



# RAINWATER

## HARVESTING GUIDE



Albuquerque Bernalillo County  
Water Utility Authority



The Albuquerque City Council is committed to quality stewardship of our precious natural resources. Through public education and community collaboration we can preserve and protect the vivid and unique diversity of our natural landscape for future generations.



# IN THE GUIDE

We are a community working to establish the next milestones in securing long-term sustainability of our water resources. The capture and storage of rainwater for use in our landscapes provides an opportunity to use water more efficiently. The *Rainwater Harvesting Guide* offers a look at a variety of installations and offers you a step-by-step process for installing a rainwater harvesting system at your home or place of business.

# THE RAINWATER HARVESTING PROJECT

The achievement of water conservation goals by the Albuquerque Bernalillo County Water Authority has brought our community to the threshold of establishing the next milestones in water conservation. We recognized that further development of outdoor water conservation opportunities was needed. So we embarked on the **Rainwater Harvesting Project** to better understand the opportunities to capture and store rainwater for use in our landscapes.

The first phase of the project installed rainwater harvesting systems in different neighborhoods throughout our community to learn about the practical considerations and aspects of installing systems. The second phase of the project was to produce a guide for you to see the different systems. What follows are the rainwater harvesting systems installed and the details of each system so that you can become familiar with the components. Our hope is to support your efforts towards the installation of rainwater harvesting systems in your home or business.

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# RESIDENTIAL RAINWATER HARVESTING SYSTEMS

## RESIDENTIAL RAINWATER HARVESTING SYSTEMS

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## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Downtown

### Size (Area of Landscape)

- 1,200 Square Feet

### Roof Area

- 1,650 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 1,650 gallons



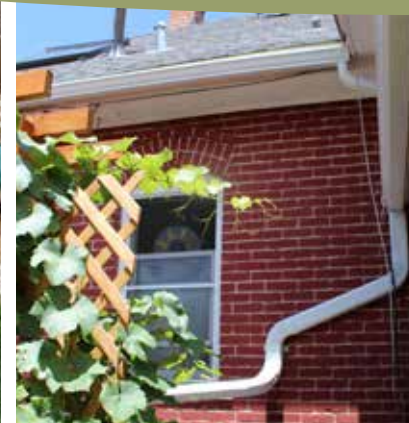
1. LOCATION FOR TANK



2. TANK HAD TO BE LIFTED OVER STRUCTURE



3. DIRECTING OVERFLOW TO TREE



4. INSTALLED GUTTERS AND DOWNSPOUT

		EXISTING	NEW
ROOF	flat		
	sloped	X	
	canale		
	downspout		X
	pipng		
	gutters		X
CISTERN	above		X
	below		
	pump inside tank		X
	pump outside tank		
	flow meter		X
	automatic connection		X
	manual connection		
	hose bib		
IRRIGATION	automatic drip	X	
	manual drip		
	soaker hose		
	sprinklers		
	hand water	X	

## CHALLENGES

The 4' wide arbor structure alongside the house was not going to allow for easily placing a 7.5' diameter cistern tank. So, the tank had to be lifted over the structure.

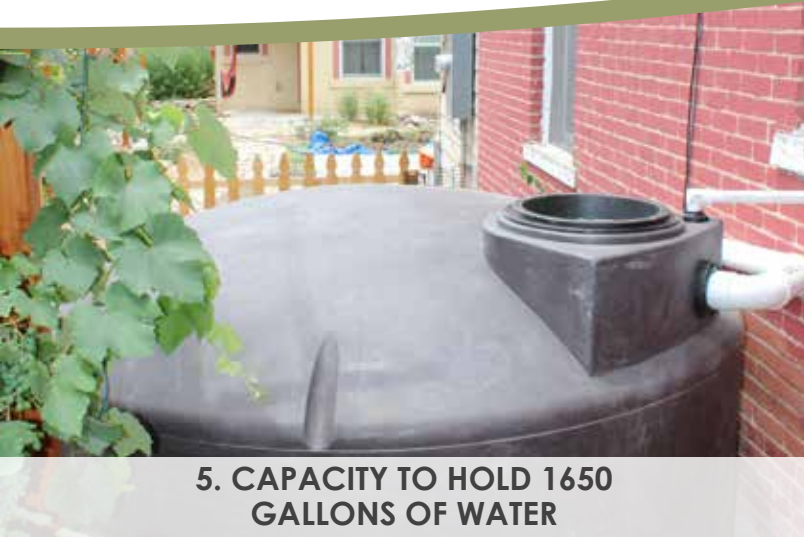
## BUDGET: \$9,000.00

Installation included one 1650 gallon cistern tank, connection to existing automatic drip irrigation, overflow piping from tank to backyard landscape, and a flow meter to track water collected and used in our landscapes. New gutters and downspouts were installed to direct rainwater into tank and gravity feed into tank.



# DOWNTOWN

Cistern: Polyethylene



5. CAPACITY TO HOLD 1650 GALLONS OF WATER



6. CONSERVING WATER FOR THE NEXT GENERATION

## CONSIDERATIONS

1

### PLANTING AREAS

- Capturing rainwater for front yard area
- Front yard has xeric plantings and existing drip irrigation system

2

### PLACEMENT

- Adjacent to south side of house near irrigation controller

3

### ROOF AREAS

- Sloped roof drained in several directions
- Capturing rainwater from three roof areas nearest to tank location on south side of the house

4

### RAINWATER ACCESS & USE

- Total volume capacity of 1650 gallons
- Automatic system control to use captured rainwater first and municipal water secondly to support front yard landscape

*"We are so fortunate to have received a water harvesting tank for our residence. We feel that it is a valuable and essential source for effectively watering our drought tolerant landscape. We proudly showcase it on our property for everyone to see."*  
-Kenneth Sandoval & Lisa Donald, Homeowners

INSTALLER:

HarvestH2o.com

## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Far Northeast Heights

### Size (Area of Landscape)

- 6,800 Square Feet

### Roof Area

- 2,300 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 4,300 gallons



1. EXISTING IRRIGATION CONTROL BOX



2. TRENCHING UNDER WALL THRU THE BACKYARD



3. INSTALLING PIPING TO TANKS

## CHECK LIST

		EXISTING	NEW
ROOF	flat	X	
	sloped		
	canale	X	
	downspout		X
	pipng		X
CISTERN	gutters		
	above		X
	below		
	pump inside tank		X
	pump outside tank		
	flow meter		X
	automatic connection		X
	manual connection		
IRRIGATION	hose bib		
	automatic drip	X	
	manual drip		
	soaker hose		
	sprinklers		
	hand water	X	

## CHALLENGES

The irrigation controls were located on the opposite side of the property from the area for the tanks' placement. This made for a long distance of conveyance through the backyard under an existing concrete patio. Fortunately, the owner was planning a renovation of the back patio with a removal of the concrete paving, so this worked well with the timing of trenching through the backyard for the conveyance piping and reduced costs.

## BUDGET: \$15,000.00

Installation included two cistern tanks, connection to existing automatic drip irrigation, flow meters on each tank to track rainwater collected and used in our landscapes. Existing canales were modified with piping to direct rainwater into conveyance system along backside of property and gravity feed into tanks.



# FAR NORTHEAST HEIGHTS

Cistern: Polyethylene



4. XERICSCAPE PLANTING TO BENEFIT FROM RAINWATER



5. CAPACITY TO HOLD 4300 GALLONS OF WATER

## CONSIDERATIONS

1

### PLANTING AREAS

- Capturing rainwater for front and back yard areas
- Front yard had xeric plantings and existing drip irrigation system

2

### PLACEMENT

- There was an unused concrete area that accommodates the two tanks

3

### ROOF AREAS

- Roof drains in several directions.
- Decision to capture rainwater from multiple roof areas nearest to conveyance piping running across backside of the property

4

### RAINWATER ACCESS & USE

- Total volume capacity of 4300 gallons
- Good balance between the water demand of the landscape and the water supply in the tanks

*"Participating in the program has been a great experience. We've learned, conserved and feel satisfaction in reducing our water footprint and our plants love the rainwater."*

*-Charles and Peg Galbraith, Homeowners*

INSTALLER:

HarvestH2o.com

## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Northeast Heights

### Size (Area of Landscape)

- 2,400 Square Feet

### Roof Area

- 1,700 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 1,650 gallons



1. AREA TO PLACE CISTERN TANK



2. BACKYARD CISTERN TANK IS MOVED OVER THE ROOF



3. INSTALLED 1650 GALLON CISTERN TANK

## CHECK LIST

		EXISTING	NEW
ROOF	flat		
	sloped	X	
	canale		
	downspout		X
	pipng		
	gutters		X
CISTERN	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		
	manual connection		X
	hose bib		
IRRIGATION	automatic drip		
	manual drip		X
	soaker hose	X	
	sprinklers		
	hand water	X	

## CHALLENGES

Placing the tank in the backyard was difficult because of a chicken coop on one side of the house and a narrow arbor on the other side of the house. Owner needed to install new roof, so rolled cistern tank over roof prior to the installation of new metal roof.

## BUDGET: \$5,084.00

Installation included one 16500 gallon cistern tank, manual drip irrigation, and a flow meter to track water collected and used in our landscapes. New gutters(135 linear feet) were installed to direct rainwater into tank and gravity feed into tank.



# NORTHEAST HEIGHTS

Cistern: Polyethylene



4. BEAUTIFUL XERIC OASIS SUPPORTED WITH RAINWATER



5. TEACHING OUR CHILDREN ABOUT CONSERVATION

## CONSIDERATIONS

1

### PLANTING AREA

- Capturing rainwater for back yard area

2

### PLACEMENT

- In backyard adjacent to south side of house

3

### ROOF AREA

- Sloped roof drained in three directions.
- Capturing rainwater from 2/3 of overall roof area

4

### RAINWATER ACCESS & USE

- Total volume capacity of 1650 gallons
- Manual irrigation control to use captured rainwater to support back yard landscape

*"Living in a desert, water scarcity is a part of daily life. Water conservation doesn't just enter the conversation on the years there is a drought; is it a constant and ongoing dialogue we have with ourselves and with our community. By choosing to live in Albuquerque, our family may have chosen to trade lush, green lawns for sunny, New Mexico skies, but we didn't want to live on a barren lot either. Finding a balance between water conservation and a beautiful yard takes resourcefulness, which is why we are thrilled to be a part of this project. -Colin and Michelle Olson, Homeowners*

## INSTALLER:



## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- North Valley

### Size (Area of Landscape)

- 2,668 Square Feet

### Roof Area

- 1,800 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 2,200 gallons



1. EXISTING RAIN BARREL



2. NEW 550 GALLON CISTERN



3. EXISTING UNDERSIZED RAIN BARRELS



4. INSTALLED 1650 GALLON CISTERN

## CHECK LIST

		EXISTING	NEW
ROOF	flat	X	
	sloped	X	
	canale	X	
	downspout		X
	pipng		
	gutters	X	X
CISTERN	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		
	manual connection		X
	hose bib		X
IRRIGATION			
	automatic drip		
	manual drip		X
	soaker hose	X	
	sprinklers		
	hand water	X	

## CHALLENGES

In preparing the level framed platform area for the 1650 gallon tank an in ground bee hive was disturbed and the installer was stung twice.

## BUDGET: \$6,254.00

Installation included two cistern tanks on level framed platforms, drip irrigation with manual connection, and flow meters on each tank to track rainwater collected used in our landscapes. An insulated box over the manual release was installed to protect against freezing winter temperatures. Existing gutters and canales were modified and replaced as needed to provide a more effective rainwater collection.



# NORTH VALLEY

Cistern: Polyethylene



## 5. GARDEN OASIS BACKYARD

### CONSIDERATIONS

1

#### PLANTING AREA

- Capturing rainwater for backyard area

2

#### PLACEMENT

- To locate tanks closest to area of use in your landscape
- Replaced undersized rain barrels in same location or nearby
- Moved work bench area to accommodate 1650 gallon tank

3

#### ROOF AREA

- Roof drains in several directions
- Decision to capture rainwater from roof areas closest to backyard area

4

#### RAINWATER ACCESS & USE

- Needed drip irrigation for flower and vegetable garden to maximize use in your landscape
- Gutters needed to be replaced

*"When I received word that my request to participate in the Rainwater Harvesting Project had been accepted, my initial reaction was disbelief and then wonderment as my imagination went wild. Finally, I would be able to utilize the volume of water I would see pouring off my attached greenhouse roof! The tank that was installed is 1650 gallons and has been full and emptied several times since its installation. I have planted an early spring garden of greens and the garlic will be harvested early summer. A second tank collects 550 gallons off the house roof and has been used to water my small pleasure, an oasis of perennial flowers." -Michelle Franklin, Homeowner*

### INSTALLER:



## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Foothills

### Size (Area of Landscape)

- 980 Square Feet

### Roof Area

- 1,000 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 1,100 gallons



1. AREA TO PLACE  
CISTERN TANK



2. LEVEL PLATFORM  
FOR TANKS



3. INSTALLED TWO TANKS  
SIDE BY SIDE

## CHECK LIST

		EXISTING	NEW
ROOF	flat		
	sloped	X	
	canale		
	downspout		X
	pipng		
CISTERN	gutters		X
	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		X
	manual connection		
IRRIGATION	hose bib		
	automatic drip		
	manual drip		X
	soaker hose	X	
	sprinklers		
	hand water	X	

## CHALLENGES

With 5' between the house and the property line, we needed a cistern tank that could fit in a narrow area.

## BUDGET: \$5,933.00

Installation included two 550 gallon cistern tanks, manual drip irrigation, and a flow meter to track water collected and used in our landscapes. New gutters were installed along garage roof to direct rainwater into tanks.



# FOOTHILLS

*Cistern: Slimline*



**4. CAPTURED RAINWATER SUPPORTING FRONT YARD LANDSCAPE**



**5. 1100 GALLONS OF RAINWATER = PUMPING LESS FRESH WATER TO SUPPORT THE LANDSCAPE**

## CONSIDERATIONS

**1**

### PLANTING AREAS

- Capturing rainwater for front yard area

**2**

### PLACEMENT

- Two side by side tanks on the north side of the property adjacent to the garage

**3**

### ROOF AREAS

- Sloped roof drained in several directions
- Capturing rainwater from half of garage roof area

**4**

### RAINWATER ACCESS & USE

- Total volume capacity of 1100 gallons
- Manual irrigation control to use captured rainwater to support front yard landscape

*"The goal of the Rainwater Harvesting Guide is to illustrate how everyday citizens in different neighborhoods throughout our community can have an impact on the amount of potable water pumped, cleansed, and conveyed to support their landscapes. The anticipated water savings shall result in lower water bills for customers. This is coupled with the environmental benefit of reducing the potable water demand for a site's landscape. In this, both water and energy are conserved."*

*- The New Mexico Water Collaborative*

### INSTALLER:



### TANK SUPPLIER:



## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Mesa del Sol

### Size (Area of Landscape)

- 400 Square Feet

### Roof Area

- 835 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 530 gallons



1. NARROW AREA FOR PLACING TANK



2. TRENCHING TO CONNECT IRRIGATION



3. TRENCH FLOODED AFTER RAIN



4. INSTALLED 530 GALLON CISTERN

## CHECK LIST

		EXISTING	NEW
ROOF	flat		
	sloped	X	
	canale		
	downspout		X
	gutters		X
CISTERN	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		X
	manual connection		
IRRIGATION	hose bib		
	automatic drip	X	
	manual drip		
	soaker hose		
	sprinklers		
	hand water	X	

## CHALLENGES

With 5' between the house and the property line, we needed a cistern tank that could fit in a narrow area.

## BUDGET: \$9,500.00

Installation included one 530 gallon cistern tank, connection to existing automatic drip irrigation, and a flow meter to track water collected and used in our landscapes. New gutters and downspouts were installed to direct rainwater into tank and gravity feed into tank.



# MESA DEL SOL

Cistern: Slimline



## 5. BEAUTIFUL, SMALL, XERIC LANDSCAPE SUPPORTED WITH RAINWATER

### CONSIDERATIONS

1

#### PLANTING AREAS

- Capturing rainwater for small front yard area
- Front yard has xeric plantings and existing drip irrigation system

2

#### PLACEMENT

- Slimline tank (18" deep) adjacent to south side of house

3

#### ROOF AREAS

- Sloped roof drained in two directions
- Decision to capture rainwater from roof area adjacent to irrigation system

4

#### RAINWATER ACCESS & USE

- Total volume capacity of 530 gallons
- Automatic system control to use captured rainwater to support front yard landscape.

*"I have been thrilled with the initiatives of The New Mexico Water Collaborative from day one. Living within the topography and climate of the New Mexico high desert, rain collection makes so much sense. The collaborative nature of the organization and its mission as outlined has been stellar. I think data will showcase further projects based on this minimal role out, will prove bountiful for a growing population. Partners onboard with keen insight and a willingness to explore, discover, learn, teach, like Heads Up Landscaping, provide a profoundly resource in this arena."*

*-Dean Savas, Homeowner*

#### INSTALLER:

growing  
better  
**Heads Up**  
LANDSCAPE | DESIGN | CONSTRUCTION | MAINTENANCE

## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Southwest

### Size (Area of Landscape)

- 468 Square Feet

### Roof Area

- 1,050 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 530 gallons



1. NARROW SPACE FOR CISTERN TANK



2. INSTALLING IRRIGATION SYSTEM



3. INSTALLING PIPING TO TANKS

## CHECK LIST

		EXISTING	NEW
ROOF	flat		
	sloped	X	
	canale		
	downspout		X
	piping		
CISTERN	gutters	X	
	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		X
	manual connection		
IRRIGATION	hose bib		
	automatic drip		X
	manual drip		
	soaker hose	X	
	sprinklers		
	hand water	X	

## CHALLENGES

With 5' between the house and the property line, we needed a cistern tank that could fit in a narrow area.

## BUDGET: \$9,105.00

Installation included one cistern tank, connection to new automatic drip irrigation, and flow meter to track water collected and used in our landscapes. Existing gutters were modified with piping to direct rainwater into tank.



# SOUTHWEST

Cistern: Slimline



4. COMPLETE INSTALLATION



5. SMALLER TANK SUITS SMALLER FRONT YARD

## CONSIDERATIONS

1

### PLANTING AREA

- Capturing rainwater for front yard area
- No existing irrigation system in place

2

### PLACEMENT

- Slimline tank fits well on the side of the house close to the front yard
- Location is near end of gutter and irrigation controls

3

### ROOF AREA

- Roof drained evenly in two directions
- Decision to capture rainwater from the roof area nearest to front yard
- Existing gutters on roof

4

### RAINWATER ACCESS & USE

- Tank capacity of 530 gallons
- Tank balances well between the water demand of the small front yard and the volume capacity in the tank

*"The Rainwater Harvesting Pilot Project has made a major impact to my property and has expanded my knowledge in how we can harvest the rain for its use on our landscape for a sustainable period of time. With what little rain we assume to get I would have never thought that half my roof would divert more than 500 gallons of water in one rainfall and in normal cases be washed down the street not to be used. Having the gutter diverted to the cistern has also solved the erosion problem on my property since I live on sloped property and most of the water is diverted to the neighbor or the street." -Mario Herrera, Homeowner*

INSTALLER:

growing  
better  
**Up Heads**  
LANDSCAPE | DESIGN | CONSTRUCTION | MAINTENANCE

TANK SUPPLIER:

**Bushman**  
WATER STORAGE PRODUCTS





# BUSINESS

## RAINWATER HARVESTING SYSTEMS

- Cistern: Galvanized Metal
  - Urban Fresh Cosmetics .....25
- Cistern: Underground Polyethylene
  - Rio Grande Food Project .....27



## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- East Downtown

### Size (Area of Landscape)

- 1,137 Square Feet

### Roof Area

- 1,225 Square Feet

### Above/Below Grade

- Above Ground Cistern Tanks

### System Capacity

- 1,000 gallons



1. LOCATE TANK NEAR THE ENTRANCE



2. DELIVERY OF METAL TANK



3. PREPARING AREA FOR TANK



3. INSTALLED 1000 GALLON CISTERN TANK

## CHECK LIST

		EXISTING	NEW
ROOF	flat	X	
	sloped		
	canale		
	downspout		X
	piping		
CISTERN	gutters		
	above		X
	below		
	pump inside tank		
	pump outside tank		X
	flow meter		X
	automatic connection		X
	manual connection		
IRRIGATION	hose bib		
	automatic drip	X	
	manual drip		
	soaker hose	X	
	sprinklers		
	hand water	X	

## CHALLENGES

The building footprint occupied most of the site area leaving few options for the cistern tank placement.

## BUDGET: \$12,600.00

Installation included one 1000 gallon cistern tank, metal downspouts, connection to automatic drip irrigation system, and a flow meter to track water collected and used in our landscapes.



# URBAN FRESH COSMETICS

*Cistern: Galvanized Metal*



## 4. BUSINESS SITES ARE GREAT OPPORTUNITIES FOR RAINWATER CAPTURE AND USE IN OUR LANDSCAPES

### CONSIDERATIONS

1

#### PLANTING AREA

- Capturing rainwater for front and side landscape areas of business

2

#### PLACEMENT

- Galvanized metal tank placed near existing downspout
- Owner wanted cistern tank to be highly visible from the street

3

#### ROOF AREA

- Extensive roof areas drained in several directions
- Capturing rainwater from roof area near front of business, adjacent to downspout

4

#### RAINWATER ACCESS & USE

- Total volume capacity of 1000 gallons
- Automatic irrigation control to use captured rainwater to support front and side landscape areas

*"Capturing and storing rainwater from your roof provides a wonderful opportunity to reduce how much treated, fresh water is pumped to support your landscape."*

*Rainwater is much better for your plants than treated water. It is possible to maintain a beautiful xeric landscape while maximizing your conservation efforts."*

*-Katherine Yuhás, Water Conservation Officer, Albuquerque Bernalillo County Water Utility Authority*

INSTALLER:

HarvestH2o.com

## AREA MAP



## SYSTEM INFORMATION

### Area of Town

- Southwest

### Size (Area of Landscape)

- 3,100 Square Feet

### Roof Area

- 5,000 Square Feet

### Above/Below Grade

- Below Ground Cistern Tanks

### System Capacity

- 5,100 gallons



1. EXCAVATION FOR TANKS



2. EACH TANK HAS 1700 GALLON CAPACITY



3. TANKS PLACED SIDE BY SIDE

## CHECK LIST

		EXISTING	NEW
ROOF	flat	X	
	sloped		
	canale		
	downspout		
	piping	X	
CISTERN	gutters		X
	above		
	below		X
	pump inside tank		X
	pump outside tank		
	flow meter		X
	automatic connection		
	manual connection		X
IRRIGATION	hose bib		
	automatic drip		
	manual drip	X	
	soaker hose		
	sprinklers		
	hand water	X	

## CHALLENGES

The roof was designed with drainage areas to an internal piping system instead of rainwater coming off of the roof in a downspout or gutter. The point at which the rainwater came out of the building was 18" above the ground. This meant we could not gravity feed rainwater into an above ground system, hence the below ground system.

## BUDGET: \$13,853.00

Installation included three 1700 gallon cistern tanks in a below ground system, connecting to existing drip irrigation, and a flow meter to track rainwater collected and used in our landscapes. New gutters were installed to maximize rainwater harvesting from roof areas without internal drainage. The water level in equalized tanks is determined with a wood dipstick, to indicate water volume in tanks.



# RIO GRANDE FOOD PROJECT

*Cistern: Underground Polyethylene*



We partnered with US Fish & Wildlife Partners Program and the Querencia Institute's Agua es Vida students to provide hands on learning about the installation of rainwater harvesting systems. For more information see: [www.querencia-institute.org](http://www.querencia-institute.org)



4. AGUA ES VIDA STUDENTS DIGGING TRENCHES



5. GREAT STAFF AND VOLUNTEERS



6. GROWING PRODUCE TO FEED THE HUNGRY

## CONSIDERATIONS

1

### PLANTING AREA

- An existing vegetable garden was located near the area of roof collection

2

### PLACEMENT

- Tanks located near exit point of rainwater from the building
- Tanks located between the building and vegetable garden

3

### ROOF AREA

- Roof drains internally; a below ground system was required

4

### RAINWATER ACCESS & USE

- Total volume capacity of 5100 gallons
- Captured rainwater will support the vegetable garden during the growing season

*"As the largest food pantry on Albuquerque's Westside, Rio Grande Food Project fed over 46,000 hungry New Mexicans last year, and in the summer months, thanks to our rainwater harvesting system, and our volunteers, we were able to supplement food boxes with fresh, healthy produce from our community garden. The water collected in the catchment tank allowed us to expand our garden yield while decreasing our dependence on city municipal water. We are conserving water and better meeting our mission."*

*-Ariel Herring, Executive Director*

INSTALLER:







# THINGS TO CONSIDER

## RAINWATER HARVESTING SYSTEMS

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# THINGS TO CONSIDER

## harvest rainwater

### 1 PLANTING AREAS

#### BEFORE YOU START - BUSINESS SITE SYSTEMS

Confirm stormwater permitting requirements in your municipality. This means identifying volume of stormwater (roof runoff and surface runoff) that must be retained on site.

1. Where are your planting areas?

Locate the planting areas of your site.

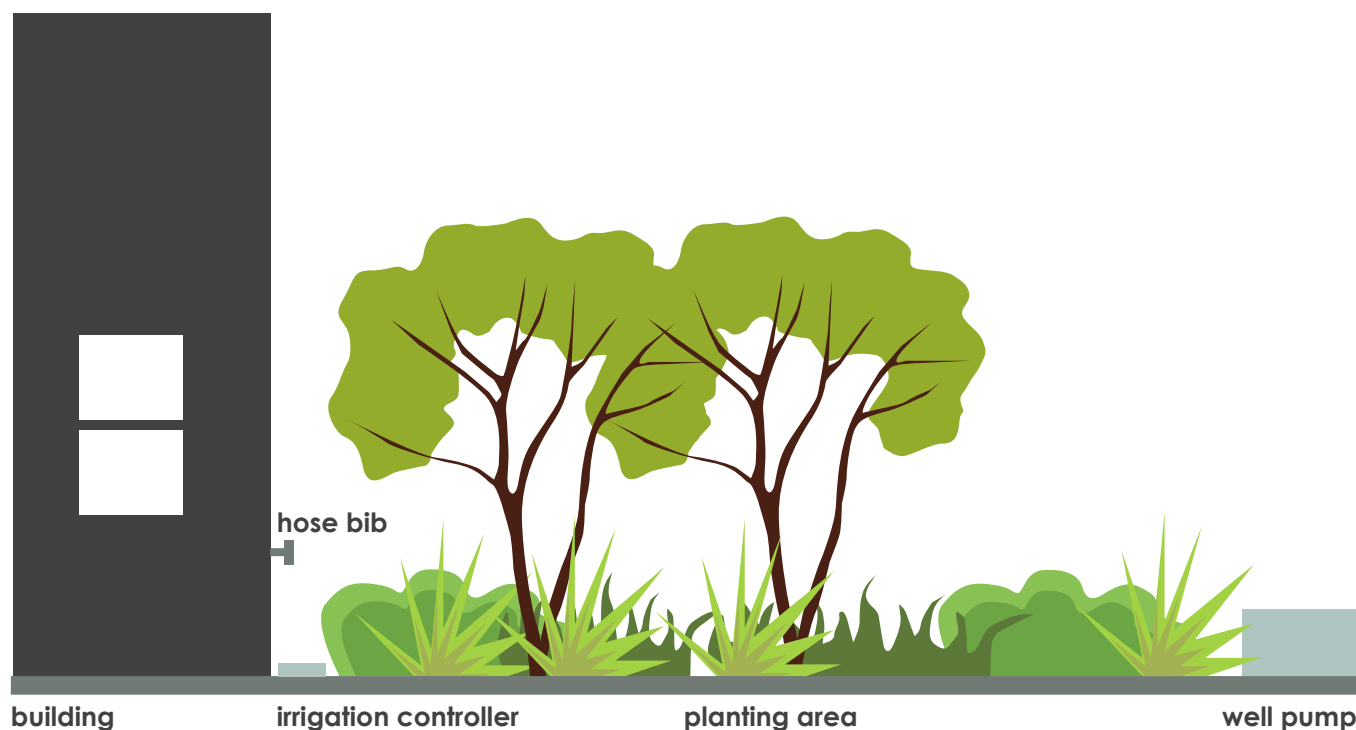
2. What is your water source?

For example: hose bib, well pump, automatic irrigation, water meter, irrigation controller

3. Where is your water source located?

4. How will you irrigate?

Options include: automatic drip, soaker hose, flood, or hand watering.







## 2 ROOF AREA

### 1. What is your roof area (square feet)?

You can obtain this information by:

- ▼ Measuring the outside perimeter of your dwelling.
  - ▼ Reviewing the survey of your dwelling. This often has the perimeter dimensions.
- OR
- ▼ Reviewing the site plan for new construction.

### 2. In which direction does your roof drain?

One side? Multiple sides? (*See diagram below*)

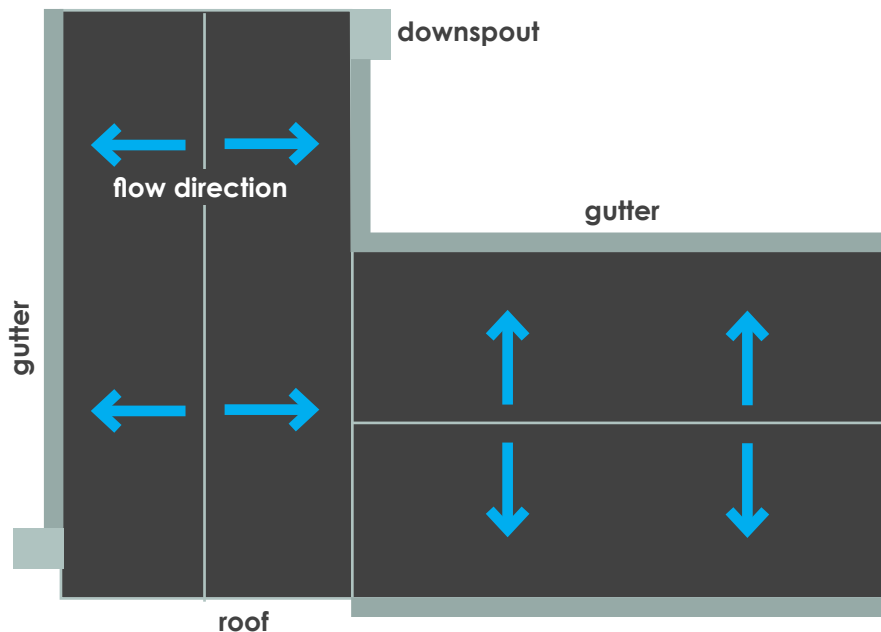
### 3. How does your roof drain?

Via canals, downspouts, gutters or pipes.

### 4. Is there an area(s) that drain(s) towards the general area(s) with planting?

If yes, determine square footage of roof area draining there.

See page 34 to calculate how much rainwater you could store.



# THINGS TO CONSIDER

## harvest rainwater

### 3 PLACEMENT

#### 1. Where to place the cistern?

Above or below ground? Ideally, you want to capture and store the rainwater close to where the water falls from the roof. There are times when this is not possible.

▼ See examples of cisterns above ground on pages 9-25, and 27 for an underground cistern.

#### 2. What kind of cistern do you need?

There are a variety of cistern types shown in this guide. Refer to the following types:

▼ Polyethylene (plastic) cistern, pages 9-15.

These come in a variety of diameters and heights.

▼ Slimline cistern, pages 17-21.

These are great when you don't have much room. They generally measure 2' deep.

▼ Galvanized metal cistern, page 25.

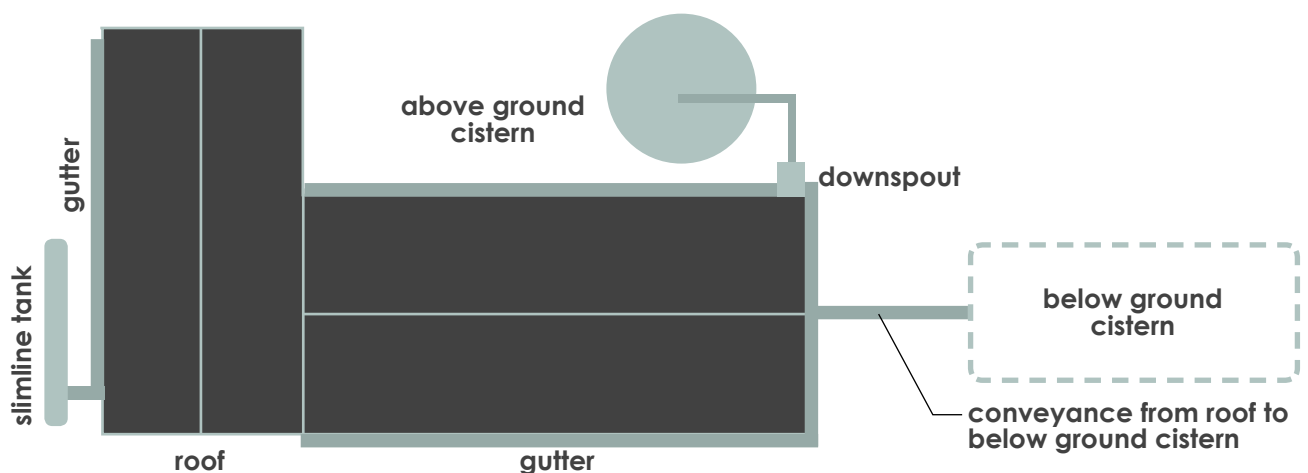
This type of tank can compliment your building design with an industrial or more contemporary look.

▼ Underground polyethylene (plastic) cistern, page 27.

This solution may be an option under driveways and parking areas if you have space constraints or plan to capture and store larger amounts of water.

See Cistern Reference Guide, page 35, to help select the best tank.

#### 3. If it's not obvious where you could place a cistern, a water management professional can help you assess the options. See page 41 for recommended professionals.





# 4 RAINWATER ACCESS & USE

### 1. Questions to consider:

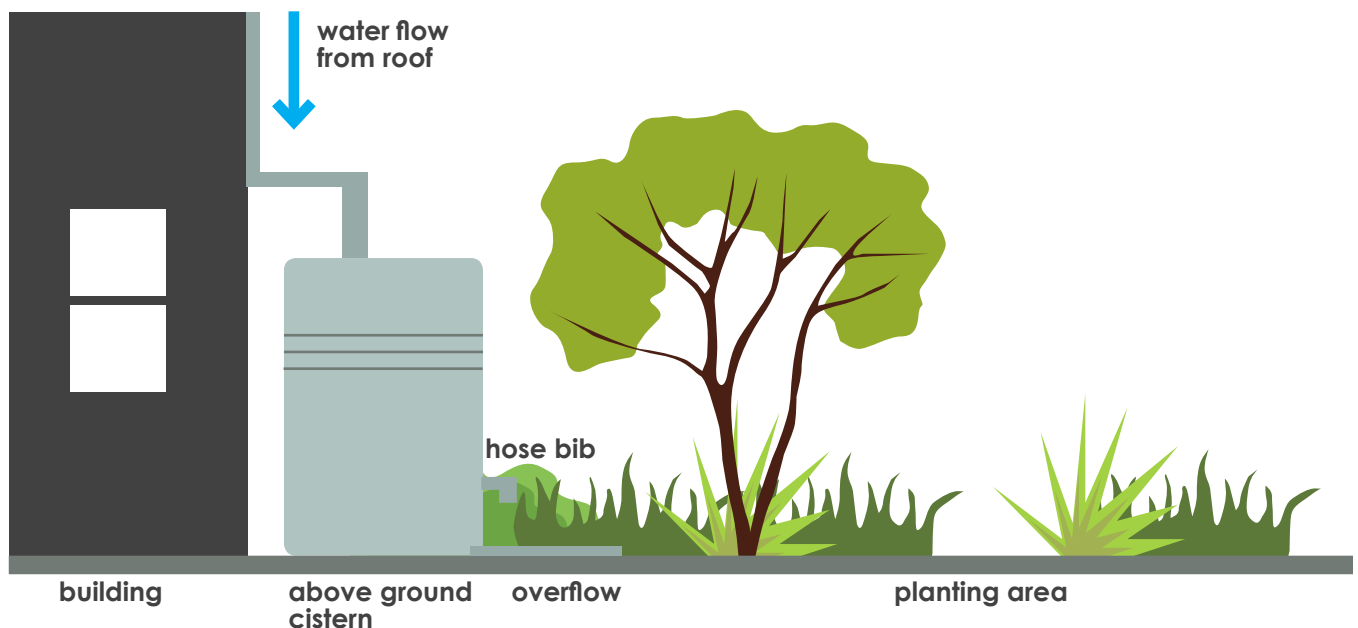
Existing planting areas:

- ▼ If you have an automated irrigation system, will the system have an automated connection to the cistern? See pages 9, 11, 17, 19, 21, 25 for examples of automated systems.
- ▼ Or, would you prefer a manual connection (hose bib to turn off yourself)? See pages 13, 15, 27 for examples of manually controlled systems.
- ▼ For businesses, coordinate between landscape designer, civil engineer and cistern installer.

### 2. Overflow?

What if my cistern fills up and it's still raining? Where does the water go?

- ▼ It's important for the overflow to drain away from any structures, and when possible into passive water harvesting areas. This is where consulting with a water management professional (see page 41) can be helpful.





# CISTERN & LANDSCAPE CALCULATIONS

## WATER SUPPLY: What size of cistern do I need?

### Calculation:

Annual Rainfall (feet)\* x Roof Area (Square Feet) x .623 = \_\_\_\_\_ gallons

(\*Albuquerque Area = 8.67"(.7225 feet) of annual rainfall)

Example: .7225 feet x 1400 square feet x .623 = 630 gallons

This calculator is provided for general guidance only. Design and installation of Rainwater Harvesting facilities should be based on site-specific conditions and technical expertise.

## WATER DEMAND: How much water does my landscape need?

### Landscape Calculation

(LWU = Low Water Use, MWU = Medium Water Use, HWU = High Water Use)

Water demand is based on plantings irrigated with drip or minimal handheld irrigation; if you intend to irrigate larger areas or a vegetable garden, you will need a larger catchment area and larger storage capacity. See Appendix A and B (page 39 and 40) for instructions and blank worksheet.

#### Trees

Month	Seasonal Factor (Albuquerque Area)	# trees LWU	LWU Gallons per Week	Total LWU Gallons per Week	# trees MWU	MWU Gallons per Week	Total MWU Gallons per Week	# trees HWU	HWU Gallons per Week	Total HWU Gallons per week	Total Gallons per month
January	0.37	2	8	5.92	3	12	13.32	1	20	7.4	115.35
February	0.40	2	8	6.4	3	12	14.4	1	20	8	124.70
March	0.52	2	8	8.32	3	12	18.72	1	20	10.4	162.12
April	0.54	2	8	8.64	3	12	19.44	1	20	10.8	168.35
May	0.63	2	8	10.08	3	12	22.68	1	20	12.6	196.41
June	0.61	2	8	9.76	3	12	21.96	1	20	12.2	190.17
July	1.38	2	8	22.08	3	12	49.68	1	20	27.6	430.23
August	1.46	2	8	23.36	3	12	52.56	1	20	29.2	455.17
September	0.96	2	8	15.36	3	12	34.56	1	20	19.2	299.29
October	0.88	2	8	14.08	3	12	31.68	1	20	17.6	274.35
November	0.46	2	8	7.36	3	12	16.56	1	20	9.2	143.41
December	0.46	2	8	7.36	3	12	16.56	1	20	9.2	143.41
	* 8.67		Total LWU	138.72		Total MWU	312.12		Total HWU	173.4	Total Months 2702.96
										Gallons per Year	2702.96

#### Other Plants (includes shrubs, perennials, ornamental grasses and cactus)

Month	Seasonal Factor (Albuquerque Area)	# Other Plants LWU	LWU Gallons per Week	Total LWU Gallons per Week	# Other Plants MWU	MWU Gallons per Week	Total MWU Gallons per Week	# Other Plants HWU	HWU Gallons per Week	Total HWU Gallons per week	Total Gallons per month
January	0.37	14	1	5.18	4	2	2.96	1	4	1.48	41.65
February	0.40	14	1	5.6	4	2	3.2	1	4	1.6	45.03
March	0.52	14	1	7.28	4	2	4.16	1	4	2.08	58.54
April	0.54	14	1	7.56	4	2	4.32	1	4	2.16	60.79
May	0.63	14	1	8.82	4	2	5.04	1	4	2.52	70.93
June	0.61	14	1	8.54	4	2	4.88	1	4	2.44	68.67
July	1.38	14	1	19.32	4	2	11.04	1	4	5.52	155.36
August	1.46	14	1	20.44	4	2	11.68	1	4	5.84	164.37
September	0.96	14	1	13.44	4	2	7.68	1	4	3.84	108.08
October	0.88	14	1	12.32	4	2	7.04	1	4	3.52	99.07
November	0.46	14	1	6.44	4	2	3.68	1	4	1.84	51.79
December	0.46	14	1	6.44	4	2	3.68	1	4	1.84	51.79
	* 8.67		Total LWU	121.38		Total MWU	69.36		Total HWU	34.68	Total Months 976.07
										Gallons per Year	976.07

This table is for general guidance only. Site-specific irrigation demands may also be calculated by other methods, or as recommended by local water management professionals.

# CISTERN REFERENCE GUIDE

Your choice of cistern should take into account:

▼ **Area available to locate cistern:**

Will it be above or below ground?

▼ **Capacity of cistern:**

How many gallons can it hold?

▼ **Finish color of home or business:**

Stucco, brick, siding, or concrete block.

▼ **Scale of home or business:**

One story versus three stories.

▼ **Cistern material options:**

Color, size, and scale options.

▼ **Overflow area:**

Where will the overflow go? Can it be directed to a planting area?

▼ **Gutters and Downspouts:**

Material and color options.

## Cistern Options







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**Automatic connection:** Refers to the either the irrigation or hose connection to the cistern operated with an automated irrigation controller.

**Cistern:** A receptacle for holding water or other liquid, especially a tank for catching and storing rainwater.

**Downspout:** A downspout drains all roof runoff water directly out of the pipe into the rainwater harvesting tank.

**Drip irrigation:** An irrigation system in which water is applied directly to the root zone of plants by means of applicators (emitters, porous tubing, perforated pipe, etc...) operated under low pressure.

**First Flush System:** A device or length of capped pipe that diverts the dirtiest or foulest first flush of water running off a catchment surface away from a cistern.

**Flow meter:** A device that measures the amount of water flowing through a pipe.

**Gutter:** a long hollow device that is attached beneath the edge of a roof to catch and carry rain water off of the building.

**Hose bib:** An outdoor water faucet, or shut off valve, that controls the release of water.

**Manual connection:** Refers to the either the irrigation or hose connection to the cistern operated manually.

**Overflow:** The planned and stabilized exit route for excess water from a water harvesting tank.

**Overflow water:** Excess water exceeding the storage capacity of a water harvesting tank.

**Passive water harvesting:** Low point areas in the landscape to contain waters until they can naturally be absorbed into the land.

**Rainwater Harvesting:** The collection and storage of rainwater (precipitation) for use in our landscapes.

**Roof Runoff:** Rainwater that flows off of a roof surface.

**Soaker hose:** A garden hose with small pores that allow water to seep into the ground to water roots of plants.

**Sprinklers:** A device that sprays water and is usually used for watering lawns.

**Stormwater:** Rainwater once it has landed on a surface.

**Sustainable:** Pertaining to a system that meets the needs of the present without compromising the ability of future generations to meet their own needs.

**Swale:** A gently sloping drainage way that moves water slowly downslope across landscape, while simultaneously allowing some of it to infiltrate into the soil.

**Water footprint:** The water footprint is an indicator of freshwater use that looks at both direct and indirect water use of a consumer or producer. The water footprint of an individual, community or business is defined as the total volume of freshwater that is used to produce the goods and services consumed by the individual or community or produced by the business.

**Well:** A human-made hole in the earth from which groundwater is withdrawn.

**Xeriscape:** Landscaping concept that requires less water for vegetation that is suited to soils and climate.

# "Thank You" to Our Elected Representatives!

The Water Authority and the New Mexico Water Collaborative wish to thank our rainwater harvesting sponsors on the Bernalillo County Commission:



## Art De La Cruz - District 2

Commissioner De La Cruz, a lifelong South Valley resident, currently serves as Chair of the County Commission. A former collegiate wrestler, he spent 25 years as a county employee before retiring and being elected to office. While serving as Director of Bernalillo County Parks and Recreation, he brokered the Mesa Del Sol Regional Park project and instituted a variety of youth activities at local community centers.

As a longtime member of the Water Authority governing board (where he currently serves as vice chair), Commissioner De La Cruz recognizes the need for initiatives such as rainwater harvesting.

"In a desert community like this, we must make full use of every drop that Mother Nature provides," he says. "As someone who grew up on a farm and who still lives on the family homestead, I know how valuable rainfall can be, and I encourage everyone to capture it and use it to full advantage."



## Debbie O'Malley - District 1

Commissioner Debbie O'Malley got her start in public service more than 20 years ago, when she was a neighborhood leader working for redevelopment of her historic working-class community. She went on to serve nine years as an Albuquerque City Councilor, focusing on public safety, workforce housing, and neighborhood planning and revitalization. She was also the founder and first executive director of the Sawmill Community Land Trust, spearheading the planning and development of the nationally acclaimed Arbolera de Vida revitalization project.

Commissioner O'Malley currently serves on the Water Authority's governing board, where she has developed a deep appreciation of the water issues we face.

"Harvesting rainwater is more than a great way to save dollars on your water bill," she says. "It's a great way to help your community in its pursuit of water sustainability. Every drop you don't take from the tap is a drop that's being saved for the future."



## LANDSCAPE CALCULATIONS WORKSHEET INSTRUCTIONS

### STEP 1

Determine how many trees you have in your landscape or design and their water demand of LWU = low water use, MWU = medium water use, HWU = high water use. Enter the quantity by water use in each month of the year.

### STEP 2

Multiply the number of Trees and Other Plants by gallons per week. Take that number, and multiply by the Seasonal Factor of the Month you are calculating. This is your Total Gallons per Week.

### STEP 3

Now add the Totals of LWU, MWU and HWU Gallons per Week for the Total Gallons per Month. Add the Total Gallons per Month to determine how many Gallons per Year are needed to support your landscape.

### STEP 4

Now look at the number of Total Gallons per Month for the month of August. Multiply this figure by 80%. This is an approximate cistern capacity needed to support your landscape.  
Example:  $500 \text{ (total in August)} \times .80 = 400 \text{ gallons}$

#### Trees

Month	Seasonal Factor (Albuquerque Area)	# trees LWU	LWU Gallons per Week	Total LWU Gallons per Week	# trees MWU	MWU Gallons per Week	Total MWU Gallons per Week	# trees HWU	HWU Gallons per Week	Total HWU Gallons per week	Total Gallons per month
January	0.37		8			12			20		
February	0.40		8			12			20		
March	0.52		8			12			20		
April	0.54		8			12			20		
May	0.63		8			12			20		
June	0.61		8			12			20		
July	1.38		8			12			20		
August	1.46		8			12			20		
September	0.96		8			12			20		
October	0.88		8			12			20		
November	0.46		8			12			20		
December	0.46		8			12			20		
Total											Total Gallons per Year

#### Other Plants (includes shrubs, perennials, ornamental grasses and cactus)

Month	Seasonal Factor (Albuquerque Area)	# Other Plants LWU	LWU Gallons per Week	Total LWU Gallons per Week	# Other Plants MWU	MWU Gallons per Week	Total MWU Gallons per Week	# Other Plants HWU	HWU Gallons per Week	Total HWU Gallons per week	Total Gallons per month
January	0.37		1			2			4		
February	0.40		1			2			4		
March	0.52		1			2			4		
April	0.54		1			2			4		
May	0.63		1			2			4		
June	0.61		1			2			4		
July	1.38		1			2			4		
August	1.46		1			2			4		
September	0.96		1			2			4		
October	0.88		1			2			4		
November	0.46		1			2			4		
December	0.46		1			2			4		
Total											Total Gallons per Year



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- 3) \$25 each for purchase of rain sensors, pressure regulation valves and pressure vacuum break (PVB) backflow prevention valves
- 4) Up to \$150 for installation of rain barrels and cisterns, depending on size of reservoir installed
- 5) \$2 per head for multi-stream rotor sprinkler heads
- 6) 25% (up to \$100) off the cost of compost and 25% (up to \$50) for turf removal equipment for xeriscape program participants
- 7) Up to \$100 per toilet for installation of approved high-efficiency models (1.28 gallons or less/flush)
- 8) \$10 apiece for purchase of approved shower heads
- 9) \$100 for purchase of an approved high-efficiency washing machine
- 10) \$25 for purchase of an evaporative cooler thermostat
- 11) \$100 for purchase of a hot-water recirculation system



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