	4.21	4.89	2.46	1.33	1.49	0.39	0.93	0.12	0.71	0.06	0.45	0.02	0.31	0.01						
6	5.05	6.86	2.96	1.86	1.79	0.55	1.11	0.17	0.85	0.09	0.54	0.03	0.37	0.01	0.25	0.00				
7	5.90	9.12	3.45	2.47	2.09	0.73	1.30	0.23	0.99	0.12	0.63	0.04	0.43	0.02	0.29	0.01				
8	6.74	11.68	3.94	3.17	2.39	0.94	1.49	0.30	1.13	0.15	0.72	0.05	0.49	0.02	0.33	0.01				
9	7.58	14.53	4.43	3.94	2.69	1.17	1.67	0.37	1.27	0.19	0.81	0.06	0.55	0.02	0.37	0.01				
10	8.42	17.66	4.93	4.79	2.99	1.42	1.86	0.45	1.41	0.23	0.90	0.08	0.61	0.03	0.41	0.01				
12	10.11	24.75	5.91	6.71	3.58	1.98	2.23	0.63	1.69	0.32	1.08	0.11	0.73	0.04	0.49	0.02				
14	11.79	[illegible]	6.90	8.93	4.18	2.64	2.60	0.83	1.98	0.43	1.26	0.14	0.86	0.06	0.58	0.02				
16	[illegible]	42.16	7.88	11.44	4.78	3.38	2.97	1.07	2.26	0.55	1.44	0.18	0.98	0.07	0.66	0.03	0.40	0.01		
18	15.16	52.44	8.87	[illegible]	5.37	4.21	3.34	1.33	2.54	0.68	1.62	0.23	1.10	0.09	0.74	0.03	0.45	0.01		
20			[illegible]	17.29	5.97	5.11	3.72	1.61	2.82	0.83	1.80	0.28	1.22	0.11	0.82	0.04	0.50	0.01		
22			10.84	20.63	6.57	6.10	4.09	1.92	3.11	0.99	1.98	0.33	1.35	0.13	0.91	0.05	0.55	0.01		
[illegible]			11.82	24.24	7.17	7.17	4.46	2.26	3.39	1.16	2.16	0.39	1.47	0.15	0.99	0.06	0.60	0.02		
26			12.81	28.11	7.76	8.31	4.83	2.62	3.67	1.34	2.34	0.45	1.59	0.18	1.07	0.07	0.65	0.02		
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	5.20	3.01	3.95	1.54	2.52	0.52	1.71	0.20	1.15	0.08	0.70	0.02		
30			14.78	36.64	8.96	10.83	5.57	3.41	4.24	1.75	2.70	0.59	1.84	0.23	1.24	0.09	0.75	0.03		
32					9.55	12.21	5.94	3.85	4.52	1.97	2.88	0.66	1.96	0.26	1.32	0.10	0.80	0.03	0.37	0.00
[illegible]					[illegible]	[illegible]	6.32	4.31	4.80	2.21	3.06	0.74	2.08	0.29	1.40	0.11	0.85	0.03	0.39	0.00
36					10.75	15.18	6.69	[illegible]	5.08	2.45	3.24	0.82	2.20	0.32	1.48	0.12	0.90	0.04	0.41	0.01
38					11.35	16.78	7.06	5.29	5.36	2.71	3.42	0.91	2.33	0.36	1.57	0.14	0.95	0.04	0.44	0.01
40					11.94	18.45	7.43	5.82	5.65	2.98	3.60	1.00	2.45	0.39	1.65	0.15	1.00	0.04	0.46	0.01
42					12.54	20.20	7.80	6.37	5.93	3.27	3.78	1.09	2.57	0.43	1.73	0.16	1.05	0.05	0.48	0.01
44					[illegible]	22.02	8.17	6.94	6.21	3.56	3.96	1.19	2.69	0.47	1.81	0.18	1.10	0.05	0.51	0.01
46					13.73	[illegible]	8.55	7.54	6.49	3.86	4.14	1.29	2.82	0.51	1.90	0.19	1.15	0.06	0.53	0.01
48					14.33	25.87	8.92	8.15	6.78	4.18	4.32	1.40	2.94	0.55	1.98	0.21	1.20	0.06	0.55	0.01
50					14.93	27.90	9.29	8.79	7.06	4.51	4.50	1.51	3.06	0.59	2.06	0.23	1.25	0.07	0.58	0.01
55							10.22	10.49	7.76	5.38	4.95	1.80	3.37	0.71	2.27	0.27	1.37	0.08	0.63	0.01
60							11.15	12.33	8.47	6.32	5.40	2.11	3.67	0.83	2.47	0.32	1.50	0.09	0.69	0.01
65							12.07	14.30	9.18	7.33	5.85	2.45	3.98	0.96	2.68	0.37	1.62	0.11	0.75	0.02
70							13.00	16.40	9.88	8.41	6.30	2.81	4.29	1.10	2.89	0.42	1.74	0.12	0.81	0.02
75							13.93	18.63	10.59	9.56	6.75	3.20	4.59	1.25	3.09	0.48	1.87	0.14	0.86	0.02
80							14.86	21.00	11.29	10.77	7.20	3.60	4.90	1.41	3.30	0.54	1.99	0.16	0.92	0.02
85									12.00	12.05	7.65	4.03	5.21	1.58	3.50	0.60	2.12	0.18	0.98	0.03
90									12.71	13.40	8.10	4.48	5.51	1.76	3.71	0.67	2.24	0.20	1.04	0.03
95									13.41	14.81	8.55	4.95	5.82	1.94	3.92	0.74	2.37	0.22	1.09	0.03
100									14.12	16.28	9.00	5.45	6.12	2.13	4.12	0.81	2.49	0.24	1.15	0.04
110											9.90	6.50	6.74	2.55	4.53	0.97	2.74	0.29	1.27	0.04
120											10.80	7.63	7.35	2.99	4.95	1.14	2.99	0.34	1.38	0.05
130											11.70	8.85	7.96	3.47	5.36	1.32	3.24	0.39	1.50	0.06
140											12.60	10.16	8.57	3.98	5.77	1.52	3.49	0.45	1.61	0.07
150											13.50	11.54	9.19	4.52	6.18	1.73	3.74	0.51	1.73	0.08

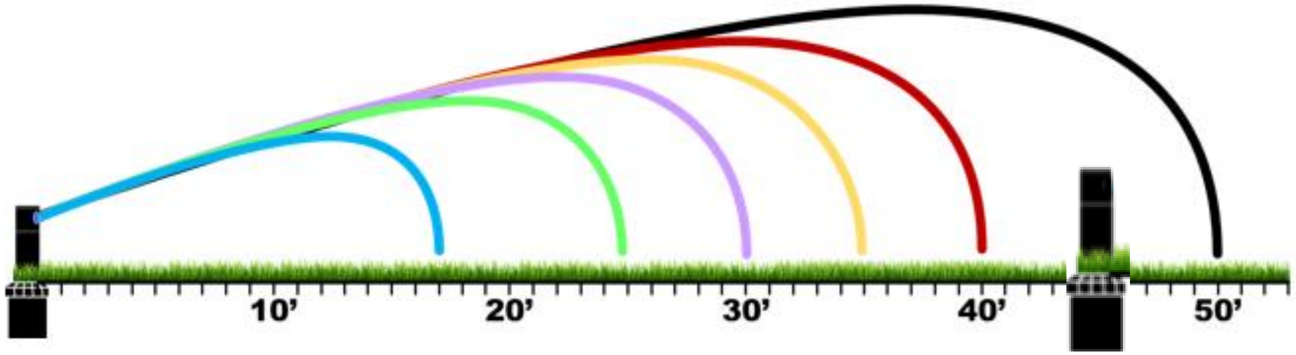

Placement
Condition
Sprinkler
Uniformity
Nozzles
Pressure

Sprinkler Placement

Effects the overlapping coverage and evenness of the water being applied
Head-to-Head (Next to and across from)
Rectangle or Equilateral Triangle Spacing

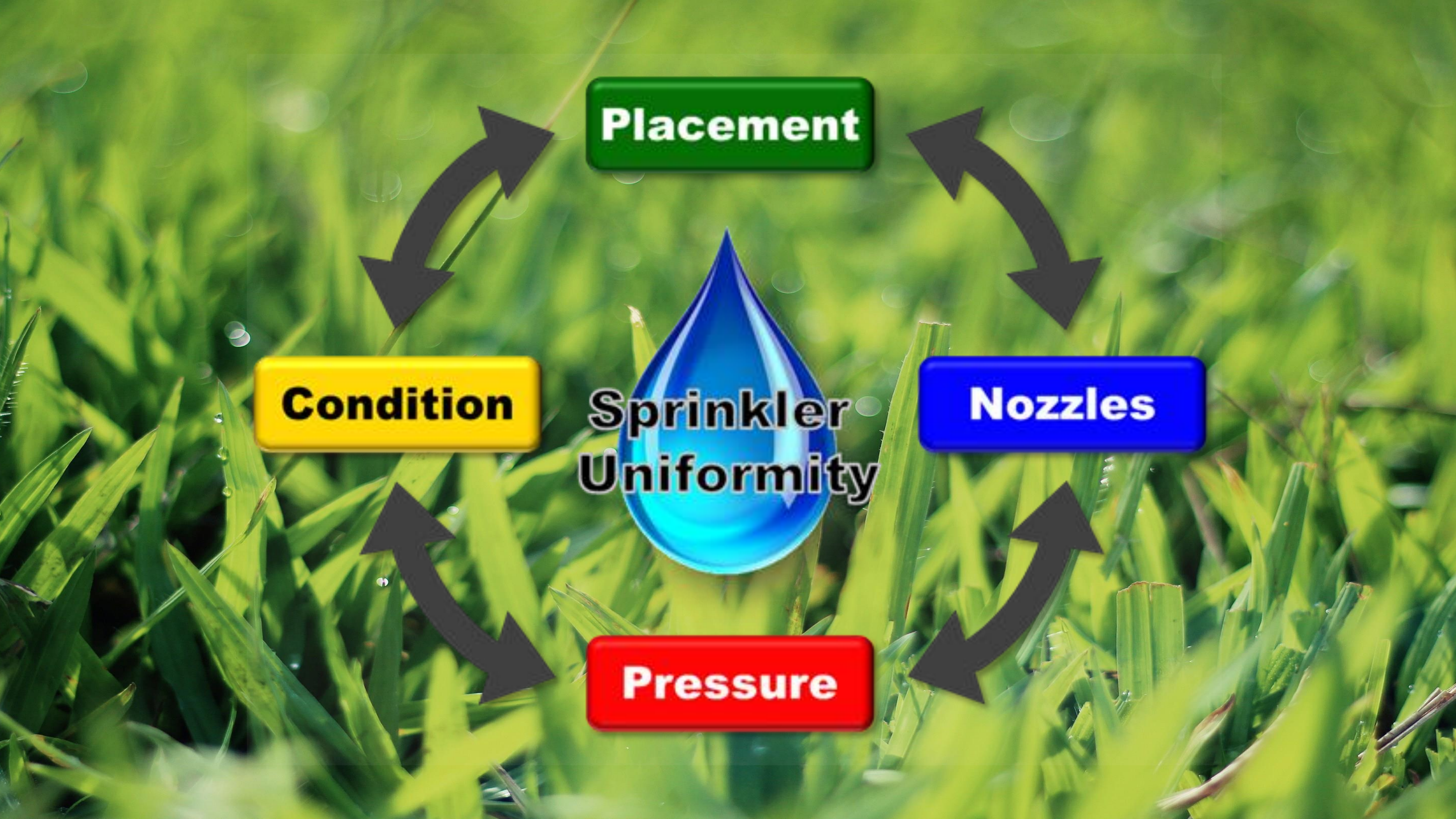
Always place sprinklers in corners!
NOT to exceed 90% of the Sprinkler Radius

If the Sprinkler Radius is 50’, then the next sprinkler should be placed at **no more than 90%** of the sprinkler radius 45’



50’ x 0.90 = 45’

Next Sprinkler at 45’ (max)


Placement
Condition
Sprinkler
Uniformity
Nozzles
Pressure

Sprinkler Nozzles

Effects the overlapping coverage and evenness of the water being applied

Option A: Flow Matched

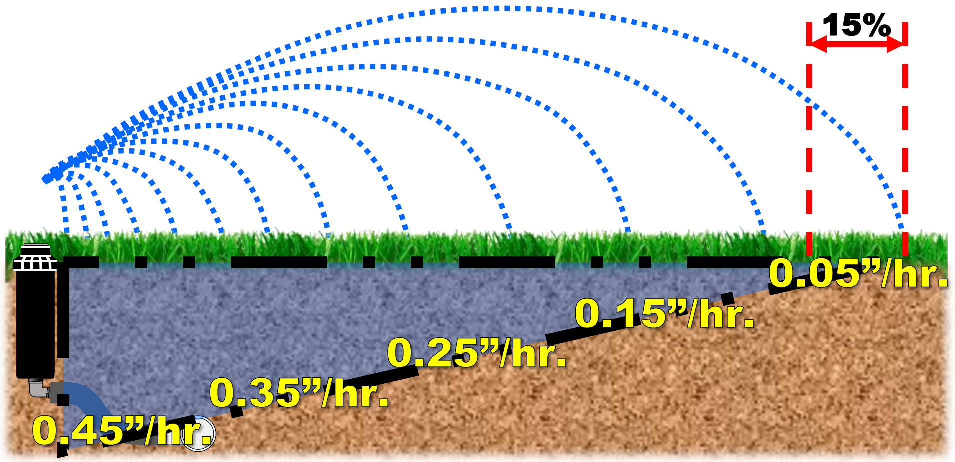
Matched the Same GPM
(Gallons Per Minute)

Option B: Time Matched

Full Circle 20 minutes
Half Circle 10 Minutes
Quarter Circle 5 Minutes

How Nozzles Are Designed To Work

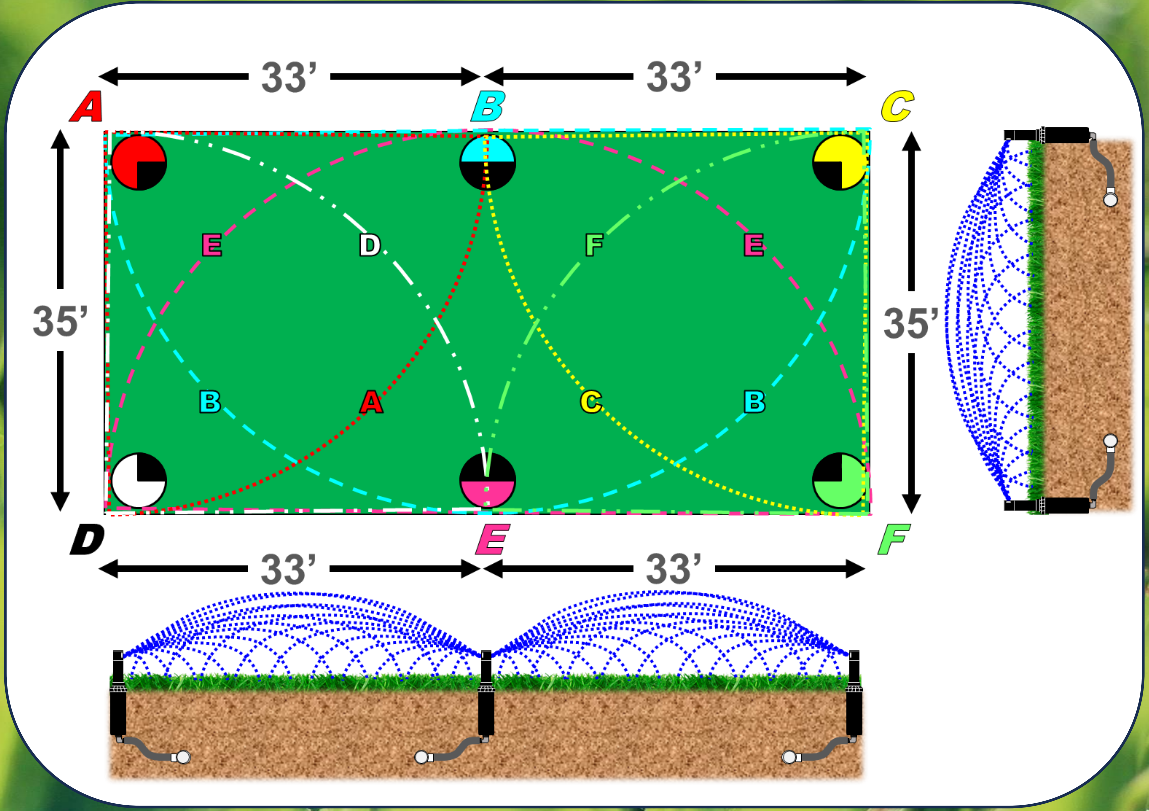
- Pressure and flow cause an explosion of water out of the nozzle
    - Small explosion, too many big droplets
    - Large explosion, too many small droplets
- The explosion creates the distribution of droplets
    - More water close and less the farther away



The end of any sprinkler has a very low precipitation rate

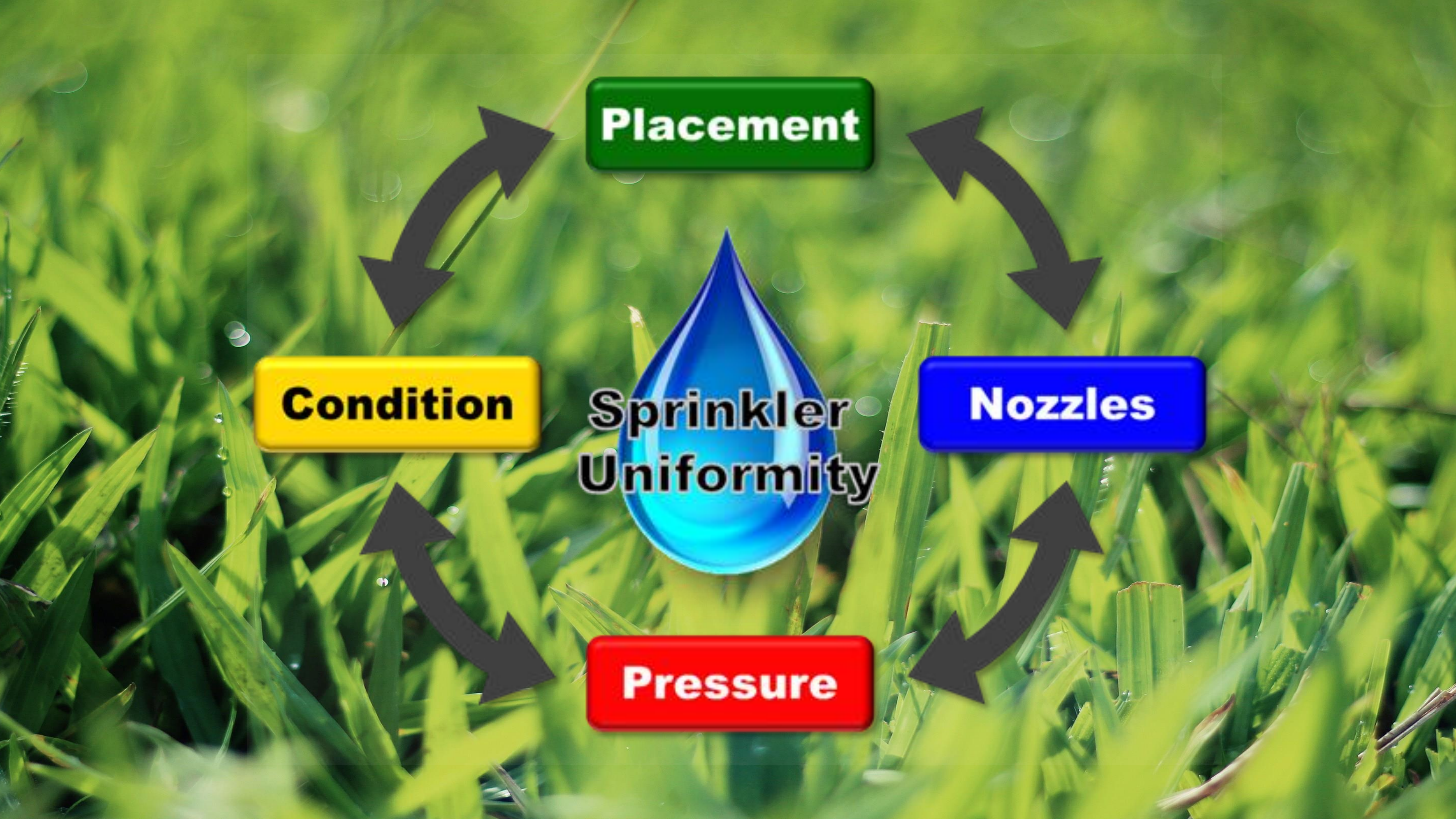
How Nozzles Are Designed To Work

- ALL nozzles are designed to operate in overlapping coverage
  - They need the “wedge” patterns to overlap to get a relatively even amount of water in the ground



I-25 STANDARD NOZZLE PERFORMANCE DATA

Nozzle	Pressure PSI	Radius ft.	Flow GPM	Precip in/hr ■	Precip in/hr ▲
04 Yellow	40	40	3.8	0.46	0.53
	50	41	4.3	0.49	0.57
	60	42	4.7	0.51	0.59
	70	43	5.1	0.53	0.61
07 Orange*	40	45	6.6	0.63	0.72
	50	47	7.0	0.61	0.70
	60	48	7.5	0.63	0.72
	70	49	7.9	0.63	0.73
08 Lt. Brown	40	47	7.7	0.67	0.77
	50	49	8.3	0.67	0.77
	60	50	9.2	0.71	0.82
	70	51	9.9	0.73	0.85
10 Lt. Green*	50	51	10.1	0.75	0.86
	60	52	11.1	0.79	0.91
	70	53	12.1	0.83	0.96
	80	54	12.9	0.85	0.98
13 Lt. Blue	50	53	11.2	0.77	0.89
	60	54	12.3	0.81	0.94
	70	55	13.3	0.85	0.98
	80	55	14.3	0.91	1.05
15 Gray*	50	56	13.4	0.82	0.95
	60	57	14.3	0.85	0.98
	70	57	15.2	0.90	1.04
	80	58	16.4	0.94	1.08
18 Red	50	58	14.5	0.83	0.96
	60	59	15.7	0.87	1.00
	70	62	16.9	0.85	0.98
	80	63	18.2	0.88	1.02
	60	62	17.8	0.89	1.03


Placement
Condition
Sprinkler
Uniformity
Nozzles
Pressure

Sprinkler Pressure

Most influential of the 4 elements

#1 cause of poor uniformity

- ✓ **Most neglected**
- ✓ **Most misunderstood**

+/- 20% of optimum sprinkler pressure

- Control pressure loss to prevent low pressure
  - Target loss in laterals = 10%
  - Understand worst-case source pressure
    - Syst Loss = 30 - 35 psi for meter & backflow
    - = 15 - 20 psi for pump
  - Use sizing and flow to control velocity
    - Provide cushion for unknowns
- Use regulation to prevent high pressure

Pressure

PSI

Pounds per **S**quare **I**nch.

Static Pressure

The force that a fluid pushes on things when it's not moving.

Dynamic Pressure:

The force that comes from the fluid's speed or how fast it's moving.

Misting

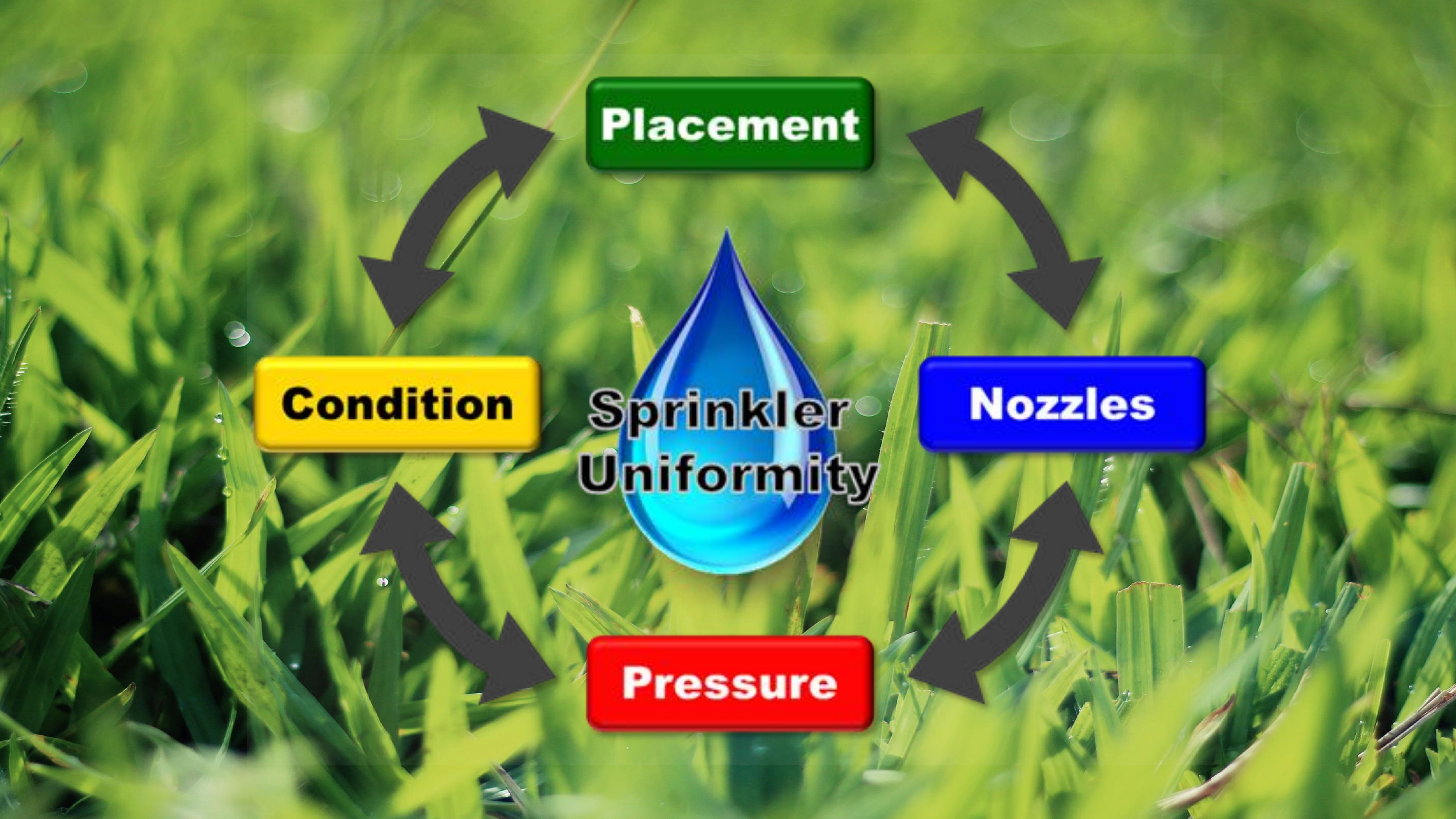
=

HIGH PRESSURE

Dribbling

=

LOW PRESSURE


Placement
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Sprinkler Condition

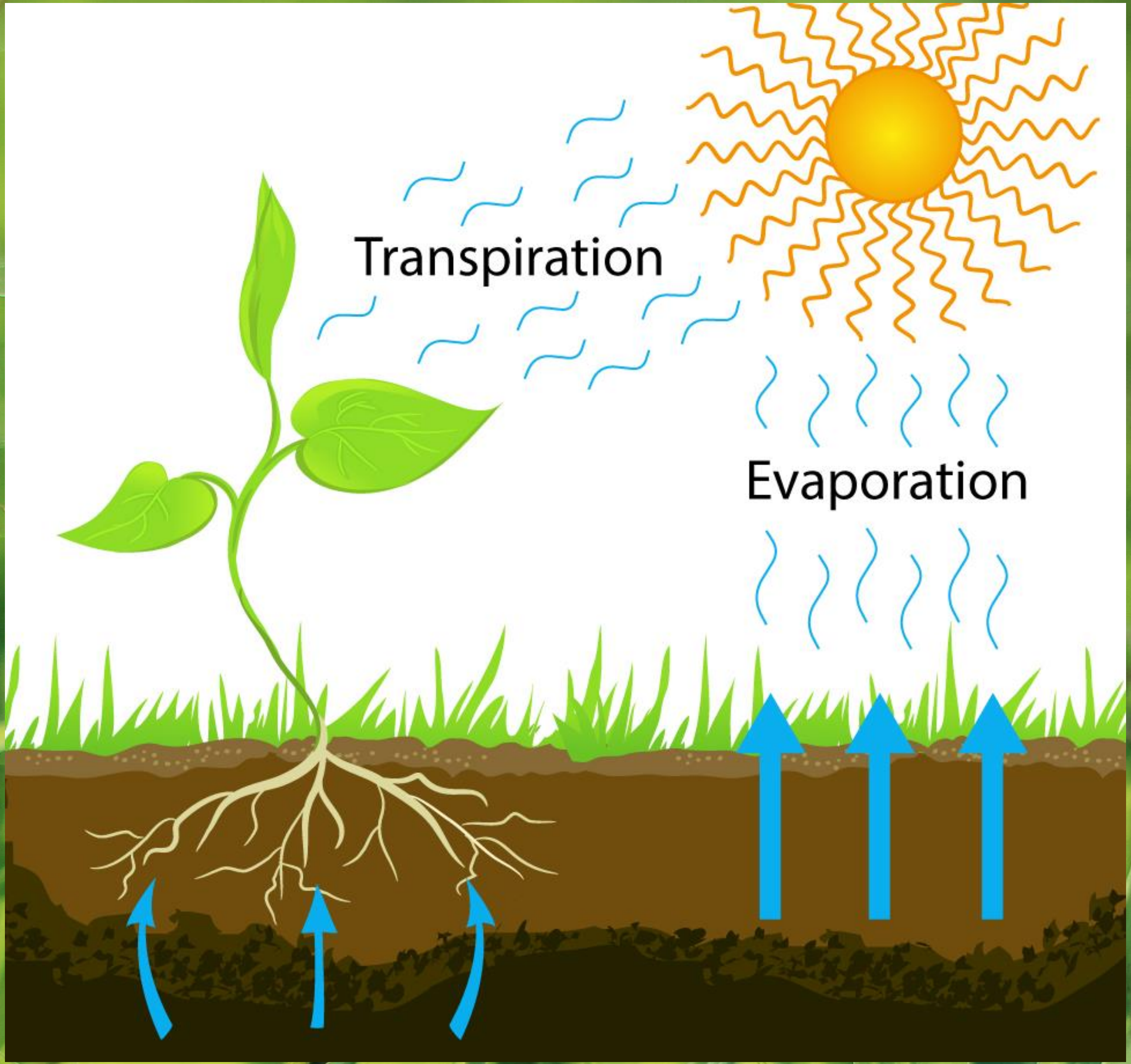
Affected by component maintenance

Sprinklers must be level!

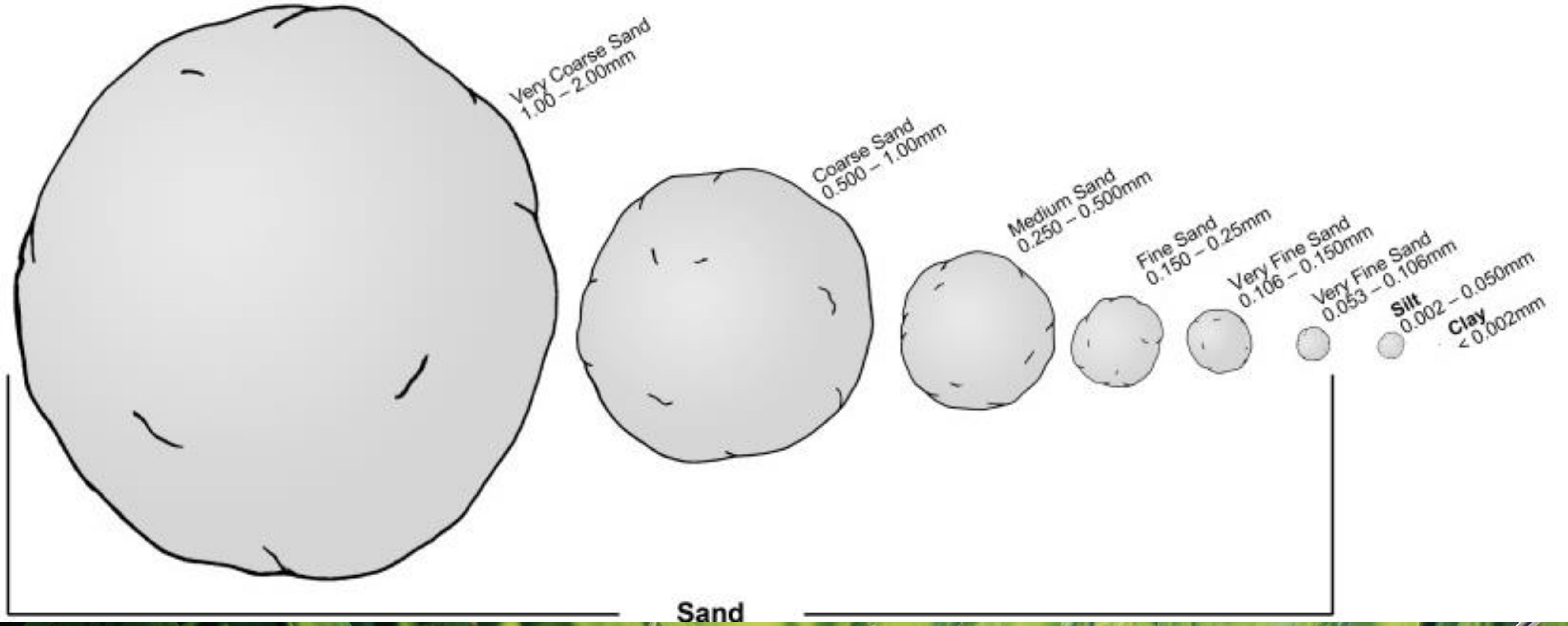
Evapotranspiration (ET):
the process through which water is transferred from the soil to the atmosphere by **evaporation** and **transpiration** from plants

Evaporation:
It occurs when sunlight warms the surface of the water. The heat from the sun makes the water molecules move faster and faster, until they move so fast they escape as a gas into the air.

Transpiration:
Water inside of plants is transferred from the plant to the atmosphere as water vapor through numerous individual leave openings. Plants transpire to move nutrients to the upper portion of the plants and to cool the leaves exposed to the sun.



1. Solar Radiation – biggest impact
2. Temperature
3. Humidity
4. Wind Velocity

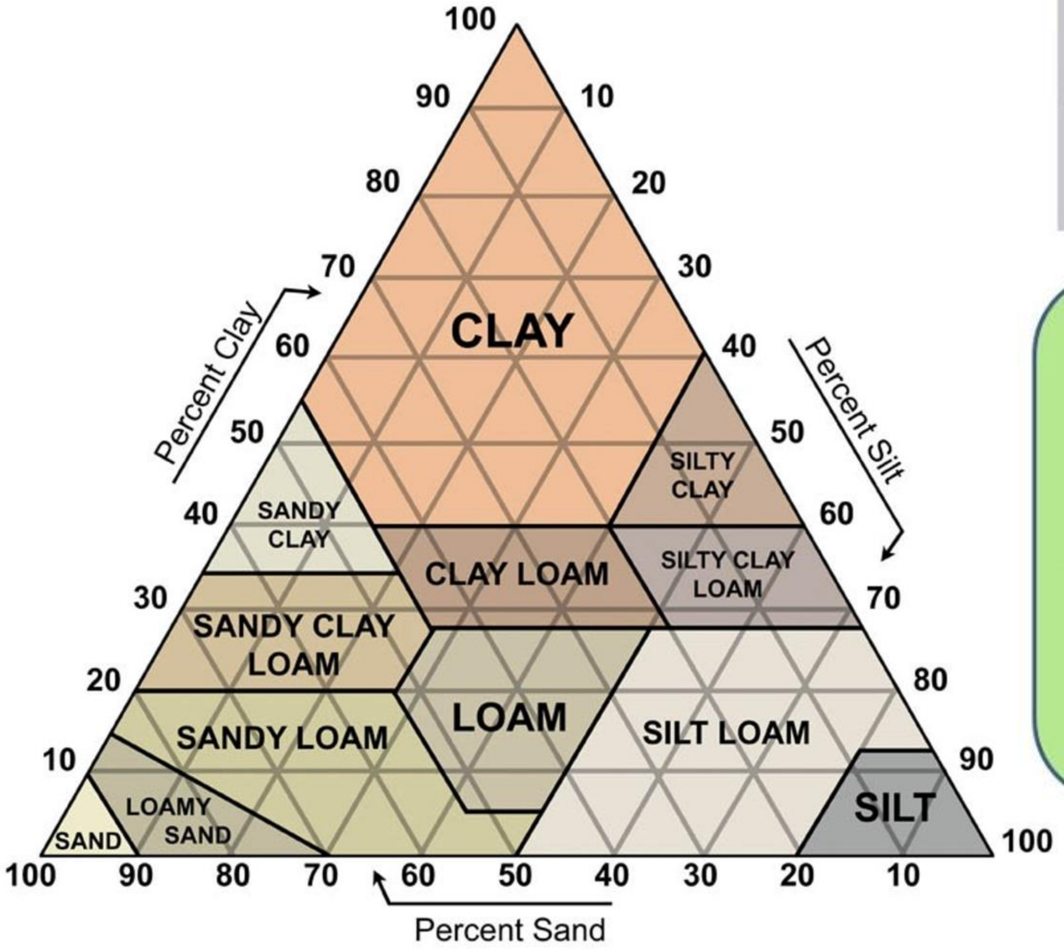

Very Coarse Sand
1.00 – 2.00mm
Coarse Sand
0.500 – 1.00mm
Medium Sand
0.250 – 0.500mm
Fine Sand
0.150 – 0.25mm
Very Fine Sand
0.106 – 0.150mm
Very Fine Sand
0.053 – 0.106mm
Silt
0.002 – 0.050mm
Clay
< 0.002mm
Sand

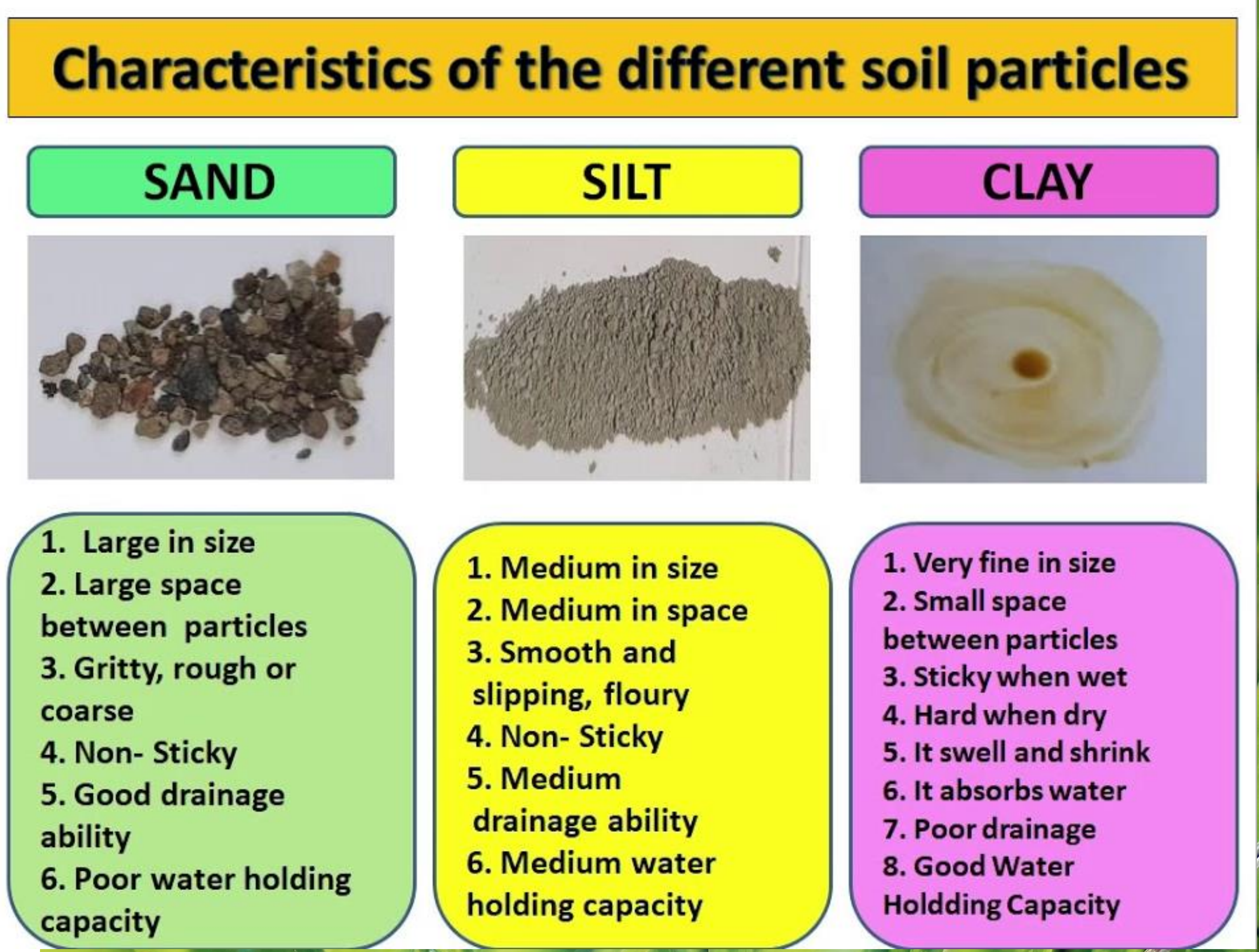
Soil Texture Triangle:

Clay

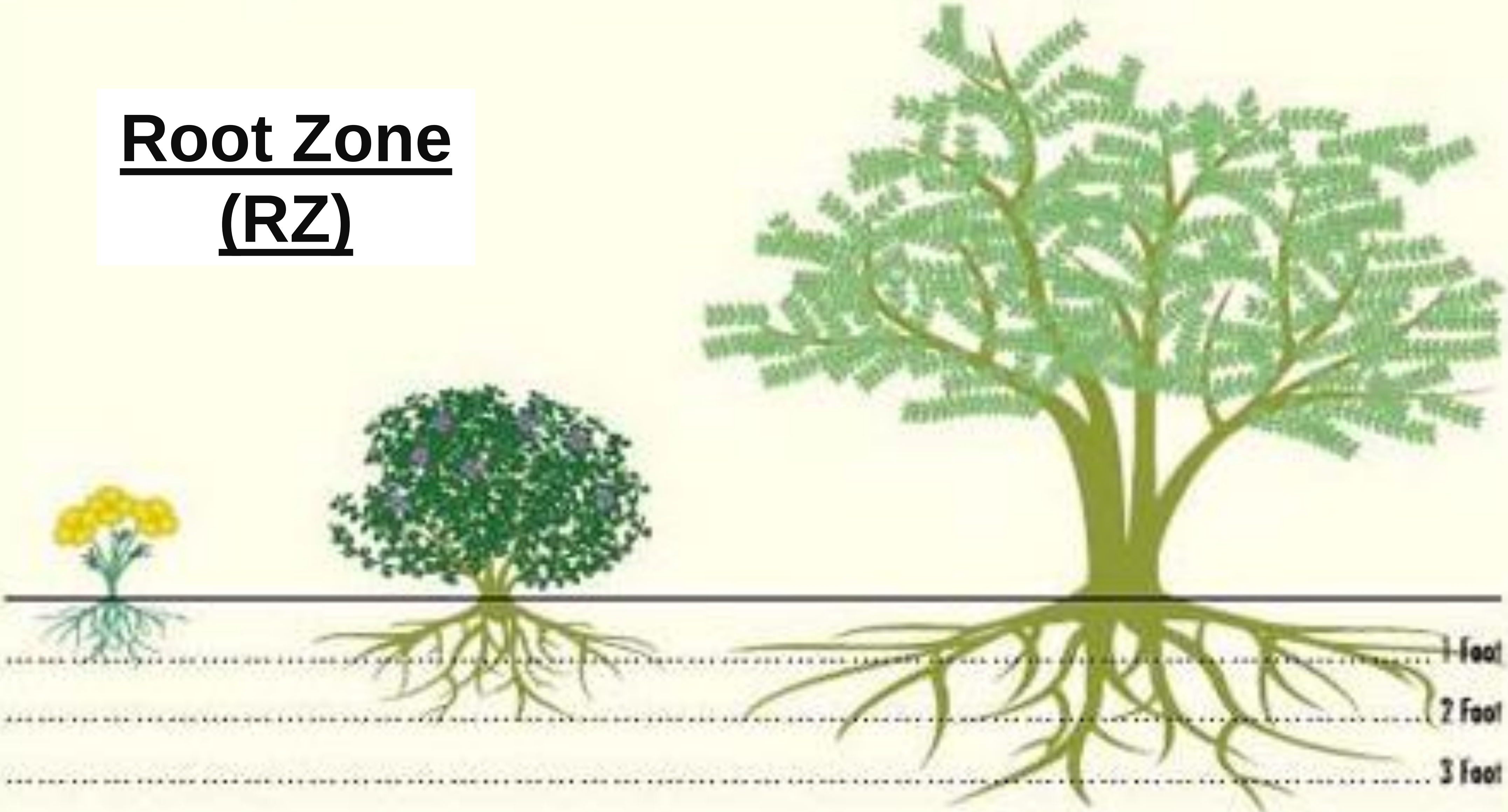
Silt

Sand





Root Zone (RZ)



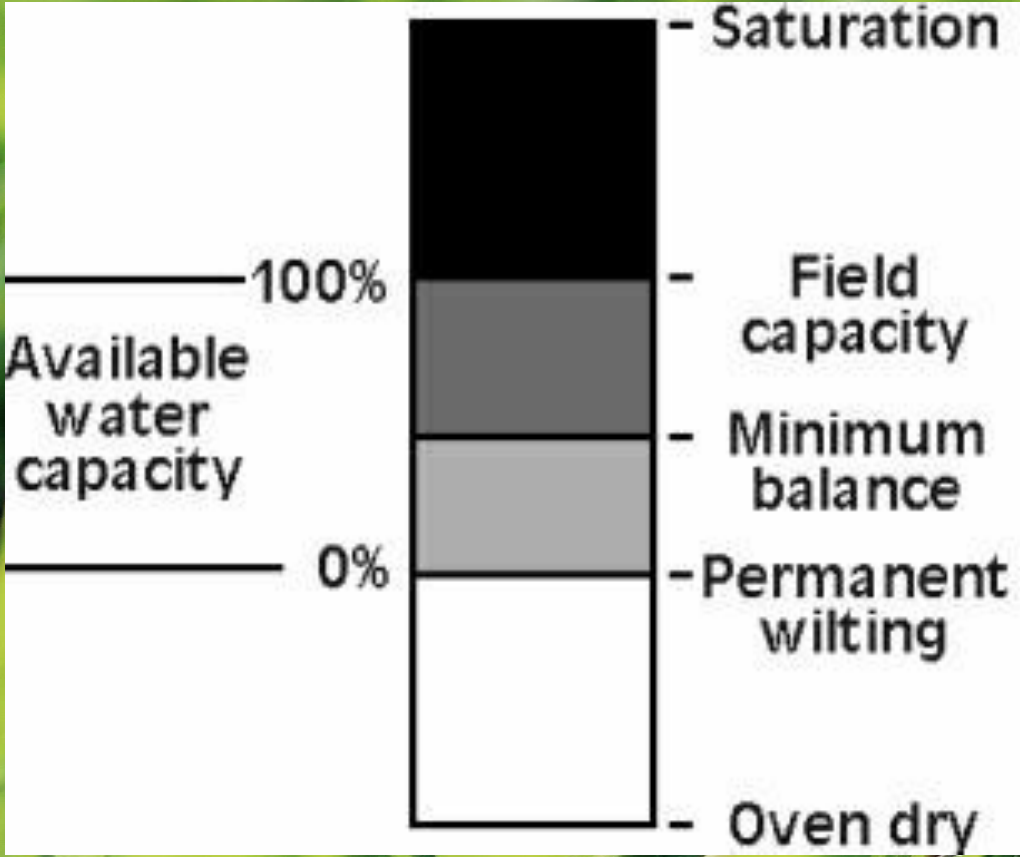
Soil Infiltration Rate (IR):
the rate in which water moves through the soil profile between, determined by soil texture, slope, and compaction.

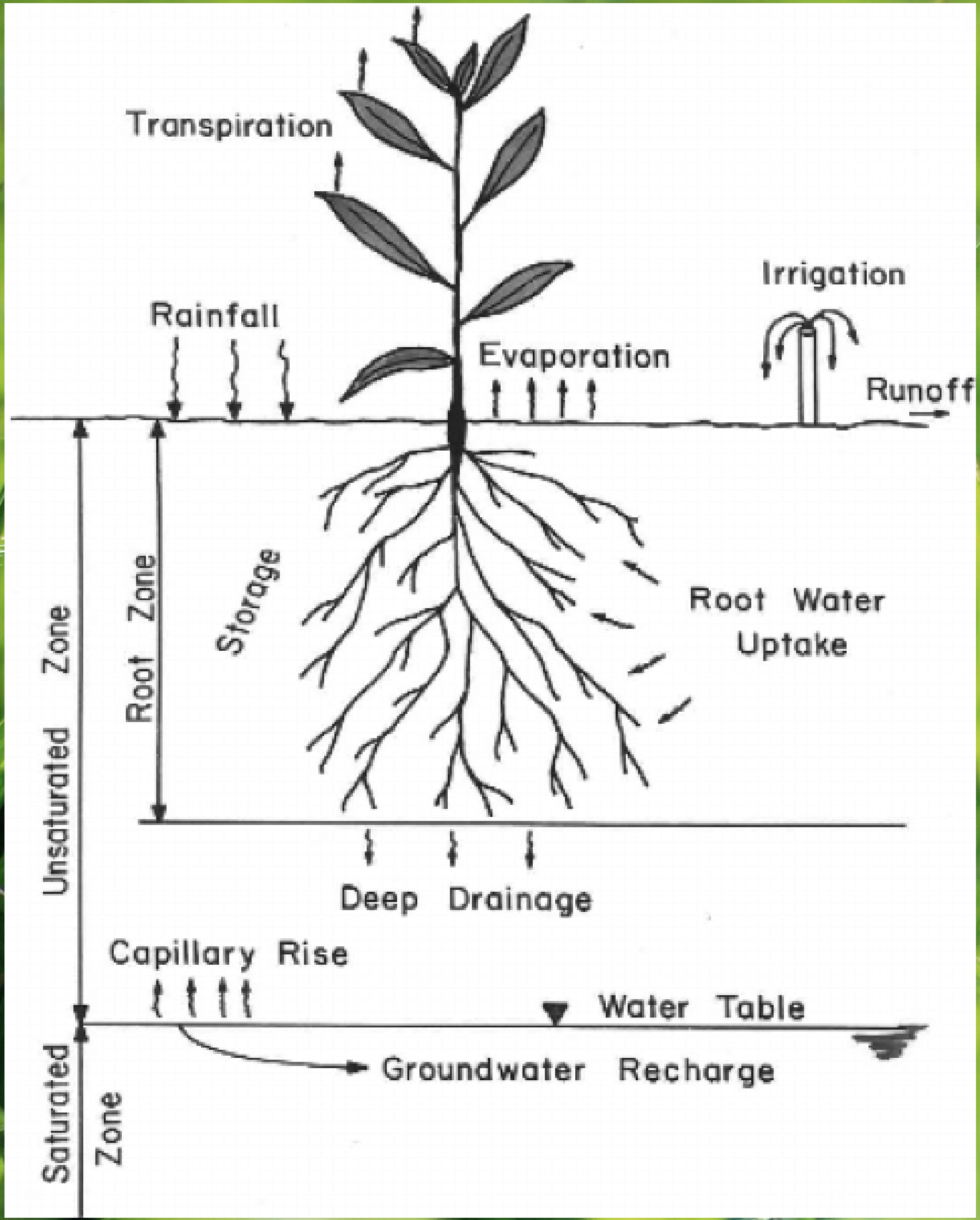
Field Capacity (FC):
the points at which the soil is fully saturated but not waterlogged.

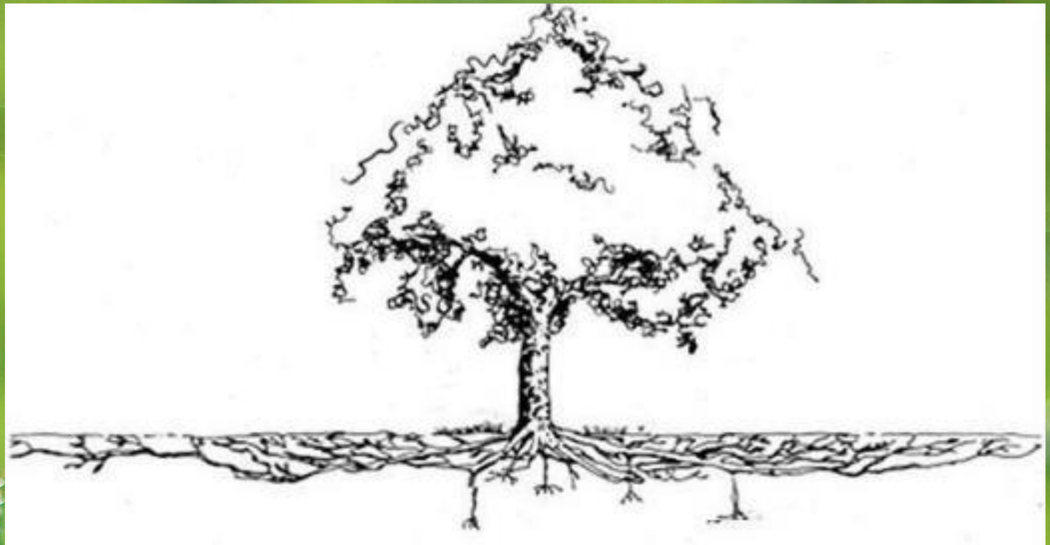
The Plant Available Water (PAW):
the difference between permanent wilting point and field capacity.

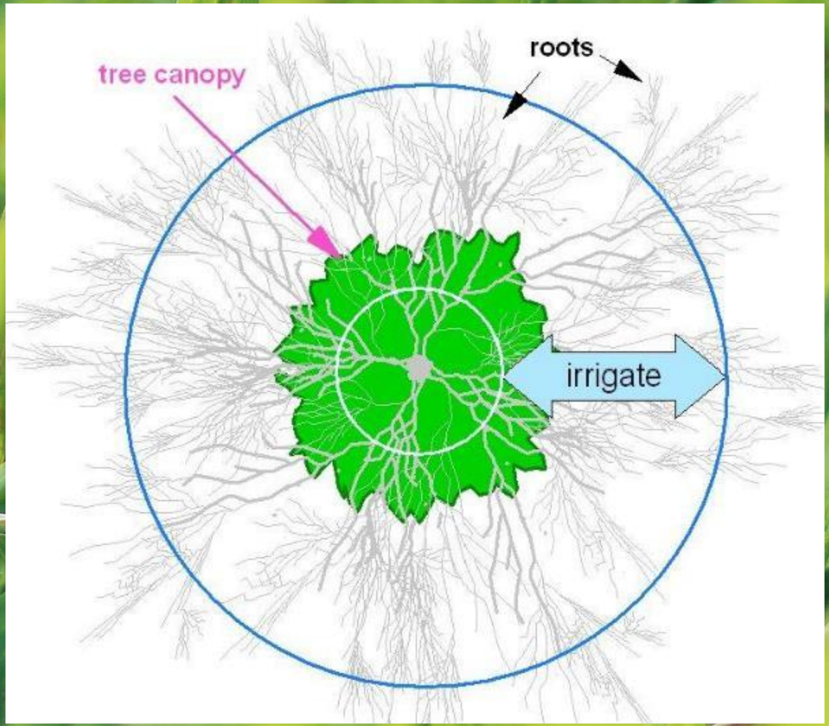
Management Allowed Depletion (MAD):
soil water content before which plants begin to experience water stress, *typically 50%,* **always determined at the water manger's discretion**

Permanent Wilting Point (PWP):
the point at which the soil moisture is too low for the plant to recover from wilting.

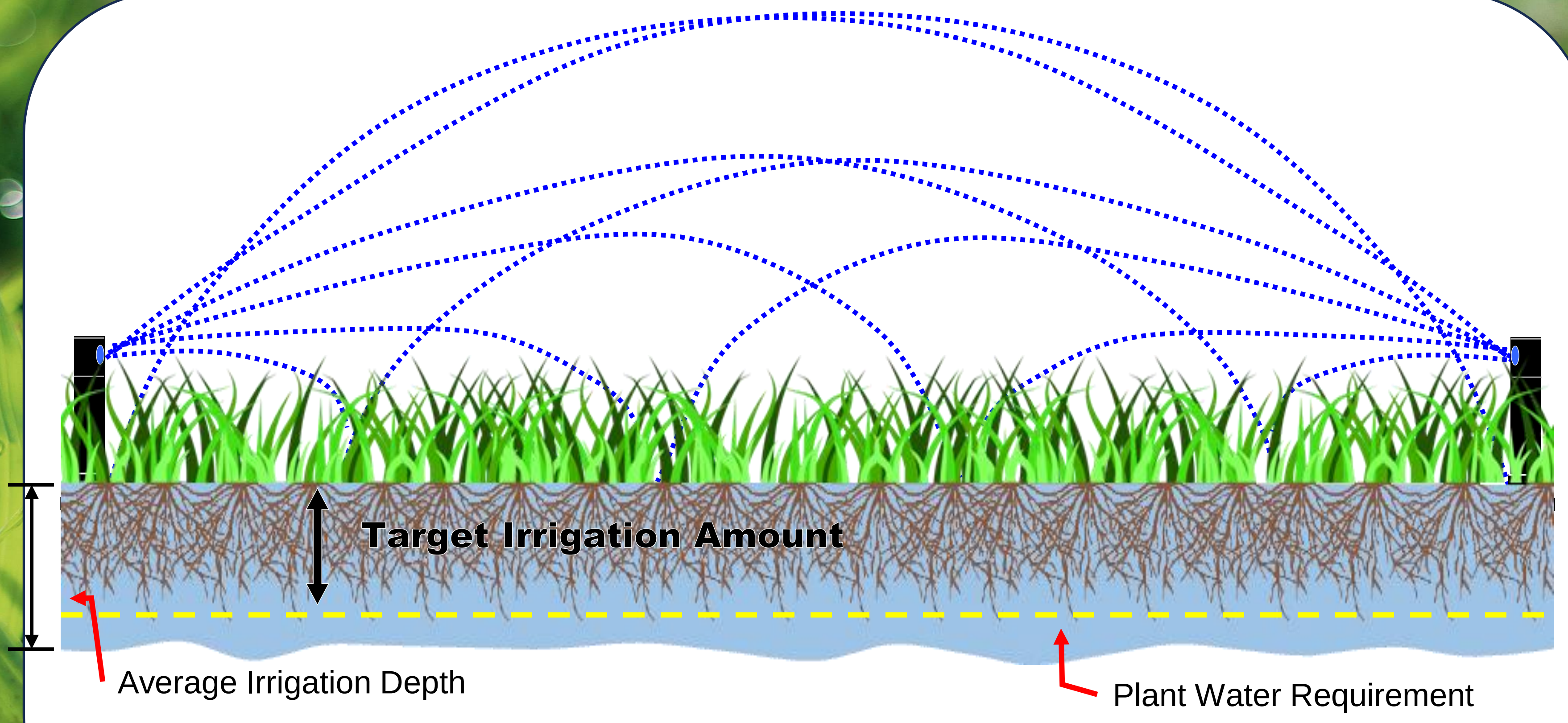



Transpiration
Irrigation
Rainfall
Evaporation
Runoff
Storage
Root Zone
Unsaturated Zone
Root Water Uptake
Deep Drainage
Capillary Rise
Water Table
Groundwater Recharge
Saturated Zone

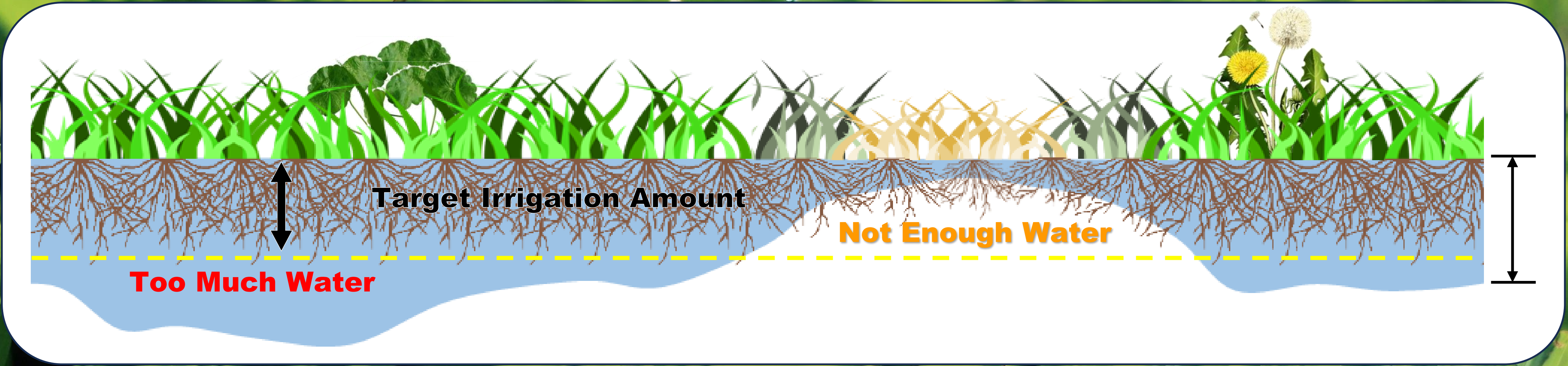



roots
tree canopy
irrigate

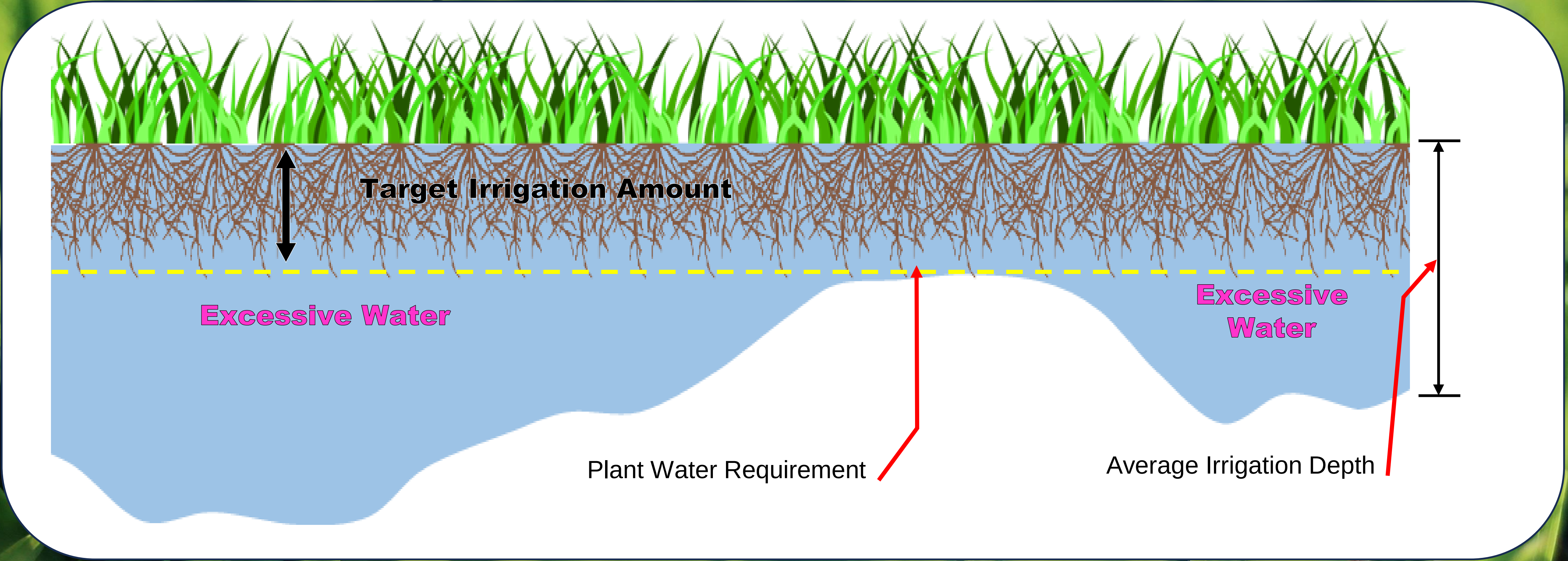
Good Uniformity



Poor Uniformity



Reaction to Poor Uniformity



Distribution Uniformity (DU):

A measurement that quantifies how *evenly* water is distributed over a given area by an irrigation system

- Poor Uniformity = Longer Runtimes
  - More water to address dry area
- Longer Runtimes = More Water
- More Water = Lower Efficiency

Impact of Distribution Uniformity

27,154 gallons to cover 1 acre - 1" deep Or **.6234** gallons per ft2

Water Required by Plants (per Week)	Distribution Uniformity (DU_{LQ})	Irrigation Required (per Week)	Gallons per Acre	Increase in Gallons Used (per Week)
1"	0.70	1.22"	33,128	-
1"	0.55	1.37"	37,201	**4,073**
1"	0.40	1.56"	42,360	**9,232**

0.10 acres (4,356 ft2) operating 40 weeks/year at a DU of 0.40 wastes 36,928 gal/yr more than if DU was 0.70

That is 2 swimming pools or 12 weeks of irrigation at 0.70

How to find the DU of a Turfgrass area

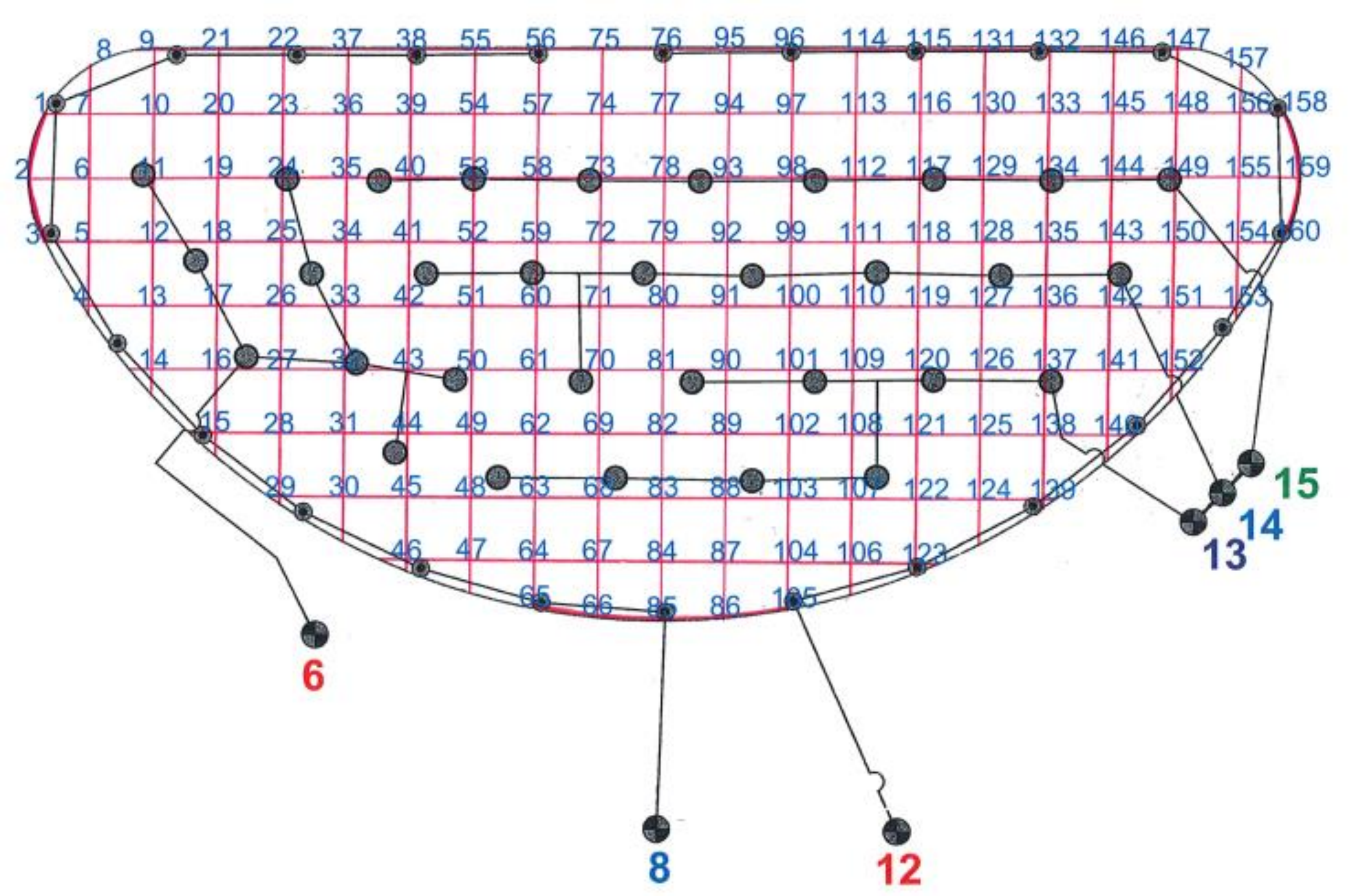
- Conduct a Catch Device Test
- How many Catchments total?
- What is the Average catchment Volume (in milliliters)?
- How many Catchments are in the Lower Quarter (Divide the total by 4)
- What is the Average LQ catchment Volume (in milliliters)?

$$DU = \frac{V_{lq}}{V_{avg}}$$

Catch Device Test

Must have at **LEAST 24** Catch Devices for an accurate Catch Device Test!

# of Catch Devices must be evenly **DIVISIBLE BY 4** for accurate DU Calculations!



How many Catch Devices are there Total?

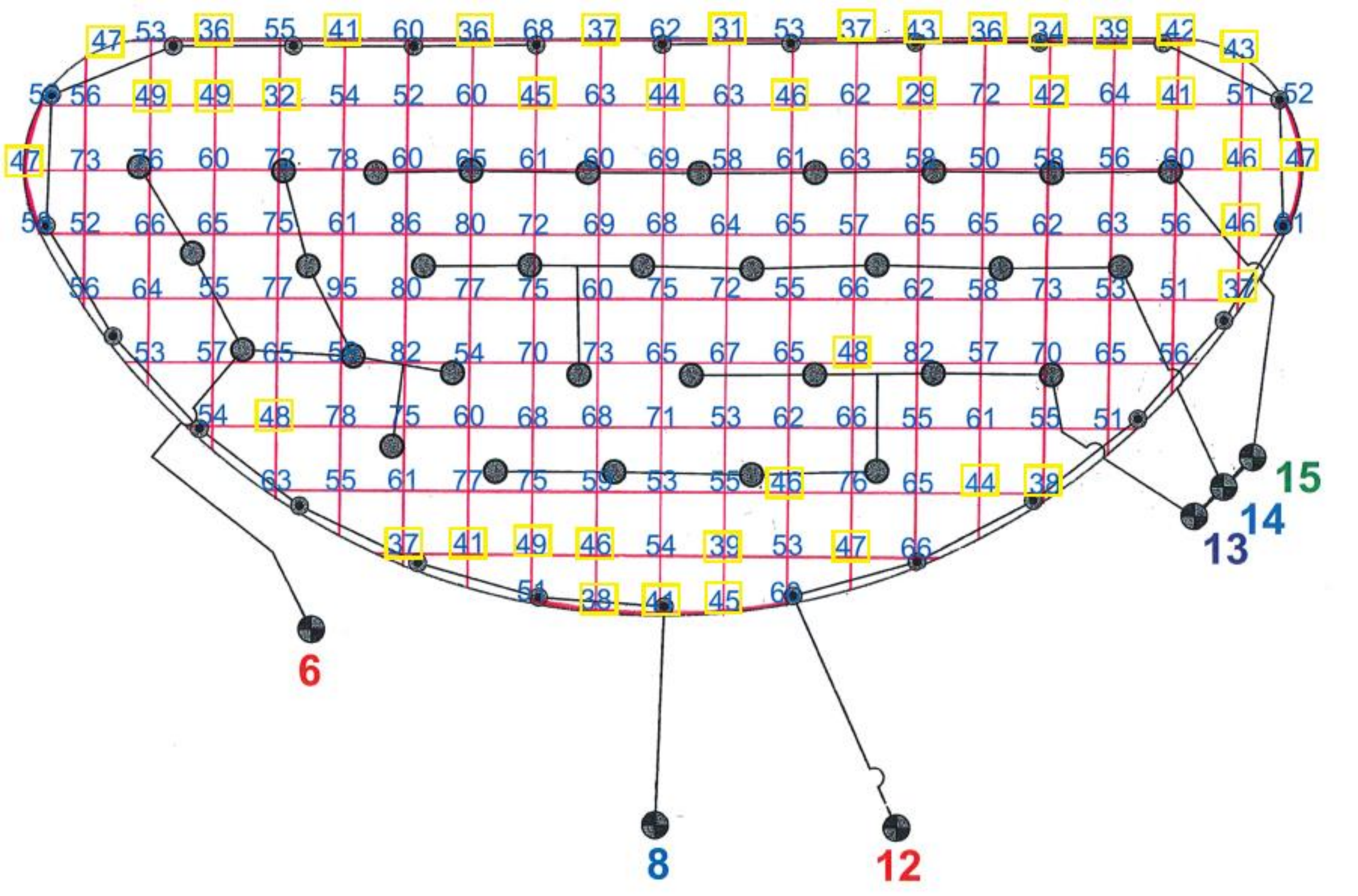
160

How many Catch Devices are in the Lower Quarter?

160 / 4 = 40

40

Catch Device Test - DU



What is the Average Catch Device Volume?

57.68 mL

What is the Average Lower Quarter Catch Device Volume?

41.18 mL

Calculate the DU for this turf area using **DU= V_{lq} / V_{avg}**

$$\frac{41.18}{57.68} = 0.71$$

DU=71

Scheduling Multiplier to Adjust Run Times

Uniformity	Scheduling Multiplier	Uniformity	Scheduling Multiplier	Uniformity	Scheduling Multiplier
1.00	1.00	0.78	1.15	0.58	1.34
0.98	1.01	0.76	1.17	0.56	1.36
0.96	1.02	0.74	1.18	0.54	1.38
0.94	1.04	0.72	1.20	0.52	1.40
0.92	1.05	0.70	1.22	0.50	1.43
0.90	1.06	0.68	1.24	0.48	1.45
0.88	1.08	0.66	1.26	0.46	1.48
0.86	1.09	0.64	1.28	0.44	1.51
0.84	1.11	0.62	1.30	0.42	1.53
0.82	1.12	0.60	1.32	0.40	1.56
0.80	1.14	Fix sprinkler problems if below 0.40			

Scheduling Multiplier adjusts your run times to account for your Distribution Uniformity.

Use the Scheduling Multiplier Table or use the following formula to find your Scheduling Multiplier:

$$SM = \frac{1}{0.4+(0.6 \times DUlq)}$$

Scheduling Multiplier to Adjust Run Times

Uniformity	Scheduling Multiplier	Uniformity	Scheduling Multiplier	Uniformity	Scheduling Multiplier
1.00	1.00	0.78	1.15	0.58	1.34
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0.84	1.11	0.62	1.30	0.42	1.53
0.82	1.12	0.60	1.32	0.40	1.56
0.80	1.14	Fix sprinkler problems if below 0.40			

Use your scheduling multiplier to adjust the runtime.

RTUpper = RT x SM

RT= Run Time
SM= Scheduling Multiplier

Example: our **DU = 73**
So, our **SM = 1.19**

RT = 10 minutes
SM = 1.19

RTUPPER = 11.9

10 x 1.19 = **11.9**

NEW RUN TIME
12 MINUTES

Use your Scheduling Multiplier to create better Watering Schedules

Nozzle Precipitation Rates

- **<u>Precipitation Rate (PR):</u>**

of an irrigation system is a measure of how quickly water is applied to a given area, typically expressed in inches per hour (in/hr).

  - Abbreviation - PR
  - Measured in inches per hour – in./hr. or "/hr.

- Importance of PR when designing
  - PR is controlled to prevent runoff and wasted water
  - Designs must have an even PR throughout the irrigated area to have good coverage
    - The PR of ALL sprinklers must match each other
  - PR is essential to determine runtimes

Gross vs. Net Precipitation Rates

<u>Gross PR</u> = Calculated using Flow & Total Area

$$\frac{96.3 \times \text{Flow (gallons per minute)}}{\text{Total Area (square feet)}}$$

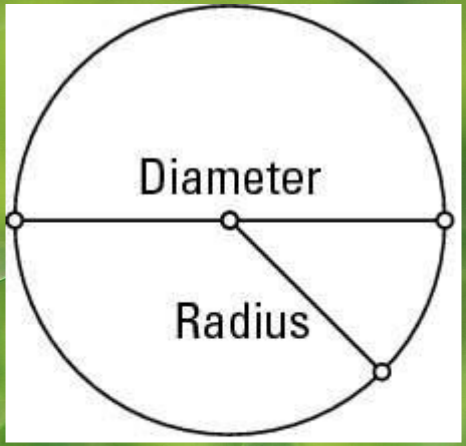
<u>Net PR</u> = Catch Device Test

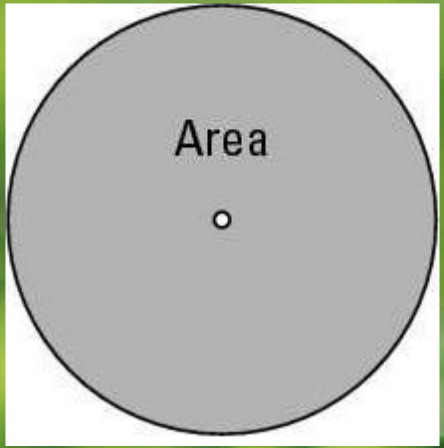
$$\frac{3.66 \times \text{Average Catch Volume}}{\text{Area of Catch Device} \times \text{Run Time}}$$

Calculate the Area

Area of a Circle

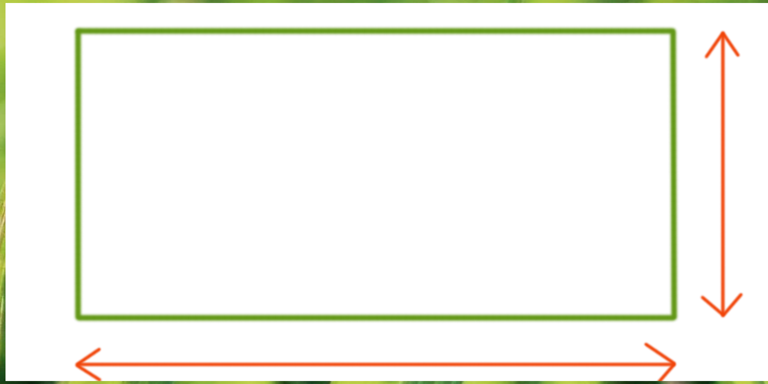
πr2 **OR** 0.785 x diameter2





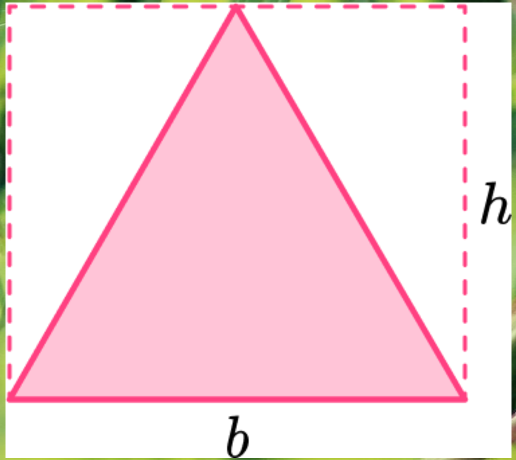
Area of a Rectangle

length x width



Area of a Triangle

½ b x h



Gross Precipitation Rate For Rectangular Spacing

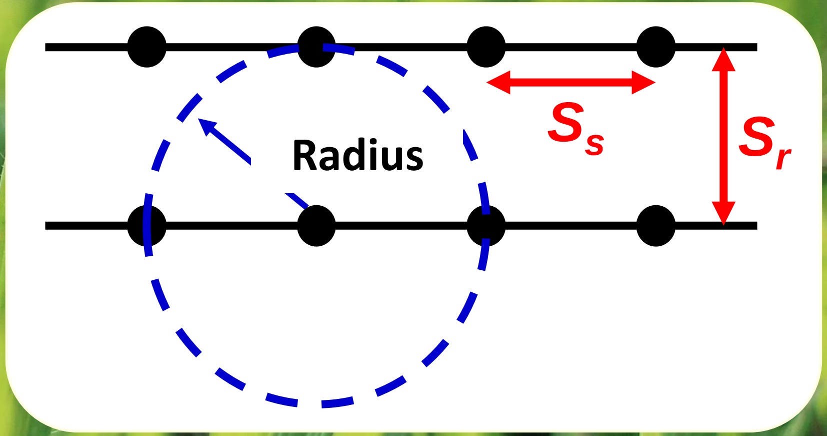
Formula:

$$PR = \frac{96.3 \times Q}{S_s \times S_r}$$

Where:

Q = total gallons per minute
96.3 = constant
S_s = spacing between sprinklers {feet}
S_r = spacing between rows {feet}

Use when spacing is consistent



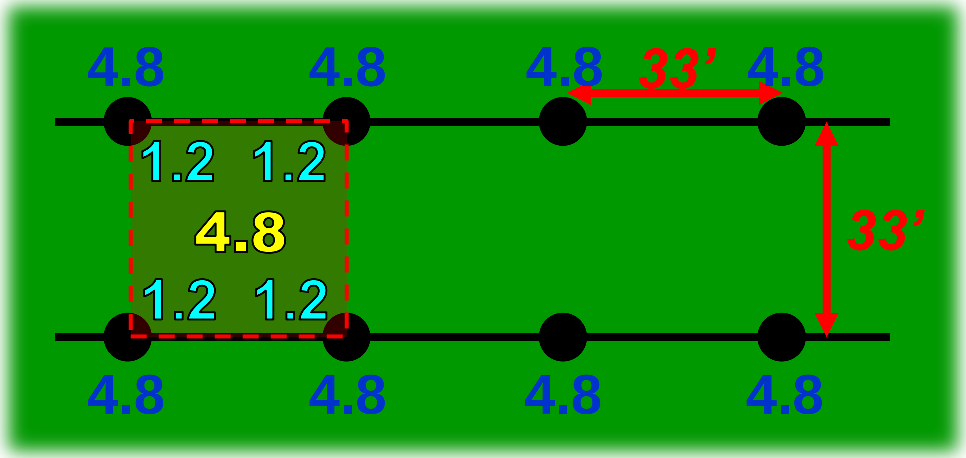
Gross Precipitation Rate For Rectangular Spacing
EXAMPLE #1

If:

Sprinkler Nozzles = **4.8** gpm

Sprinkler are **33'** by **33'**

Then:



$$PR = \frac{96.3 \times 4.8}{33 \times 33}$$

$$= \frac{462.24}{1{,}089} = 0.424 = \mathbf{0.42\ in./hr.}$$

Gross Precipitation Rate For Rectangular Spacing
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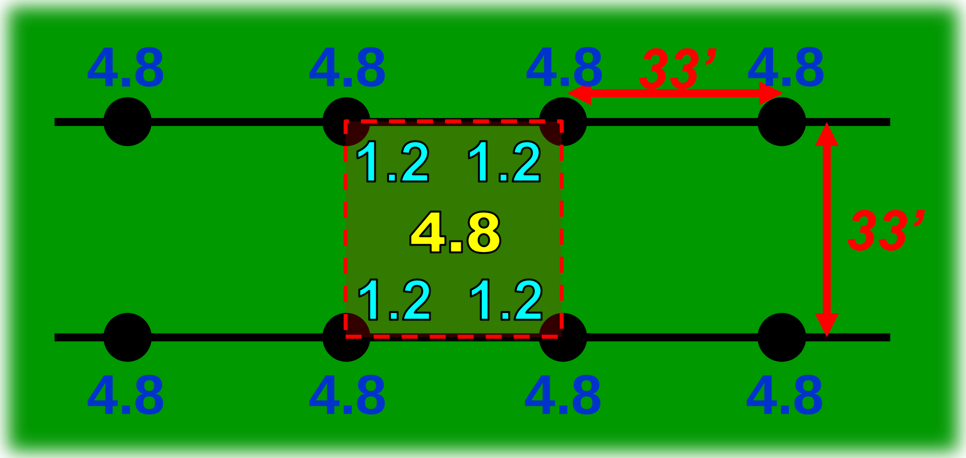

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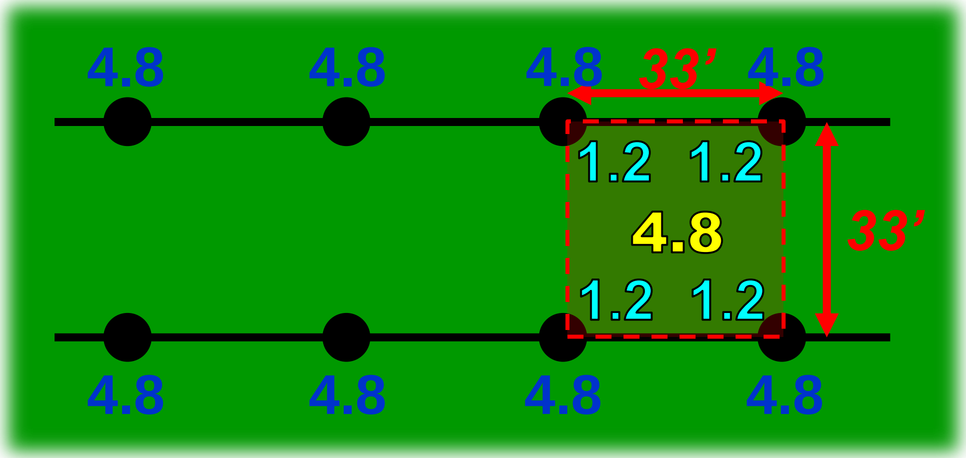


Gross Precipitation Rate For Rectangular Spacing
EXAMPLE #2

If:

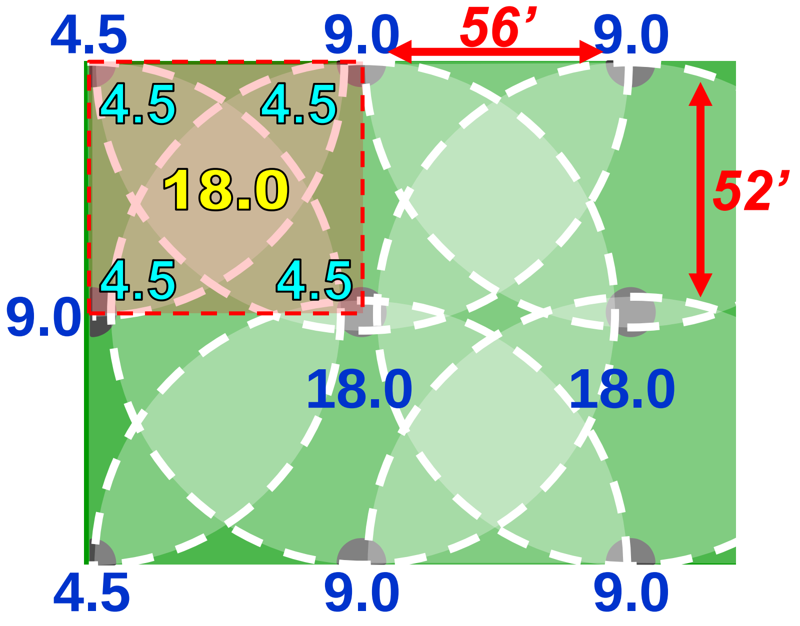
Sprinkler nozzles as shown

Sprinkler are **56’** by **52’**

Then:

$$PR = \frac{96.3 \times 18}{56 \times 52}$$

$$= \frac{1,733.4}{2,912} = 0.595 = \textbf{0.60 in./hr.}$$



Gross Precipitation Rate For Rectangular Spacing
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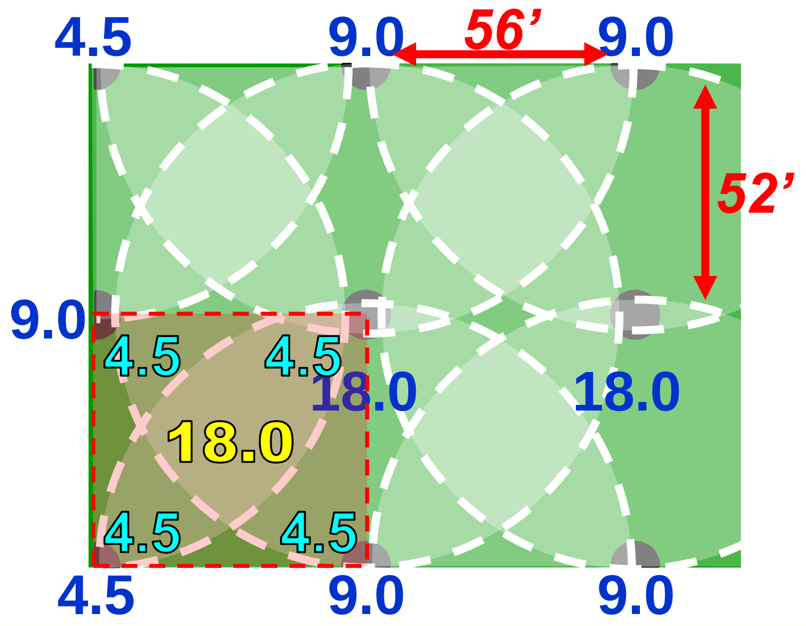

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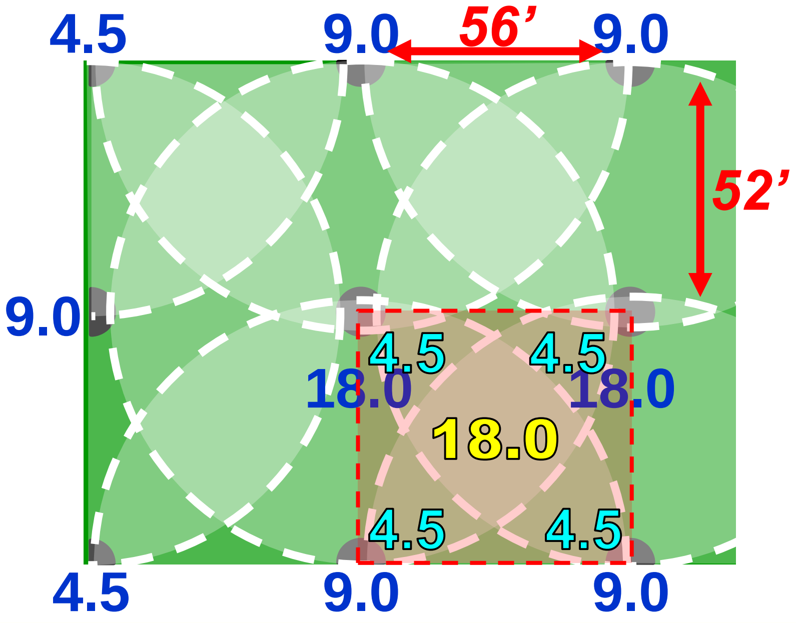

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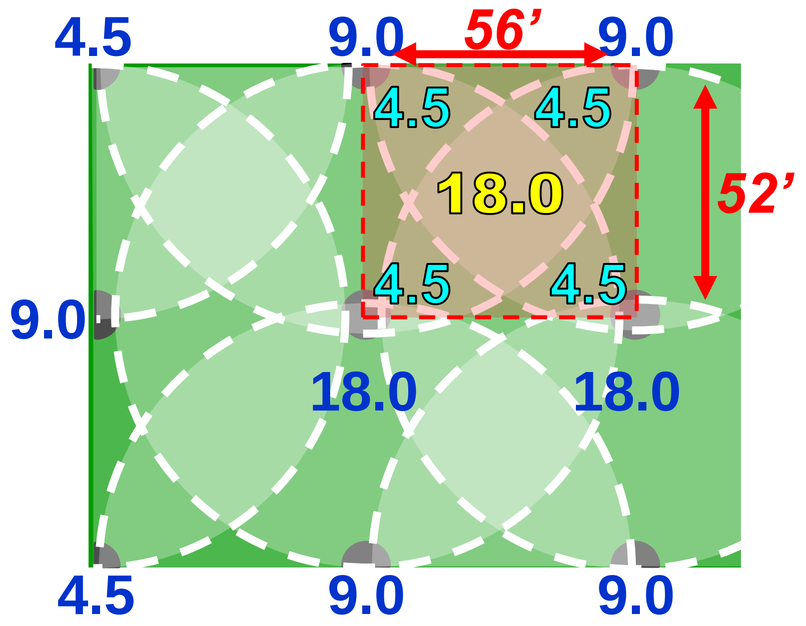
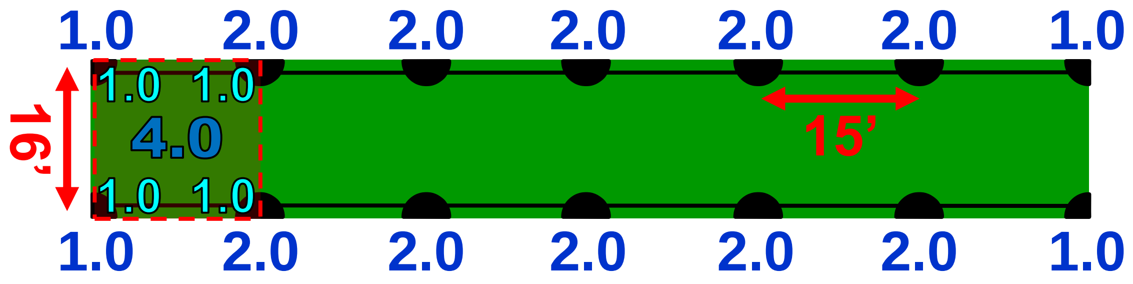


Rectangular Spacing
Precipitation Rate

Head-to-head 15-foot sprays are watering a median 16 feet wide.

The 15H are 2 gpm and the 12Q are 1 gpm. The DULQ is 0.61. What is the precipitation rate?



$$PR = \frac{96.3 \times 4.0}{16 \times 15} = \frac{385.2}{240} = 1.605 = \textbf{1.61 in./hr.}$$

Gross Precipitation Rate For Total Area
EXAMPLE #1

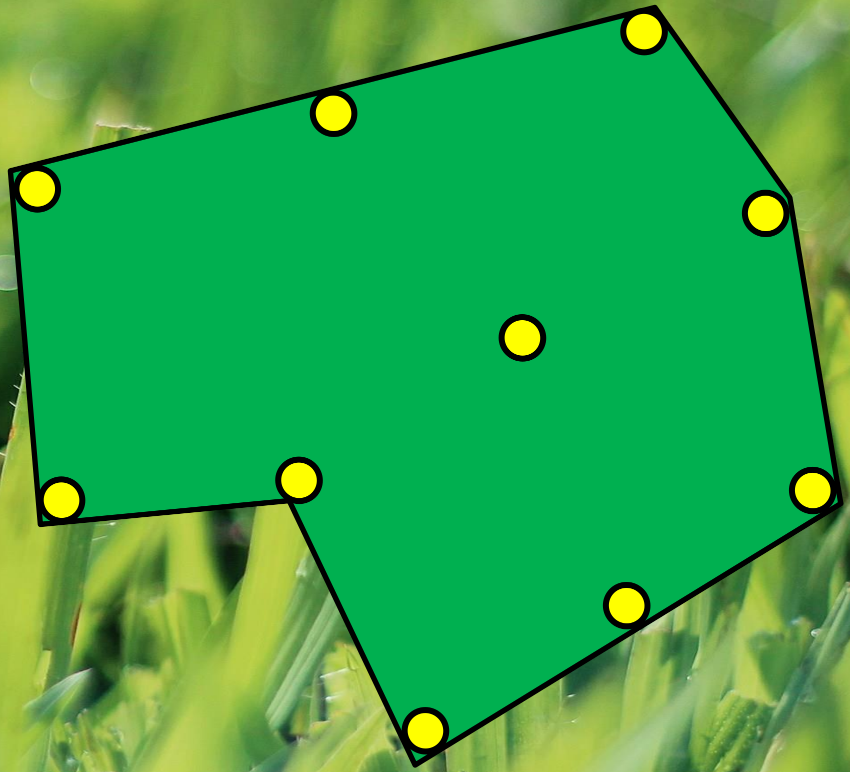
If:

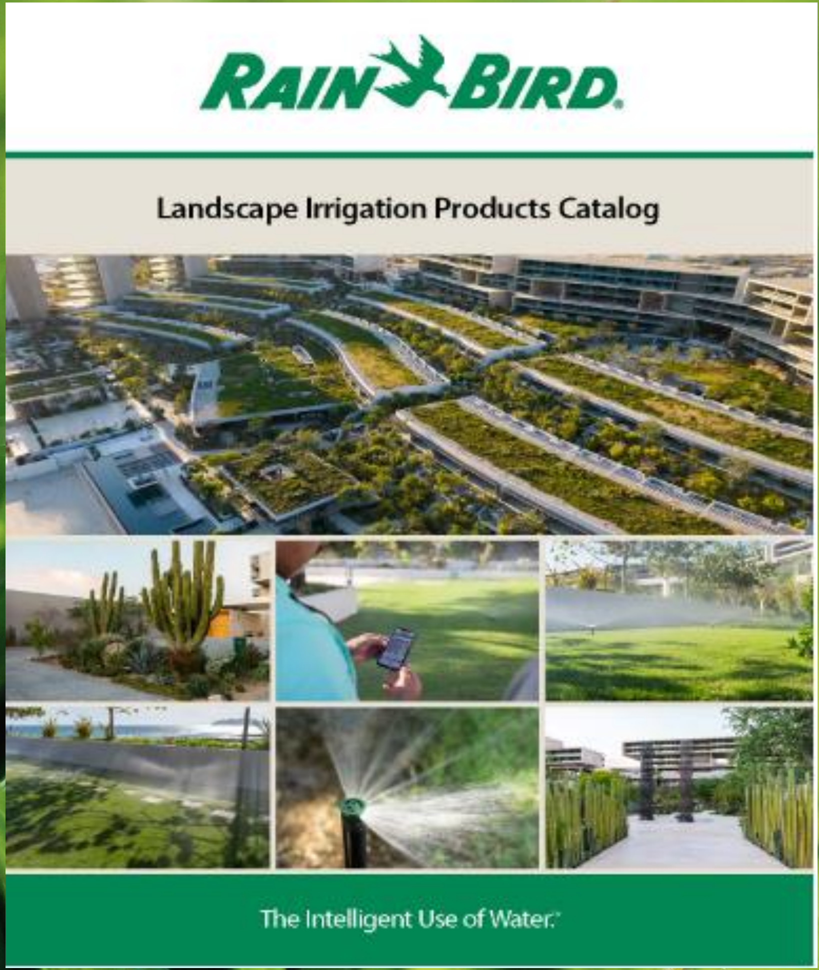
The total gpm is **14.5** (using meter)

The total area = **3,820** sq. ft.

Then:

$$PR = \frac{96.3 \times \mathbf{14.5}}{\mathbf{3{,}820}} = \frac{1{,}396.35}{\mathbf{3{,}820}} = 0.3655 = \mathbf{0.37 in./hr.}$$





5000 Series Std. Angle Rain Curtain™ Nozzle Performance

Pressure psi	Nozzle	Radius ft.	Flow gpm	□ Precip In/h	△ Precip In/h
25	1.5	33	1.12	0.20	0.23
	2.0	35	1.50	0.24	0.27
	2.5	35	1.81	0.28	0.33
	3.0	36	2.26	0.34	0.39
	4.0	36	2.91	0.43	0.49
	5.0	37	3.72	0.52	0.60
	6.0	37	4.25	0.60	0.69
	8.0	33	5.90	1.26	1.50
35	1.5	34	1.35	0.22	0.26
	2.0	36	1.81	0.27	0.31
	2.5	37	2.17	0.31	0.35
	3.0	38	2.71	0.36	0.42
	4.0	40	3.50	0.42	0.49
	5.0	41	4.47	0.51	0.59
	6.0	43	5.23	0.54	0.63
	8.0	41	7.06	0.94	1.10
45	1.5	35	1.54	0.24	0.28
	2.0	37	2.07	0.29	0.34
	2.5	37	2.51	0.35	0.41
	3.0	39	3.09	0.37	0.43
	4.0	42	4.01	0.44	0.51
	5.0	43	5.09	0.48	0.56
	6.0	44	6.01	0.59	0.69
	8.0	44	8.03	0.92	1.06
55	1.5	35	1.71	0.27	0.31
	2.0	37	2.30	0.32	0.37
	2.5	37	2.76	0.39	0.45
	3.0	40	3.47	0.42	0.48
	4.0	42	4.44	0.48	0.56
	5.0	45	5.66	0.54	0.62
	6.0	50	6.63	0.51	0.59
	8.0	47	8.86	0.80	0.93

Calculating Run Time based on Precipitation Rate - PR

$$RT = \frac{ET}{PR} \times 60$$

RT= Run Time

ET= Landscape ET (inches)

PR= Precipitation Rate

60= Minutes Conversion

Let's say the ET yesterday was 0.31 inches
Calculate the run time for both examples

EXAMPLE 1:
Precipitation Rate of **<u>1.83</u>**

(0.31 ÷ 1.83) x 60 = 10.164

Run Time = 10 Minutes

EXAMPLE 2:
Precipitation Rate of **<u>0.37</u>**

(0.31 ÷0.37) x 60 = 50.270

Run Time = 50 Minutes

Work Orders

Order Number
Location
Description of Project

Profit & Loss Statement

Labor Cost
Parts & Equipment
Sales $$$


Questions?

Scott Sutton CGCS, CGIA, CLIA, CIC

Director of Agronomy – The Club at Sunrise

President & Owner – Sutton Irrigation Auditing

President & Founder – Southern Nevada Irrigation Association

President – Desert Green Foundation

Former President – Southern Nevada Golf Course Superintendent Association

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