City of Santa Fe

Agenda

CITY CLERK'S OFFICE
DATE 6/7/17 TIME 9:11a
SERVED BY Christine Chavez
RECEIVED BY

SANTA FE WATER CONSERVATION COMMITTEE MEETING
BDD WATER TREATMENT PLANT – 341 Caja Del Rio Rd
CONFERENCE & TRAINING ROOM
June 13, 2017
3:30 PM TO 6:00 PM

1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF AGENDA
4. APPROVAL OF CONSENT AGENDA
5. APPROVAL OF MINUTES FROM THE MAY 9, 2017 MEETING

CONSENT AGENDA

6. UPDATE ON CURRENT WATER SUPPLY STATUS (Caryn Grosse)
7. MONTHLY OVERVIEW OF SCORECARD PROGRESS (Caryn Grosse)

INFORMATIONAL ITEMS:

8. BDD WATER TREATMENT PLANT TOUR (Bernardine Padilla, 60 minutes)
9. NEXT GENERATION WATER SUMMIT REPORT (Doug Pushard, 30 minutes)
10. IRRIGATION SYSTEM SELF-AUDIT GUIDE (Caryn Grosse, 5 minutes)
11. SAVE WATER SANTA FE PASSPORT (Caryn Grosse, 5 minutes)
12. GROUP REPORTS FROM WATER CONSERVATION COMMITTEE WORKING GROUPS
    - A. GROUP 1 – Irrigation Subcommittee (No Update)
    - B. GROUP 2 – General Education Program (No Update)
    - C. GROUP 3 – Marketing Outreach (No Update)
    - D. GROUP 4 – Water Conservation Codes, Ordinances and Regulations (Doug Pushard, 5 minutes)
    - E. GROUP 5 – Grants (No Update)

MATTERS FROM PUBLIC:

MATTERS FROM STAFF:

MATTERS FROM COMMITTEE:

NEXT MEETING – TUESDAY JULY 11, 2017:

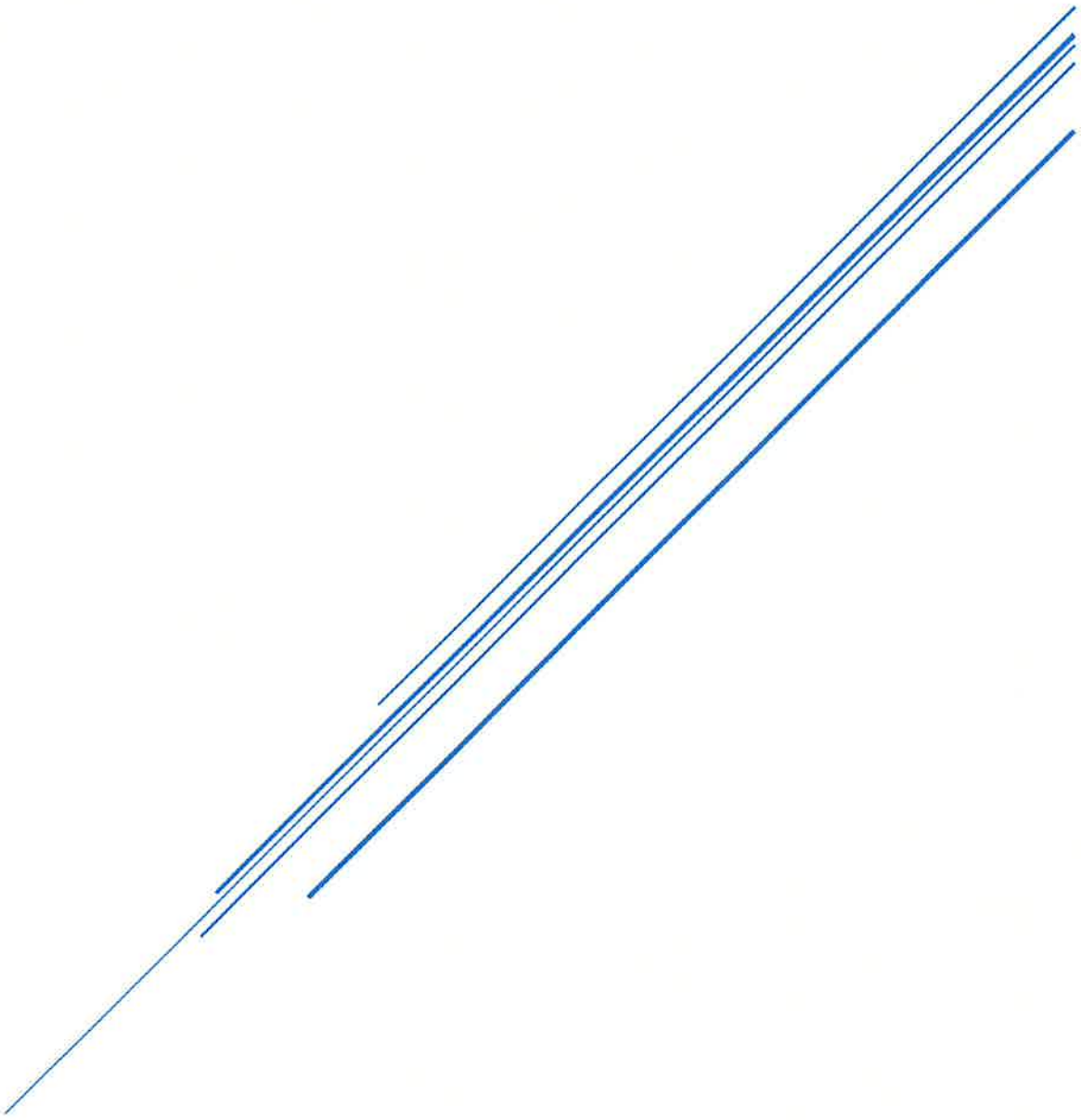
CAPTIONS: MONDAY, JUNE 26, 2017 @ 3 PM.
PACKET MATERIAL: WEDNESDAY, JUNE 28, 2017 @ 3 PM.

ADJOURN.

Persons with disabilities in need of accommodations, contact the City Clerk's office at 955-6520, five (5) working days prior to meeting date.

SANTA FE WATER CONSERVATION COMMITTEE

MEETING MINUTES –MAY 9, 2017



SUBMITTED BY LINDA VIGIL FOR FRAN LUCERO

SANTA FE WATER CONSERVATION COMMITTEE
MEETING INDEX
May 9, 2017

SANTA FE WATER CONSERVATION COMMITTEE MEETING
City Councilor's Conference Room
200 Lincoln Ave. Santa Fe, NM
May 9, 2017
4:00 p.m. to 6:00 p.m.

1. CALL TO ORDER

Councilor Ives, Chair of the Water Conservation Committee called the meeting to order at 4:04 p.m. at the Water Division Conference Room. A quorum was established at roll call.

2. ROLL CALL

PRESENT:
Councilor Peter Ives, Chair
Lisa Randall, Co-Chair
Aaron Kauffman
Tim Michael
Robert D. Coombe
Stephen K. Wiman
Ken Kirk
Doug Pushard
Justin Lyon
Bill Roth

NOT PRESENT/EXCUSED:

OTHERS PRESENT:
Christine Y. Chavez, City of Santa Fe Water Conservation Manager
Caryn Grosse, City of Santa Fe Water Conservation Specialist
Linda Vigil for Fran Lucero, Stenographer
David Groenfeldt, Water Culture Institute
Several members of the Santa Fe Art Institute
Andy Otto, Santa Fe Watershed Association

3. APPROVAL OF THE AGENDA

MOTION: Ms. Randall moved to approve the agenda as presented with a second from Mr. Kauffman which passed by voice vote.

4. APPROVAL OF THE CONSENT AGENDA

Mr. Michael would like to remove the Regional Water Authority White Paper from the consent agenda and have it as an item to discussion.

MOTION: Ms. Randall moved to approve the consent agenda as amended with a second from Mr. Wiman which passed by voice vote.

5. APPROVAL OF MINUTES FROM APRIL 11, 2017 MEETING

MOTION: Mr. Coombe moved to approve the minutes as presented with a second from Ms. Randall which passed by voice vote.

CONSENT AGENDA

6. UPDATE ON CURRENT WATER SUPPLY STATUS *(See Exhibit A)*

7. MONTHLY OVERVIEW OF SCORECARD PROGRESS

DISCUSSION

8. REGIONAL WATER AUTHORITY WHITE PAPER

Councilor Ives asked if all were able to review. *(See Exhibit B)* Mr. Michael appreciates the Committee moving it for discussion. Mr. Michael would like his statement that he disagrees with the statement that water is the limiting resource for development in the City.

A discussion was held about possibly changing the language to *a* limiting resource.

Councilor Ives is willing to take that information back to adjust it. Mr. Michael is not suggesting the language be changed, he merely wanted his statement on record. Ms. Chavez stated the document was already presented in the Public Works Committee.

Councilor Ives explained the initial interest in creating a regional water authority. Mr. Pushard asked if the meetings with the County have started. Councilor Ives stated they have not yet started meeting however the County would like to discuss more broad issues.
Mr. Kirk read the white paper and was shocked that it didn't show any future action about taking it further.

ACTION ITEM

9. NOMINATION TO FILL REMAINING VACANCY ON THE SANTA FE WATER CONSERVATION COMMITTEE

Mr. Roth discussed the latest nomination for the Santa Fe Water Conservation Committee, they are honored to have Scott Bunton show an interest in becoming a member. He has an extensive background in public policy. Ms. Chavez explained Mr. Kirk has taken the place of the County member.

MOTION: Mr. Roth moved to nominate Mr. Scott Bunton to fill the vacancy on the Water Conservation Committee with a second from Mr. Wiman which passed by voice vote.

INFORMATIONAL ITEMS

10. SANTA FE WATER CHARTER PROJECT

Mr. Dave Groendfeldt from the Water Culture Institute, explained his work. Mr. Groenfeldt discussed his book on water ethics and the efforts to facilitate a water charter. He explained the conflicting values and making a statement of principles. The statement would be documentation on what the community can agree upon. The concept he is looking to draft it after is the Berlin Water Charter (See Exhibit C).

Mr. Groenfeldt is working on holding meetings with stakeholders and then focus groups. Based on what they discuss, they will develop a straw charter. Then they will have facilitated workshops. After it is developed they will present to the City and the County.

A brief discussion was held on water law. Mr. Groenfeldt introduced some members of the SF Art Institute who came with him this evening. Mr. Wiman mentioned the photography project that Mr. Groenfeldt is working on. Mr. Groenfeldt is also working on a water infrastructure project.

11. 2016 GPCD

Ms. Chavez updated the Committee on the data she collected and presented it on the overhead projector. The annual measurements will have the readings from the new meters.

Ms. Chavez explained that schools, state buildings, and churches were counted as residential. The Utilities Department has an inside knowledge of the data. On Friday Ms. Chavez worked with the data and reached a number that made sense.

Ms. Chavez showed a graph which showed the trend. She is still in the middle of adding the historical numbers going back to 1995. Councilor Ives asked to see a 2016 accounts breakdown.

Ms. Chavez discussed the numbers for single family residents and multi family. Mr. Roth asked if the landscape the irrigation go under a different category. Ms. Chavez explained the single family is captures both.

Ms. Chavez will still work on the data for outdoor use, perhaps they can have a pilot project where a sample of homes to track the real-time data.

A discussion was held about the disparity in the numbers. Mr. Pushard thanked her for adding the historical numbers as well.

Ms. Chavez explained the math formula used to determine the number. Councilor Ives would like to see the outdoor use for a portion of the year, it would be interesting to see the winter months.

Mr. Lyon would like to know the assumptions for housing occupancies. Councilor Ives explained there us the Affordable Housing Report available that may help.

Ms. Chavez stated she will continue to work on the data and will update the Committee.

12. STORMWATER FILTRATION AND CATCHMENT OBSTACLES AND OPPORTUNITIES

Mr. Kauffman presented a chart and list of ideas for catchment systems (See Exhibit D). Mr. Kauffman presented a slideshow with his ideas of opportunities for stormwater catchment. There is data from Ms. McDonalds report that is helpful. Councilor Ives mentioned the EPA grant matched by City funds to develop a new Stormwater plan.

Mr. Pushard would like to know the number of the impervious surfaces and rooftop catchment.

Mr. Wiman asked if any of the State statutes have changed. Mr. Kauffman stated there is an amount that can be captured.

A discussion was held about the City clause on roof catchment and the public right of way and how it can be reused.

Councilor Ives would like the legal department to speak about the clause and someone from the OSE as well perhaps at the next meeting.

Ms. Chavez discussed the recent rain gardens and how with the Sustainable Water Commission the water component will come in.

A brief discussion was held about the Santa Fe Watershed Association and the joint effort with the City.

13. GROUP REPORTS

A. **GROUP 1-Irrigation Subcommittee**
B. **GROUP 2- General Education Program**
C. **GROUP 3- Marketing Outreach**
D. **GROUP 4- Water Conservation Codes, Ordinances and Regulations**
E. **GROUP 5- Grants**

Councilor Ives would like the working groups to report early in the next meeting due to the lack of time.

14. MATTERS FROM THE PUBLIC

There were visitors from Long Island who just started a water conservation committee in their area. She would like to meet with Committee members to get information to take back with her. Councilor Ives is willing to meet with them.

15. MATTERS FROM STAFF

Ms. Chavez discussed the upcoming Water Summit. Committee members are welcome to attend however the classes will have a cost. The Green Expo is also coming up.

Ms. Chavez discussed Mr. Patricio Pacheco who was a temporary employee and received the Muchimas Gracias from the City was hired on full time. They are very excited to have him.

16. MATTERS FROM COMMITTEE

There were not any matters from the Committee.

17. NEXT MEETING JUNE 13, 2017

The meeting will need to be rescheduled due to several conflicts. The date that has been decided will be June 8, 2017 it can be held at BDD.

18. ADJOURN

There being no further business to come before the Santa Fe Water Conservation Committee the meeting as adjourned at 6:07 p.m.

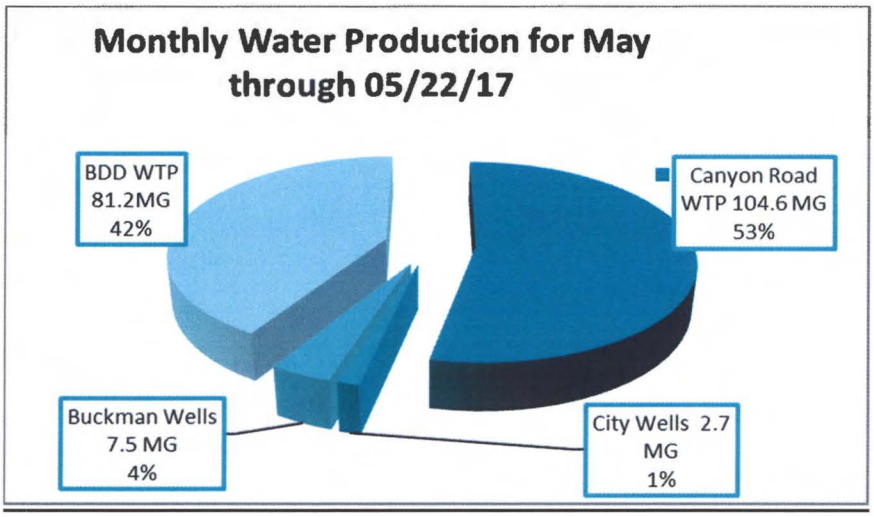
SIGNATURES

Councilor Peter Ives

Linda Vigil for Fran Lucero, Stenographer

City of Santa Fe, Source of Supply Section/Water Division
Water Production Update - through May 22, 2017
Public Utilities Committee Meeting
June 7, 2017

Water Production for May (through 05/22/2017)



Total Production of System

Sum: 196 MG for 22 days
Daily Average Consumption: 8.91 MGD

Reservoir Storage Levels:

McClure: 69.3% or 755.1 MG
Nichols: 54% or 116.2 MG
Combined: 66.71 % or 871.25 MG

Santa Fe River Flow

Below Nichols (Living River Flows): 5.9 cubic feet per second (cfs) or 3.83 MGD on May 22th, 2017
Above McClure (Inflow to Reservoir): 13.23 cubic feet per second (cfs) or 8.55 MGD;

Baca Street Well

The City will meet on June 12th with the NMED Petroleum Storage Tank Bureau and the Ground Water Protection Bureau to discuss PNM's initial investigation and findings and future requirements for continued investigation and remediation of the site.

Former Ortiz Landfill

The City's Stage 1 Investigation Plan was approved by the New Mexico Environment Department's Ground Water Quality Bureau after minor revisions and will be implemented by INTERA Corporation as follows:

- Test Pits – Week of June 12
- Borings/Vapor Well installation – Week of June 26

Drought/Monsoon, Storage, and ESA Update

NOAA has recently updated ENSO (El Nino/La **Niña**) status to: **ENSO-neutral conditions are present. ENSO-neutral conditions are favored to continue through at least the Northern Hemisphere spring 2017, with increasing chances for El Niño development by late summer and fall.** Regional reservoir levels on the Rio Grande and Chama Rivers are rising. Upper Santa Fe River reservoirs are also rising. Preliminary estimates for 2017 are for an approximate 100% delivery of full firm-yield of San Juan-Chama Project (SJCP) water. There are no water-related Endangered Species Act (ESA) updates. Updates on ESA issues will be made as needed. Rio Grande Compact Article VII storage restrictions are not in effect, which means the City will be allowed to impound "native" runoff into Nichols and McClure Reservoirs above the pre-Compact pool of 1,061 acre-feet (AF). Updates to this condition will be made as needed.

Most current City of Santa Fe SJCP Reservoir Storage:

Heron:
5,029 AF. 2016 deliveries were at about 95% of annual total.

El Vado:
1,239 AF.

Abiquiu:
9,815 AF SJCP carry-over from previous years, no time limit to vacate due to storage agreement with ABCWUA

TOTAL:
16,083 AF

Water Conservation Office

Monthly Overview of Scorecard Progress – May 2017

Education Outreach:

Education Initiative:

- 5/1 - Model Presentation as part of Watershed Field Trip – Kearny - 22 participants
- 5/2 -Model Presentation as part of Watershed Field Trip – Kearny - 22 participants
- 5/3 -Model Presentation as part of Watershed Field Trip – Kearny - 22 participants
- 5/4 -Model (Both DW and Watershed models) Presentation as part of Watershed Field Trip – Wood Gormley - 39 participants
- 5/4 – Lisa attended the Northstar Guiding Principles round table discussion for the SFPS
- 5/10 – Model (Both DW and Watershed Models) Presentation as part of Watershed Field Trip – El Camino Real – 24 students
- 5/11 – Model Presentation as part of Watershed Field Trip – 39 students
- 5/16 – Model Presentation as part of Watershed Field Trip – 22 participants
- 5/18- Model Presentation as part of Watershed Field Trip – 22 participants

General Outreach:

5/3 - Presented at the Green Lunch on Water Conservation Program/ Commercial Rebate/ Eye on Water
5/8 – Radio Show with Kim Shanahan on Water Conservation Program
5/13 – Tabled at Community Days(distributed 150 eye on water cards)
5/31 – Presented Water Conservation Program to Climate Masters Group
5/10 – Presented program to UNM Center on Water Governance (Representatives from water systems in Mexico)
5/25 – Presented program to Santa Fe Botanical Garden's Sustainability Committee
5/27 – Climate Masters Watershed Tour

Communication and Customer Service:

Eye On Water Rollout:

As of 5/30 – 2,151 users have signed up for the Eye On Water app

Indoor Water Audits:

Enforcement Activity:

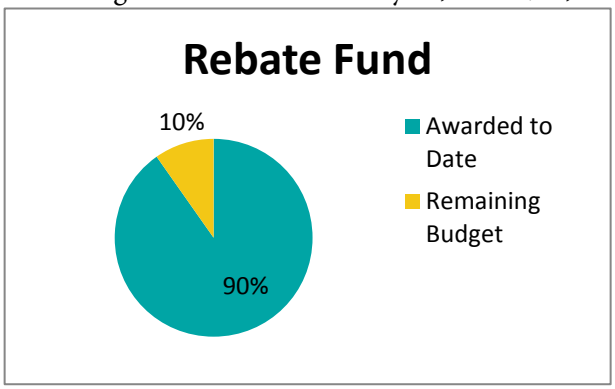
5/23- Time of day, power washing, warning issued
5/24- Fugitive water, warning issued
5/25- Power washing, warning issued
5/26- Time of day, warning issued

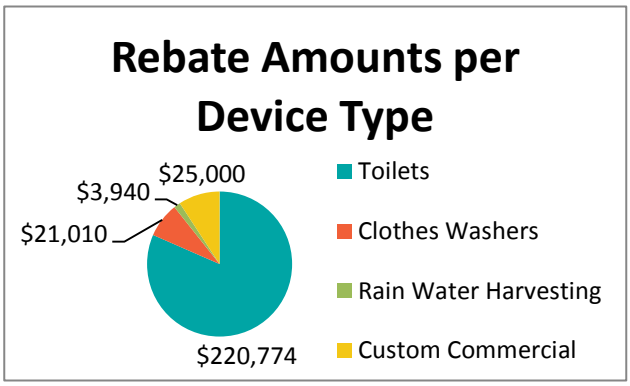
Strategic Marketing Plan:

- Radio Show Guests (Doug Pushard, Dave Groenfeld, Customer Service, Glen Schiffbauer)
- Update of PUC website underway – Conservation program charged with project
- Promotion of Next Generation Water Summit
- Campaign being developed to incentivize rest of rebate funding
- Campaign for the high demand season focusing on eye on water and avoidance of Tier 2 rates

Residential and Commercial Rebates:

Remaining fund balance as of May 30, 2017: $29,276.00





Rebates awarded FY-to-date:

- HET (all types) 1,498
- Clothes Washers (all types) 75
- Rain Water Harvesting (including rain barrels) 35
- Custom Commercial 1

Effective Program Management

Organizational Development:

- Patricio Pacheco started on 5/22/2017
- Full time water conservation enforcement officer position posted on 5/24/2017

Water Conservation Committee:

- Scott Burnett appointment scheduled for Council in June

Integration with Water Resources:

- GPCD work being continued with Utility Billing and ITT
- AWWA audit is in progress.
- Annual Water Report information is being gathered.
- Caryn Grosse assisting with the Long Range Water Supply Plan

Stewardship and Conservation:

Regional Collaborations:

- Lisa Noriega is serving on the NMWCA board.
- Caryn Grosse is working with the Xeriscape Council Conference Planning Committee.
- Christine Chavez is participating in the Next Generation Water Summit planning.
- Attended Sustainable Santa Fe public meetings on 5/3, 5/20 and 5/27
- Partnered with High Country News on Household Water Rates in the Western U.S. http://www.hcn.org/articles/the-variable-price-of-household-water-in-the-west
- Featured in article from the Circle of Blue https://www.vox.com/science-and-health/2017/5/19/15477702/map-30-us-cities-water-price

Irrigation System Self-Audit Kit and Instructions

Landscape irrigation accounts for about 38% of the water used in Santa Fe each year. Many homeowners have already converted their lawns to xeriscape (low water use plants) and replaced sprinkler systems with drip irrigation, but leaks and/or over-watering can still waste water and money without contributing to the beauty of your yard.

This kit is designed to help you self-audit your home irrigation system to see if improvements can be made which can save money and water. While an irrigation audit may seem like a complicated process, these instructions are designed to help you work your way through the process one step at a time, with pictures and forms built into the instruction booklet.

As a thank you for taking the time to do this self-audit, when you return the kit and a copy of your completed audit, you can receive either a soil moisture sensor or a rain sensor, which can be added on to most types of controllers to further reduce over-watering.

Just sprinklers™

THE FIREBIRD

EWING Irrigation & Landscape Supply

Irrigation System Self-Audit Kit and Instructions

Explanations for some of the terminology used in this guide can be found in the back of this book. Please contact the Water Conservation Office at 955-4225, during normal business hours, with other questions you may have.

Self-Audit Kit Contents:

25 catch cans
1 soil probe
1 pressure gauge (with attachments)
1 Rainbird green screwdriver
1 Hunter adjustment tool
1 screwdriver
1 stop watch
1 rain gauge
25 pink "problem" flags
60 "zone" flags (15 each of green, blue, red, yellow)

Step 1: Record Existing Settings

Use the enclosed clipboard to hold this booklet, make sure you have a pen or pencil and go find your irrigation controller (often located in the garage.) If you know where your controller manual is, it will be helpful to take it with you.

Record the current settings below; watering days (run days) and start times.

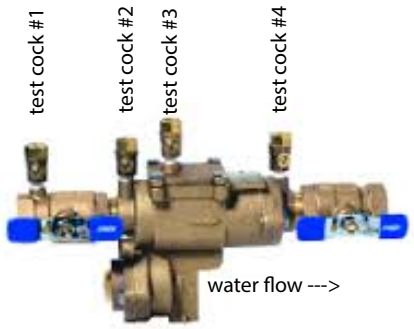
Controller Settings

Current Run Days (circle)													
M	T	W	Th	F	Sa	Su	M	T	W	Th	F	Sa	Su
Current Start Times				1 _____			2 _____			3 _____			

Very Important Note on Backflow Prevention Devices!
Because landscape may have a variety of contaminants, ranging from fertilizers and pesticides, to pet waste, to soil-borne diseases, it is very important to prevent water in the irrigation system from being sucked back into your home's water lines. This is why all irrigation systems are legally required to have a backflow preventer. There are a number of different types of devices available, but not all are approved for all uses, so if you do not know what this device is, or what type to use for your system, please contact a licensed landscape professional for assistance.

Step 2: Measure Water Pressure

1. Locate your backflow prevention device (typically near the irrigation valve boxes.)
2. Thread the pressure gauge into the #2 test cock. Valves must be open.



3. Using the standard screwdriver, slowly open the test cock by turning the screw.
4. If you cannot make a connection to the backflow device, use the hose bib. Thread it as you would a hose and open the spigot to measure pressure.
5. Record two pressures: (Please make sure that no other water devices are running before checking pressure!)

Static pressure: (irrigation system off)

Operating pressure: (irrigation system on)

6. Slowly close the test cock and remove the gauge.

Types of Heads:

Spray heads have a fixed pattern, rotors move from side to side. High efficiency rotary nozzles have individual streams that rotate.


popup


rotor


impact


mp rotor

Types of Drip Line and Emitters:

Drip tubing comes in a variety of forms: emitter tubing has emitters places at even distances along the length of the tube, distribution tubing is either 1/2" to move water from the main water supply or 1/4" (sometimes referred to as spaghetti line) to connect with emitters, misters, bubblers and microsprays. Products like netafim and drip tape are often used underground.

netafim (subsurface)

drip with small tubing

turbokey

microspray

Step 3: Inspect Each Irrigation Zone

1. Starting with Zone 1, turn on each zone and inspect the heads or emitters and observe the watering patterns.
2. Some controllers have a "test" mode that activates each zone for a selected test time. If not, manually turn on each zone for 5 minutes. Place a flag next to each sprinkler head or drip emitter.

Use a different colored flag for each zone. If you have more than 4 zones, you will need to do multiple tests as there are only 4 colors of flags in the kit.

3. Place pink flags where you find broken heads, clogged emitters or other problems.
4. Record observed problems on the Zone Evaluation Checklist on page 5.

Zone Evaluation Checklist

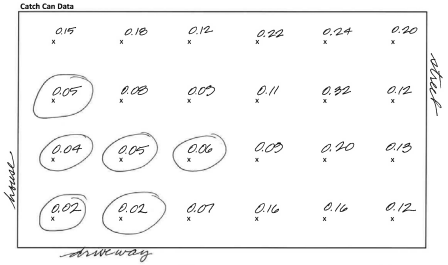
Observed Problems	Zone # 1	2	3	4	5	6	7	8	9	10	11	12
Low Pressure												
High Pressure												
Mixed Head Type												
Broken Head(s)												
Clogged Nozzle												
Tilted Head												
Low/Sunken Head												
Improper Arc or Radius												
Overspray												
Obstructions												
Low Head Drainage												
Leaks												
Comments												

Step 4a: Catch Can Test for Sprinklers

A catch can test collects data which is used to calculate the precipitation rate (PR) and the distribution uniformity (DU). PR indicates how fast the sprinklers are applying water, measured in inches. DU measures how evenly the system applies water over an area.

1. Select an area for the catch can test. More than one zone can be done as long as the irrigation head type is the same in both zones.
2. For sprinklers, set out 24 catch cans in a grid six rows by four rows. Place the catch cans about two feet away from sprinkler heads.

3. Run a zone for 5 minutes (10 minutes for a rotor zone). If more than one zone waters the selected area, run the first zone for the suggested time and then the second zone for the same time and so on, without moving or emptying the catch cans.
4. Start the stop watch when the heads are fully pressured.
5. Shut off the zone precisely on time.
6. On the Catch Can Data Diagram (page 7), record the amount of water in each catch can at the corresponding point.
7. Observe the areas that receive less water–they may show stress or brown spots.
8. Empty catch cans and repeat for additional zones.



Example of Catch Can Diagram

Run Time _____ min. # Catch Cans _____

Total Water (inches) _____

1. Total Water/# Catch Cans = Total Average _____

Catch Can Data

Step 4b: Catch Can Test for Drip System

Drip irrigation zones can be evaluated by placing the catch cans under drip emitters at the beginning, quarter, halfway, three-quarter and end of each line. This will check the uniformity of water distribution along the line.

Pressure compensating (PC) lines or emitters should discharge the same amount of water at all points along the line. Non-pressure compensating (non-PC) lines will be affected by line pressure, elevation changes, and pressure losses in the line.

Be careful when placing the catch can that the water does not run back along the tubing instead of into the container.

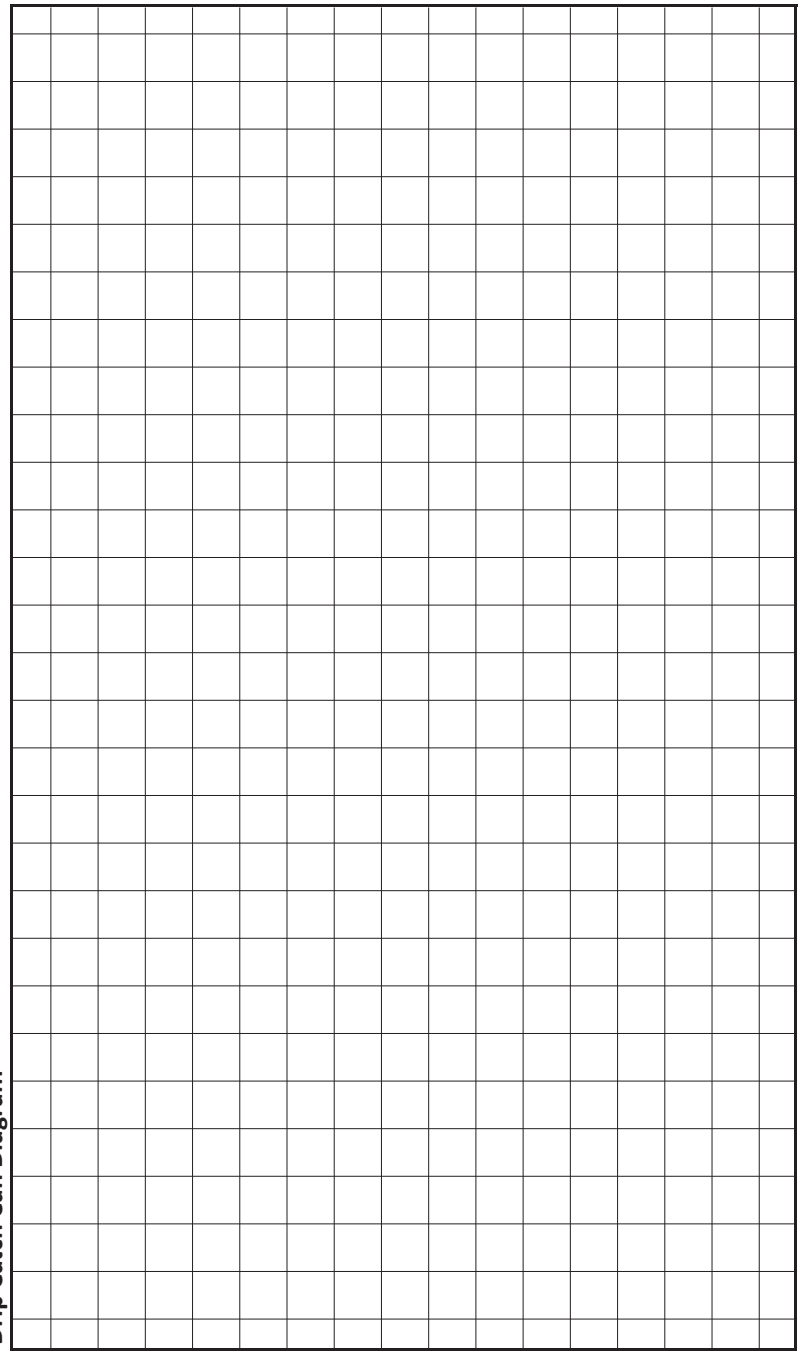
1. Select an area for the catch can test. More than one zone can be done as long as the emitter type is the same in both zones.
2. Make a sketch of the drip line layout showing the lines with drippers, dimensions of the zone and locations where the catch cans are placed. Take photos. Allow room to write in the data measurements.
3. Place the catch cans right under the emitters.
4. Run a zone for 10 minutes. If more than one zone waters the selected area, run the first zone for the suggested time and then the second zone for the same time and so on, without moving or emptying the catch cans.
5. On the Drip Catch Can Diagram (page 9), record the amount of water in each catch can at the corresponding point.
6. Observe the areas that receive less water–plants in these areas may show stress.
7. Empty catch cans and repeat for additional zones.

Run Time _____ min. # Catch Cans _____

Total Water (inches) _____

1. Total Water/# Catch Cans = Total Average _____

Drip Catch Can Diagram



Step 5: Calculate Precipitation Rate (PR) and Distribution Uniformity (DU)

Use the information your recorded either on page 6-7, or 8-9:

1. Enter the Total Average from your diagram.
2. Circle the six lowest values on the diagram and add them together to find the Low Quarter.
3. Divide the Low Quarter Total by 6; this is the Low Quarter Average.

1. Total Water/# Catch Cans = Total Average _____

2. Low Quarter (LQ) Total _____

Catch Cans Low Quarter 6

3. Low Quarter Total/# LQ Catch Cans = Low Quarter Average _____

If your run time was 5 minutes, divide your Total Average by 12 to determine your Precipitation Rate (PR):

If RT is 5 min., PR = Total Average x 12 = _____ in./hr.

If your run time was 10 minutes, divide your Total Average by 6 to determine your Precipitation Rate (PR):

If RT is 10 min., PR = Total Average x 6 = _____ in./hr.

To calculate Distribution Uniformity (DU) divide the Low Quarter Average by the Total Average:

$$\frac{\text{Low Quarter Average}}{\text{Total Average}} = \_\_\_\_\_$$

Distribution Uniformity

	Excellent	Good	Fair	Your System
Sprayhead	.75-.90	.55-.70	.40-.50	
Rotor	.80-.90	.65-.75	.50-.60	
Drip (non-PC)	.85-.90	.75-.85	.65-.75	
Drip (PC)	.90-.95	.85-.90	.80-.85	

Step 6: Take a Soil Sample

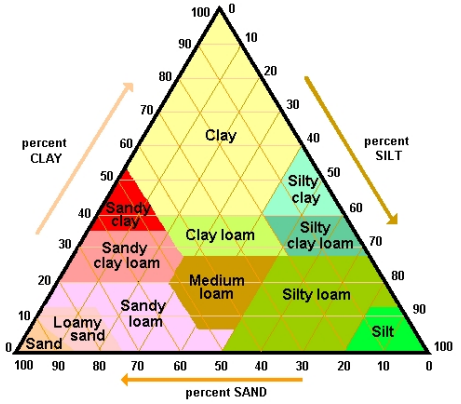
Irrigation systems depend upon the soil to move and store water. Soil is made up of sand, silt and clay particles. The percentage of these three particles is what determines soil type and how much water the soil can hold and how much water will be available to the plants.

1. Push the soil probe into the soil without twisting; twist it back and forth to remove a sample.
2. It's easiest to take the sample from a zone where you did the catch can test so the soil is moist.
3. With a screwdriver, separate the soil textures while looking for fine hair-like roots in the soil.

4. Use a ruler to measure the length of the roots and record below:

5. Place the soil sample in a quart jar with water and a few drops of dish soap. Shake the jar until the soil particles are suspended in the water and then allow to settle.
   a. Sand will settle in just a few minutes.
   b. Silt will settle on top of the sand.
   c. Clay will settle on top of the silt (this could take up to 24 hours.)
   d. Some clay particles and organic matter will not settle at all.
6. Measure the layers and determine percentage of each type.

For example, a soil that is 40 percent sand, 40 percent silt and 20 percent clay is classified as medium loam.



Sandy soil has a low value for available moisture, clay soil has a moderately high value and loam has the highest available soil moisture. Organic matter, such as compost, added to the soil can help to improve the moisture capacity of the soil.

Step 7: Calculate Run Times

1. Enter the PR for each zone tested on the Audit Sheet under the Data column, below.
2. From the Run Time chart, locate the PR in the left hand column. Find the Run Time recommended range, from Low to High, and record in the Run Time column of the Audit Results Sheet.
3. In the column under Run Time on the Audit Results chart, record the low and high times.
4. If a zone has partial or full shade, revise the run time under Adjusted Run Time.
5. Since clay soil can only absorb about ¼ inch of water per hour, if your soil sample had a lot of clay divide the run time into two cycles.
6. Enter these times into the Run Time per Start column on the Audit Results chart.
7. Now you know how long to water to apply ½ inch. Typically, run the system once in the spring and fall and twice during most of the summer. Add a third day when the weather is hot and dry.
8. Enter a Run Time per Start for zones that were not tested by using the Run Times from similar zones and adjusting for shade.

Run Time
To apply .5 inches (minutes)

Precipitation Rate	Run Time		Precipitation Rate	Run Time	
	Low	High		Low	High
0.20	108	120	1.25	17	19
0.25	87	96	1.30	16	18
0.30	72	80	1.35	16	18
0.35	62	69	1.40	15	17
0.40	54	60	1.45	15	17
0.45	48	53	1.50	14	16
0.50	43	48	1.55	13	1
0.55	40	44	1.60	13	15
0.60	36	40	1.65	13	15
0.65	33	37	1.70	12	14
0.70	31	34	1.75	12	14
0.75	29	32	1.80	11	13
0.80	27	30	1.85	11	13
0.85	25	28	1.90	11	13
0.90	24	27	1.95	11	12
0.95	22	25	2.00	11	12
1.00	21	24	2.10	10	11
1.05	20	23	2.20	1	11
1.10	20	22	2.30	9	10
1.15	19	21	2.40	9	10
1.20	18	20	2.50	9	10

Audit Results

Zone	Existing				Data	Watering Schedule		
	Run Time (min.)		Head Type	Exposure	Precipitation Rate	Run Time (min.)	Adjusted Run Time (min.)	Run Time per Start (2 start times)
	A	B	**S**pray **R**otor **D**rip **MP** Rotor	**S**un **P**artial Shade **F**ull Shade	(inches/hour)	(to apply 1/2 inch)	25% (partial shade) 50% (full shade)	(to apply 1/4 inch)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Step 8: Program Controller

1. Add up all the times in the Run Time per Start column. This is the time it takes to complete one watering cycle.
2. Enter a start time into the controller. Preferably, begin watering after midnight. When a complete cycle ends, enter a second start time to water the additional cycle.

3. For example, if the entire sprinkler cycle runs for 90 minutes, enter two start times in the controller; one at 2 a.m. and the second at 4 a.m. This waters the entire lawn's first ¼ inch, waits a half hour while the water is absorbed and applies the second ¼ inch.
4. If recommended run times are higher than your current run times, you may have other factors contributing to your efficiency. These are guidelines —you may be able to water less.
5. Monitor the appearance of your grass and adjust the run times up or down a few minutes for each zone.

Terminology:

Audit: a detailed review of an irrigation system, including tests to determine overall system efficiency, identify problems that need correction and determine an ideal watering schedule.

Backflow Preventer: a mechanical device which prevents water in the irrigation system from flowing back into the potable water supply.

Controller (also Timer or Clock): the brain of the irrigation system, the controller automatically opens and closes valves according to a preset schedule. Smart Controllers use weather-based calculations and/or environmental conditions to adjust watering based on plant needs.

Coverage: area of landscape watered by a sprinkler or group of sprinklers.

Distribution Uniformity (DU): a calculated value that shows how evenly water is distributed by the system.

Drip Irrigation: low volume watering method which delivers water slowly and directly to the roots of the plant for maximum efficiency.

Emitter: small watering device which delivers water at very low rate, measured in gallons per hour.

Evapotranspiration (ET): amount of water lost due to evaporation from the soil and transpiration from the plants. ET is used by Smart Controllers to help determine the amount of water needed.

Head to Head Coverage: practice of placing sprinklers so that the water from one sprinkler overlaps all the water to the next.

Hydrozone: a grouping of plants with similar water requirements so that can be irrigated with a common zone.

Irrigation System: a set of components which includes the water source, distribution network (pipe or tubing), control components (controller and valves), emission devices (sprinklers and emitters) and backflow prevention device.

Low Head Drainage: residual flow from low-elevation sprinkler heads after the control valve has been closed.

Matched Precipitation Rate (MPR): refers to sprinklers that apply water at the same rate per hour no matter the arc of coverage.

Microclimate: unique environmental conditions in a particular area of the landscape. Factors include sun, shade, soil type and wind.

Moisture Sensor: device which monitors the amount of water present in the soil and modifies the watering schedule accordingly.

Nozzle: final orifice through which water passes from sprinkler or emitter. Nozzle shape, size and placement has a direct effect on distance, water pattern and distribution uniformity.

Operating Pressure: the pressure of the system during operation.

Precipitation Rate (PR): rate at which the system applies water to the landscape, usually expressed as inches per hour.

Rain Sensor: a device which prevents the controller from activating the valves when a preset amount of rainfall is detected.

Run-Off: Water which is not absorbed by the soil and drains to another location. Usually occurs when water is applied too fast, or in excessive amounts.

Static Pressure: the pressure in a closed system, without any water movement.

Station: a circuit on the controller which activates a single control valve to control watering for a particular zone.

Watering Days: specific days of the week on which water will take place.

Winterization: process of removing water from an irrigation system before the onset of freezing temperatures. This is necessary to prevent damage to the system caused by expansion of freezing water in the pipes.

Xeriscape: landscape that uses native or well adapted plants which are suited to the amount of precipitation in a particular region.

Zone: section of an irrigation system served by a single control valve. Similar sprinkler types, as well as plant material types with similar water requirements and soil types, should be used within each zone.

Step 9: Audit Completed

1. Congratulations! You have completed your audit and can now enjoy the benefits of saving water and money.
2. Please return the self-audit kit and a copy of your results to receive your free gift.
3. While there be sure to inquire about any parts you may need to purchase to make repairs or improvements, as well as other water saving devices, rebates and programs which are offered by the City of Santa Fe Water Conservation Office.

Applicant Details: *(please print clearly)*

Water Account #:

Customer Name:

Contact Person:

Phone:

Email:

Installation Address:

Street :

City/State:

Zip code:

Mailing Address: *(if different from above)*

Address:

City/State:

Zip code:

SAVE WATER SANTA FE

PASSPORT

Santa Fe, New Mexico

The Mayor of the City of Santa Fe, New Mexico, hereby requests all whom it may concern to permit the student of the City of Santa Fe, New Mexico, named herein to visit these facilities to learn about water, energy and the environment.

Le Maire de la Ville de Santa Fe, Nouveau-Mexique, sollicite tout ce qu'il peut concerner pour permettre à l'élève de la Ville de Santa Fe, Nouveau-Mexique, nommée ci-après pour visiter ces installations pour en savoir plus sur l'eau, l'énergie et l'environnement.

El Alcalde de la Ciudad de Santa Fe, Nuevo México, por este medio pide a todos los que pueda interesar para permitir que el estudiante de la Ciudad de Santa Fe, Nuevo México, llamada aquí a visitar estas instalaciones para aprender sobre agua, energía y medio ambiente.

SIGNATURE OF BEARER / SIGNATURE DU TITULAIRE / FIRMA DEL TITULAR

PASSPORT
PASSEPORT
PASAPORTE

Santa Fe, New Mexico

Surname / Nom / Apelidos

Given names / Prenoms / Nombres

School / L'ecole / La escuela

Date of issue / Date de deliverance / Fecha de expedicion

M M D D Y Y Y Y

(DRAW A PICTURE OF YOURSELF HERE)

City Partner Stamps

City Partner Stamps

Component/City Partner: ***Water-Energy Nexus, Sustainable Santa Fe***

Description: *This activity introduces the relationship between energy and water, also known as the "energy-water nexus." Different types of energy sources, such as fossil-fuel based electricity, renewable energy, natural gas, and others, not only require water in their production, but they are also used to move water from its source into homes and businesses. This is an in-class presentation with a hands on activity and discussion.*

Students will learn energy basics such as, what energy is, types of different energy, how they are created, how they are measured, and how they are used. The presentation will also include information about the advantages and disadvantages of using each type of energy, how to conserve energy, their impact on the environment, and how using different types of water sources impact energy use.

Activity Type: *In class presentation*

Student Expectations Prior to Attendance:

- *Key terms: energy, kilowatt hour, therm*
- *Key concepts: Students should be able to define energy nexus in their own terms and be able to describe different sources of energy including solar, wind, electricity, etc.*

Outcome/Learning Objectives: *Energy plays a big role in water and wastewater treatment and water distribution. It is impossible to discuss any aspect of water without establishing the importance of energy, as each of those resources affects the other. Students should be able to understand what the energy-water nexus is, understand different sources of energy and their use, and understand how conserving energy also conserves water and vice-versa.*

Component/City Partner: ***Water Treatment, Buckman Direct Diversion***

Description: *The field trip begins with a short presentation, including an activity and discussion. Safety and rules and guidelines for the tour will be discussed at this time. The tour begins with the raw storage/ pre-sedimentation basin which stores up to 8 million gallons of raw water. Students learn about the process of getting water from the river to the treatment plant and the disposal of solids that have settled as a result of the process. The tour proceeds to Flash Mix and Flocculation/ Sedimentation before visiting the Advanced Treatment Facility and learning about membrane filtration, ozone and biofiltration. BDD is the only facility in New Mexico that utilizes these advanced processes to provide very high quality water for Santa Fe. The students will see a booster station and the Operator's Control room to learn how the entire facility is monitored. The last stop is the Laboratory where students learn about the testing and sampling required of the system.*

Activity Type: *Field trip*

Student Expectations Prior to Attendance:

- *Key terms: Sedimentation*
- *Key concepts: Students should have a basic understanding of where their water comes from and what the different sources are; surface water from the Rio Grande, surface water from the Santa Fe River, city well field and Buckman well field. Each source requires a different sort of treatment before it is considered of drinking water quality.*

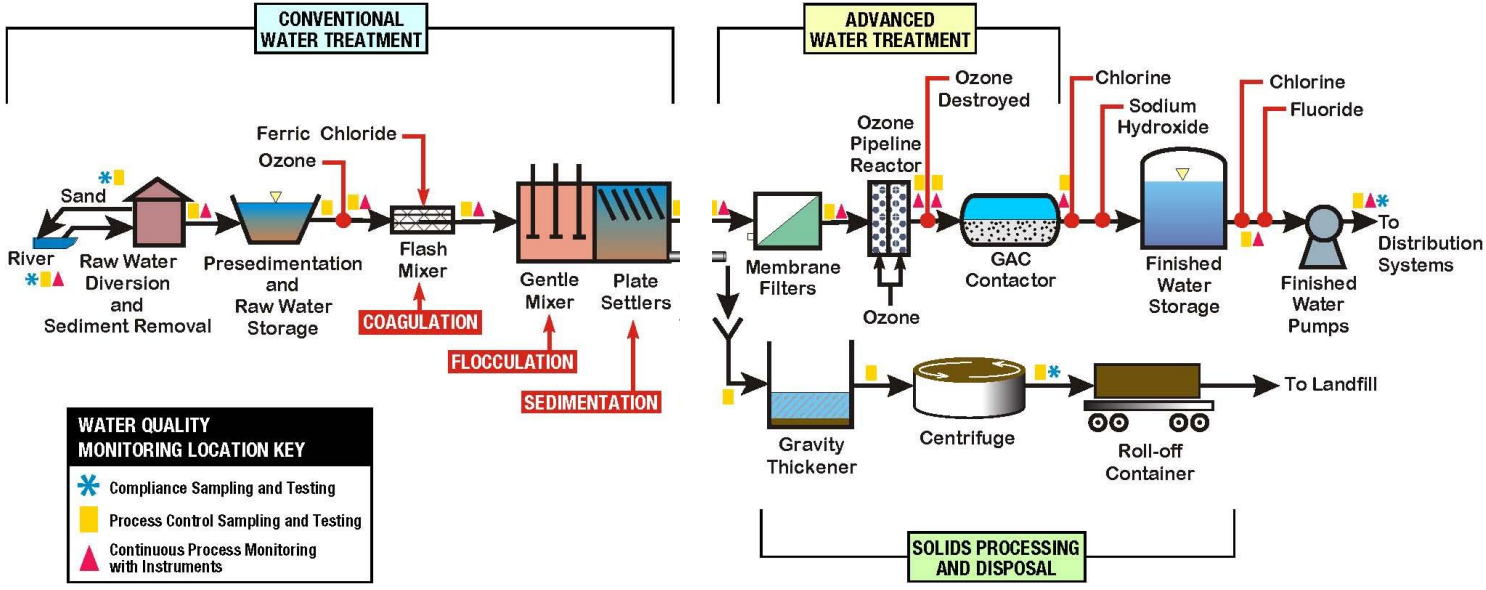
Outcome/Learning Objectives: *The tour provides perspective on how surface water is treated to drinking water standards. The BDD has advanced treatment processes unique to New Mexico.*

Buckman Regional Water Treatment Plant Processes

Buckman Direct Diversion

The Buckman Regional Water Treatment Plant includes a series of conventional and advanced water treatment processes. The conventional processes remove the vast majority of contaminants. The advanced processes provide additional treatment and polishing of the finished drinking water.

Conventional treatment processes include coagulation, flocculation, sedimentation and disinfection. Raw water ozonation improves the effectiveness of conventional treatment. Advanced treatment is provided by membrane filters, ozone and granular activated carbon contactors. Disinfection is accomplished with lower amounts of chlorine because the high-quality water does not need as much chlorine.



Component/City Partner: ***Recycling, Keep Santa Fe Beautiful***

Description: *Recycling Saves Water: This program focuses on calculating the amount of water that recycling saves based on the total tons of commodity that gets collected in Santa Fe's recycling program. This two part activity demonstrates how much water production uses and then how much is saved through recycling. A recycling activity is also set up to have students "sort" through trash that is potentially recyclable which will educate students on how to most appropriately do it in their homes. It is also a chance for the program to showcase the new roll out carts and the increased recycling potential for city households.*

Activity Type: *In class presentation*

Student Expectations Prior to Attendance:

- *Key terms: recycling*
- *Key concepts: Students should become familiar with the City's recycling program and have an idea of what things can be recycled in their new roll out bins*

Outcome/Learning Objectives: *Connecting every day activities like recycling to water conservation gives students ideas about other things that can be done to save water besides things like turning off the water when they are brushing their teeth. Every day choices and behaviors can be modified to save water.*

Component/City Partner: ***Waste Water Treatment, City of Santa Fe Wastewater Management***

Description: *Students tour the City of Santa Fe's Wastewater Treatment facility, learn about how wastewater gets from their homes to the facility and how its treated. Students participate in a short presentation before the tour which covers the benefits of wastewater treatment and its role in sustainability. They learn about reclaimed water, composting, and production of renewable energy through solar and biogas generation. The tour includes pretreatment, primary treatment and secondary treatment where students learn about the biological and chemical treatment of wastewater. Students are also introduced to regulatory water quality requirements as the tour moves through the tertiary treatment process. The tour ends with a stop at the outfall where treated water leaves the plant to find it's new beneficial use, whether reclaimed and used for irrigation, or flows into the Santa Fe river to support a thriving ecosystem and recharge groundwater supply.*

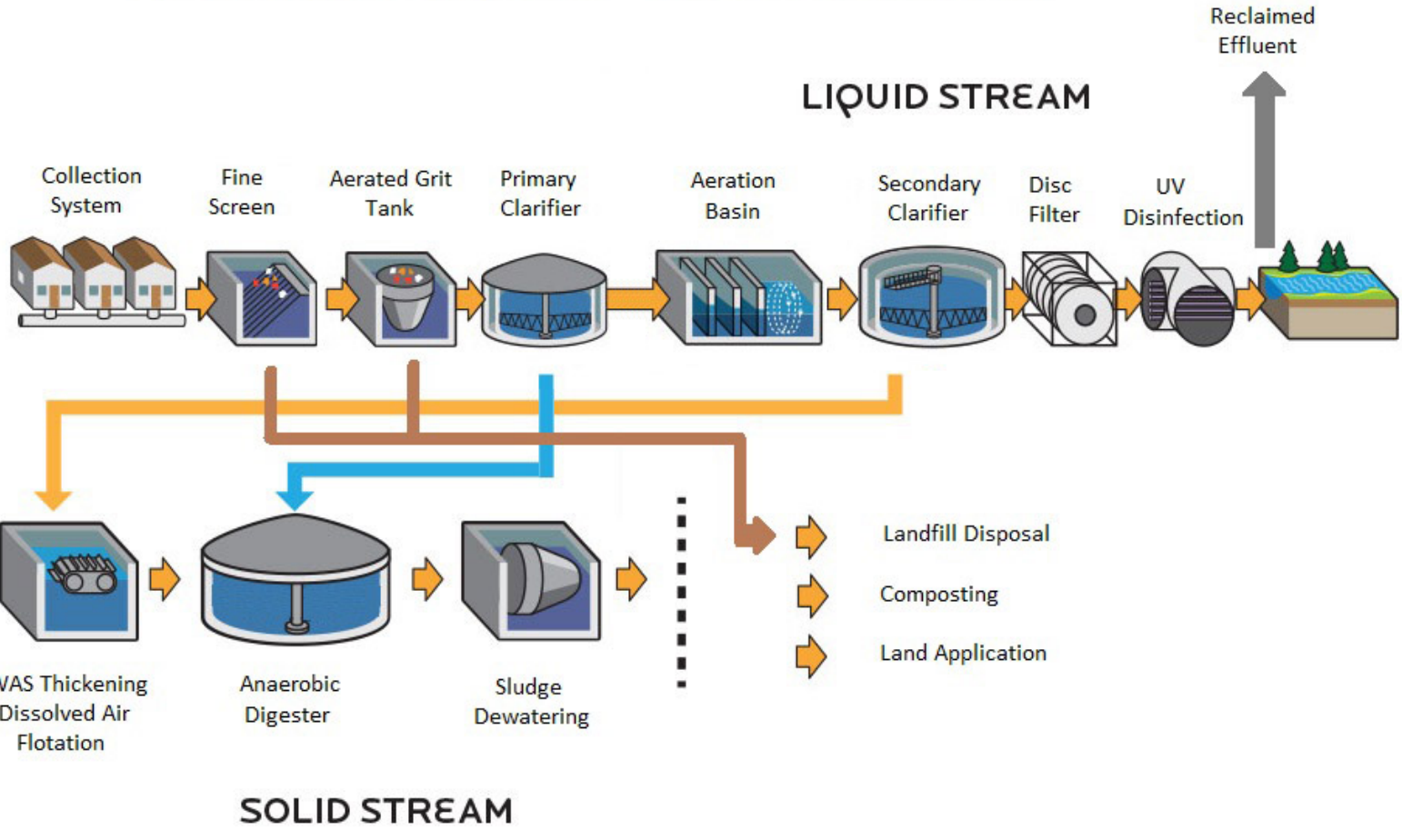
Activity Type: *Field Trip*

Student Expectations Prior to Attendance:

- *Key terms: effluent, reclaimed water, potable and non-potable water, microorganisms, nitrification, and disinfection*
- *Key Concepts: Students should have an understanding of the different sources of wastewater in their home such as toilets, showers, sinks, laundry machines, dish washers, etc. Also what shouldn't: cell phones, oils and grease, pharmaceuticals, and toys.*

Outcome/Learning Objectives: *Students gain appreciation of where wastewater goes and the benefit of treating wastewater to be used for irrigation. Students learn about different city properties that are irrigated with treated effluent through a purple pipe system.*

CITY OF SANTA FE WASTEWATER TREATMENT PLANT



Component/City Partner: ***Water Conservation, City of Santa Fe Water Conservation Office***

Description: *A demonstration using an Enviroscape model of where the City's drinking water comes from, how it is treated, different sources of wastewater c and where it goes and how it is treated and re-used. The model will tie the entire program together as it briefly demonstrates every component of this program. The students enjoy the interactive display and the use of different media to demonstrate different parts of the model.*

Activity Type: *In class presentation.*

Student Expectations Prior to Attendance:

- *Key terms: aquifer, ground water, surface water, biosolids*
- *Key concepts: Students should have a basic understanding of the water cycle and be able to discuss the different sources of our drinking water.*

Outcome/Learning Objectives: *The model brings together the different aspects of the program on a small scale basis.*

Component/City Partner: ***Water Fiesta, City of Santa Fe Water Conservation Office***

Description: *Students attend the annual Children's Water Fiesta. This is a one day event where the students will rotate through a series of five activities. Demonstrations may be provided by Sandia National Labs, Los Alamos National Laboratory, New Mexico Office of the State Engineer and many others. All of the City Partners in this program will also be providing an activity at this event.*

Activity Type: *Field Trip*

Student Expectations Prior to Attendance:

- *Key terms: aquifer, ground water, surface water, biosolids*
- *Key concepts: Students should have a basic understanding of the water cycle and be able to discuss the different sources of our drinking water.*

Outcome/Learning Objectives: *The Children's Water Fiesta brings together all the aspects of the passport program into a one day event, which provides prospective via overlapping lessons about the importance of water, and the role of the environment in a clean, sustainable water supply.*